

PRIMA K and PRIMA P Series

Operating manual



Use and maintenance instructions

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1 GENERAL RULES

Carefully read the warnings listed below as they provide important information regarding the rules for installation, use and maintenance.

Please keep this manual carefully for further reference.

1.1 Shipping and transporting the pump

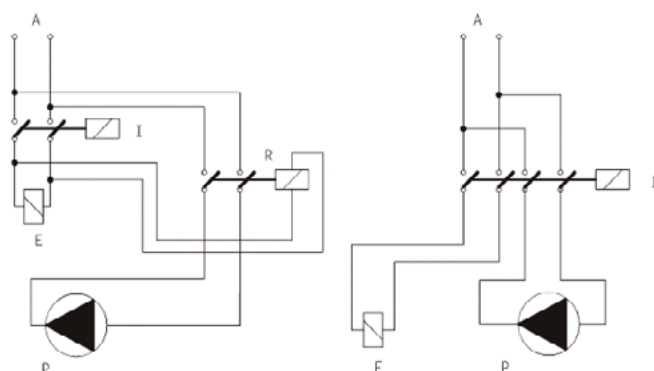
The equipment must be transported in its original packaging, organized and built in such a way as to minimize shocks and to protect the protruding parts that can be damaged. If there is a need for transport after the equipment has already been installed (e.g. for a return for repair or replacement), reuse the original packaging or a sufficiently sturdy packaging with the equipment protected with absorbent material (eg bubble wrap). The external packaging must be such as to ensure the safety of the equipment in the event of a fall from 1 meter in height.

1.2 Installation standards

Install the dosing pump so that it is easily accessible whenever maintenance is required. Never obstruct the place where the dosing pump is located. The servicing and maintenance of the dosing pump and all its accessories must always be carried out by qualified personnel. STURDOS cannot be held responsible for damage to persons or things caused by poor installation or incorrect use of the dosing pump.



Check that the ground is fully functional and corresponds to the regulations in force. Make sure there is a high sensitivity differential switch (0.03 A). Check that the pump ratings are compatible with those of the mains supply. Never install the pump directly in parallel with inductive loads (eg motors / solenoid valves) but if necessary use an "insulation relay". Inside the pump there are two protections: a varistor and a fuse.



P: dosing pump

R: relay

I: Switcher or multi-pole security device

E: Motor or generally inductive charge

A: supply voltage

1.3 Proper use of the pump

The use of this pump must comply with the methods and instructions set out in this manual. The pump can dose chemicals that can be harmful to human health and for this reason it is essential that must be used by qualified personnel who adopt the appropriate safety methods and personal protective equipment.

AVOID IMPROPER USE of the equipment in order to avoid damage to things and people, due to uncontrolled splashes, drips, electrical contacts, etc.

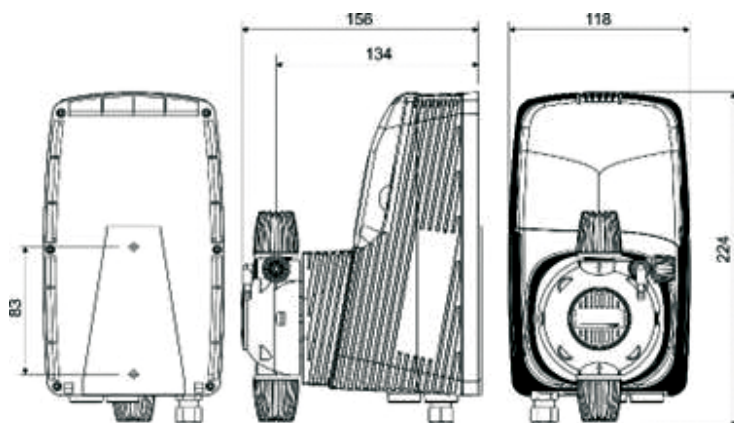
The following uses can be considered improper uses, in indicative and non-exhaustive form:

- Dosing of products not consistent with the materials with which the pump is made
- Dosing of explosive and / or flammable products
- Dosing of fluids with excessive viscosity (1000 cps), such as to prevent the priming of the pump itself
- Dosage of food liquids, if intended to maintain such use
- Avoid inverting the pump delivery and suction
- Avoid powering the pump with voltages other than those indicated in the technical specifications
- Avoid connecting any equipment other than specific equipment to the signal outputs (level, pulse counter, current signal, etc.)

2 OPERATION

PRIMA K Model and PRIMA P Model analogue pumps are solenoid driven dosing pumps that can operate at constant flow (K version) or at proportional flow according to an external signal (P version). Depending on the model, there may be: a BNC connector for connecting a level sensor and / or a 4-pole connector for connection to a current signal (mA) or from a pulse-emitting water meter.

2.1 Overall dimensions



2.2 Technical features

Power supply: 100÷240VAC $\pm$ 10% – 50/60Hz

Insulation Class: CLASS I

Absorbed power: see “2.3 - Hydraulic Features”

Fusible: 2 A – RIT

Protection Grade: IP65

Environmental conditions: Closed environment, altitude up to 2000m, room temperature from 5°C up to 40°C, maximum relative humidity 80% (linearly decreases until it is reduced to 50% at 40°C).



The equipment, subject to this document, are not intended to be installed and used in explosive atmosphere environments. It isn't an ATEX pump.

2.3 Hydraulic features

• Hydraulic characteristics of the 230V version

Model	Mode	Flow Rate	Pressure	Strokes	Injection value	Absorbed power
		l/h	bar	spm	ml/stroke	Watt
60	L	1	7	100	0,17	13
		5	1		0,83	13
	M	3	7	150	0,33	16
		9	1		1	16
	H	5,5	6	180	0,51	22
		10	1		0,93	22
70	L	1,8	20	75	0,40	18
		4	1		0,89	18
	M	4	12	120	0,56	25
		7	1		0,97	25
	H	5,8	9	180	0,54	27
		14	1		1,30	27
80	L	4	20	150	0,44	24
		10	1		1,11	24
	M	6,5	12	200	0,54	27
		13	1		1,08	27
	H	13,5	5	300	0,75	35
		20	1		1,11	35

The above data refer to tests carried out with water at room temperature. Values can fluctuate by 10%.

With chemical products with a different viscosity than that of water, the flow rate data may undergo even sensitive variations.

• Hydraulic characteristics of the 110V version

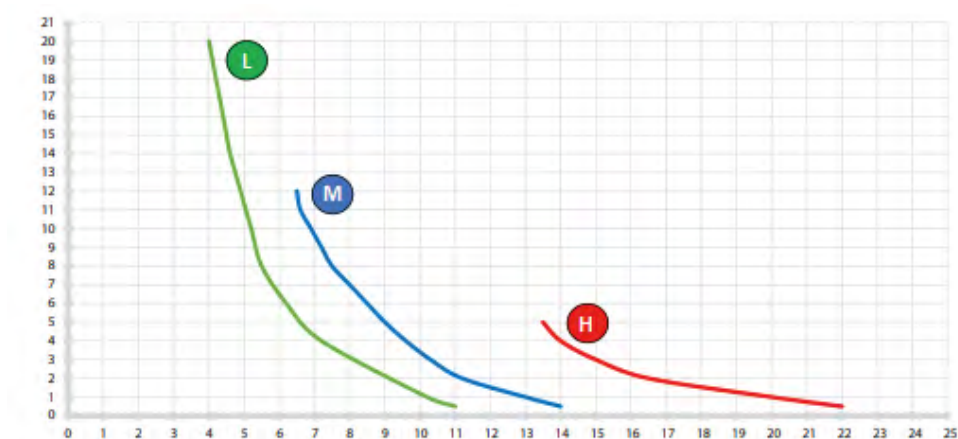
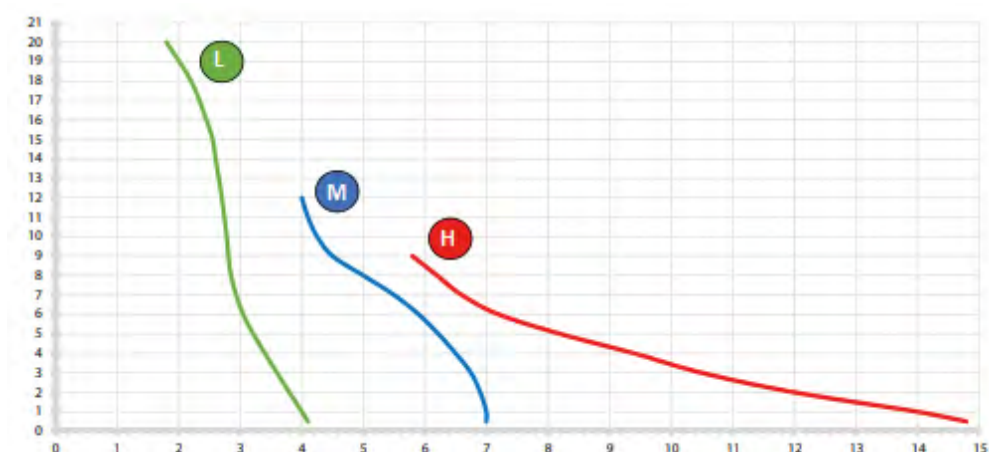
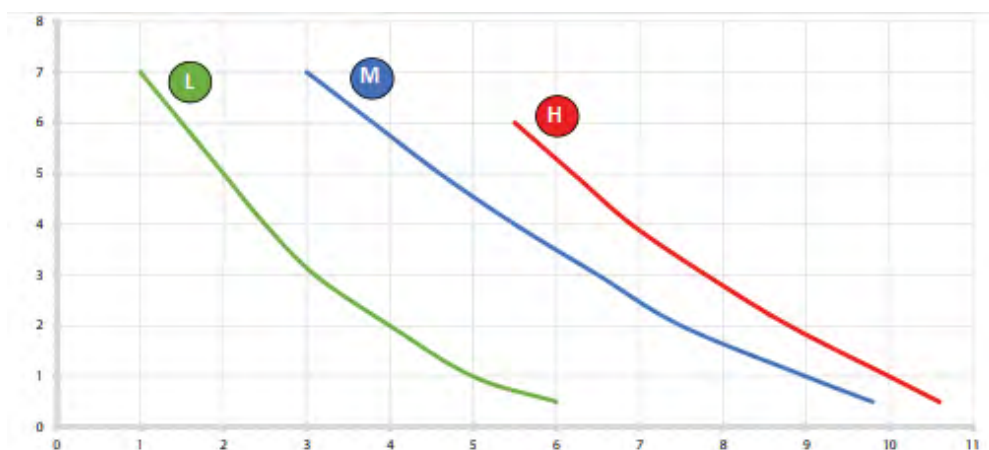
Model	Mode	Flow Rate	Pressure	Strokes	Injection value	Absorbed power
		l/h	bar	spm	ml/stroke	Watt
60	L	1,5	7	100	0,25	18
		5	1		0,83	18
	M	4,5	7	150	0,5	23
		7	1		0,78	23
	H	6	6	180	0,56	28
		8,8	1		0,81	28
70	L	1	20	75	0,22	21
		4,5	1		1	21
	M	4	12	120	0,56	31
		7	1		0,97	31
	H	6,8	9	180	0,63	41
		10,8	1		1	41
80	L	3	17	150	0,33	27
		10	1		1,11	27
	M	7,5	12	200	0,63	36
		13	1		1,08	36
	H	11	5	230	0,80	44
		16	1		1,16	44

The above data refer to tests carried out with water at room temperature. Values can fluctuate by 10%.

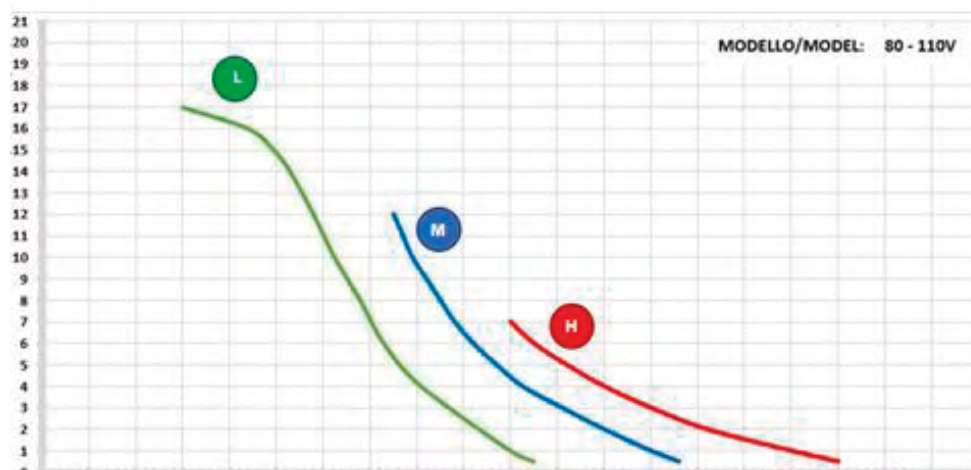
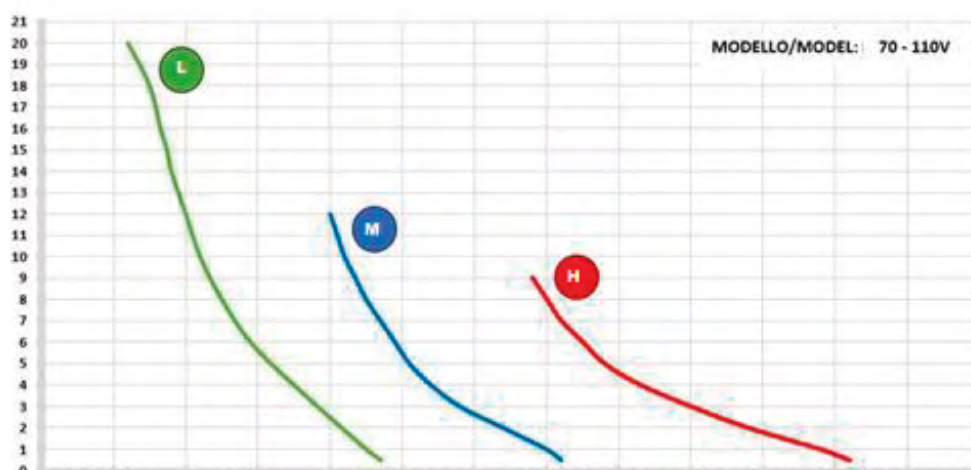
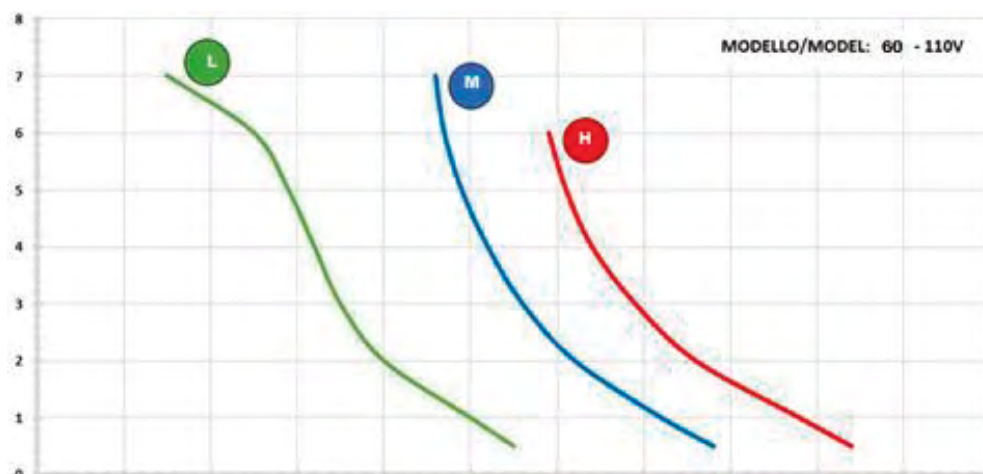
With chemical products with a different viscosity than that of water, the flow rate data may undergo even sensitive variations.

2.4 Performance graphs

- Performance curve for 230V



• Performance curve for 110V



2.5 Content of the package

- PRIMA pump
- User's manual
- Injection valve PP-GL-VT (PVDF-CE-VT only for P model)
- Foot filter PP-GL-VT (PVDF-CE-VT only for P model)
- 2 meters PE discharge tube
- 2 meters PVC suction tube
- 2 meters PVC bleed valve tube (2 m)
- Fixing bracket
- Set of screws and plugs for wall mounting

3 PRIMA K

3.1 Prima K Pump controls

PRIMA K pump control panel looks like this:



- 1.Green/RedLED Stand-by/Pulse
- 2.Green LED stroke frequency scale;
- 3.Function/Enter button
- 4.Strokes frequency hand knob
- 5.Pump performances selector

3.2 PRIMA K operating mode

The pump can work in the following mode:

On-Off Mode:

the pump doses at a constant frequency based on the percentage set using the strokes frequency knob (4) When it turns on for the first time the pump is set, by default, in Stand by (green LED (1)steady) with 100% scale frequency (green LED (2)steady).

To activate the pump, press and hold the SET (3) button for 2 seconds, the pump will start to work (red LED (1) flashing) at the frequency set using the hand knob (4); to stop the pump press and hold the SET button for 2 seconds.

To change the scale frequency from 100% to 20% press SET (3) button; ATTENTION: the selection of the frequency scale can be performed only when the pump is in stand-by mode.

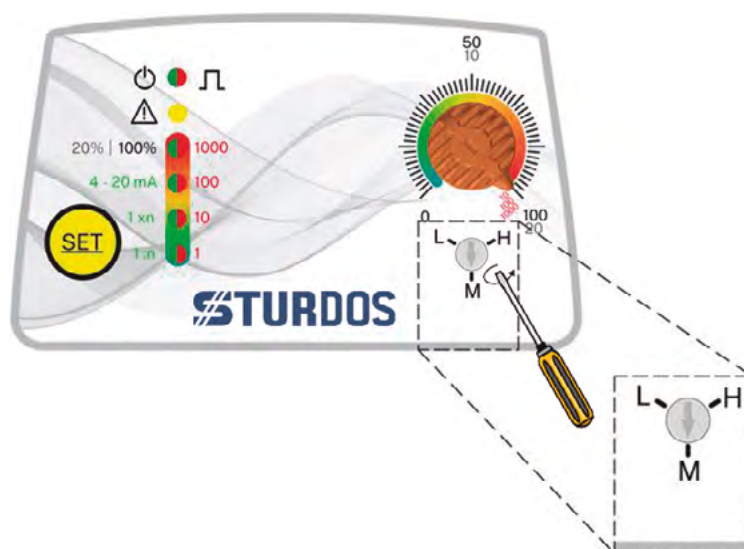


NOTE: after a power failure the pump will return to the state prior to the power failure (Eg: if the pump was operating at the time of the power failure, on its return, the pump will continue working).

3.3 Modification of pump performance

PRIMA pumps are equipped with a selector (5) on the control panel which allows greater flexibility in the choice of the performances obtainable from the pump. The function of the selector is described below:

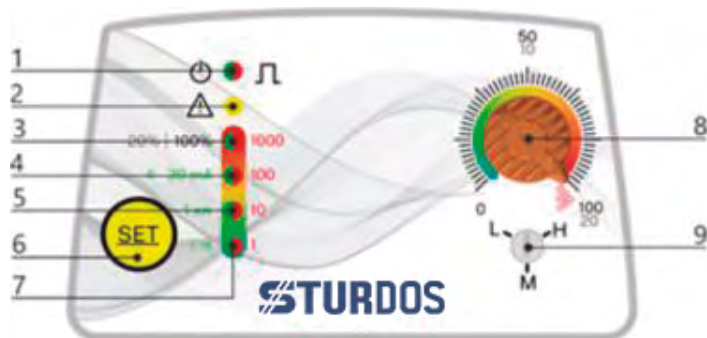
1. Switch off the dosing pump;
2. By means of a flat screwdriver, rotate the selector from its actual position to the desired one (L-M-H), each one corresponding to the datas of "2.3 - HYDRAULIC FEATURES" on pag. 21, depending on pump model chosen (model 60, 70 or 80);
3. Switch on the dosing pump.



4 PRIMA P

4.1 PRIMA P pump controls

PRIMA P pump control panel looks like this:

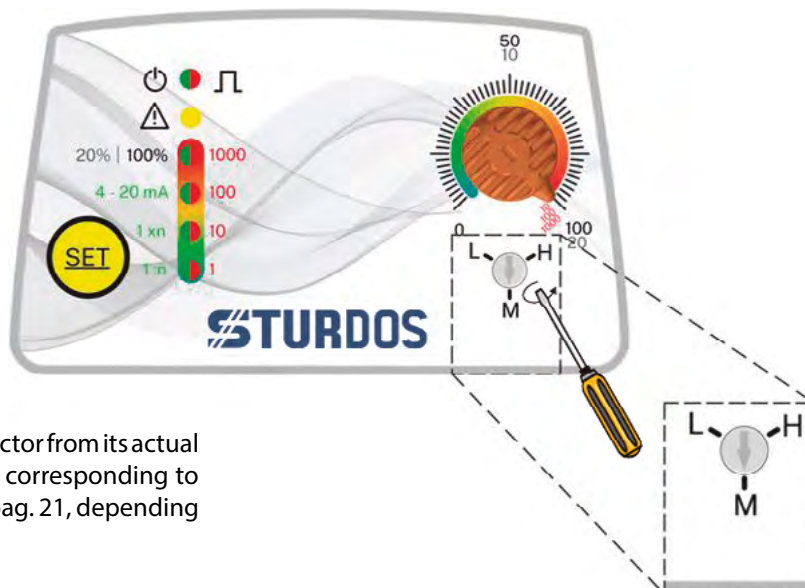


1. Green/Red LED, Stand-by/Pulse;
2. Orange LED, Level alarm;
3. Green/Red LED, frequency scale (green), divider 1:1000 (red);
4. Green/Red LED, 4-20mA signal (green), divider 1:100 (red);
5. Green/Red LED, multiplier (green), divider 1:10 (red);
6. Function/Enter button;
7. Red LED, divider 1:1;
8. Strokes frequency hand knob/multiplier-divider scale 1/10/100/1000;
9. Pump performances selector

4.2 Modification of pump performance

PRIMA P is equipped with a selector (9) on the control panel which allows greater flexibility in the choice of the performances obtainable from the pump.

The function of the selector is described below:



1. Switch off the dosing pump;
2. By means of a flat screwdriver, rotate the selector from its actual position to the desired one (L-M-H), each one corresponding to the data of "2.3 -HYDRAULIC FEATURES" on pag. 21, depending on pump model chosen (model 60, 70 or 80);
3. Switch on the dosing pump.

4.3 PRIMA P operating mode

The pump can operate in one of the following modes, which can be selected by pressing the SET button:



1. When it turns on for the first time the pump is set, by default, in Stand-by (green LED (1) steady) with 100% scale frequency (green LED (3) steady), press SET button to move to the next function;

2. Green LED flashing (3), 20% scale frequency, this means the function it has been selected. It is now possible to obtain a more precise adjustment of the percentage of strokes using the hand knob (8) is used, press the SET button to move to the next function;

3. Green LED (4) steady, 4-20mA proportional functioning: the mA current supplied to the pump (via an input signal) will determine the proportional dosage. By means the hand knob (8) it is possible to set the max frequency of the pump (in percentage) associated to the maximum mA current value (which it is 20 mA) (ex.: hand knob (8) set on 50%, at 20mA the pump will work at 50% of the maximum frequency);

4. Green LED (5) steady, pulse emitting water meter proportional functioning – 1xN multiplier mode: pulses supplied by water meter, are multiplied by the value set with the hand knob (8) (from 10 to 100);

5. Red LED (7) steady, pulse emitting water meter proportional functioning – 1:N divider mode – (divider mode $1 \div 1$): a pulse provided by the water meter generates a strokes from the pump.

6. Red LED (5) steady, pulse emitting water meter proportional functioning – 1:N divider mode – (divider mode $1 \div 10$): pulses provided by a water meter, are divided (from 1 to 10) by means the hand knob (8).

7. Red LED (4) steady, pulse emitting water meter proportional functioning – 1:N divider mode – (divider mode $10 \div 100$): pulses provided by a water meter, are divided (from 10 to 100) by means the hand knob (8).

8. Red LED (3) steady, pulse emitting water meter proportional functioning – 1:N divider mode – (divider mode $100 \div 1000$): pulses provided by a water meter, are divided (from 100 to 1000) by means the hand knob (8).



NOTE: It is advisable to use the “multiplier” mode in the presence of water meters that provide few pulses and it is necessary to multiply them to allow the pump to dose correctly. It is advisable to use the “divider” mode in the presence of water meters that provide many pulses and it is necessary to divide them to allow the pump to dose correctly.

ATTENTION: to confirm that you want to use the selected mode, you must hold down the SET button for 2 seconds. To return to “selection” mode, press and hold the SET button again for 2 seconds.

4.4 How to choose the performance of a pump

Being known the value of m³ (cubic meters) of water of the plant to be treated and the quantity of chemical to be dosed, expressed in ppm (gr / m³), it is possible to define the minimum flow rate (l / h) of the metering pump required, using the following formula:

$$l/h = \frac{\text{ppm} \times K \times m^3}{1000}$$

Where:

- ppm = quantity of product to be dosed, expressed in ppm (gr/m³)
- K = dilution coefficient of the chemical to be dosed. Pure chemical K=1
(Example: Sodium hypochlorite at 12%; K = 100:12 = 8,3)
- m³ = maximum flow of the water to be treated expressed in m³

4.5 How to calculate the multiplication value (1xN)

$$N = \frac{\text{ppm} \times K}{\text{imp/l} \times \text{cc} \times 1000}$$

Where:

- ppm = quantity of product to be dosed, expressed in ppm (gr / m³)
- K = dilution coefficient of the chemical to be dosed. Pure chemical K=1
(Example: Sodium hypochlorite at 12%; K = 100:12 = 8,3)
- pulses/l = pulses per liter supplied by the pulse emitting water meter
- cc = quantity of chemical dosed per single injection from the dosing pump

4.6 How to calculate the division value (1:N)

$$N = \frac{\text{imp/l} \times \text{cc}}{\text{ppm} \times K} \times 1000$$

Where:

- ppm = of chemical to be dosed, expressed in ppm (gr / m³)
- K = dilution coefficient of the chemical to be dosed. Pure chemical K=1
(Example: Sodium Hypochlorite at 12%; K = 100:12 = 8,3)
- pulses/l = pulses per liter supplied by the pulse emitting water meter
- cc = quantity of chemical dosed per single injection from the dosing pump

If in the calculation of the parameter "N", it results:

- N<1 (N less than 1) it is necessary to install a water meter with a higher number of pulses per liter or a dosing pump with a higher flow rate per injection.
- N>1000 (N more than 1000) it is necessary to install a dosing pump with a lower flow rate per injection.

5 DOSING PUMPS INSTALLATION RULES

Strictly follow the instructions for a correct installation of the dosing pump to avoid malfunctions. The most frequent cases are described below:

- Locate the pump as shown in Figure 1, bearing in mind that it can be mounted either below or above the level of the chemical to be dosed within the maximum limit of 2 meters (we suggest 1.5 meters). The injection point must always be placed higher than the chemical to be injected.
- If the system to be treated works at atmospheric pressure and the chemical tank must absolutely be positioned higher than the injection point (Figure 2), periodically check the functionality of the injection valve (I), as its excessive wear could lead to unintentional injection of the chemical into the plant due to gravity (even with the dosing pump stopped). If the problem persists, insert a counter-pressure valve (V) correctly calibrated between the dosing pump and the injection point.
- For chemicals that emit aggressive fumes, do not install the pump on top of the tank unless the tank is hermetically sealed (Figure 3).

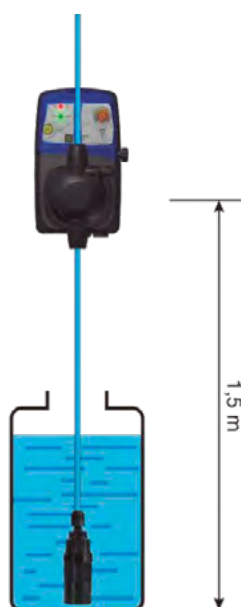


Figure 1



Figure 2

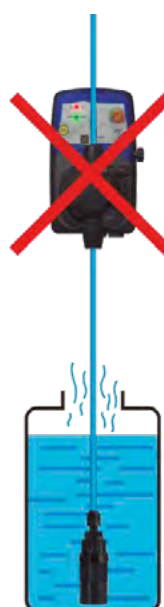
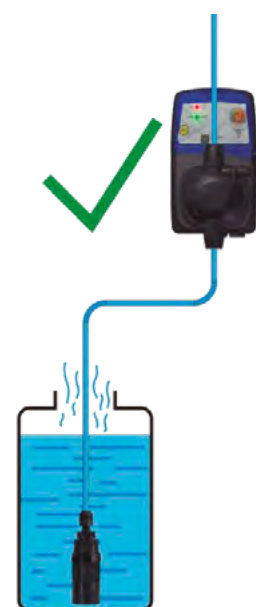


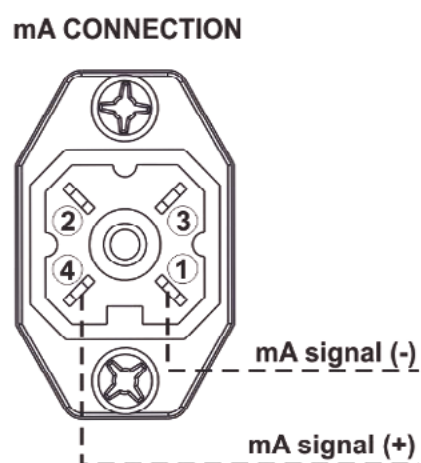
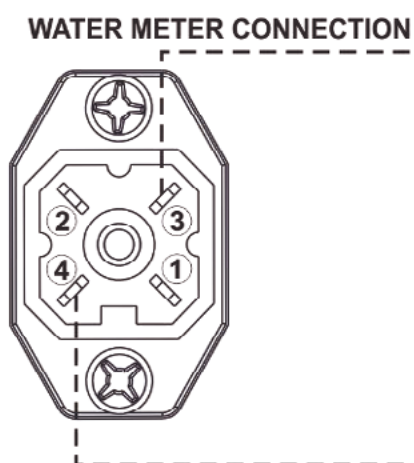
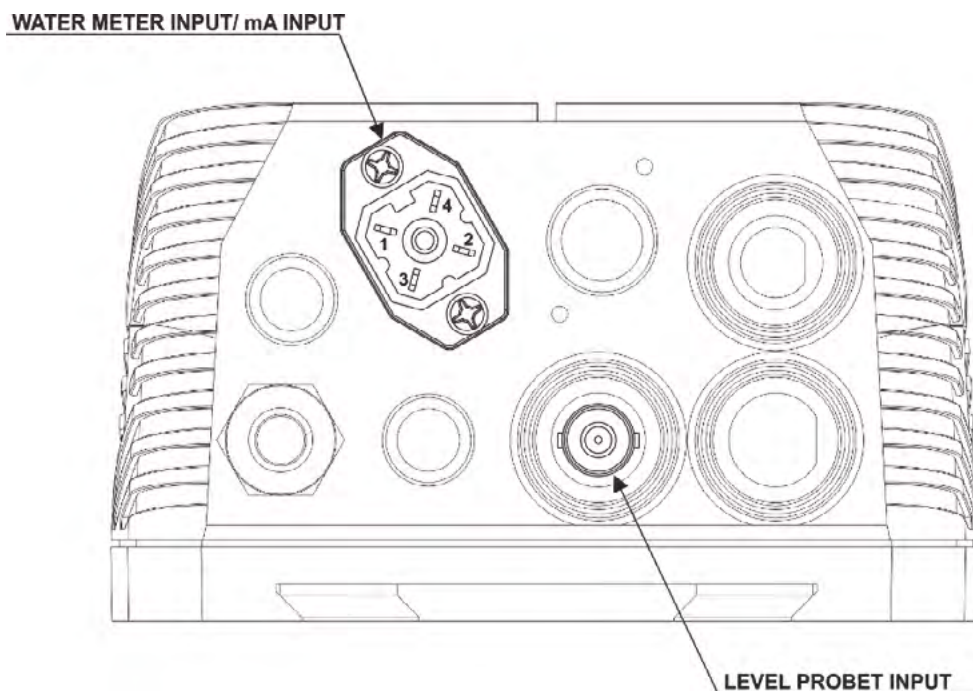
Figure 3



6 ELECTRICAL CONNECTIONS

6.1 PRIMA P model pump

The connector on the bottom of the pump allows the connection of an external signal coming from a pulse emitting water meter or a mA signal. Obviously, if a pulse emitting water meter is connected, a mA signal cannot be connected and vice versa. The pump is also equipped with a BNC connector for connecting a level probe (not included in the package).



7 TROUBLESHOOTING

The solenoid driven dosing pump is a relatively robust device, therefore the chances of mechanical failures are low. Sometimes chemical leaks may occur from nipples or loose hose nuts of the pump head or simply due to breakage of the discharge pipe. If one of the above cases occurs, user has to first disconnect the unit from the power supply, then replaces the damaged part, cleans the unit from any chemical leaks, then restart the pump.

7.1 Problem - Cause - Solution

Below are listed some of the problems that may occur, the causes and solutions

Problem	Possible Cause	Solution
The pump does not switch on	The pump is not powered	Connect the pump to the mains
	The protection fuse is blown up	Replace the fuse
	The electronic board is damaged	Replace the electronic board
The pump does not dose but the solenoid is working	The foot filter is obstructed	Clean the foot filter
	The suction tube is empty, the pump is not primed	Repeat the priming procedure
	Air bubbles in the hydraulic circuit	Check nipples and hoses
	The chemical in use generates gas	Open the bleed valve and let the air goes out. Replace the pump head with automatic bleed version.
The pump does not dose and the solenoid does not works or the stroke is greatly muffled	Crystals formation, valve occlusion and / or the balls are blocked	Clean the valves and try to circulate water instead of the chemical product
	The injection valve is obstructed	Replace the valves of the pump head. Replace the injection valve.

8 CLEANING AND MAINTENANCE

8.1 Cleaning the pump

The pump must be periodically cleaned in order to ensure its efficiency. We suggest to carry out regular cleaning during maintenance period.

Before carrying out any maintenance or cleaning operations on the dosing pump, it is necessary to:

1. Make sure that it is electrically disabled (both polarities) by disconnecting the conductors from the contact points of the power supply by opening the omnipolar switch;
2. Eliminate in the most appropriate and gradual way, (paying the utmost attention not to generate splashes), the existing pressure in the pump body and in the delivery pipe, by opening the appropriate air bleed valve.
3. Remove the protective cover of the pump body, to highlight any underlying leaks and encrustations;
4. Clean any incrustations due to leaks or drips on the pump body or on the entire pump structure, paying particular attention to the lower part of the pump where, usually, any incrustations due to drips accumulate;
5. Reassemble the cover of the pump body, the delivery and suction pipes, close the air bleed valve and reconnect the pump electrically;
6. Carry out priming if necessary and restore the normal operating status of the pump.

8.2 Pump maintenance

Under normal operating conditions, the metering pump should be checked monthly.

To avoid malfunctions or sudden stops, carefully check the following items:

- check that the electrical and hydraulic connections are intact;
- check for any leaks on the connections of the pump head or the injection valve;
- check that there are no parts of the pump or pipes corroded.

Always empty the pump head from chemical, if there could still be presence of dangerous chimica inside the pump head it is mandatory to declare it filling the RETURN MATERIAL AUTHORIZATION module.

Always use original spare parts if it is necessary to replace worn parts

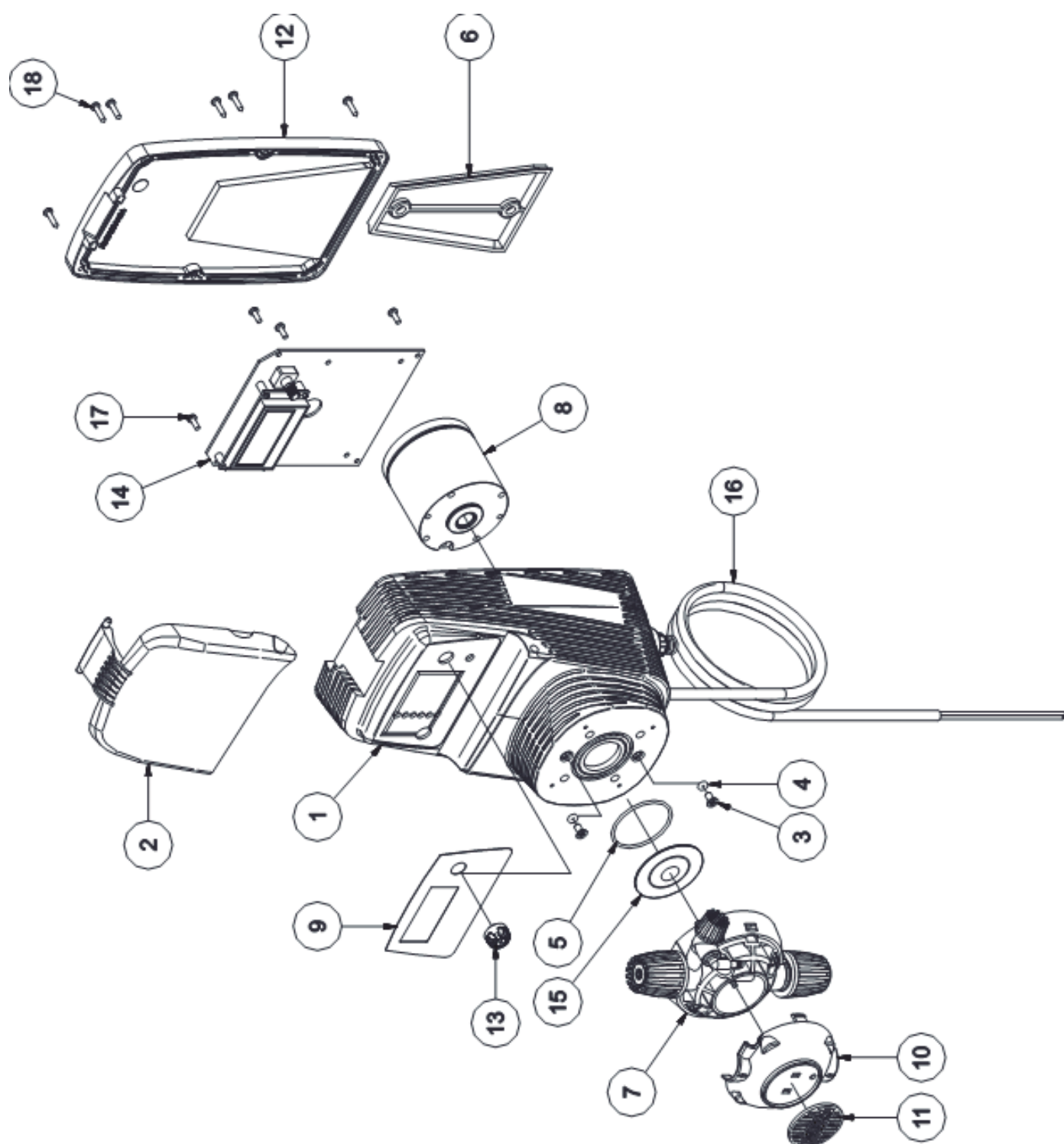
All technical assistance operations must be performed only by expert and authorized personnel. If the pump requires direct assistance from the manufacturer, it is necessary to remove all the liquid inside the pump head and dry it BEFORE packing it in its original box!

9 WARRANTY

The product is covered by the manufacturer's warranty for manufacturing defects. The methods and conditions are set forth in the "General Conditions of Sale" document of STURDOS

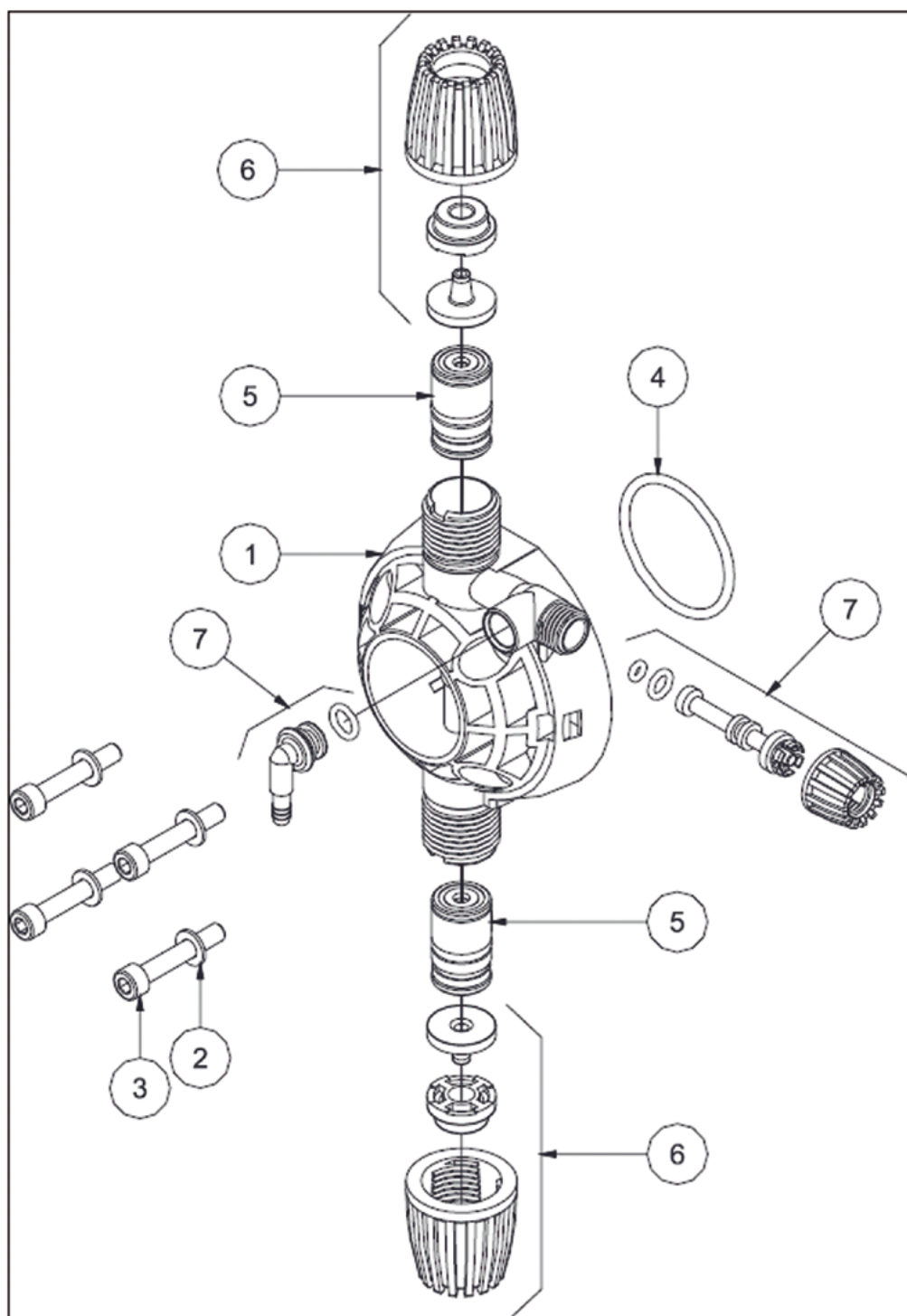
9.1 Exploded views

• Exploded view



Nº	Code	Description	Quantities
1	PRIMAP9300058	PRIMA+ PP+20% GF BLACK HOUSING	1
2	PRIMAP9300061	PRIMA TRANSPARENT FRONT COVER	1
3	PRIMAP6000708	M4X8 UNI 7688 (AF-TSTC) SS A2 SCREW	2
4	PRIMAP5007072	NBR – 2,60X1,90 O-RING	2
5	PRIMAP5007117	FPM 2150 ORING	1
6	PRIMAP6020221	WALL FIXING BRACKET	1
7	PRIMAP9000105	1-14 PVDF-CE-VT INCOMPLETE PUMP HEAD	1
7	PRIMAP900PI06	1-14 PVDF-CE-DT INCOMPLETE PUMP HEAD	1
8	PRIMAP6000295	230V D60 COMPLETE SOLENOID	1
8	PRIMAP6000287	230V D70 COMPLETE SOLENOID	1
8	PRIMAP6000536	230V D80 COMPLETE SOLENOID	1
9	PRIMAP7000772	PRIMA+ MULTI/PH-RX-CL POLICARBONATE ADHESIVE LABEL	1
10	PRIMAP9000022	1-14LT PUMP HEAD BLACK COVER	1
11	PRIMAP9000003	1-14LT PUMP HEAD BLACK PLATE WITH LOGO STURDOS	1
12	PRIMAP9300034L	PRIMA DGT PP BACK COVER WITH GASKET	1
13	PRIMAP9300072	PRIMA KNOB FOR POTENTIOMETER	1
14	PRIMAP9300083	PRIMA MULTIFUNCTION 10÷240Vac ELECTRONIC BOARD	1
15	PRIMAP9200001	1614/1645 1-14L PRIMA M12x1 PTFE DYNEON DIAPHRAGM	1
16	PRIMAP6020281	H05VV-F 3x0,75 POWER SUPPLY CABLE 3 METERS W/OUT PLUG	1
17	PRIMAP6000749	3x8 SS A2 HILO SERIES SCREW	4
18	PRIMAP6000714	2,9x13 UNI6954 SCREW	6

• Pump Head



CORPO POMPA PP / PP PUMP HEAD

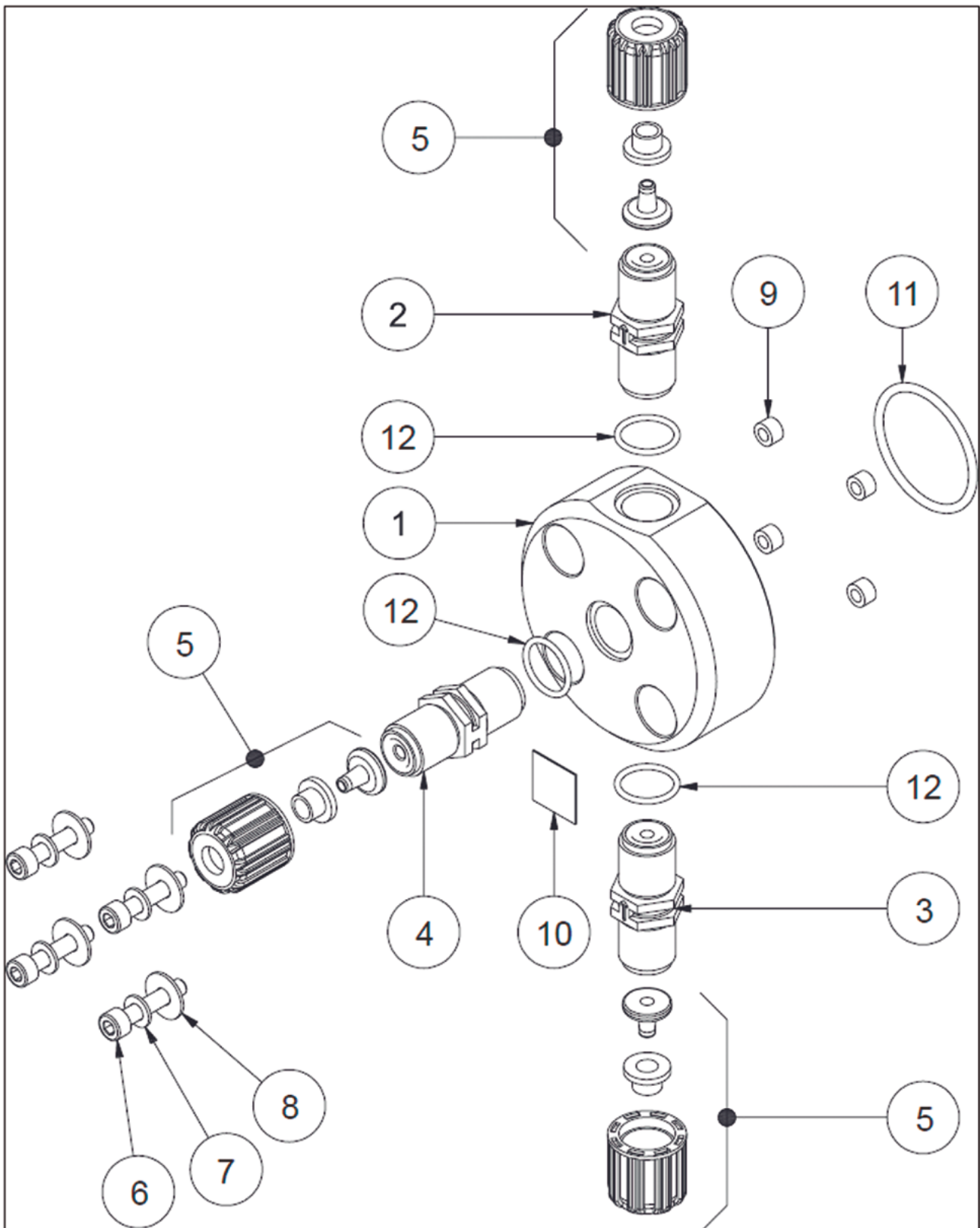


CORPO POMPA PVDF / PVDF PUMP HEAD



Nº	Code	Description	Quantities
1	PRIMAP9000001	1-14 PP BLACK PUMP HEAD	1
1	PRIMAP9000001P	1-14 PVDF WHITE PUMP HEAD	1
2	PRIMAP6000701	D.5 WASHER – UNI 6592 SS A2	4
3	PRIMAP9000016	M5x30 UNI 5931 SS A2 SCREW	4
4	PRIMAP5007200	FPM 3143 (T.2,62xD.36,14) ORING	1
4	PRIMAP5007209	EPDM 3143 (T.2,62xD.36,14) ORING	1
5	PRIMAP9005010	½" PP-GL-VT VALVE KIT	1
5	PRIMAP9005011	½" PP-GL-DT VALVE KIT	1
5	PRIMAP9005P12	½" PVDF-CE-VT VALVE KIT	1
5	PRIMAP9005P13	½" PVDF-CE-DT VALVE KIT	1
6	PRIMAP6500059	½" PP FIXING KIT FOR 4x6 HOSE	1
6	PRIMAP6500060	½" PVDF FIXING KIT FOR 4x6 HOSE	1
6	PRIMAP6500067	6x8 FIXING KIT WITH ½" BLACK PP HOSE NUT	2
6	PRIMAP6500068	6x8 FIXING KIT WITH ½" BLACK PP HOSE NUT L	2
6	PRIMAP6500063	6x8 FIXING KIT WITH ½" BLACK PP HOSE NUT	2
7	PRIMAP6500072	AIR BLEED KIT + PP-VT HOSE FITTING FOR PUMP HEAD	1
7	PRIMAP6500072P	AIR BLEED KIT + PP-VT HOSE FITTING FOR PUMP HEAD	1
7	PRIMAP6500073	AIR BLEED KIT + PP-DT HOSE FITTING FOR PUMP HEAD	1
7	PRIMAP650073P	AIR BLEED KIT + PVDF-DT HOSE FITTING FOR PUMP HEAD	1

- **Auto Bleed Pump Head**



Nº	Code	Description	Quantities
1	PRIMAP9000029	1-14 PVC AUTO BLEED PUMP HEAD	1
2	PRIMAP5005033	3/8" PP-CE-VT DEGAS VALVE KIT	1
2	PRIMAP5005133	3/8" PP-CE-DT DEGAS VALVE KIT	1
2	PRIMAP5005036	3/8" PVDF-CE-VT DEGAS VALVE KIT	1
2	PRIMAP5005038	3/8" PVDF-CE-DT DEGAS VALVE KIT	1
3	PRIMAP5005031	3/8" PP-CE-VT VALVE KIT	1
3	PRIMAP5005131	3/8" PP-CE-DT VALVE KIT	1
3	PRIMAP5005034	3/8" PVDF-CE-VT VALVE KIT	1
3	PRIMAP5005037	3/8" PVDF-CE-DT VALVE KIT	1
4	PRIMAP5005032	3/8" PP-CE-HAST-VT VALVE KIT	1
4	PRIMAP5005132	3/8" PP-CE-HAST-DT VALVE KIT	1
4	PRIMAP5005035	3/8" PVDF-CE-HAST-VT VALVE KIT	1
4	PRIMAP5005135	3/8" PVDF-CE-HAST-DT VALVE KIT	1
5	PRIMAP6500048	3/8" PP FIXING KIT FOR 4X6 HOSE	3
5	PRIMAP6500013	3/8" PVDF FIXING KIT FOR 4X6 HOSE	3
6	SDFMB010040	M5x25 UNI 5931 SS A2 SCREW	4
7	PRIMAP6000701	D. 5 WASHER – UNI 6592 SS A2	4
8	SDFMB010460	5x15 WASHER – UNI 6592 SS A2	4
9	PRIMAP5007011	PUMP HEAD SCREW GASKET D. 3,2 x 6,45 x 5,5 SANT64A	4
10	PRIMAP7000442	FLOW DIRECTION LABEL	1
11	PRIMAP5007200	FPM 3143 (T.2,62 x D.36,14) ORING	1
11	PRIMAP5007209	EPDM 3143 (T.2,62 x D.36,14) ORING	1
12	PRIMAP5007001	FPM 2062 - ORING	3
12	PRIMAP5007002	EPDM 2062 - ORING	3



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Industrial metering pumps