# VMS PO

PRODUCT LABEL


SOLENOID DRIVEN METERING PUMPS
WITH DIAPHRAGM

EN

OPERATING MANUAL

This operating instructions contains safety information that if ignored can endanger life or result in serious injury.

Read these instructions **carefully** before use and keep them for future reference. Original instruction.

Information and specifications on this manual could be uncorrect or could have printing errors. Specifications are subject to change without notice.

Version: R1-02-18

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**NORME CE**
**EC RULES (STANDARD EC)**
**NORMAS DE LA CE**

Direttiva Bassa tensione
Low Voltage Directive
Directiva de baja tensión
} **2014/35/UE**

Direttiva EMC Compatibilità Elettromagnetica
EMC electromagnetic compatibility directive
EMC directiva de compatibilidad electromagnética
} **2014/30/UE**

Norme armonizzate europee nell'ambito della direttiva
European harmonized standards underdirective
Las normas europeas armonizadas conforme a la directiva
} **2006/42/CE**

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**GENERAL SAFETY GUIDELINES**

Operating, installing, or maintaining the unit in any way that is not covered in this manual could cause death, serious personal injury, or damage to the equipment.

**ICON**

This manual use the following safety message icon:

**Danger!**
Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

**Warning!**
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

**Important** - A practice not related to personal injury or additional information.

**Cross reference** - An instance which refers to related information elsewhere in the same document

**PURPOSE OF USE AND SAFETY**

**METERING PUMP IS INTENDED FOR CHEMICAL DOSING.**

Do not use in explosive area (EX).
Do not use with flammable chemicals.
Do not use with radioactive chemicals.

Use after a proper installation.

Use the pump in accordance with the data and specifications printed on the label.

Do not modify or use in a manner inconsistent with the provisions of the operating manual.

**Keep the pump protected from sun and water. Avoid water splashes.**

**In emergencies the pump should be switched off immediately. Disconnect the power cable from the power supply.**

**When using pump with aggressive chemicals observe the regulations concerning the transport and storage of aggressive fluid .**

**When installing always observe national regulations.**

**Manufacturer is not liable for any unauthorized use or misuse of this product that may cause injury, damage to persons or materials.**

**Pump must be accessible at all times for both operating and servicing. Access must not be obstructed in any way.**

**Feeder should be interlocked with a no-flow protection device to automatically shut-off the pumps when there is no flow**

**Adequate measures shall be taken to prevent cross connection of chemicals!**

**Chemical feeding must be stopped during backwash cycles and periods of noflow as these conditions may introduce the potential for chemical overdosing. Not doing so may result in elevated chemical concentrations and hazerdous gas introduction into the pool or spa.**

**Pump and accessories must be serviced and repaired by qualified and authorized personnel only.**

**Before any operation:**

- **always read chemical Material Safety Data Sheet (MSDS);**
- **always wear protective clothing;**
- **always discharge the liquid end before servicing the pump.**
- **empty and rinse the liquid end before work on a pump which has been used with hazardous or unknown chemicals.**

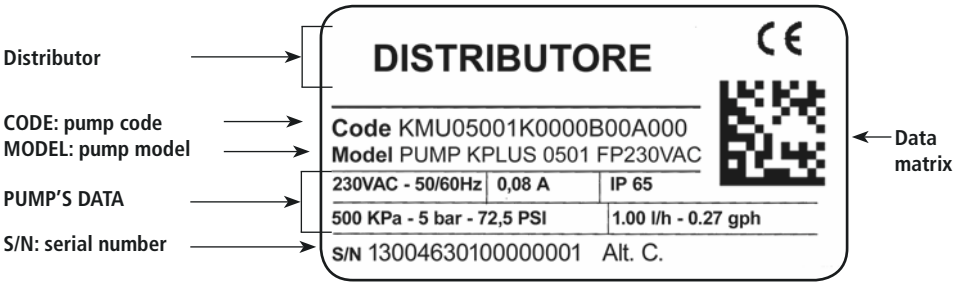
**Environmental safety**

**Work area**
Always keep the pump area clean to avoid and/or discover emissions.

**Recycling guidelines**
Always recycle according to these guidelines:
1. If the unit or parts are accepted by an authorized recycling company, then follow local recycling laws and regulations.
2. If the unit or parts are not accepted by an authorized recycling company, then return them to the nearest representative.

**Waste and emissions regulations**
Observe these safety regulations regarding waste and emissions:
- Dispose appropriately of all waste.
- Handle and dispose of the dosed chemical in compliance with applicable environmental regulations.
- Clean up all spills in accordance with safety and environmental procedures.
- Report all environmental emissions to the appropriate authorities.

**LABEL**




**Spare parts**

For spare parts orders or any other communication, refer to the pump's label.
Code (CODE) and serial number (S / N) uniquely identify the pump.

**Transportation and storage**

**A not suitable transportation or storage can cause damages.**

**Use origianal box to pack the pump.**

**Observe storage conditions also for transportation.**

**Although packed, always protect the unit against humidity and the action of chemicals.**

**Before return the dosing pump to the manufacturer Repair service, drain the chemical from pump head and rinse it. Refer to Shutdown procedure.**

Fill the PRODUCT SERVICE REPAIR FORM and send it with the dosing pump.
Repair service is not accepted if PRODUCT SERVICE REPAIR FORM is missing.

DO NOT TRASH PACKAGING. USE IT TO RETURN THE PUMP.

Transportation and storage temperature ..... 10 - 50°C (32 - 122°F)
Umidity..... 95% relative humidity (not condensed)

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**Included into package**

| QUANTITY | CONTENT | **VMS PO** |
|---|---|---|
| n. 2 | ø6 dibbles | ● |
| n. 2 | 4,5 x 40 self tapping screws | ● |
| n. 1 | 5 X 20 delayed fuse | ● |
| n. 1 | level probe with axial foot filter (PVDF) | ● |
| n. 1 | 0,3 bar injection valve (PVDF) | ● |
| m 2 | delivery hose (PVDF) | ● |
| m 2 | suction hose (PE) | ● |
| m 2 | discharge hose (PVC 4x6 transparent) | ● |
| m 2,5 | input signal cable | ● |
| n.1 | operating manual | ● |

## DESCRIPTION

**VMS PO**

VMS PO is a proportional dosing pump with level control.
It is driven by internal built-in pH or Redox (ORP) meter (electrode not included).

Ranges:
pH: 0 - 14 pH
ORP: -999mV - +999mV

FEATURES
Select pH or ORP parameter by menu: choose MODE and set pH or ORP.
In both modes, the pump can be set to dose in on / off or proportional.
In On / Off mode, the pump operates in two values (set-point)
In proportional mode the pump doses proportionally into the set point.

Fast calibration
You can performa a fast calibration on standard value.
7.0 and 4.0 for pH, 650 mV for ORP. For different value proceed to a full calibration.

Restore last calibration
If an error occur during calibration you can restore last calibration saved.

Alarms (sold as option, PG7 two wires)
Dosing, reading (probe failure), min and max, level and stand-by.

Alarm output status: N.O. or N.C.

DELAY
Programmable delay at dosing start up.

RESTORE FACTORY
Restore factory value (default value).

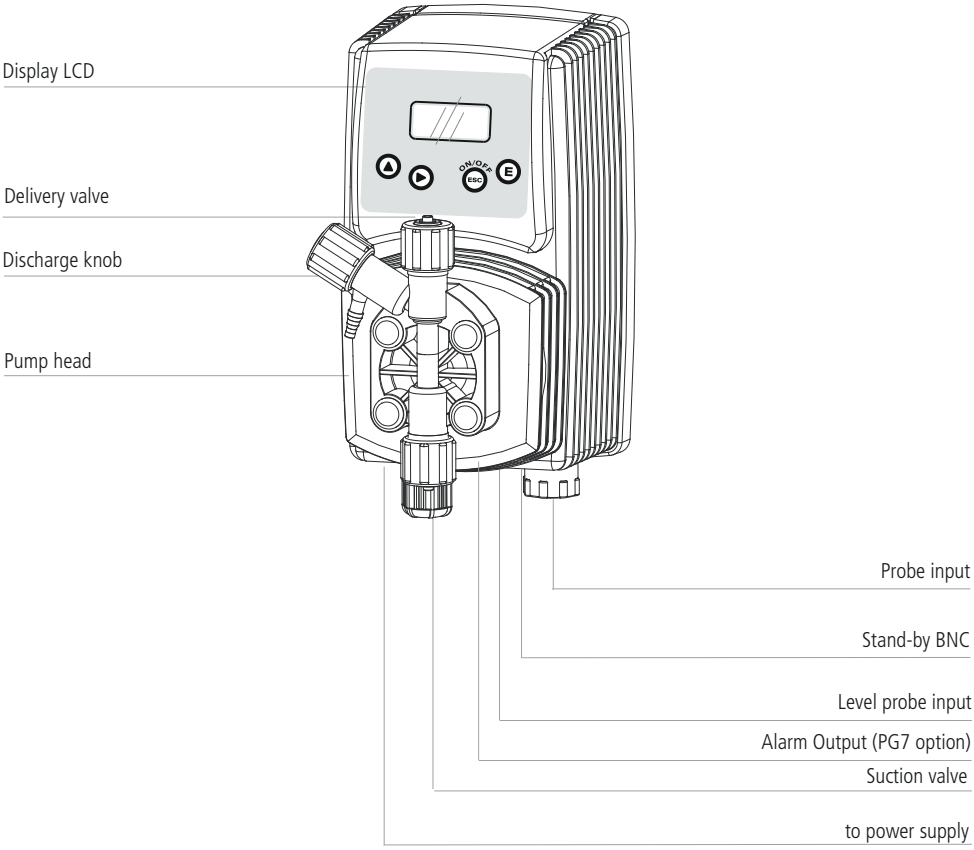
PASSWORD AND LANGUAGE
Settable password and language (EN or FR or ES or IT).

STAND-BY
Stand-by INPUT. (default N.O:)

**VERIFY CHEMICAL COMPATIBILITY OF PUMP HEAD, O-RING AND HOSES BEFORE USE.**

⚠ **Refer to ⎘ Chemical Compatibility table.**

Fig. 2. VMS PO


Display LCD
Delivery valve
Discharge knob
Pump head
ON/OFF
ESC
E
Probe input
Stand-by BNC
Level probe input
Alarm Output (PG7 option)
Suction valve
to power supply

**Features**

| Power Supply | Fuse | Frequency |
|---|---|---|
| 230 VAC (180-270 VAC) | 800 mA | 50/60 Hz |
| 115 VAC (90-135 VAC) | 400 mA | |
| 24 VAC (20-32 VAC) | 2 A | |
| 12 VDC (10-16 VDC) | 3,15 A | / |

Environment temperature ..... 10 - 45°C (32 - 113°F)
Chemical temperature ..... 0 - 50°C (32 - 122°F)
Transportation and storage temperature ..... 10 - 50°C (32 - 122°F)
Installation class ..... II
Pollution level ..... 2
Audible noise ..... 70.4 dbA
Protection degree ..... IP 65 (RU working %: 85% with T<=40°C;
..... 70% T=50°C without condensing water)
Altitude ..... 2000 m AMSL
Dimensions ..... 225x215x125mm
Max installation height ..... 1,5 m
Capacity ..... Table 1-2

Tab. 1. Capacity (manual models)

| Model | FLOW | | | cc per STROKE | pulse/min | Maximum pressure | | Hoses | |
|---|---|---|---|---|---|---|---|---|---|
| | min cc/h | max l/h | Max GPH | | | bar | PSI | delivery (PE) | suction (PVC) |
| 2001 | 0.09 | 1 | 0.26 | 0.09 | 180 | 20 | 290 | 4 x 8 | 4 x 8 |
| 1802 | 0.19 | 2 | 0.53 | 0.19 | 180 | 18 | 261 | 4 x 8 | 4 x 8 |
| 1804 | 0.37 | 4 | 1.06 | 0.37 | 180 | 18 | 261 | 4 x 8 | 4 x 8 |
| 1502 | 0.19 | 2 | 0.53 | 0.19 | 180 | 15 | 217 | 4 x 6 | 4 x 6 |
| 1504 | 0.37 | 4 | 1.06 | 0.37 | 180 | 15 | 217 | 4 x 6 | 4 x 6 |
| 1505 | 0.46 | 5 | 1.32 | 0.46 | 180 | 15 | 217 | 4 x 6 | 4 x 6 |
| 1004 | 0.37 | 4 | 1.06 | 0.37 | 180 | 10 | 145 | 4 x 6 | 4 x 6 |
| 1005 | 0.46 | 5 | 1.32 | 0.46 | 180 | 10 | 145 | 4 x 6 | 4 x 6 |
| 1010 | 0.93 | 10 | 2.64 | 0.93 | 180 | 10 | 145 | 4 x 6 | 4 x 6 |
| 0706 | 0.56 | 6 | 1.58 | 0.56 | 180 | 7 | 101 | 4 x 6 | 4 x 6 |
| 0510 | 0.93 | 10 | 2.64 | 0.93 | 180 | 5 | 72 | 4 x 6 | 4 x 6 |
| 0512 | 1.11 | 12 | 3.17 | 1.11 | 180 | 5 | 72 | 4 x 6 | 4 x 6 |
| 0501 | 0.09 | 1 | 0.26 | 0.09 | 180 | 5 | 72 | 4 x 6 | 4 x 6 |
| 0408 | 0.74 | 8 | 2.11 | 0.74 | 180 | 4 | 58 | 4 x 6 | 4 x 6 |
| 0310 | 0.93 | 10 | 2.64 | 0.93 | 180 | 3 | 43 | 4 x 6 | 4 x 6 |
| 0215 | 1.39 | 15 | 3.96 | 1.39 | 180 | 2 | 29 | 6 x 8 | 6 x 8 (PE) |
| 0116 | 1.48 | 16 | 4.23 | 1.48 | 180 | 1 | 14 | 6 x 8 | 6 x 8 (PE) |

Tab. 2. Capacity (self venting models)

| Model | FLOW | | | cc per STROKE | pulse/min | Maximum pressure | | Hoses | |
|---|---|---|---|---|---|---|---|---|---|
| | min cc/h | max l/h | Max GPH | | | bar | PSI | delivery (PE) | suction (PVC) |
| 200.5 | 0.05 | 0.5 | 0.13 | 0.05 | 180 | 20 | 290 | 4 x 8 | 4 x 8 |
| 1802 | 0.19 | 2 | 0.53 | 0.19 | 180 | 18 | 261 | 4 x 8 | 4 x 8 |
| 1503 | 0.28 | 3 | 0.79 | 0.28 | 180 | 15 | 217 | 4 x 6 | 4 x 6 |
| 1501 | 0.09 | 1 | 0.26 | 0.09 | 180 | 15 | 217 | 4 x 6 | 4 x 6 |
| 103.4 | 0.31 | 3.4 | 0.9 | 0.31 | 180 | 10 | 145 | 4 x 6 | 4 x 6 |
| 1007 | 0.65 | 7 | 1.85 | 0.65 | 180 | 10 | 145 | 4 x 6 | 4 x 6 |
| 1002 | 0.19 | 2 | 0.53 | 0.19 | 180 | 10 | 145 | 4 x 6 | 4 x 6 |
| 0704 | 0.37 | 4 | 1.06 | 0.37 | 180 | 7 | 101 | 4 x 6 | 4 x 6 |
| 057.5 | 0.69 | 7.5 | 1.98 | 0.69 | 180 | 5 | 72 | 4 x 6 | 4 x 6 |
| 0509 | 0.83 | 9 | 2.38 | 0.83 | 180 | 5 | 72 | 4 x 6 | 4 x 6 |
| 045.5 | 0.51 | 5.5 | 1.45 | 0.51 | 180 | 4 | 58 | 4 x 6 | 4 x 6 |
| 0307 | 0.65 | 7 | 1.85 | 0.65 | 180 | 3 | 43 | 4 x 6 | 4 x 6 |
| 0212 | 1.11 | 12 | 3.17 | 1.11 | 180 | 2 | 29 | 6 x 8 | 6 x 8 (PE) |
| 0113.5 | 1.25 | 13.5 | 3.57 | 1.25 | 180 | 1 | 14 | 6 x 8 | 6 x 8 (PE) |

**Materials**

✓ : standard
✗: options available

| | PVDF | PP | PPV0 | PMMA | PVC | PE | CE | VETRO | PTFE | SS | FKM B | EPDM | WAX | SI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BOX | | ✓ | ✗ | | | | | | | | | | | |
| PUMP HEAD | ✓ | | | ✗ | | | | | | | | | | |
| DIAPHRAGM | | | | | | | | | ✓ | | | | | |
| BALLS | | | | | | | ✓ | ✗ | ✗ | ✗ | | | | |
| SUCTION HOSE | ✗ | | | | ✓ | ✗ | | | | | | | | |
| DELIVERY HOSE | ✗ | | | | ✗ | ✓ | | | | | | | | |
| DISCHARGE HOSE | ✗ | | | | ✓ | ✗ | | | | | | | | |
| O RING | | | | | | | | | ✗ | | ✗ | ✗ | ✗ | ✗ |
| LEVEL PROBE/ FOOT FILTER | ✓ | | | | | | | | | | | | | |
| LEVEL PROBE CABLE | | | | | | ✓ | | | | | | | | |

## INSTALLATION

**How to install metering pump**

5 steps to install and start-up the pump:

1. Pump location
2. Piping connections (hoses, level probe, injection valve)
3. Wirings
4. Pump priming
5. Programming and start-up

The operator must be aware of safety precautions to prevent physical injury.

**User health and safety**

**POWER SUPPLY DISCONNECTION**
**Disconnect power supply before you perform any installation or maintenance tasks. Failure to disconnect power will result in serious physical injury.**

**SAFETY EQUIPMENT**
**Use safety equipment according to the company regulations. Use this safety equipment within the work area:**
- **Helmet**
- **Safety goggles (with side shields)**
- **Protective shoes**
- **Protective gloves**
- **Gas mask**

**The work area**

**THE WORK AREA**
**Observe these regulations and warnings in the work area:**
- **Always keep the work area clean.**
- **Pay attention to the risks presented by gas and vapors in the work area.**
- **Avoid all electrical dangers. Pay attention to the risks of electric shock or arc flash haza ds.**
- **Avoid water splashs and direct sun!**

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**Pump location**

Pump must be installed on a stable support at a max **1,5 mt** height from tank's bottom.

**Injection point must be higher than tank to avoid accidental chemical injection.**

Otherwise, connect a **multifunction valve** on delivery pipeline.

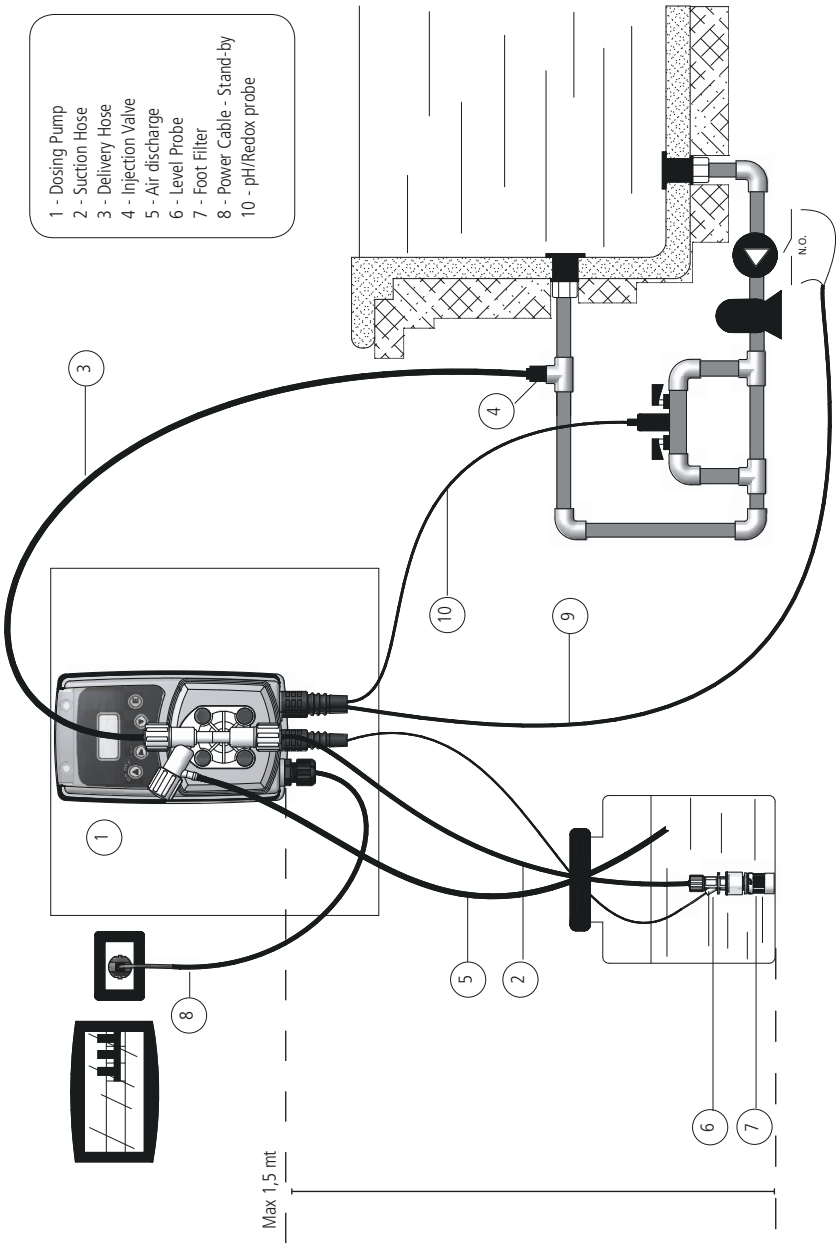
**INSTALLATION PUMP GUIDELINES**
**Install the pump**
**- in a safety place and fixed to the table / wall to avoid vib ation problems;**
**- in an easy accessible place;**
**- in horizontal position.**

**Use only hoses compatibles with product to dose.**
**See "Chemical compatibility table" page 31.**
**If dosing product is not listed please consult full compatibility table or contact chemical's manufacturer.**

**Requirements for product positioning**

**REQUIREMENTS FOR PRODUCT POSITIONING**
**Only use fasteners of the proper size and material.**
**Replace all corroded fasteners.**
**Make sure that all fasteners are properly tightened and that there are no missing fasteners.**

Fig. 3. Installation



## PIPING CONNECTIONS

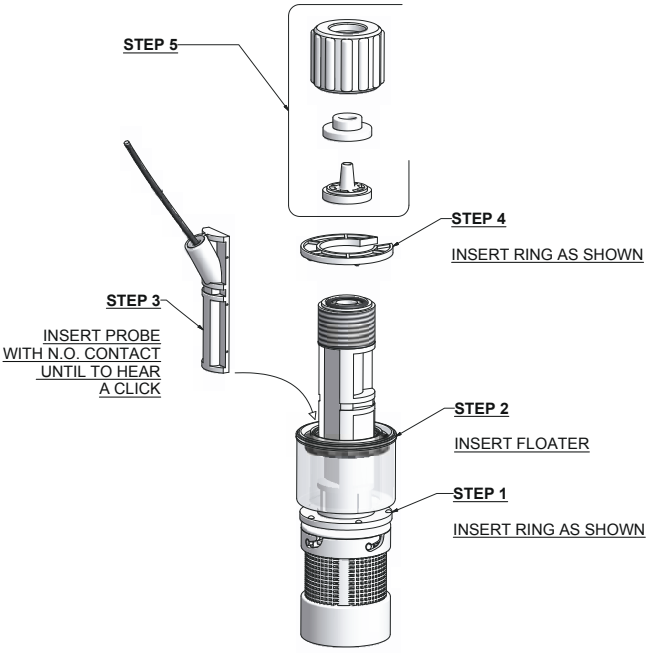
**Foot filter / Level probe (included only in some models)**

Level probe is assembled with a foot filter that avoid sediments priming probles.
Install level probe on the bottom of the tank.
Connect BNC level probe to the pump BNC input.

**Warning: If there is a mixer installed into tank, install a suction lance instead of level probe / foot filte .**

In case of replacement of level probe parts, follow the diagram below.

Fig. 4. Level probe assembling diagram.



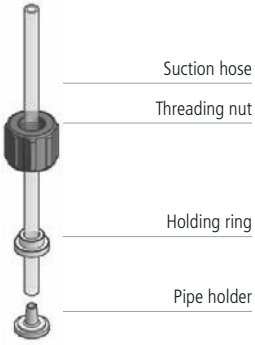
**Suction hose connection**

**Suction piping should be as short as possible and installed in vertical position to avoid air bubbles suction.**

Completely unscrew tightening nut from pump's head and remove assembling components: tightening nut, holding ring and pipe holder.
Assembly as shown in fig. 4.
Insert hose into pipe holder until it reaches the bottom. Lock hose on pump's head by screwing down the tightening nut.

**Hand-tighten the nuts firml .**
Do not use tongs or any other tool.

Fig. 5. Suction hose assembling




**Pump head / delivery hose assembling procedure**

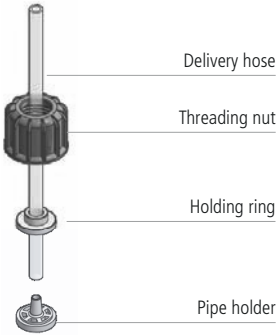
**Suction and delivery valves must be in vertical position.**

**Delivery hose must be firmly fixed to avoid suddenly movements that coul damage near objects**

Completely unscrew tightening nut from pump's head and remove assembling components: tightening nut, holding ring and pipe holder.
Assembly as shown in fig.5.
Insert hose into pipe holder until it reaches the bottom. Lock hose on pump's head by screwing down the tightening nut.

**Hand-tighten the nuts firml .**
Do not use tongs or any other tool.
Connect the other end of the hose to the injection valve using the same procedure.

Fig. 6. Delivery hose / pump head assembling



**Injection valve**

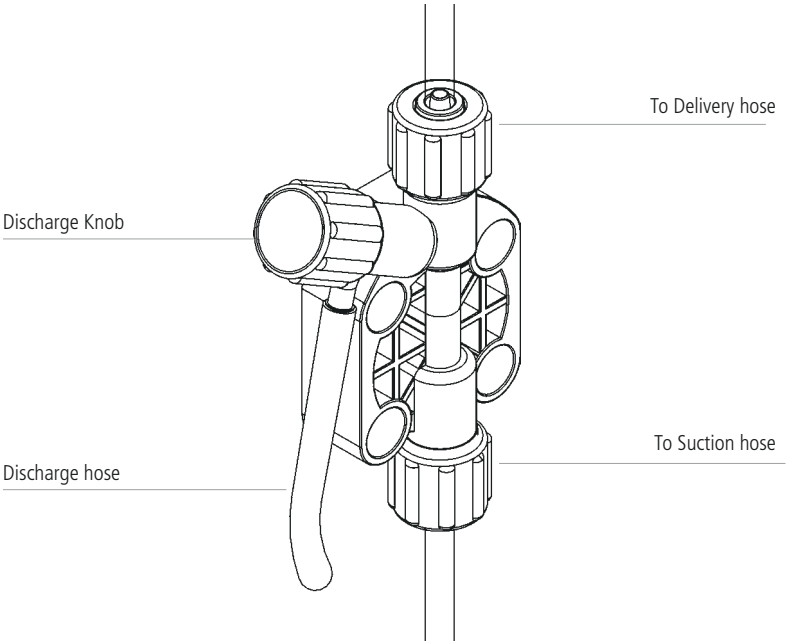
Injection valve must be installed on plant from water's input.
Injection valve will open at pressure greater than 0,3 bar.
On request 1, 2, 3, 4 or 5 bar injection valve are available.

**Discharge hose**

Insert one side of discharge hose into discharge connector as shown in fig below.

Insert other side of discharge hose into product's tank.
During priming procedure product exceeding will flow into tank.

Fig. 7. Manual venting pump head model (VMS PO).




For priming procedure see **PRIMING**.

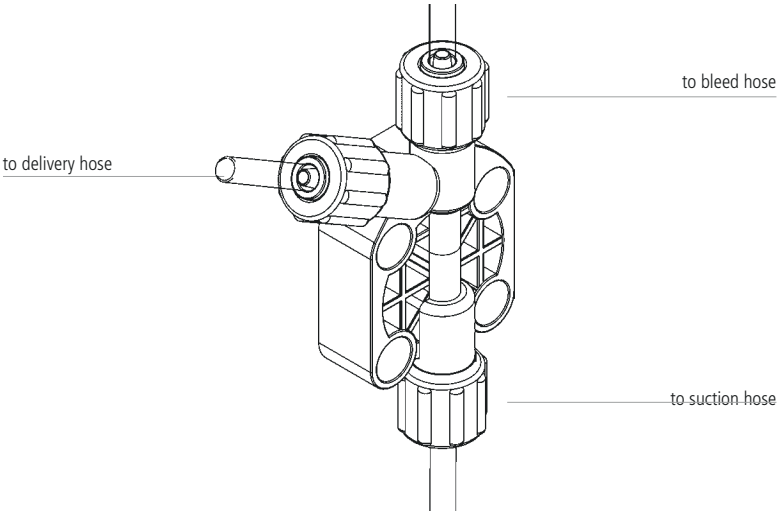
it's allowed to lightly bend discharge hose.

**During calibration procedure ("TEST") insert discharge hose into BECKER test-tube.**

**VMSA PO self venting pump head connection**

Refer to fig. below for delivery and discharge hose.
Assembling procedures are the same described before.

Fig. 8. Self-venting models pump head




**Suction, delivery and discharge valve are different.**

## WIRING

**Preliminary checks**

**THE ELECTRICAL WIRINGS SHOULD BE CARRIED OUT BY AUTHORIZED AND QUALIFIED PERSONNEL ONLY IN ACCORDANCE WITH LOCAL REGULATIONS.**

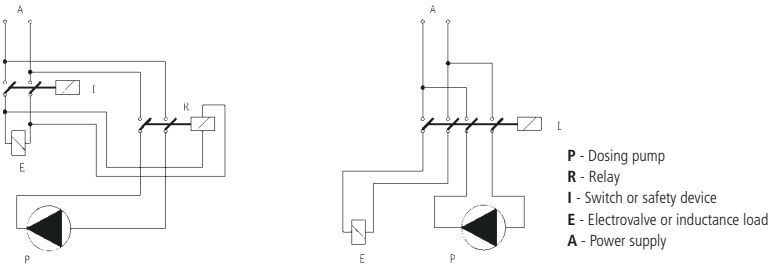
Before to proceed, verify the following steps:

1. **Verify the data on nameplate.**
   Make sure that the electrical data on the nameplate of the motor corresponds to the electrical supply.

2. **Verify the grounded power outlet.**
   The pump must be plugged to a grounded power outlet. Pump must be connected to a motor protection switch (Residual Current Circuit Breaker - MCCB).

3. **Install a relay switch. Do not install it in parallel with heavy inductance load (for example: engines). See fi . below.**

Fig. 9. Electrical installation.




4. **Verify peak Amps. 115 or 230 VAC pumps do not use motor overload protection.**

| Power supply | |
|---|---|
| 12 VDC | connect the pump to a 55 Ah-12VDC battery |
| 24 VDC | connect the pump to a 200W stabilized power supply (verify peak Amps) |

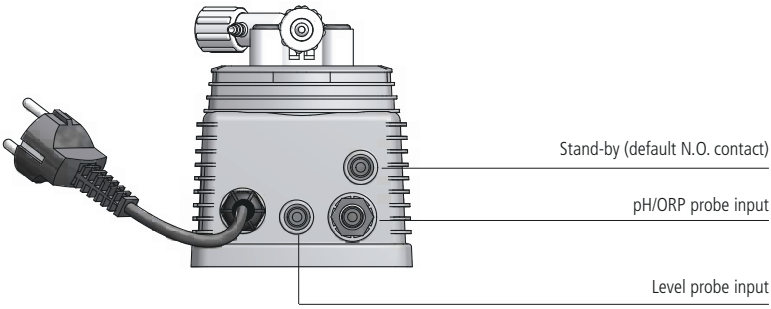
5. **Verify level probe "BNC" is connected as described in "Foot filter / Level p obe".**

**Pump's wiring**

Connect pH or ORP probe "BNC" to pump probe input.

Connect level probe to pump level probe input.

Fig. 10. Wirings



## PRIMING

**Warnings**

⚠ **Feeder should be interlocked with a no-flow p otection device to automatically shut-off the pumps when there is no flow**

⚠ **Adequate measures shall be taken to prevent cross connection of chemicals!**

⚠ **Chemical feeding must be stopped during backwash cycles and periods of noflow as these conditions may introduce the potential for chemical overdosing. Not doing so may result in elevated chemical concentrations and hazerdous gas introduction into the pool or spa.**

⚠ **Never operate any pumping system with a blocked suction and discharge. You must take all necessary measures to avoid this condition.**

⚠ **SAFETY EQUIPMENT**
**Use safety equipment according to the company regulations. Use this safety equipment within the work area:**
- **Helmet**
- **Safety goggles (with side shields)**
- **Protective shoes**
- **Protective gloves**
- **Gas mask**

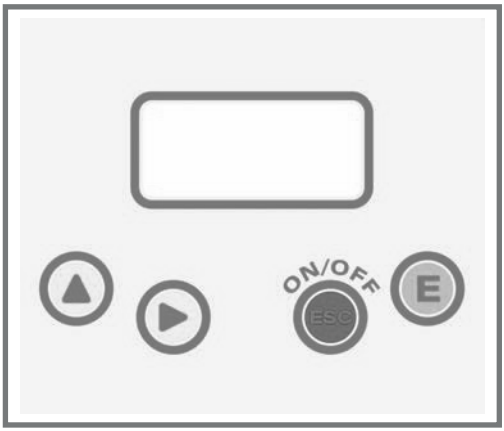
**Pump's priming**

To prime the pump:

1. perform al pipings (delivery, suction and discharge hose);
2. turn completely the discharge knob to open discharge valve;
3. supply the pump and turn on
4. set MANUAL (refer to Setting menu).
5. When the product will start to flow into discharge hose, close the discharge valve turning the knob (not for self-venting model).

For viscous liquids, to facilitate priming: insert a 20 cc syringe on venting pipe and suck;
When syringe is almost full close the discharge valve turning the knob..

## VMS PO CONTROL PANEL




| | | |
|---|---|---|
| **Keyboard function** | ▲ | SCREENS SCROLL / NUMBER INCREASING |
| | ▶ | CHANGE FIELD ON THE SAME SCREEN |
| | **ESC** | ON/OFF / EXIT OR BACK WITHOUT SAVE |
| | **E** | SELECT / CONFIRM / SAVE |

## PROGRAMMING THE PUMP

**Start/Power off**

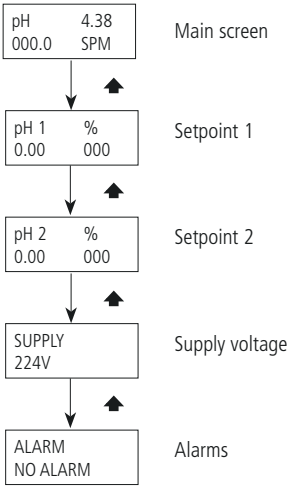
Connet power supply cable and start the pump with ON/OFF key.
Display will be on (default settings).
At first power on choose language.
Mode OFF: press OFF to switch off the pump.
Unplug power supply to complete the power off.

**Default settings**

| | | |
|---|---|---|
| PASSW | PASSWORD | 0000 |
| LANG | LANGUAGE | ENGLISH |
| OUT AL | OUT ALARM | N.O. |
| STAND-BY | STAND-BY | N.O. - TIME 00 MIN |
| DOS AL | DOSING ALARM | TIME 0h 00min - STOP no |
| READ AL | READING ALARM | TIME 0h 00min - STOP no |
| SET P pH | SETPOINT pH | PROP - pH1 7,5 50% - pH2 7,3 0% |
| SET P ORP | SETPOINT ORP | PROP - ORP1 700 50% - ORP2 730 0% |

**Main menu**

Use ▲ to scroll main menu.

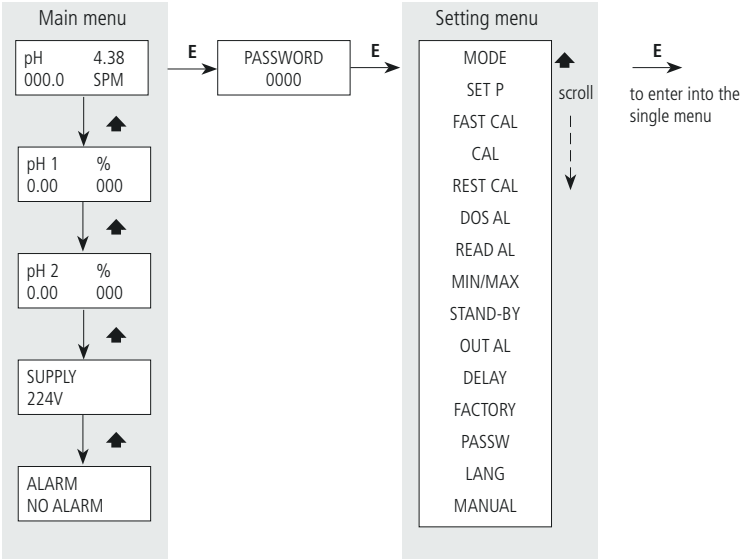



Tab. 3. Symbols on display

| | |
|---|---|
| # | one or more alarms occur (⎘ **ALARMS)**. |

Press ▲ to delete alarm messages on display.

**Setting menu** Settings

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**MODE**

Set the pump **working mode** between pH and ORP.


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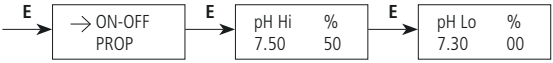
**SET P**

Set the pump **working mode** between ON/OFF or PROPORTIONAL and the ranges for on/off dosing or proportional dosing. % refer to pump stroke/minute.

In ON/OFF mode the pump works using two set values that enable or disable the pump.
Regulate Low value on 0% for pump off. Only in exceptional cases and for special applications regulate low value on a percentage different from 0%.

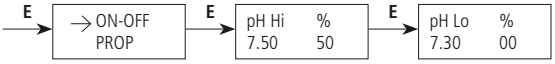
If pH pump:



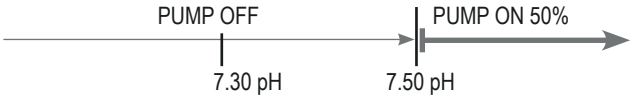

If ORP pump:

**Example**

Pump working in ON/OFF mode:





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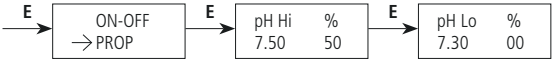
In PROPORTIONAL mode the pump works proportionally in the set range.
Regulate Low value on 0% for pump off. Only in exceptional cases and for special applications regulate low value on a percentage different from 0%.

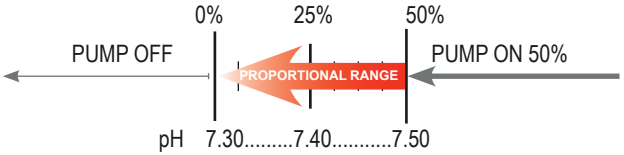
If pH pump:

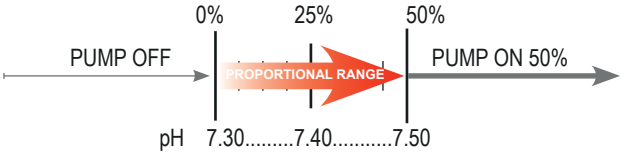



If ORP pump:


**Example**

Pump working in PROPORTIONAL mode

**FAST CAL**

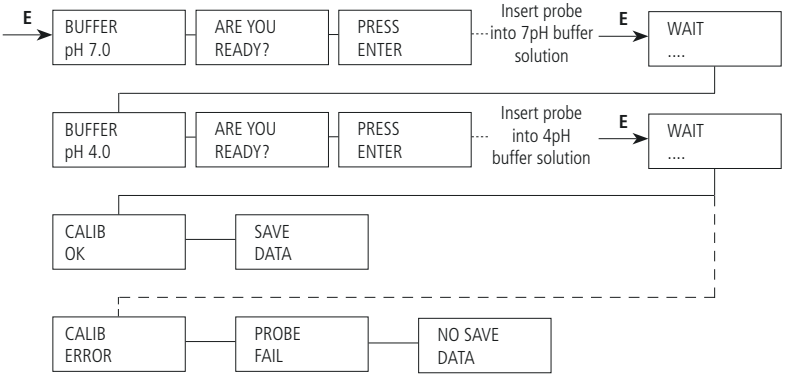
Set FAST CAL to perform a fast calibration on standard value: 7pH and 4ph or 650mV.
In order to perform a fast calibration, you need:

- 7 pH buffer solution
- 4 pH buffer solution

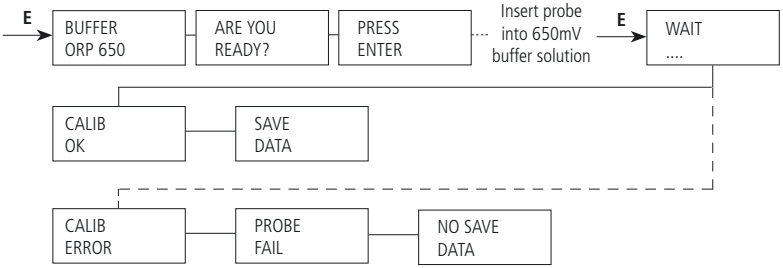
or

- 650 mV buffer solution

If pH pump:




If ORP pump:

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**CAL**

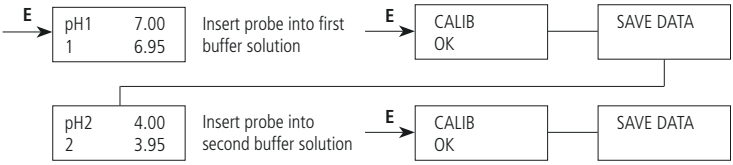
Set CAL to perform a classic calibration on 2 points if pH pump or on 1 point if ORP pump.
In order to perform a complete calibration, you need:

- two pH buffer solutions

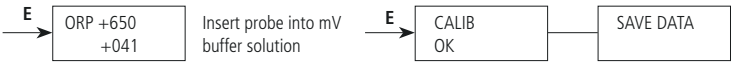
or

- a mV buffer solution.

If pH pump:




If ORP pump:



**REST CAL**

Set REST CAL to restore the LAST calibration saved.

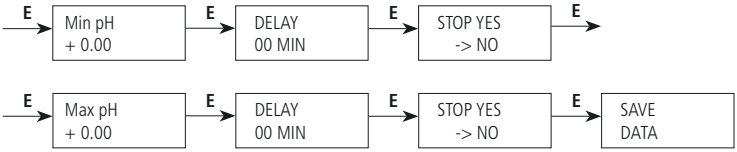

**DOS AL**

DOSING ALARM set a maximum dosing time alarm (max 9 h 99 min). This alarm prevents the pump to dose if a set time is reached.
If pump doses over the time, an alarm occurs.
If the dosing alarm occurs, the pump can be stopped or not (select STOP YES or NO).

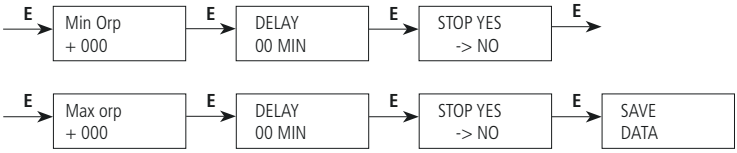

**MIN/MAX**

MIN/MAX set tha alarm for high and low ORP value. Set a delay to wait a reasonable time before alarm.
The alarm can stop (STOP YES) the pump.

If pH pump:

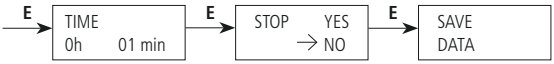



If ORP pump:



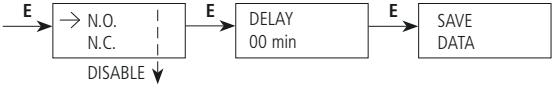

**READ AL**

READING ALARM set a probe reading alarm (max 9 h 99 min). This alarm prevents against probes failures.
If the value read by probe does not change for the time set, an alarm occurs.
If the reading alarm occurs, the pump can be stopped or not (select STOP YES or NO).




**STAND-BY**

STAND-BY set an input to stop the pump.
Set a delay (max 99 min) to wait a reasonable time after alert.
The stand by input can be set on:
- N.O.
- N.C.
- Disable



**OUT AL**

OUT AL set alarm relais status. This contact can be set as:
- N.O. contact;
- N.C. contact.


**DELAY**

DELAY set a waiting time after pump supply. It is suggested to wait a reasonable time for probe polarization. You can interrupt this delay by pressing **ESC** key to cancel the remaining time. Max delay 99 minutes.


**FACTORY**

Set FACTORY to restore the default settings (refer to Default settings).


**PASSW**

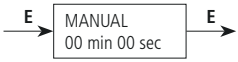
Set PASSWORD to change default password (0000).


**LANG**

Set LANG to change language (ENGLISH, FRENCH, DEUTSCH or SPANISH).

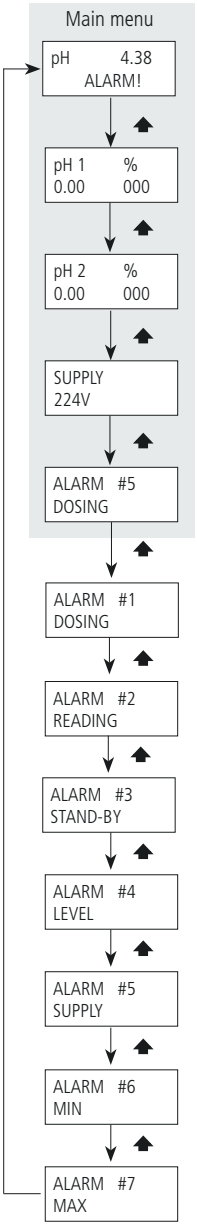

**MANUAL**

MANUAL set pump manual dosing up to 99 minutes and 99 seconds . This menu allows to prime the pump.



**ALARMS**

If one or more alarms occur, they are listed on main menu.
Solve the problem and delete the alarm message pressing ▲.



Documented alarms are:

| ALARM | CAUSE | SOLUTION | |
|---|---|---|---|
| DOSING | Dosing time over the limit (refer to DOS AL into Setting menu). | Check the probe | Clean and calibrate.<br>Eventually replace with a new probe |
| | | Check pump: no/not enough feeding | Control and clean injection valve<br>Control and clean foot filter<br>Control and clean pump's valves<br>Control solenoid |
| READING | Probe reading is not reliable. A probe failure is probable (refer to READ AL into Setting menu). | Check the probe | Clean and calibrate.<br>Eventually replace with a new probe |
| | | Check probe holder | Restore flow into probe holder |
| STAND-BY | No water flow. | Check probe holder | Restore flow into probe holder |
| | | Check the flow into plant | Restore flow into plant |
| LEVEL | Empty tank | Fill the tank | Restore product into tank |
| SUPPLY | Supply voltage over the limit (refer to the label) | Check supply voltage | Delete alarm on display pressing ⏏ |
| MIN | pH (or ORP) under min | Alarm disappears when reading is within the set range | |
| MAX | pH (or ORP) over max | Alarm disappears when reading is within the set range | |

Not documented alarms

| ALARM | CAUSE | SOLUTION | |
|---|---|---|---|
| PH PROBE READING BLINKS ON DISPLAY | pH over the limit (0/14 pH) | Check probe | Clean and calibrate.<br>Eventually replace with a new probe |
| | | Check pump: too feeding | Control pump settings<br>Control and clean injection valve |
| ORP PROBE READING BLINKS ON DISPLAY | ORP over the limit (-999/+999 mV) | Check probe | Clean and calibrate.<br>Eventually replace with a new probe |
| | | Check pump: too feeding | Control pump settings<br>Control and clean injection valve |

**TROUBLESHOOTING**

Tab. 5. Guide to troubleshooting

| PROBLEM | CAUSE | REMEDY |
|---|---|---|
| Pump does not start | • Pump not powered<br>• Protection fuse<br>• Main board | • Collegare la pompa alla rete elettrica<br>• Replace fuse **Fuse replacement procedure**.<br>• Replace main board **Main board replacement procedure**. |
| Pump does not feed but solenoid runs | • Foot filter obstruction<br>• Pump head empty (suction pipe empty)<br>• Air bubbles into pump head or into suction pipe<br>• Product generates gas | • Clean the foot filter<br>• Prime the pump **PRIMING**<br>• Check valves, pipes and fittings<br>• Open discharge knob and let air flow out. Use a self-venting pump head. |
| Pump does not feed, solenoid does not run or slightly run | • Valves and/or ball valves blocked<br>• Injection valve obstruction | • Clean valves and ball valve. Feed 2-3 litres of water to wash valves and pump head<br>• Change valves |

If the problem can not be solved, please contac after-sales service or return the dosing pump to the manufacturer.

**Repair service**

**Before return the dosing pump to the manufacturer Repair service, drain the chemical from pump head and rinse it. Refer to Shutdown procedure.**
**If there is the possibility that residual corrosive liquid into pump head could cause damages, declare it on REPAIR FORM.**

Fill the PRODUCT SERVICE REPAIR FORM and send it with the dosing pump.
Repair service is not accepted if PRODUCT SERVICE REPAIR FORM is missing.

**Fuse replacement procedure**

**⚠ Make sure that the product is isolated from the power supply and cannot be powered by mistake.**

**⚠ This procedure SHOULD BE CARRIED OUT BY AUTHORIZED AND QUALIFIED PERSONNEL**

In order to replace fuse, you need these tools:
- a 3x16 screwdriver
- a 3x15 screwdriver
- fuse (see **Features**)

- Unplug power supply and pipings.
- Remove screws on the back of the pump.
- Pull back cover until it's completed separated from pump's front. Be careful of the knob's spring.
- Locate the fuse and replace with a new one.
- Reassemble the pump.
- Reinsert screws

---

**Main board replacement procedure**

**⚠ Make sure that the product is isolated from the power supply and cannot be powered by mistake.**

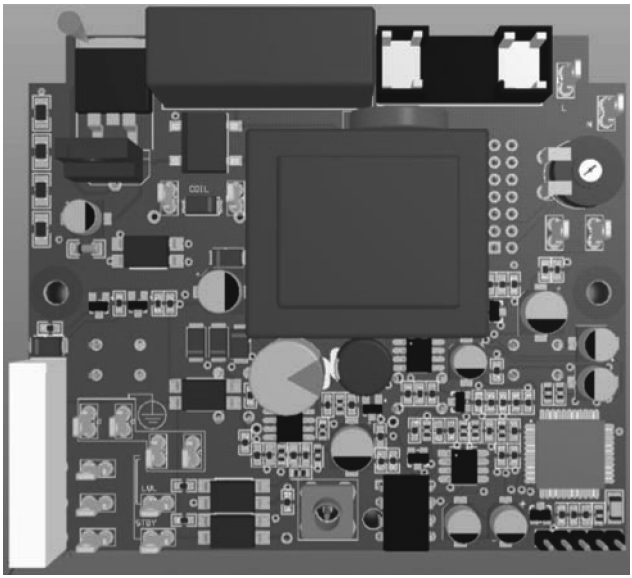
**⚠ This procedure SHOULD BE CARRIED OUT BY AUTHORIZED AND QUALIFIED PERSONNEL**

In order to replace main board, you need these tools:
- a 3x16 screwdriver
- a 3x15 screwdriver
- new main board.

- Unplug power supply and pipings.
- Remove screws on the back of the pump.
- Pull back cover until it's completed separated from pump's front. Be careful of the knob's spring.
- Remove boards screws..
- Completely disconnect wires from main board and replace it. Reinsert screws.
- Reconnect wires to the main board ( Main board scheme).
- Reassemble the pump.
- Reinsert screws.

**Main board**

Fig. 12. Main board scheme



## MAINTENANCE

**Maintenance schedule**

**In order to ensure the requirements of potable drinking water treated and the maintenance of the improvements as declared by the manufacturer, this equipment must be checked at least once a month.**

**OPERATOR PROTECTION**

**Use safety equipment according to the company regulations.**
**Use this safety equipment within the work area during installation, service and when handling chemicals:**

- **protective mask**
- **protective gloves**
- **safety goggles**
- **ear plugs or hear muffs**
- **further security device, if necessary.**

**POWER SUPPLY DISCONNECTION**

**Always disconnect power before you perform any installation or maintenance tasks. Failure to disconnect power will result in serious physical injury.**

**Installation and maintenance tasks should be carried out by AUTHORIZED AND QUALIFIED PERSONNEL only in accordance with local regulations.**

Use original spare parts.

---

**Maintenance inspection**

**Shutdown the dosing pump before any maintenance operation** **Shutdown procedure.**

A maintenance schedule includes these types of inspections:

- Routine maintenance and inspections
- Three-month inspections
- Annual inspections

Shorten the inspection intervals appropriately if the pumped chemical is abrasive or corrosive.

**Routine maitenance and inspections**

Perform these tasks whenever you perform routine maintenance:

- Inspect the seal. Ensure that there are no leaks from the mechanical seal.
- Check electrical wiring
- Check for unusual noise and vibration (noise allowed 73 dbA; ± 5 dB).
- Check the pump and piping for leaks.
- Check for corrosion on parts of the pump and / or on hoses.

**Three-month inspections**

Perform these tasks every three months:

- Check that the tightenings.
- Check the mechanical seal if the pump has been left idle.

**Annual inspections**

Perform these inspections one time each year:

- Check the pump capacity (as per nameplate).
- Check the pump pressure (as per nameplate).
- Check the pump power (as per nameplate).

If the pump performance does not satisfy your process requirements, and the process requirements have not changed, then perform these steps:
1. Disassemble the pump.
2. Inspect it.
3. Replace worn parts.

**Shutdown procedure**

⚠ **This procedure SHOULD BE CARRIED OUT BY AUTHORIZED AND QUALIFIED PERSONNEL**

⚠ **OPERATOR PROTECTION**
**Use safety equipment according to the company regulations.**
**Use this safety equipment within the work area during installation, service and when handling chemicals:**
- **protective mask**
- **protective gloves**
- **safety goggles**
- **ear plugs or hear muffs**
- **further security device, if necessary.**

Shutdown the dosing pump **before any maintenance operation** or **before long downtimes**. Disconnect power and ensure it cannot be restarted.

⚠ **Depressurize the system. The liquid may leak splashing.**

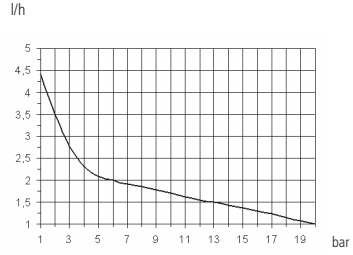
Drain the chemical from pump head.
Release the pressure and disconnect the disharge pipe from the discharge valve.
Rinse the pump head and clean all valves.

**Delivery curves**

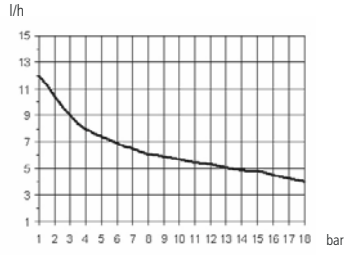
Flow rate indicated is for $H_2O$ at 20°C at the rated pressure.
Dosing accuracy ± 2% at constant pressure ± 0,5 bar.

Fig. 13. VMS PO delivery curves

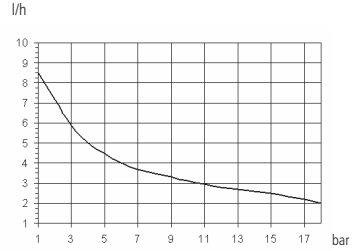
2001: l/h 1 bar 20
Pump head mod. J



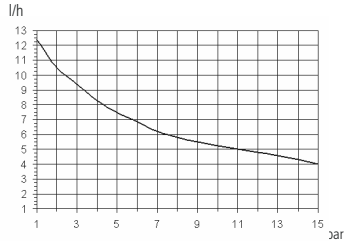

1804: l/h 4 bar 18
Pump head mod. K



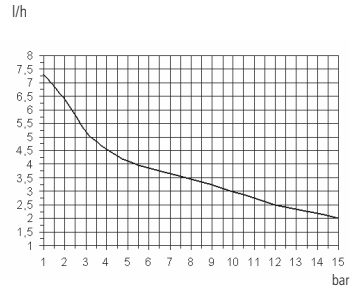

1802: l/h 2 bar 18
Pump head mod. K



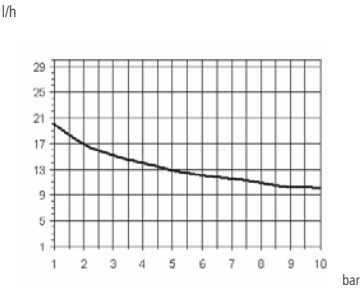

1504: l/h 4 bar 15
Pump head mod. K



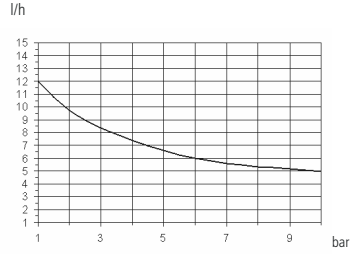

1502: l/h 2 bar 15
Pump head mod. K



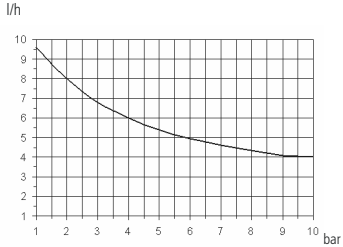

1010: l/h 10 bar 10
Pump head mod. K



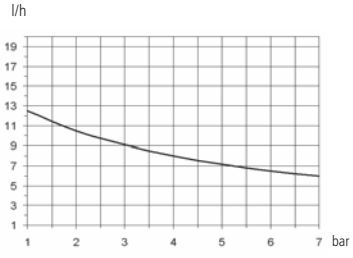
1005: l/h 5 bar 10
Pump head mod. K



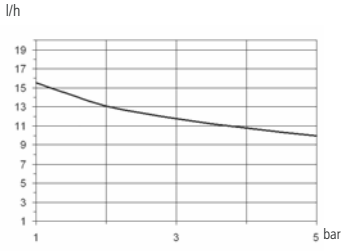

1004: l/h 4 bar 10
Pump head mod. K



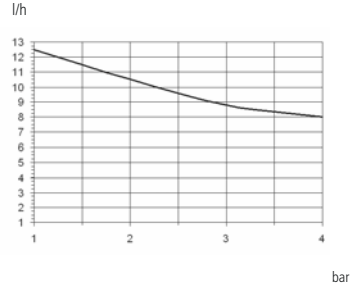

0706: l/h 6 bar 7
Pump head mod. K



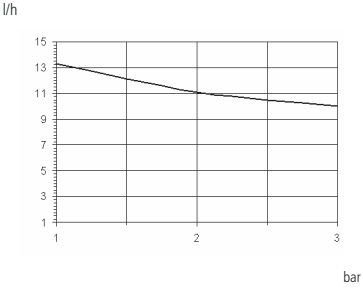

0510: l/h 5 bar 10
Pump head mod. K



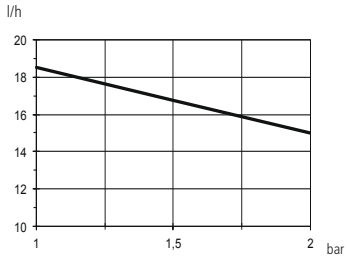

0408: l/h 8 bar 4
Pump head mod. K




0310: l/h 10 bar 3
Pump head mod. K




0215: l/h 15 bar 2
Pump head mod. K




0116: l/h 16 bar 1
Pump head mod. K

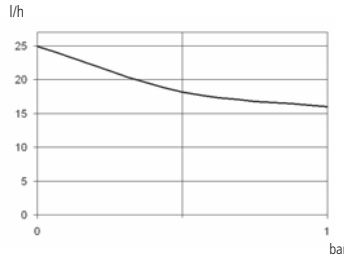
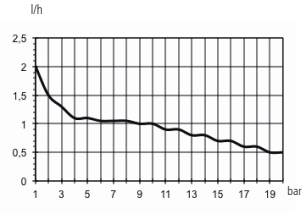
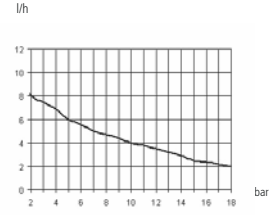


Fig. 14. VAPO delivery curves

200.5: l/h 0.5 bar 20
Pump head mod. JA

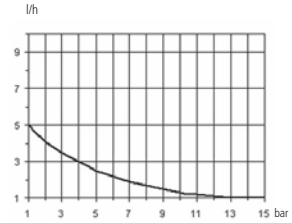



1802: l/h 2 bar 18
Pump head mod. KA

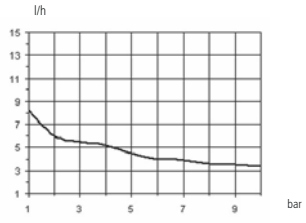



1503: l/h 3 bar 15
Pump head mod. KA

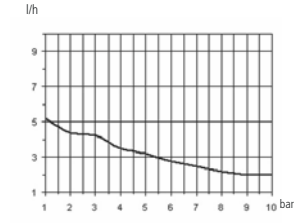

1501: l/h 1 bar 15
Pump head mod. KA



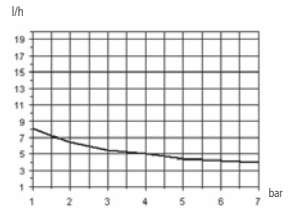

103.4: l/h 3.4 bar 10
Pump head mod. KA



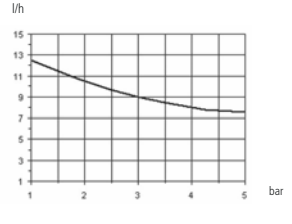

1002: l/h 2 bar 10
Pump head mod. KA



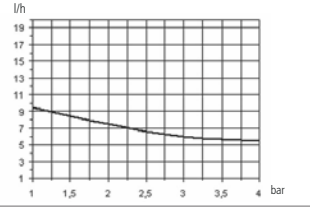

0704: l/h 4 bar 7
Pump head mod. KA



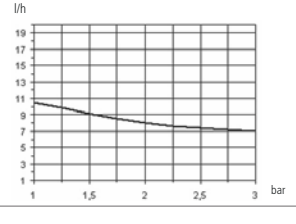

057.5: l/h 7.5 bar 5
Pump head mod. KA




045.5: l/h 5.5 bar 4
Pump head mod. KA



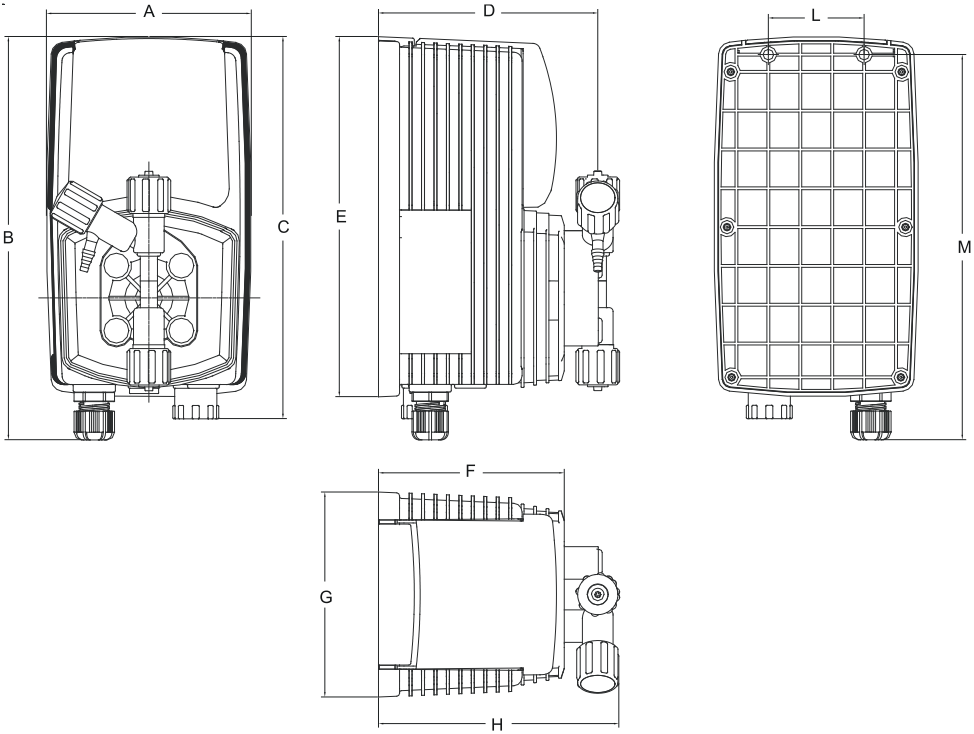

0307: l/h 7 bar 3
Pump head mod. KA



**Dimensions**

Fig. 15. Dimensions

| DIMENSIONS | | |
|---|---|---|
| | *mm* | *inch* |
| *A* | 106.96 | 4.21 |
| *B* | 210.44 | 8.28 |
| *C* | 199.44 | 7.85 |
| *D* | 114.50 | 4.50 |
| *E* | 187.96 | 7.40 |
| *F* | 97.00 | 3.81 |
| *G* | 106.96 | 4.21 |
| *H* | 125.47 | 4.93 |
| *L* | 50.00 | 1.96 |
| *M* | 201.00 | 7.91 |



## COMPATIBILITY TABLE

**Chemical compatibility table**

Solenoid driven metering pumps are widely used to dose chemical fluids and it is important that the most suitable material in contact with fluid is selected for each application. This compatibility table serves as a useful help in this respect. All the informations in this list are verified periodically and believed to be correct on the date of issuance. All the informations in this list are based on manufacturer's data and its own experience but since the resistance of any material depends by several factors this list is supplied only as an initial guide, in no way manufacturer makes warranties of any matter respect to the informations provided in this list.

Tab. 6. Chemical compatibility table.

| Product | Formula | Ceram. | PVDF | PP | PVC | SS 316 | PMMA | Hastel. | PTFE | FPM | EPDM | NBR | PE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetic Acid, Max 75% | CH3COOH | 2 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 3 | 1 |
| Hydrochloric Acid, Concentrate | HCl | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 3 | 3 | 1 |
| Hydrofluoric Acid 40% | H2F2 | 3 | 1 | 3 | 2 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 1 |
| Phosphoric Acid, 50% | H3PO4 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 3 | 1 |
| Nitric Acid, 65% | HNO3 | 1 | 1 | 2 | 3 | 2 | 3 | 1 | 1 | 1 | 3 | 3 | 2 |
| Sulphuric Acid, 85% | H2SO4 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 3 | 3 | 1 |
| Sulphuric Acid, 98.5% | H2SO4 | 1 | 1 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 3 | 3 | 3 |
| Amines | R-NH2 | 1 | 2 | 1 | 3 | 1 | - | 1 | 1 | 3 | 3 | 1 | 1 |
| Sodium Bisulphite | NaHSO3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Sodium Carbonate (Soda) | Na2CO3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 |
| Ferric Chloride | FeCl3 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Calcium Hydroxide (Slaked Lime) | Ca(OH)2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Sodium Hydroxide (Caustic Soda) | NaOH | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1 |
| Calcium Hypochlor.(Chlor. ted Lime) | Ca(OCl)2 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 3 | 1 |
| Sodium Hypochlorite, 12.5% | NaOCl + NaCl | 1 | 1 | 2 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 2 | 3 |
| Potassium Permanganate, 10% | KMnO4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 |
| Hydrogen Peroxide, 30% (Perydrol) | H2O2 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 3 | 3 | 1 |
| Aluminium Sulphate | Al2(SO4)3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Copper-II-Sulphate (Roman Vitriol) | CuSO4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

1 - Good resistance rating

2 - Fairly resistance rating

3- Not resistant

**Materials**

Polyvinyldene fluoride (PVDF) .....Pump heads, Valves, Fittings
Polypropylene (PP).....Pump heads, Valves, Fittings
PVC .....Pump heads
Stainless steel (SS 316).....Pump heads, Valves
Polymethyl Metacrilate Acrylic (PMMA) ...Pump heads
Polytetrafluoroethylene (PTFE) .....Diaphragm
Fluorocarbon (FPM).....O-ring
Ethylene propylene (EPDM).....O-ring
Nitrile (NBR).....O-ring

**Hose resistance table**

Hose features are very important for a reliable dosage. Every pump's model is made to work in the best way using selected hoses according to pump's capacity / model. Information reported here are intended for standard use only. For extended information ask to hose's manufacturer.

Tab. 7. Hoses features

| Suction / Delivery Hose | | | |
|---|---|---|---|
| 4x6 mm PVC (transparent) | 4x8 mm PE (opaque) | 6x8 mm PE (opaque) | 8x12 mm PVC (transparent) |

| Delivery Hose | Working Pressure | | | | Breaking Pressure | | | |
|---|---|---|---|---|---|---|---|---|
| 4x6 mm PE 230 (opaque) | 20°C 12 bar | 30°C 10.5 bar | 40°C 8.5 bar | 50°C 6.2 bar | 20°C 36 bar | 30°C 31.5 bar | 40°C 25.5 bar | 50°C 18.5 bar |
| 4x8 mm PE 230 (opaque) | 20°C 19 bar | 30°C 15.7 bar | 40°C 12 bar | 50°C 7.5 bar | 20°C 57 bar | 30°C 47 bar | 40°C 36 bar | 50°C 22.5 bar |
| 6x8 mm PE 230 (opaque) | 20°C 8.6 bar | 30°C 6.8 bar | 40°C 4.8 bar | 50°C 2.3 bar | 20°C 26 bar | 30°C 20.5 bar | 40°C 14.5 bar | 50°C 7 bar |
| 8x12 mm PE 230 (opaque) | 20°C 12 bar | 30°C 10.5 bar | 40°C 8.5 bar | 50°C 6.2 bar | 20°C 36 bar | 30°C 31.5 bar | 40°C 25.5 bar | 50°C 18.5 bar |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4x6 mm PVDF Flex 2800 (opaque) | 20°C 40 bar | 30°C 34 bar | 40°C 30 bar | 50°C 27 bar | 60°C 24.8 bar | 80°C 20 bar | 90°C 10 bar |
| 6x8 mm PVDF Flex 2800 (opaque) | 20°C 29 bar | 30°C 25.5 bar | 40°C 22 bar | 50°C 20 bar | 60°C 18 bar | 80°C 14.5 bar | 90°C 7.3 bar |
| 8X10 mm PVDF Flex 2800 (opaque) | 20°C 18 bar | 30°C 15.5 bar | 40°C 13.5 bar | 50°C 12.5 bar | 60°C 11.2 bar | 80°C 9 bar | 90°C 4.5 bar |

| | |
|---|---|
| 1/4 PE 230 (opaque) | 20°C 17.6 bar |
| 3/8 PE 230 (opaque) | 20°C 10.6 bar |
| 1/2 PE 230 (opaque) | 20°C 10.6 bar |

**PRODUCT SERVICE REPAIR FORM**

ENCLOSE THE PRESENT FORM TO THE DELIVERY NOTE

**DATE** .....

**SENDER**

Company name.....

Address .....

Phone no. .....

Contact person.....

**PRODUCT TYPE (see product label)**

DEVICE CODE .....

S/N (serial number).....

**OPERATING CONDITIONS**

Location/installation description .....

.....

Chemical .....

Start-up (date) ..... Running time (approx. hours).....

REMOVE ALL THE LIQUID INTO THE PUMP HEAD AND DRY IT BEFORE PACKAGING IN ITS ORIGINAL BOX.

**DESCRIPTION OF PROBLEM**

☐ MECHANICAL
- Wear parts.....
- Brekage/other damages .....
- Corrosion.....
- Other.....

☐ ELECTRICAL
- Connections, connector, cables .....
- Operating controls (keyboard, display, etc.) .....
- Elettronics.....
- Other.....

☐ LEAKS
- Connections.....
- Pump head .....

☐ NOT OR INADEQUATE FUNCTION/OTHER

.....

.....

.....

**I declare that the dosing pump is free of any hazardous chemical.**

Signature of the compiler

Company stamp

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**Disposal of end-of-life equipment by users**

This symbol warns you not to dispose of the product with normal waste. Respect human health and the environment by giving the discarded equipment to a designated collection center for the recycling of electronic and electrical equipment. For more information visit the online site.

When dismantling a pump please separate material types and send them according to local recycling disposal requirements. We appreciate your efforts in supporting your local Recycle Environmental Program. Working together we'll form an active union to assure the world's invaluable resources are conserved.