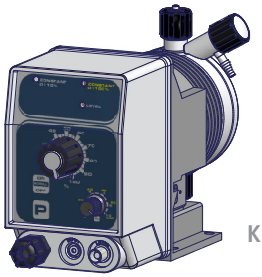
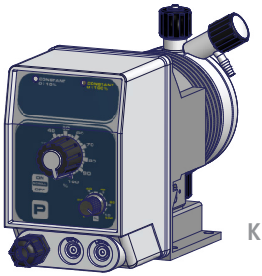
K PLUS - K CL PLUS - K CO PLUS

Self-venting version: KA PLUS
Viscous liquids: K PLUS LPV

PRODUCT LABEL



K CL PLUS



K CO PLUS

K PLUS

EN

OPERATING MANUAL

SOLENOID DRIVEN METERING PUMPS
WITH DIAPHRAGM

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. The original instruction is in English. All non-english instructions are translations of the original instruction.

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

Version: R2-07-21

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**

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 fluids.

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.

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.**
-

This equipment requires regular maintenance to ensure potability requirements of the water and maintenance of improvements as declared by the manufaturer.

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.

ENVIRONMENTAL SAFETY

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

Recycling guidelines

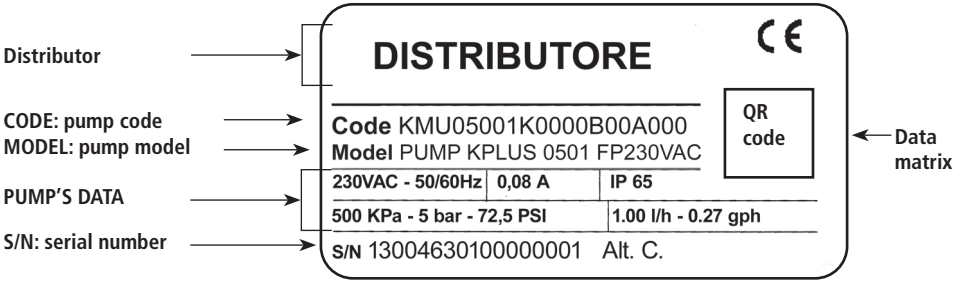
EWC code: 16 02 14

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

Fig. 1. Product 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)

Included into package

QUANTITY	CONTENT	K PLUS	K CL PLUS	K CO PLUS	KA PLUS	KA CL PLUS	KA CO PLUS	K PLUS LPV	K CL PLUS LPV	K CO PLUS LPV
n. 4	ø6 dibbles	●	●	●	●	●	●	●	●	●
n. 4	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)r	● 1/2"	● 1/2"	● 1/2"	● 1/2"	● 1/2"	● 1/2"	● 3/4"	● 3/4"	● 3/4"
m 2	delivery hose	● PVDF	● PVDF	● PVDF	● PVDF	● PVDF	● PVDF	● PE	● PE	● PE
m 2	suction hose	● PVC/PE	● PVC/PE	● PVC/PE	● PE	● PE	● PE	● PVC	● PVC	● PVC
m 2	venting hose	● PVC	● PVC	● PVC	● PE	● PE	● PE			
m 0,3	priming hose / syringe							● PVC	● PVC	● PVC
m 2,5	external signal cable	●			●			●		
n.1	operating manual	●	●	●	●	●	●	●	●	●

DESCRIPTION

K PLUS

K PLUS is a constant or proportional dosing pump with level control for chemical feeding into water.

In **Constant** dosing mode pump doses a constant quantity regularly as configured by the user.
In **Proportional** dosing mode pump doses a quantity proportionally to an input signal, digital (voltage free contact) or current (mA).

Working modes available:
- constant
- constant with 1-10 pulses divider
- multiplier with 1-10 pulses divider
- divider with 1-10 pulses divider
- divider with 1-100 pulses divider
- divider with 1-1000 pulses divider
- mA current signal (0/4 mA = 0 pulses: 20mA = max pulses)

Flow rate is determined by the stroke length and by the stroke speed. The stroke length is adjustable from 0 to 100% using the stroke length adjustment knob. However dosing accuracy is guarantee within an adjustment range from 30% to 100%.

K CO PLUS

K CO PLUS works in **constant mode.**

The pump can be set to work in
- constant
- constant with 1-10 speed reducer.

K CL PLUS

K CL PLUS works in **constant mode and has got level control.**

The pump can be set to work in
- constant

NSF/ANSI 61

- constant with 1-10 speed reducer.

Self venting:
KA PLUS

KA is the K version with **self-venting pump head**.
Self-venting pump head must be used when using chemicals that produce gas (i.e. hydrogen peroxide, ammonium, sodium hypoclorite at particular conditions).
For connections 📄 **"Self-Venting pump head installation".**

Compressed air:
K AC PLUS

K AC is the K version with **double supply: compressed air and power supply.**
Compressed air without lubrifiant and/or condensed water.
Air supply pressure range must be from 6 to 10 bar.

Viscosity up to 8.000 cPs:
K PLUS LPV

K PLUS LPV is the K version with PMMA pump head for **liquids with max viscosity 8.000 cPs.**
Funtioning mode is the same as K PLUS.
Flow may change according to viscosity. Flow rates indicated refer to a measure with water.
Liquid ends: 3/4" injection valve, 16x22 PVC suction hose and 8x12 PE injection hose.
Not included: Stainless steel foot filter with valve.

Fig. 2. K PLUS - KA PLUS

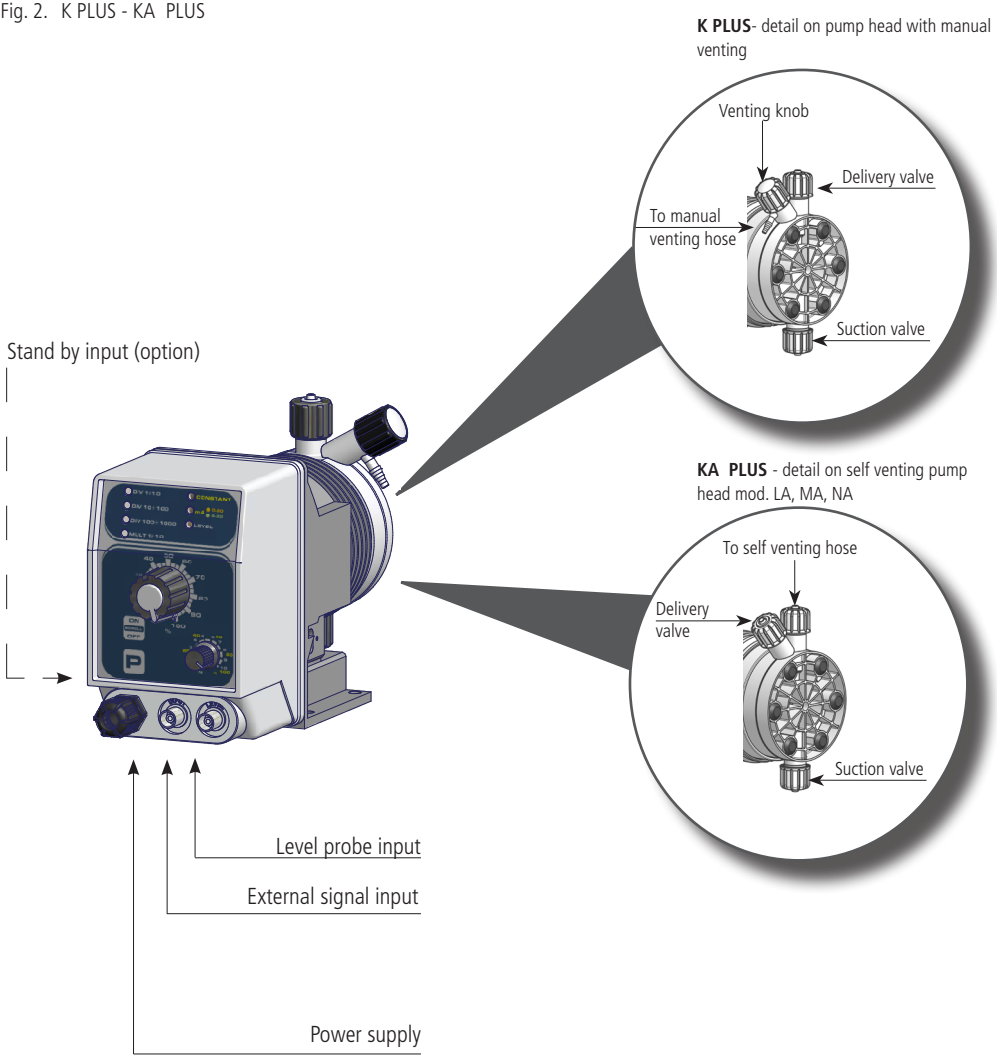
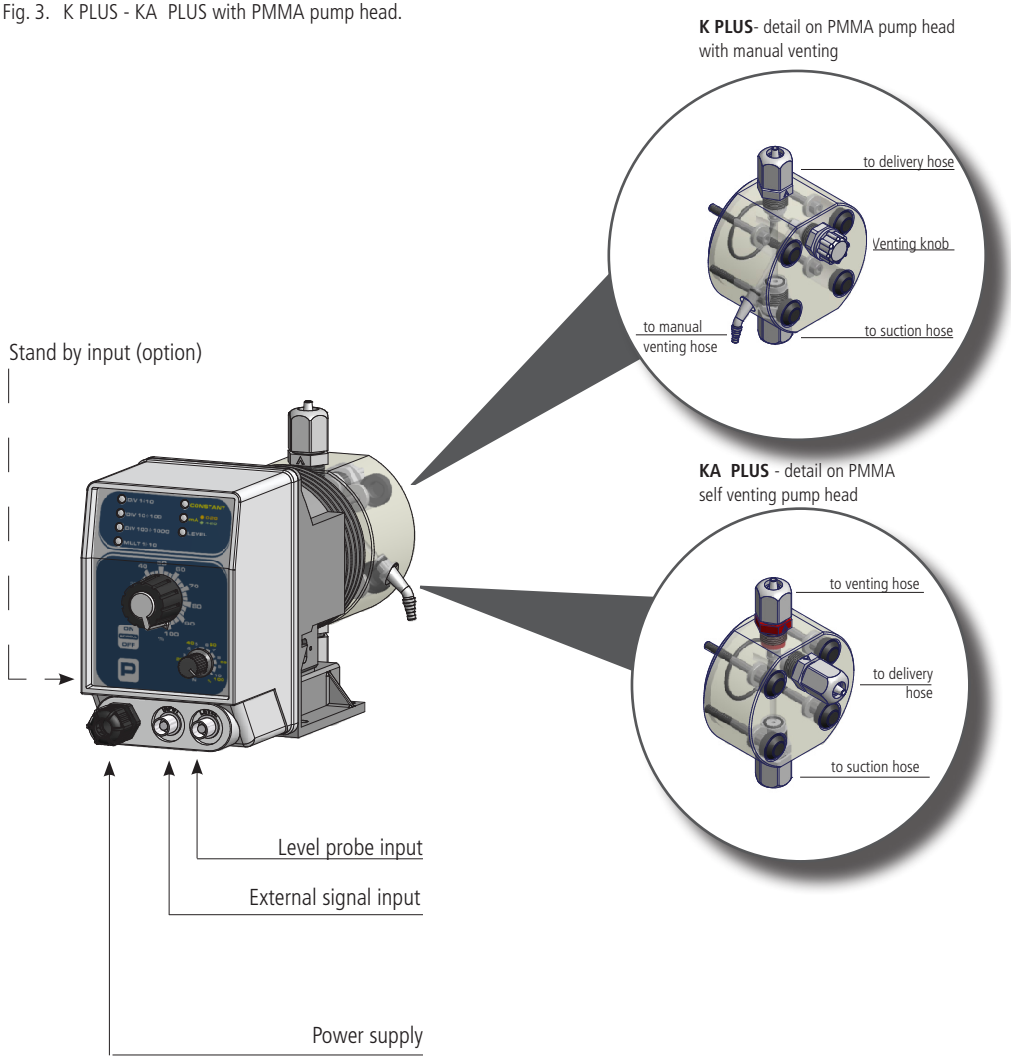


Fig. 3. K PLUS - KA PLUS with PMMA pump head.



Features

Power Supply	Fuse
230 VAC (180-270 VAC) - 50/60 Hz	1 A
115 VAC (90-135 VAC) - 50/60 Hz	500 mA
24 VAC (20-32 VAC) - 50/60 Hz	2 A
12 VDC (10-16 VDC)	2 A

Environment temperature .....10-45°C (55-113°F) - 50/60 Hz
Chemical temperature .....0-50°C (32-122°F) - 50/60 Hz
Transportation and storage temperature ...10-50°C (55-122°F) - 50/60 Hz
Installation class II
Pollution level 2
Altitude max .....2000 m
Audible noise.....73,4 dbA (silenced: 70,4 dbA; ultrasilenced: 69,4 dbA)
Protection degree.....IP 65
Working UR % .....85% at t ≤40 °C; 70% at 50 °C (no condensing water)
Max installation height.....1,5 m
Capacity ..... Table 1 and 2

Tab. 1. Capacity (manual and self venting models)

CAPACITY														
Mod. K PLUS K PLUS LPV[1]	**Flow**				**cc per stroke[2]**		**pulse/ min**	**Max pressure**		**peak Amps (A)**		**Delivery hose (PVDF)**	**Suction hose**	**Pump head**
	min cc/h	max l/h	Min GPH	Max GPH	**min**	**max**		**bar**	**PSI**	230 VAC	115 VAC			
2001	0,03	1	0,000008	0,3	0,03	0,09	180	20	290	2.7	1.45	4 x 6	4 x 6	I
1802	0,06	2	0,000016	0,53	0,06	0,19	180	18	261	2.7	1.45	4 x 6	4 x 6	L
1504	0,11	4	0,000029	1,06	0,11	0,37	180	15	217	2.7	1.45	4 x 6	4 x 6	L
1005	0,14	5	0,000037	1,32	0,14	0,46	180	10	145	2.7	1.45	4 x 6	4 x 6	L
0808	0,22	8	0,000058	2,11	0,22	0,74	180	8	116	2.7	1.45	4 x 6	4 x 6	L
0510	0,28	10	0,000074	2,64	0,28	0,93	180	5	72	2.7	1.45	4 x 6	4 x 6	L
0501	0,28	1	0,000008	0,3	0,03	0,09	180	5	72	2.7	1.45	4 x 6	4 x 6	L
0218	0,50	18	0,00013	4,76	0,50	1,67	180	2	29	2.7	1.45	6 x 8	6 x 8	M
Mod. KA PLUS	**Flow**				**cc per stroke[2]**		**pulse/ min**	**Max pressure**		**peak Amps (A)**		**Delivery hose (PVDF)**	**Suction hose**	**Pump head**
	min cc/h	max l/h	Min GPH	Max GPH	**min**	**max**		**bar**	**PSI**	230 VAC	115 VAC			
1801	0,03	1	0,000008	0,26	0,03	0,09	180	18	261	2.7	1.45	4 x 6	4 x 6	LA
1503	0,08	3	0,000021	0,79	0,08	0,28	180	15	217	2.7	1.45	4 x 6	4 x 6	LA
103.5	0,10	3,5	0,000026	0,92	0,10	0,32	180	10	145	2.7	1.45	4 x 6	4 x 6	LA
085.5	0,15	5,5	0,000040	1,45	0,15	0,51	180	8	116	2.7	1.45	4 x 6	4 x 6	LA
057.5	0,21	7,5	0,000055	1,98	0,21	0,69	180	5	72	2.7	1.45	4 x 6	4 x 6	LA
0213	0,37	13	0,000098	3,43	0,37	1,20	180	2	29	2.7	1.45	6 x 8	6 x 8	MA

[1] Flow rates indicated refer to a measure with water. flow may change according to viscosity.
[2] cc per stroke: referred to cc/stroke with stroke length knob on 100%.

Tab. 2. Capacity (compressed air model)

CAPACITY											
Modello K AC PLUS	Flow				cc per stroke *		Max pressure		Delivery hose (PVDF)	Suction hose	Pump head
	min cc/h	max l/h	Min GPH	Max GPH	min	max	bar	PSI			
1018	0.6	18	0.16	4.7	0.6	2	10	145	6 x 8	6 x 8	M
*** cc per stroke:** referred to cc/stroke with stroke length knob on 100%.											

Manual stroke length adjustment

Max cc/stroke (**Construction Materials and Technical info**) are referred to cc/stroke with stroke length knob on 100%.
The stroke length knob adjusts the pump capacity. Press and rotate the knob when the pump is powered.

Dosing accuracy is guarantee within an adjustment range from 30% to 100%.

Note:if knob isn't on 100% position then the pump will dose at pressure greater than the one declared on label.

Materials

✓ : standard
✗: options available
✓ : standard
✗: opzione disponibile

Materiali di costruzione K PLUS KA PLUS

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

Materiali di costruzione K PLUS LPV

	PVDF	PP	PPV0	PMMA	PVC	PE	CE	GLASS	PTFE	SS	FKM B	EPDM	WAX	SI
BOX		✓	✗											
PUMP HEAD				✓										
DIAPHRAGM									✓					
BALLS										✓				
SUCTION HOSE					✓									
DELIVERY HOSE						✓								
PRIMING HOSE					✓									
O RING											✓	✗	✗	

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 hazards.**
- **Avoid water splashs and direct sun!**

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 vibration problems;
- in an easy accessible place;
- in horizontal position.

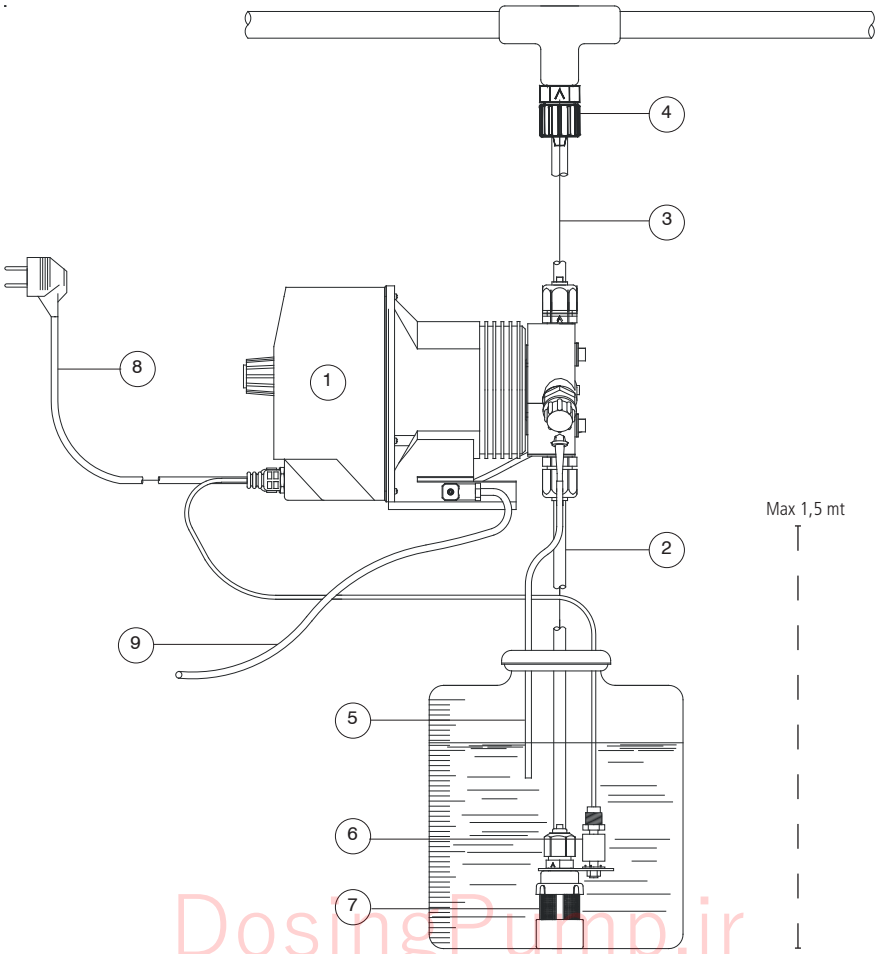
Use only hoses compatibles with product to dose.
See "Chemical compatibility table" page 31.
If dosing product is not listed please consult full compatibility table or contact chemical's manufacturer.

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. 4. Installation

1 - Dosing Pump
2 - Suction Hose
3 - Delivery Hose
4 - Injection Valve
5 - Air discharge
6 - Level Probe
7 - Foot Filter
8 - Power Cable
9 - Stand-by/alarm (if any)



PIPING CONNECTIONS

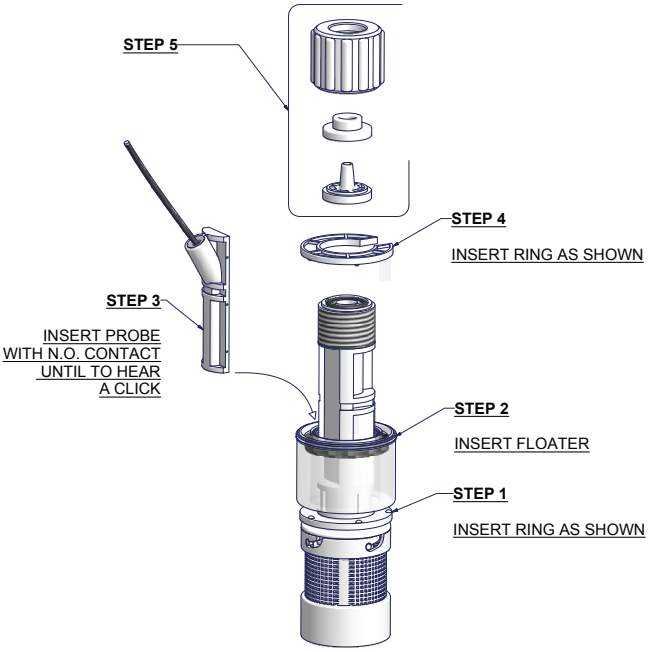
Foot filter / Level probe (included only in some models)

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 filter.

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

Fig. 5. Level probe assembling diagram.



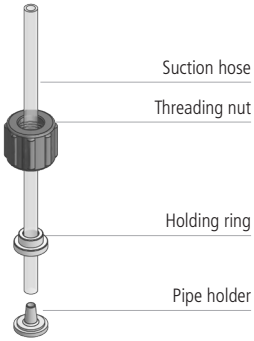
Suction hose connection

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. 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 firmly.
Do not use tongs or any other tool.

Fig. 6. Suction hose assembling



Pump head / delivery hose assembling procedure

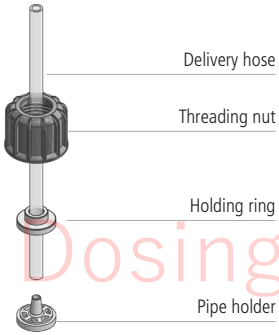
Suction and delivery valves must be in vertical position.

Delivery hose must be firmly fixed to avoid suddenly movements that could 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.6.
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 firmly.
Do not use tongs or any other tool.
Connect the other end of the hose to the injection valve using the same procedure.

Fig. 7. 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.

Venting hose

Insert one side of venting hose into discharge connector as shown in fig 8.

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

Fig. 8. Manual venting pump head model (K PLUS).

fig. 9a. PVDF pump head connections.

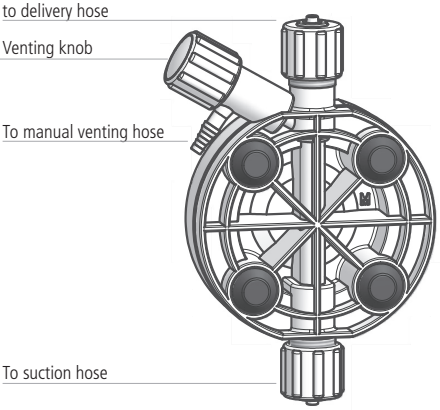
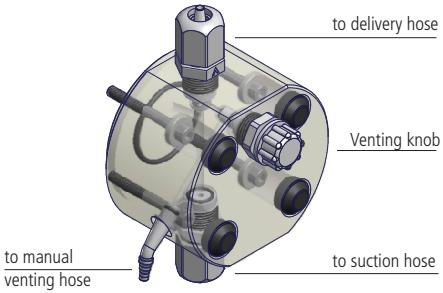


fig.9b. PMMA pump head connections.



Flow direction is indicated by the arrow on the valves.

For priming procedure see **PRIMING**.

it's allowed to lightly bend venting hose.

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

KA PLUS self venting pump head connection

Refer to fig. 9 for delivery and venting hose.
Assembling procedures are the same described before.

Fig. 9. Self-venting models pump head: IA, LA, MA, (KA PLUS).

fig. 10a. PVDF pump head connections.

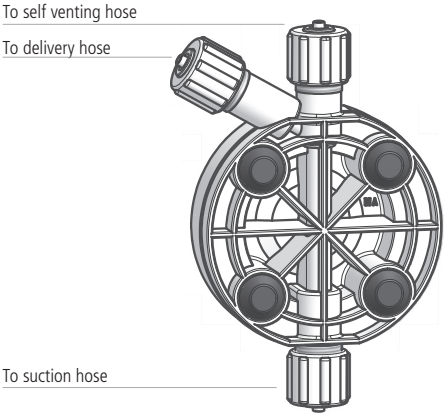
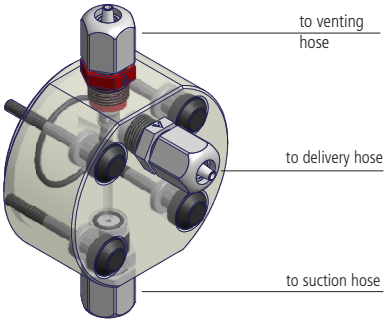


fig. 10b. PMMA pump head connections.



Flow direction is indicated by the arrow on the valves.

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.

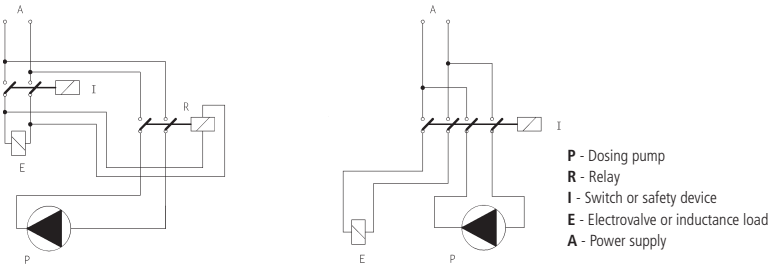
Before to proceed, verify the following steps:

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 fig. 10.**

Fig. 10. Electrical installation.



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

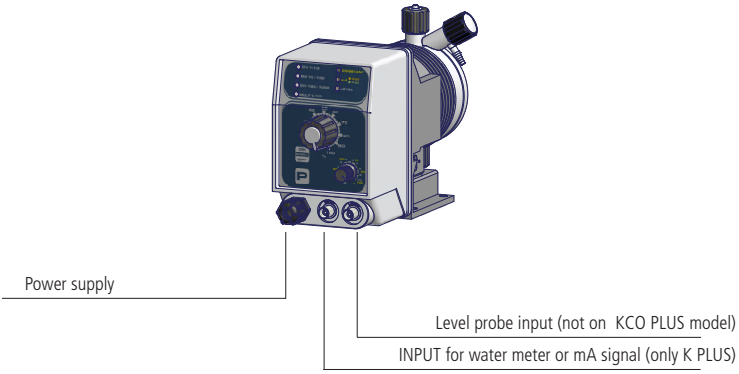
Power supply	
12 VDC	connect the pump to a 55 Ah-12VDC battery
24 VDC	connect the pump to a 200W stabilized power supply (verify peak Amps)

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

Pump's wiring

Connect external signal "BNC" to pump "INPUT".
This signal can be:
- water meter input
- mA signal input.

Fig. 11. Wirings



Level alarm output (option)

If present, connect level alarm (blue and brown wires).
Level alarm is free contact and not fuse protected output.
Max load relay output: 2A 250VAC.

PRIMING

Warnings

⚠ **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.**

⚠ **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**

Manual priming

To prime the pump (only in CONSTANT working mode):

1. perform al pipings (delivery, suction and venting hose);
2. turn completely the venting knob to open discharge valve;
3. set STROKE LENGTH KNOB on 100% (for viscous liquids set between 50 and 70%);
4. supply the pump.
5. When the product will start to flow into venting 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..

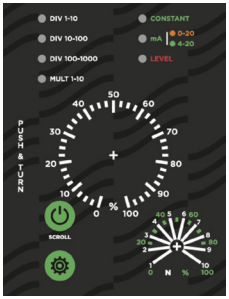
Automatic priming

1. Turn OFF the pump.
2. Keep pressed OFF key for 4 seconds.
3. Pump primes for 30 seconds.
4. Turn ON the pump.

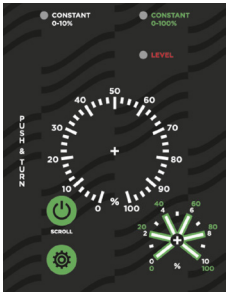
The pump returns to the last working mode.

CONTROL PANEL

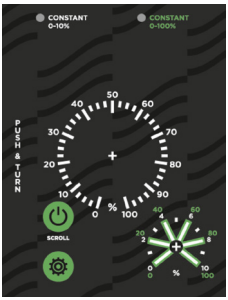
K PLUS



K CL PLUS



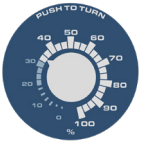
K CO PLUS



Keyboard function

"P" KEY / PROGRAMMING MODE ENTER/EXIT

ON/OFF - SCROLL PROGRAMS



STROKE LENGHT ADJUSTMENT KNOB (0-100%)

K PLUS
- STROKE FREQUENCY ADJUSTMENT (yellow labelled scale 0-100%) or
- DIVIDER MULTIPLIER FACTOR ADJUSTMENT N (grey labelled scale N: 1-10)

K CO PLUS / K CL PLUS
- STROKE FREQUENCY ADJUSTMENT (yellow labelled scale 0-100%) WITH CONSTANT 0-100% PROGRAM
- DIVIDER FACTOR ADJUSTMENT N (grey labelled scale 0-10%) WITH CONSTANT 0-10% PROGRAM

Tab. 3. Keys functions

OPERATION	KEY
ON / OFF / AUTOMATIC PRIMING	ON/OFF - SCROLL
ENTER / EXIT from PROGRAMS MENU	⚙
CONFIRM PROGRAM	⚙
SCROLL PROGRAMS	ON/OFF - SCROLL

KCO PLUS

KCL PLUS

K PLUS

PROGRAMMS LED

Select a program to turn on the corresponding LED  **Set the PROGRAM**.

LED LEVEL (NOT ON K CO PLUS)

Functions described in **Led LEVEL**.

LEVEL led

Red level led blinks in different ways described in the table

Tab. 4. Led LEVEL

LED	STATE	SOLUTION
Permanent red	Product end (if present a level probe) / tank empty	Fill the tank
3 blinks per second	Power supply is under the range (refer to pump label)	Check power supply correspond to pump label. Shutdown and restart.
2 blinks per second	Power supply is over the range (refer to pump label)	Check power supply correspond to pump label. Shutdown and restart.
1 blink per second	Pump is waiting program setting	Press scroll key and choose a program. Confirm with P key

PROGRAMS led

PROGRAMS led shows the current working program.
Press repeatedly SCROLL to select the working program

Tab. 5. Led PROGRAMS

LED	STATE
On	Pump ON. Current pump working mode.
1 blink every 2 seconds on last working program.	Pump OFF.
All leds blinking together	Pump is waiting for programming. Press P and SCROLL to select the program or wait 30 seconds to exit without changing.

PROGRAMMING THE PUMP

Start/shutdown

Connet power supply cable and start the pump with ON/OFF key.
Led will be on the last program set (default setting:).
In OFF mode led will blink once every 2 seconds on the last program set (default setting:).

Set the PROGRAM

- Keep pressed P for 4 seconds.
- Leds blink together.
- Press P.
- Press SCROLL and choose a program.
- Press P to confirm. Led will be on the program set.

If you do not press any key, after 30 seconds pump will esc from programming mode.

PROGRAMS

Each program has its own led.

Tab. 6. Programs menu

PROGRAMS	WORKING MODE
mA [1]	proportional dosing mode based on mA current signal
CONSTANT	constant dosing mode
CONSTANT / DIVIDE	costant dosing mode with pulses divider (to reduce up to 10 times pump capacity)
MULT 1÷10 [1]	External pulses from a water meter are multiplied by a factor "N" from 1 to 10. Set "N" value turning DIVIDER MULTIPLIER FACTOR ADJUSTMENT KNOB (grey labelled scale N: 1-10).
DIV 1÷10 [1]	External pulses from a water meter are divided by a factor "N" from 1 to 10. Set "N" value turning DIVIDER MULTIPLIER FACTOR ADJUSTMENT KNOB (grey labelled scale N: 1-10).
DIV 10÷100 [1]	External pulses from a water meter are divided by a factor "N" from 10 to 100. Set "N" value turning DIVIDER MULTIPLIER FACTOR ADJUSTMENT KNOB (grey labelled scale N: 1-10). Grey labelled scela 1-10 is proportional to the range 10-100. Adjust the knob on maximum value (10) is equivalent to setting the scale on 100.
DIV 100÷1000 [1]	External pulses from a water meter are divided by a factor "N" from 100 to 1000. Set "N" value turning DIVIDER MULTIPLIER FACTOR ADJUSTMENT KNOB (grey labelled scale N: 1-10). Grey labelled scale 1-10 is proportional to the range 10-100. Adjust the knob on maximum value (10) is equivalent to setting the scale on 1000.

[1] Not available on K CO PLUS and K CL PLUS models.

mA mode

Current from an external device (BNC input) drives the pump that doses proportionally according to the minimum and maximum set (0-20 mA or 4-20 mA).

To set press SCROLL until mA led turn on (red for 0-20 mA; green for 4-20 mA) and confirm with P key.

To choose if...	... there is a mA current signal (controllers provided with proportional output in current), and you have to dose a certain amount of product.

STROKE LENGHT ADJUSTMENT KNOB (0-100%) acts percentually on pump capacity.

STROKE FREQUENCY ADJUSTMENT (yellow labelled scale 0-100%) acts on injection per minutes.

CONSTANT mode

Pump doses at a constant rate set with stroke length adjustment knob.

To set press SCROLL until CONSTANT led turn on and confirm with P key.

To choose if...	... there is not an external signal, and you have to dose a certain amount of product regularly.

STROKE LENGHT ADJUSTMENT KNOB (0-100%) acts percentually on pump capacity.

STROKE FREQUENCY ADJUSTMENT (yellow labelled scale 0-100%) acts on injection per minutes.

CONSTANT with divider mode

Pump doses at a constant rate set with stroke length adjustment knob but this rate is divided by a factor up to 10.

To set press SCROLL until CONSTANT and DIV 1÷10 led turn on together, then confirm with P key.

To choose if...	... there is not an external signal, and you have to dose a certain amount of product regularly but pump capacity is too high

STROKE LENGHT ADJUSTMENT KNOB (0-100%) acts percentually on pump capacity.

DIVIDER FACTOR ADJUSTMENT KNOB (grey labelled scale 1-10%) set the divider factor 1-10 to reduce pump capacity.

MULT 1÷10 mode

External pulses are multiplied by a value set by MULTIPLIER FACTOR ADJUSTMENT KNOB.

To set press SCROLL until MULT 1÷10 led turn on, then confirm with P key.

To choose if...	... an external signal produces low pulses number. This working mode multiplies pulses from 1 to 10 to dose the correct product amount.

STROKE LENGHT ADJUSTMENT KNOB (0-100%) acts percentually on pump capacity.

MULTIPLIER FACTOR ADJUSTMENT KNOB (grey labelled scale 1-10) set the multiplier factor 1-10 to increase pump capacity.

DIV 1÷10
DIV 10÷100
DIV 100÷1000 mode

External pulses are multiplied by a value set by DIVIDER FACTOR ADJUSTMENT KNOB.

To set press SCROLL until DIV 1÷10 or DIV 10÷100 or DIV 100÷1000 led turn on, then confirm with P key.

To choose if...	... an external signal produces high pulses number. This working mode divides pulses to dose the correct product amount.

STROKE LENGHT ADJUSTMENT KNOB (0-100%) acts percentually on pump capacity.

DIVIDER FACTOR ADJUSTMENT KNOB (grey labelled scale 1-10) set the divider factor to reduce pump capacity:

- from 1 to 10 if in **DIV 1÷10 mode**
- from 10 to 100 if in **DIV 10÷100 mode**
- from 100 to 1000 if in **DIV 100÷1000 mode**

Calculate the N factor

Use the formula:

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

N	value to set with FACTOR ADJUSTMENT KNOB
[imp/l]	pulses/litre from pulse emitter water meter
[cc]	single injection product amount of dosing pump (cubic centimetres)
[ppm]	part per million product amount (gr/m^3)
[K]	product diluition coefficient.

Depending on N set working mode:

Result	Working mode
N>1	**DIV 1÷10 or DIV 10÷100 or DIV 100÷1000**
N<1	**Calculate 1/N then set the resul in MULT 1÷10**
N=1	**DIV 1÷10 or DIV 10÷100 or DIV 100÷1000 or MULT 1÷10**

TROUBLESHOOTING

Tab. 7. Guide to troubleshooting

PROBLEM	CAUSE	REMEDY
Pump does not start	• Pump not powered • Protection fuse • Main board	• Connect to main voltage • Replace fuse **Fuse replacement procedure**. • Replace main board **Main board replacement procedure**.
Pump does not feed but solenoid runs	• Foot filter obstruction • Pump head empty (suction pipe empty) • Air bubbles into pump head or into suction pipe • Product generates gas	• Clean the foot filter • Prime the pump **PRIMING** • Check valves, pipes and fittings • Open venting 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 • Injection valve obstruction	• Clean valves and ball valve. Feed 2-3 litres of water to wash valves and pump head • 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:i:
- a 3x16 screwdriver
- a 3x15 screwdriver
- fuse (see **Features**)

- Unplug power supply and pipings.
- Turn STROKE LENGHT ADJUSTMENT KNOB on 0%.
- 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. Be careful to put back the knob's spring.
- Reinsert screws

Main board replacement procedure

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

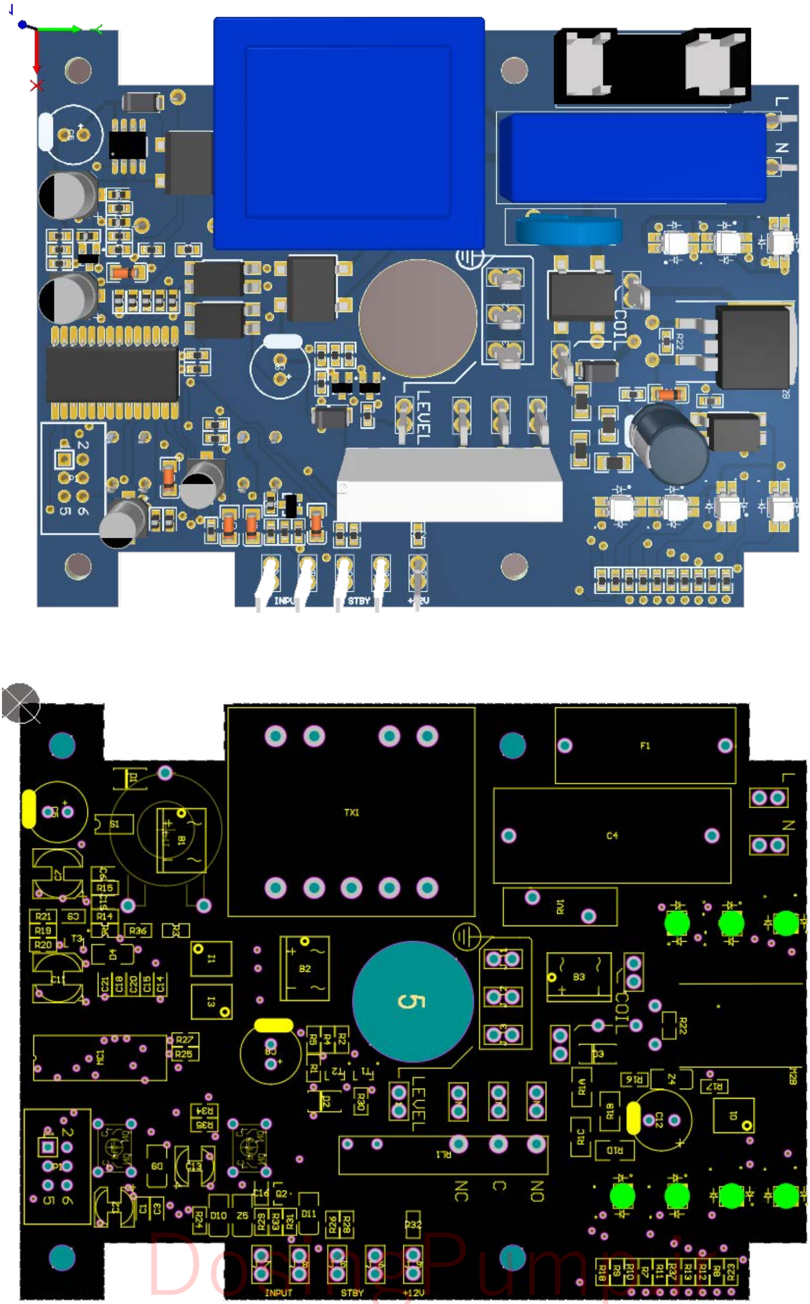
⚠ This procedure SHOULD BE CARRIED OUT BY AUTHORIZED AND QUALIFIED PERSONNEL

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

- Unplug power supply and pipings.
- Turn STROKE LENGHT ADJUSTMENT KNOB on 0%.
- 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. Be careful to put back the knob's spring.
- 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 to the motor 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 inspoections
- 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 74 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).

f 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.**

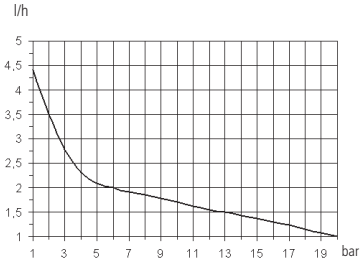
Drain the chemical from pump head.
Release the pressure and disconnect the disharge pipe from the discharge valve.
Rinse the pump head and clean all valves.

Delivery curves

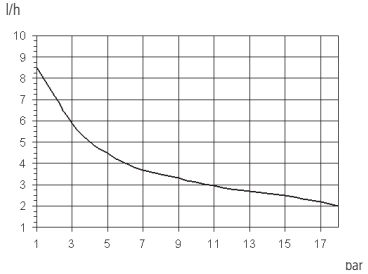
Flow rate indicated is for H_2O at 20°C at the rated pressure.
Dosing accuracy ± 2% at constant pressure ± 0,5 bar.

Fig. 13. K PLUS delivery curves

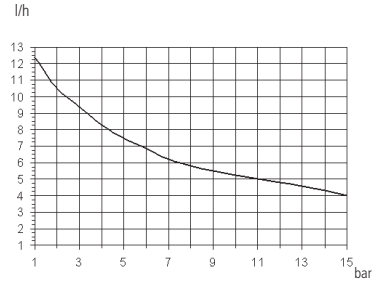
2001: l/h 01 bar 20
Pump head mod. I



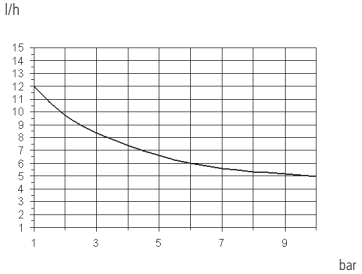
1802: l/h 2 bar 18
Pump head mod. L



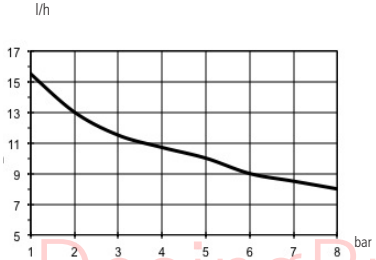
1504: l/h 4 bar 15
Pump head mod. L



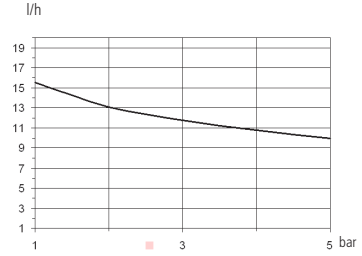
1005: l/h 5 bar 10
Pump head mod. L



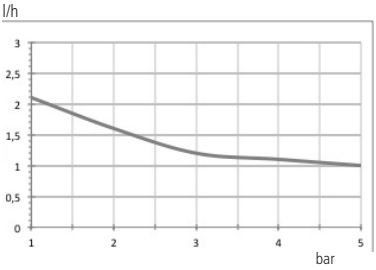
0808: l/h 8 bar 8
Pump head mod. L



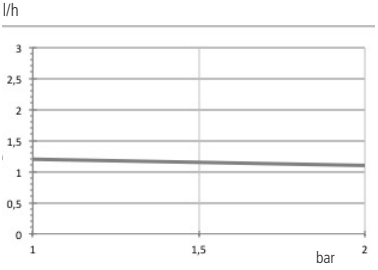
0510: l/h 10 bar 5
Pump head mod. L



0501: l/h 1 bar 5
Pump head mod. I



0301: l/h 1 bar 3
Pump head mod. I



0218: l/h 18 bar 2
Pump head mod. M

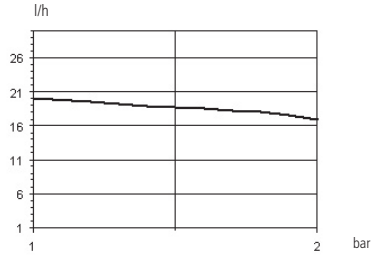
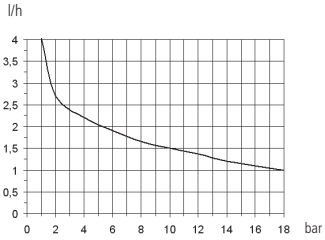
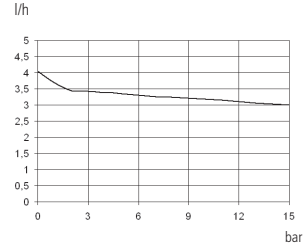


Fig. 14. K A PLUS delivery curves

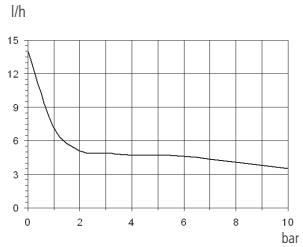
1801: l/h 1 bar 18
Pump head mod. LA



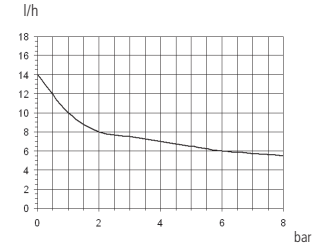
1503: l/h 3 bar 15
Pump head mod. LA



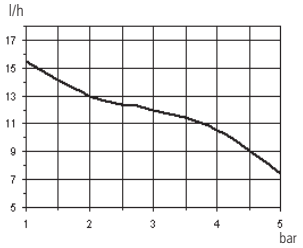
103,5: l/h 3,5 bar 10
Pump head mod. LA



085,5: l/h 5,5 bar 8
Pump head mod. LA



057,5,5: l/h 7,5 bar 5
Pump head mod. LA



0213: l/h 13 bar 2
Pump head mod. MA

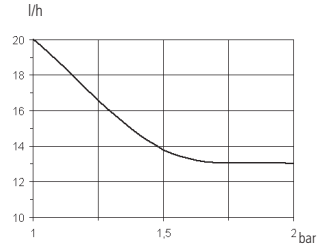
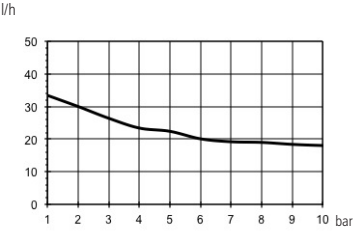


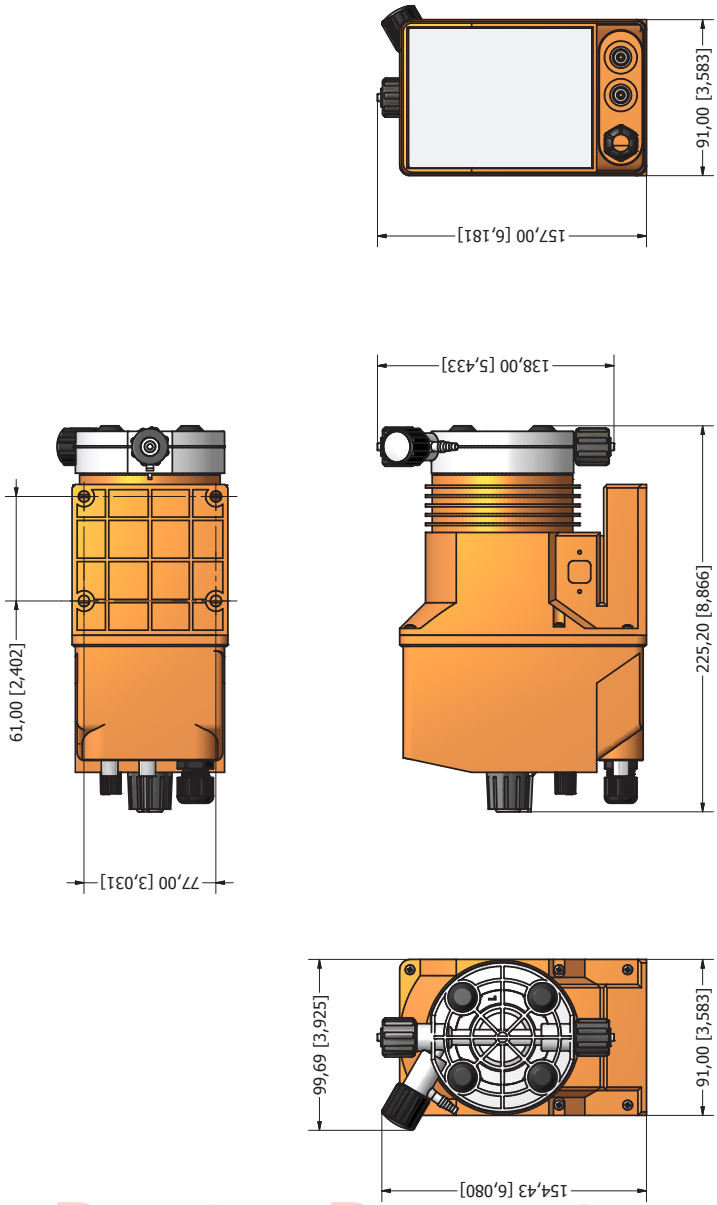
Fig. 15. K AC PLUS delivery curve

1018: l/h 18 bar 10
Pump head mod. M



Dimensions

Fig. 16. Dimensions



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. 8. 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	3	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) [1]	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] Calcium Hypochlor.(Chlor.ted Lime): WQA test was based on 1% Calcium Hypochlorite solution.

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. 9. 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

TABLE OF CONTENTS

FIGURES

TABLES

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.

"K PLUS" series metering pumps

Data Sheet

R100523

- Foot mounted
- Microprocessor technology
- Constant or proportional feeding
- Manual stroke length adjustment
- Manual venting (K) or self venting (KA) pump head
- Enclosure .....PP
- Environment temperature.....10-45°C (55-113°F)
- Chemical temperature.....0-50°C (32-122°F)
- Transportation and storage temperature .....-10-50°C (14-122°F)
- Altitude .....2000 m
- Installation class II
- Pollution level.....2
- Audible noise.....73.4 db(A)
- Protection degree .....IP65 (% working RU: 85% T<=40°C; 70% T=50°C - without condensing water)

CE

c UL us LISTED (on request)

Configuration Code

MODELS			
Code K	Code KA	MOD.	DECRIPTION
MU	**AU**	K PLUS	Constant proportional pump with level control. Working mode: - constant - constant with divider (1/10) - pulse divider (1/10; 10/100; 100/1000) - pulse multiplier (1/10) - mA signal current (0/4 mA = 0 pulses: 20mA = max pulses)
PO	**PA**	KCO PLUS	Constant pump with speed reducer (1/10)
PL	**UA**	KCL PLUS	Constant pump with level control. Speed reducer (1/10)

CAPACITIES				
K			**Hoses**	**Pump head**
2001	1 l/h at 20 bar	0.26 GPH at 290 PSI	4 x 6	I
1802	2 l/h at 18 bar	0.53 GPH at 261 PSI	4 x 6	L
1504	4 l/h at 15 bar	1.06 GPH at 217 PSI	4 x 6	L
1005	5 l/h at 10 bar	1.32 GPH at 102 PSI	4 x 6	L
0808	8 l/h at 8 bar	2.11 GPH at 116 PSI	4 x 6	L
0510	10 l/h at 5 bar	2.64 GPH at 58 PSI	4 x 6	L
0218	18 l/h at 2 bar	4.76 GPH at 29 PSI	6 x 8	M
KA			**Hoses**	**Pump head**
1801	1 l/h at 18 bar	0.26 GPH at 261 PSI	4 x 6	LA
1503	3 l/h at 15 bar	0.79 GPH at 217 PSI	4 x 6	LA
103.5	3.5 l/h at 10 bar	0.92 GPH at 102 PSI	4 x 6	LA
100.5	0.5 l/h at 10 bar	0.13 GPH at 102 PSI	4 x 6	JA
085.5	5.5 l/h at 8 bar	1.45 GPH at 116 PSI	4 x 6	LA
057.5	7.5 l/h at 5 bar	1.98 GPH at 58 PSI	4 x 6	LA
0213	13 l/h at 2 bar	3.43 GPH at 29 PSI	6 x 8	MA

Model K MU 2001 K 00 00

LIQUID ENDS								
	HEAD	**ORINGS**	**VALVE**		**DIAPHRAGM**	**HOSES** [1]		**VISCOSITY**
			Body	Balls		Delivery	Suction	Max CPS
K	PVDF	FKM B	PVDF	Ceramic	PTFE	PVDF	PVC	100
P	PVDF	EPDM	PVDF	Ceramic	PTFE	PVDF	PVC	100
Y	PVDF	Nytrile	PVDF	Ceramic	PTFE	PVDF	PVC	100
V	PP	FKM B	PP	Ceramic	PTFE	PVDF	PVC	100
D	PP	EPDM	PP	Ceramic	PTFE	PE	PVC	100
W	PP	Nytrile	PP	Ceramic	PTFE	PE	PVC	100
J	PVDF	FKM B + PTFE	PVDF	Ceramic	PTFE	PVDF	PVC	100
M	PVDF	EPDM + PTFE	PVDF	Ceramic	PTFE	PVDF	PVC	100
A	Acrylic	FKM B	PVDF	Ceramic	PTFE	PVDF	PVC	100
Z	SS	FKM B	SS	SS	PTFE	N/A	N/A	100
$	Acrylic	FKM B	PP	SS + Hastelloy spring	PTFE	PP	PVC	8000 [2]

POWER SUPPLY	
00	230 VAC Schuko plug
0S	230 VAC australian plug
01	230 VAC without plug
03	115 VAC US plug
04	24 VAC without plug
05	12 VDC *
07	24 VDC
* On some models only.	

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Specifications subject to change without notice | R11-19

Technical features

INFORMATION FOR K PLUS								
Models	Strokes speed		Stroke length range reliability	Power consumption at max flow (230 VAC)	Power consumption at max flow (115 VAC)	Power consumption at max low (24 VAC/ 24VDC)	Power consumption at max low (12 VDC)	Weight
	min	max						
2001	18	180	from 30% to 100%	19 Watt	24 Watt	12 Watt	8.8 Watt	4.1 Kg (9.02 Lbs)
1802	18	180						
1504	18	180						
1005	18	180						
0808	18	180						
0510	18	180						
0501	18	180						
0218	18	180						
INFORMATION FOR KA MODELS								
1801	18	180	from 30% to 100%	19 Watt	24 Watt	12 Watt	8.8 Watt	4.1 Kg (9.02 Lbs)
1503	18	180						
103.5	18	180						
100.5	18	180						
085.5	18	180						
057.5	18	180						
0213	18	180						

CAPACITY								
K PLUS	FLOW				cc per STROKE		Maximum pressure	
	min cc/h	max l/h	Min GPH	Max GPH	min	max	bar	PSI
2001	30	1	0,01	0,26	0,03	0,09	20	290
1802	60	2	0,02	0,53	0,06	0,19	18	261
1504	120	4	0,03	1,1	0,1	0,37	15	217,5
1005	150	5	0,04	1,3	0,1	0,46	10	145
0808	240	8	0,06	2,1	0,2	0,74	8	116
0510	300	10	0,08	2,6	0,3	0,93	5	72,5
0501	30	1	0,01	0,3	0	0,09	5	72,5
0218	540	18	0,14	4,8	0,5	1,67	2	29

CAPACITY								
KA PLUS	FLOW				cc per STROKE		Maximum pressure	
	min cc/h	max l/h	Min GPH	Max GPH	min	max	bar	PSI
1801	30	1	0,01	0,26	0,03	0,09	18	261
1503	90	3	0,02	0,79	0,08	0,28	15	217,5
103.5	105	3,5	0,03	0,9	0,1	0,32	10	145
100.5	15	0,5	0,0039	0,13	0,1	0,32	10	145
085.5	165	5,5	0,05	1,5	0,2	0,51	8	116
057.5	225	7,5	0,06	2	0,2	0,69	5	72,5
0213	390	13	0,1	3,4	0,4	1,2	2	29

QUANTITY	PACKAGE CONTENT
n. 1	Assembly kit
n. 1	5 X 20 delayed fuse
n. 1	Level probe with axial foot filter (PVDF) - level probe not in KCO PLUS mod.
n. 1	0,3 Bar injection valve (PVDF)
m 2	Delivery hose
m 2	Suction hose
m 2	Discharge hose
m 2,5	Input signal cable (only K PLUS)
n.1	Operating manual

POWER SUPPLY	FUSE
230 VAC (190-265 VAC) - 50/60 Hz	1 A
115 VAC (90-135 VAC) - 50/60 Hz	500 mA
24 VAC (20-32 VAC) - 50/60 Hz	2A
12 VDC (10-16 VDC)	3.15A

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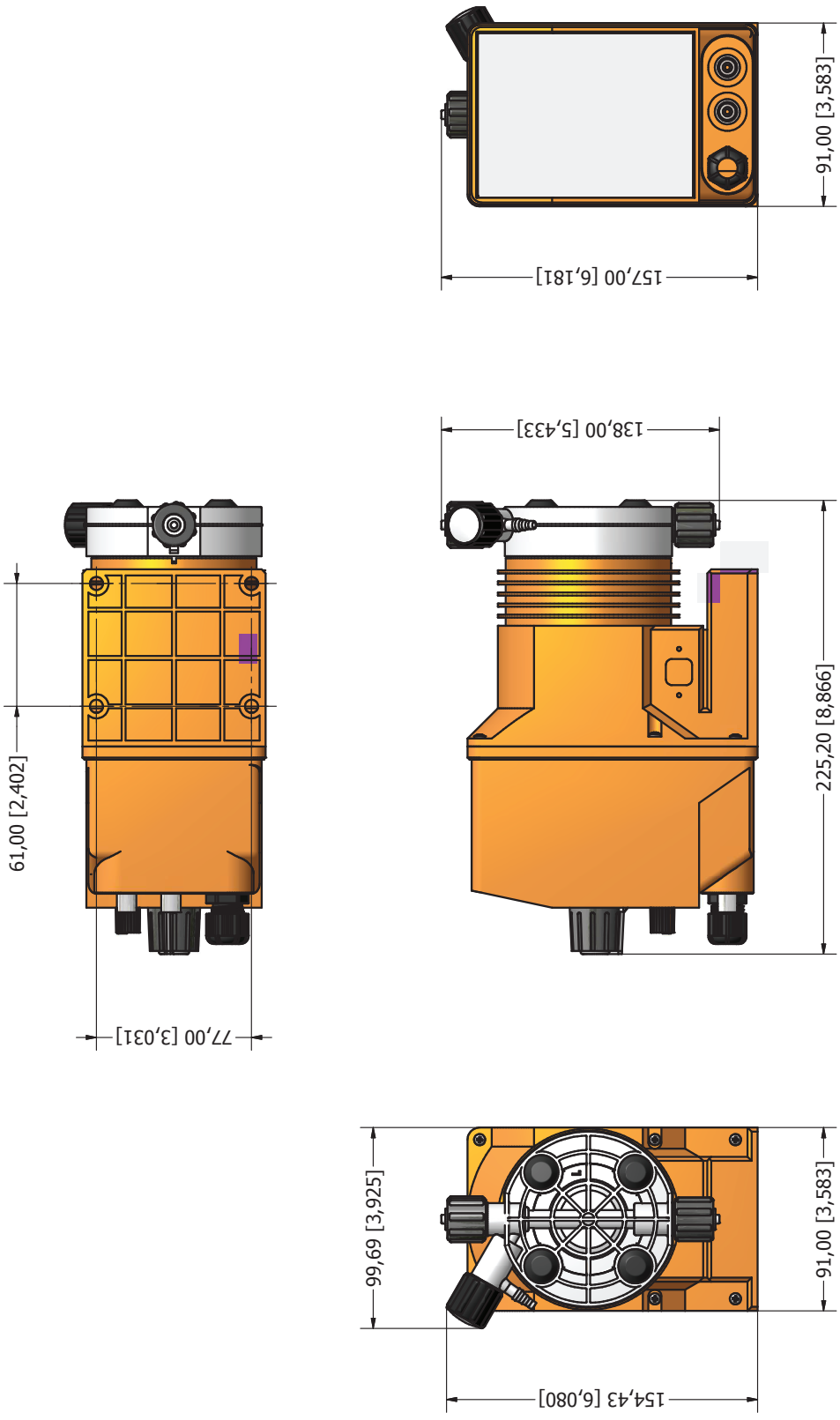
Dimension

mm [inches]



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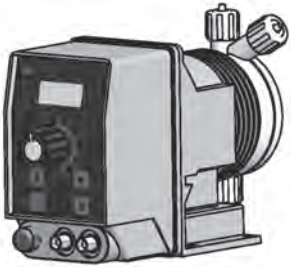
KMS DC - KMSA DC

PRODUCT LABEL

EN

KMS DC



KMSA DC

SOLENOID DRIVEN METERING PUMPS
WITH DIAPHRAGM

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.

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

Version: R1-04-15

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

Direttiva Bassa Tensione
Low Voltage Directive
Directiva de baja tensión
} **2006/35/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**

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 AND DRINKING WATER TREATMENT.

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 fluids.

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.

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.**

This equipment requires regular maintenance to ensure potability requirements of the water and maintenance of improvements as declared by the manufaturer.

ENVIRONMENTAL SAFETY

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

Recycling guidelines

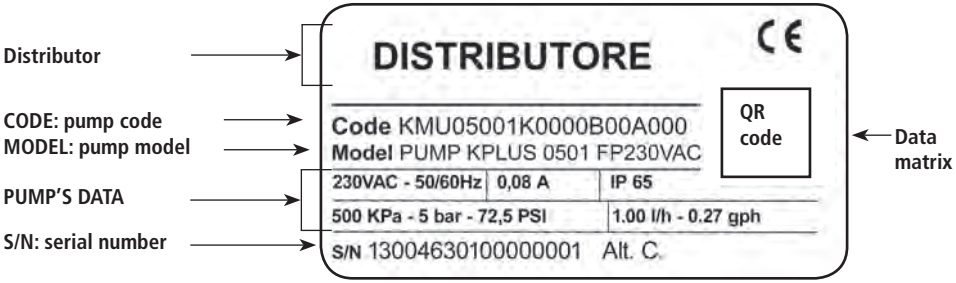
EWC code: 16 02 14

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

Figura 1. Product 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)

1. INTRODUCTION

1.1 KMS DC Series

KMS D is designed for low/middle dosing of chemicals.
The pump works CONSTANT MODE.

KMS DC has got:
- STAND-BY input
- ALARM contact output.

Flow rate is determined by the stroke length and by the stroke speed. The stroke length is adjustable from 0 to 100% using the stroke length adjustment knob. However dosing accuracy is guarantee within an adjustment range from 30% to 100%.

All control and setup parameters are available through a digital keyboard and they are displayed on a LCD backlit display.

Note: some functions described into this manual may need accessories not included into the pump packaging.

1.2 KMSA DC Series

KMSA DC is the KMS DC version with **self-venting pump head**.
Self-venting pump head must be used when using chemicals that produce gas (i.e. hydrogen peroxide, ammonium, sodium hypoclorite at particular conditions).
For connections **"Self-Venting pump head installation".**

1.4 Working mode

Pump workS in CONSTANT MODE:

MODE	WORKING MODE
CONSTANT	Pump doses at a constant rate set in "SPH" (strokes for hour), "SPM" (strokes for minute) or "LPH" (litres per hour) parameters set during program session.

2. UNPACKING

Included into package:

n.4	Dibbles ø6
n.4	Self tapping screws 4,5 x 40
n.1	Delayed fuse 5 X 20
n.1	Foot filter with valve
n.1	Injection valve
n.1	Level probe
m 2	Delivery pipe * (PVDF)
m 2	Suction pipe * (transparent PVC)
m 2	Discharge pipe (transparent PVC)
m 2,5	Signal cable for "Stand-by" and "Alarm"
n.1	This installation manual

* If hose is 6x8 there is only a 4meters long hose. Cut to obtain suction and delivery hoses.

PLEASE DO NOT TRASH PACKAGING.
IT CAN BE USED TO RETURN THE PUMP.

LEGEND:

a. Alternating Current;

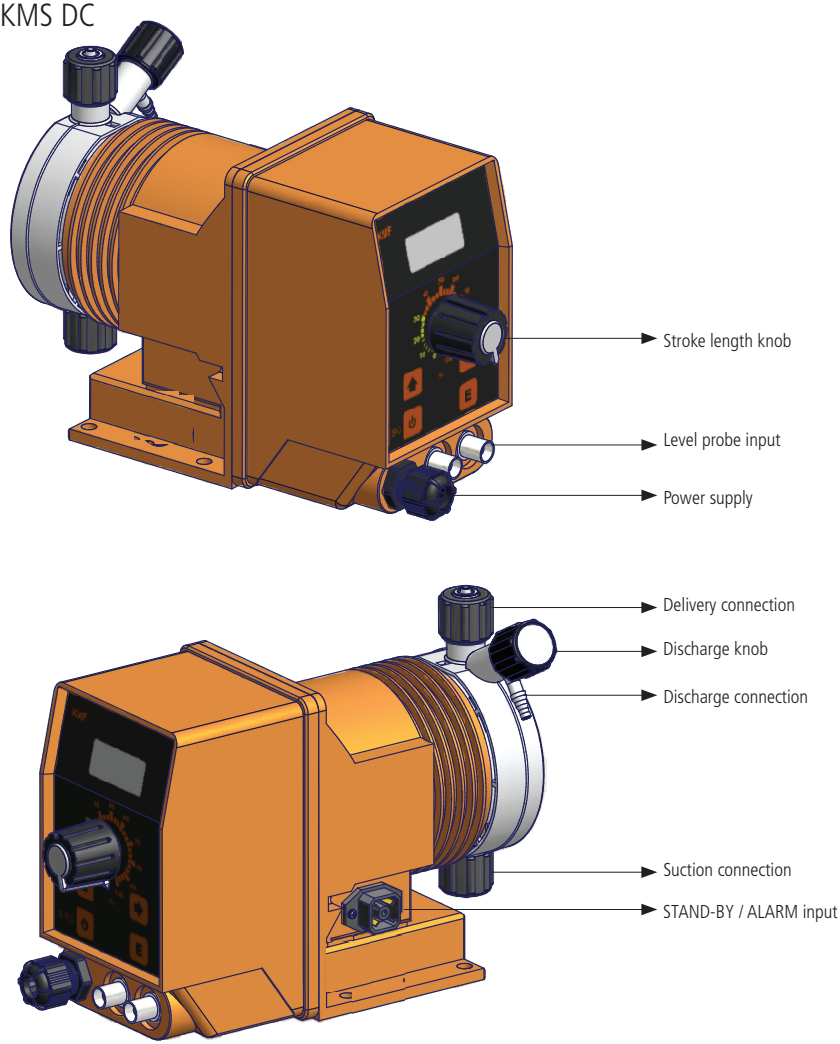
b. DC,

c. Protective Earth;

d. Standby;

e. Warning -

KMS DC



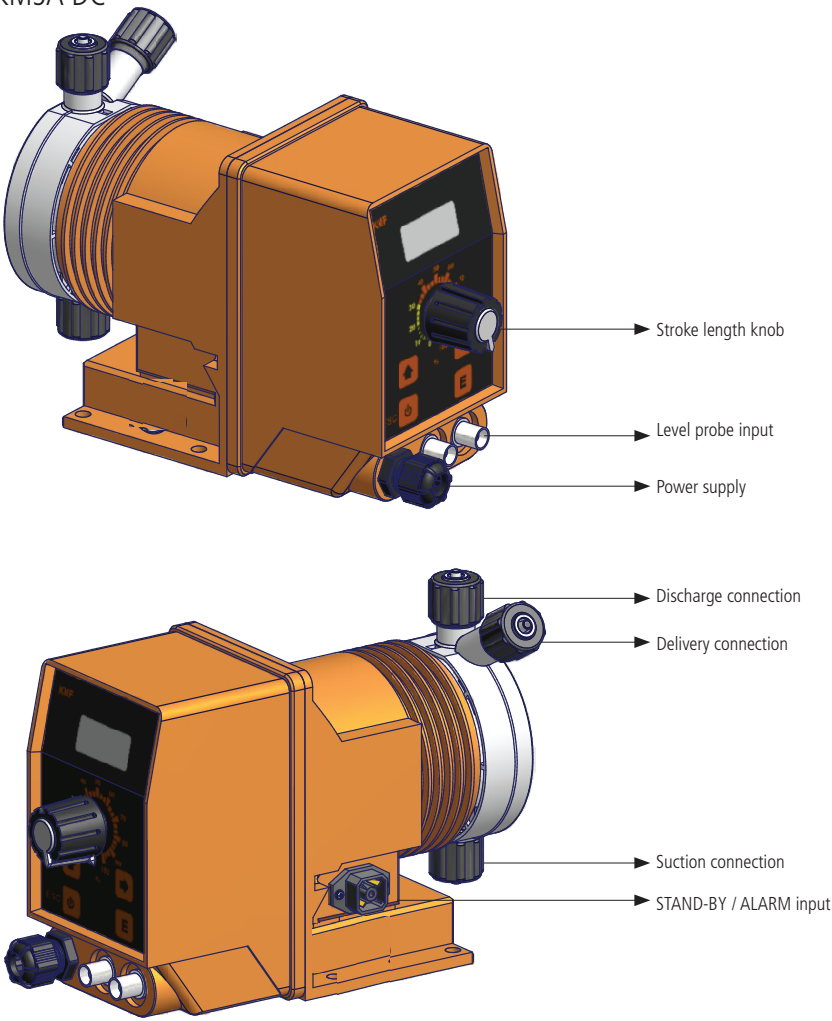
Manual stroke length adjustment

Max CC/stroke (**Construction Materials and Technical info**) are referred to Stroke length knob on 100%.
If Stroke length knob is on 50% cc/stroke will be halved.
To regulate pump's capacity: turn on the pump then press and rotate the knob.

Dosing accuracy is guarantee within an adjustment range from 30% to 100%.

Note: if knob isn't on 100% position then the pump will dose at a pressure greater than the one declared on label.

KMSA DC



4. BEFORE TO INSTALL WARNINGS

Pump's installation and operativity is made in 4 main steps:

Pump's installation
Hydraulic Installation (hoses, level probe, injection valve)
Electrical Installation (main power connection, priming)
Programming the pump.

Before to start, please read carefully the following safety information.

Protective clothes

Wear always protective clothes as masks, gloves, safety glasses, ear plugs or ear muffs and further security devices during ALL installation procedure and while handling chemicals.

Installation location

Pump must be installed in a safety place and fixed to the table / wall to avoid vibration problems!

Pump must be installed in a easy accessible place!

Pump must be installed in horizontal position!

Avoid water splashes and direct sun!

Hoses and Valves

Suction and delivery hoses must be installed in vertical position!
All hoses connections must be performed using only hands' force!
No tongs required!

Delivery hose must be firmly fixed to avoid suddenly movements that could damage near objects!

Suction hose must be shorter as possible and installed in vertical position to avoid air bubbles suction!

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

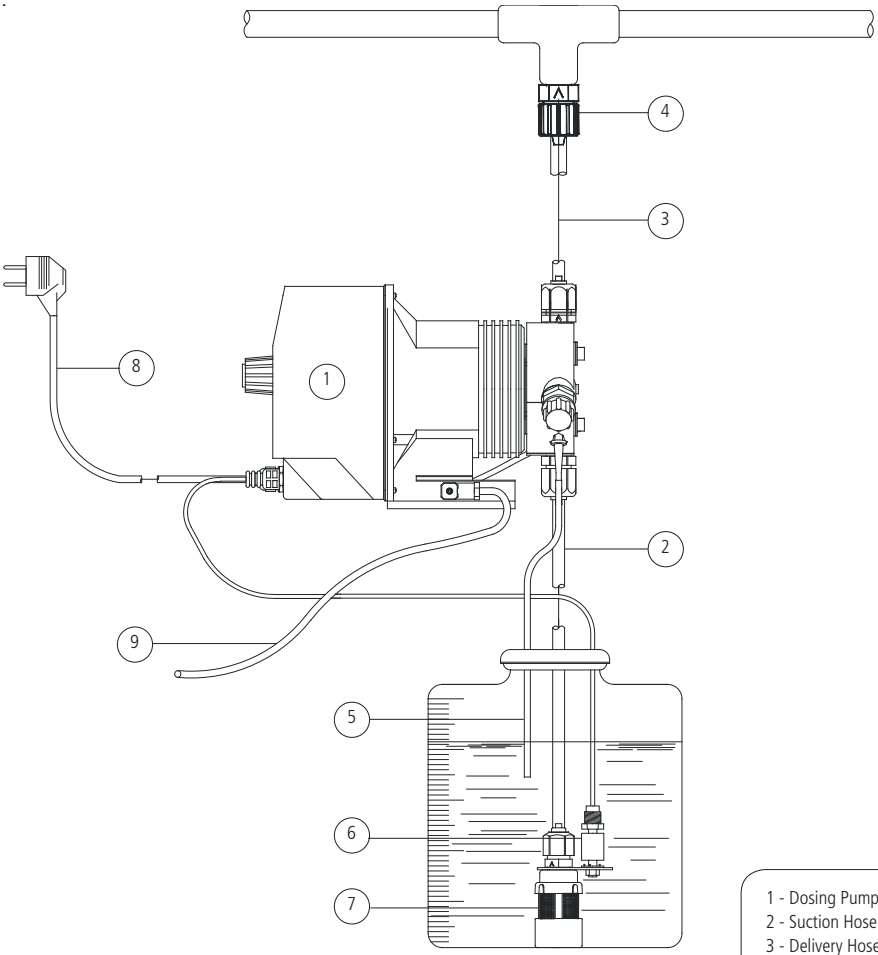
Feeder should be interlocked with a no-flow protection device to automatically shut-off the pumps when there is no flow!

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.

5. INSTALLATION DRAW

Pump must be installed in a stable support (for example a table) at a maximum height (**from tank's bottom**) of **1,5 meters**.



1 - Dosing Pump
2 - Suction Hose
3 - Delivery Hose
4 - Injection Valve
5 - Air discharge
6 - Level Probe
7 - Foot Filter
8 - Power Cable
9 - Standby / Alarm

6. HYDRAULIC INSTALLATION

Hydraulic connections are:

Suction Hose with level probe and foot filter
Delivery Hose with injection valve
Discharge Hose

Suction Hose.

Completely unscrew tightening nut from pump's head and remove assembling components: tightening nut, holding ring and pipe holder.

Assembly as shown in fig. (A). Insert hose into pipe holder until it reaches the bottom.

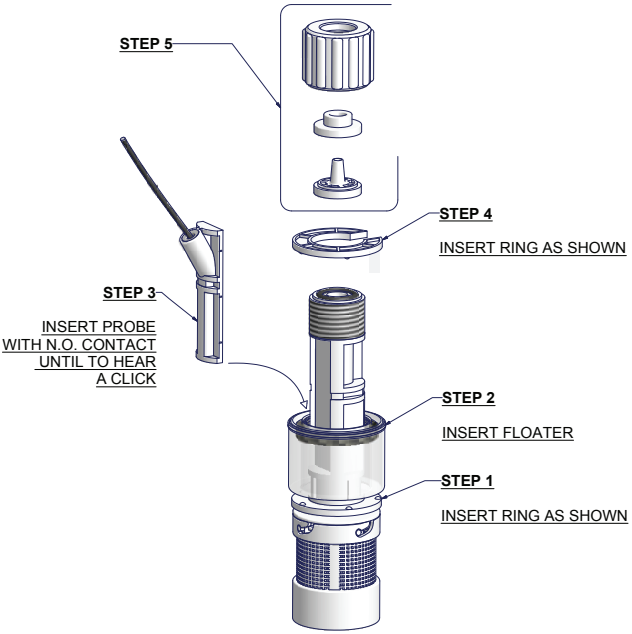
Lock hose on pump's head by screwing down the tightening nut.
Use only hands to do it!

Connect other side of the hose to the foot filter using the same procedure.

fig. (A)

Assembling foot filter with level probe.

Level probe must be assembled with foot filter using the provided kit.
Foot valve is made to be installed into tank's bottom without sediments priming problem.



Connect BNC from level probe into pump's level input (front side of the pump).
Put level probe assembled with foot filter into tank's bottom.

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

Delivery Hose.

Completely unscrew tightening nut from pump's head and remove assembling components: tightening nut, holding ring and pipe holder.

Assembly as shown in fig. (A). Insert hose into pipe holder until it reaches the bottom.

Lock hose on pump's head by screwing down the tightening nut.
Use only hands to do it!

Connect other side of the hose to the injection valve using the same procedure.

Injection Valve.

Injection valve must be installed on plant from water's input.
Injection valve will open at pressure greater than 0,3bar.

Dicharge hose.

Insert one side of discharge hose into discharge connector as shown in fig (C).

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

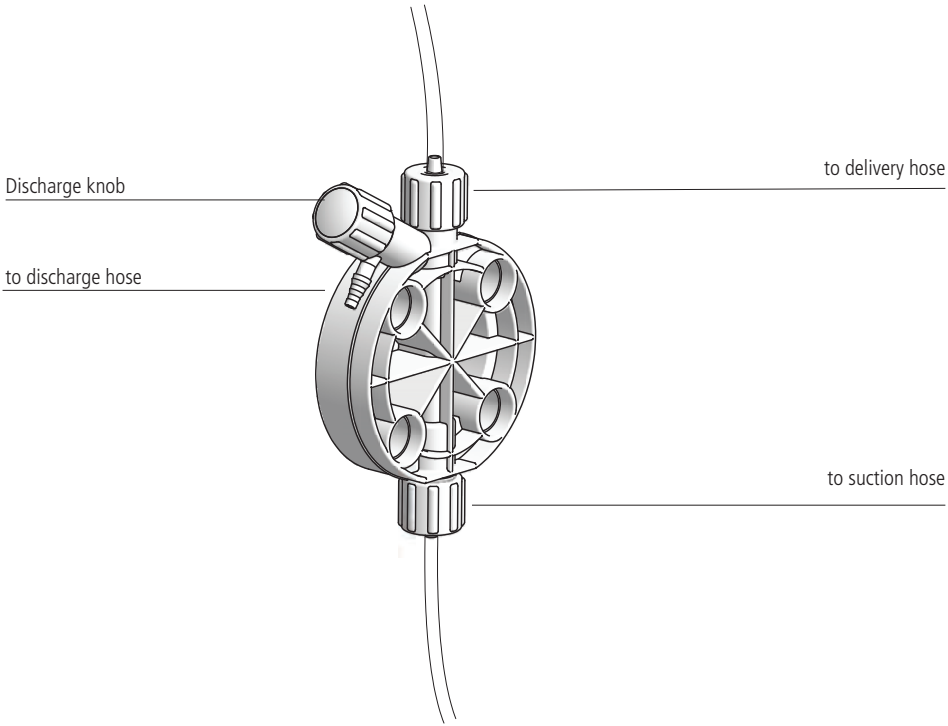
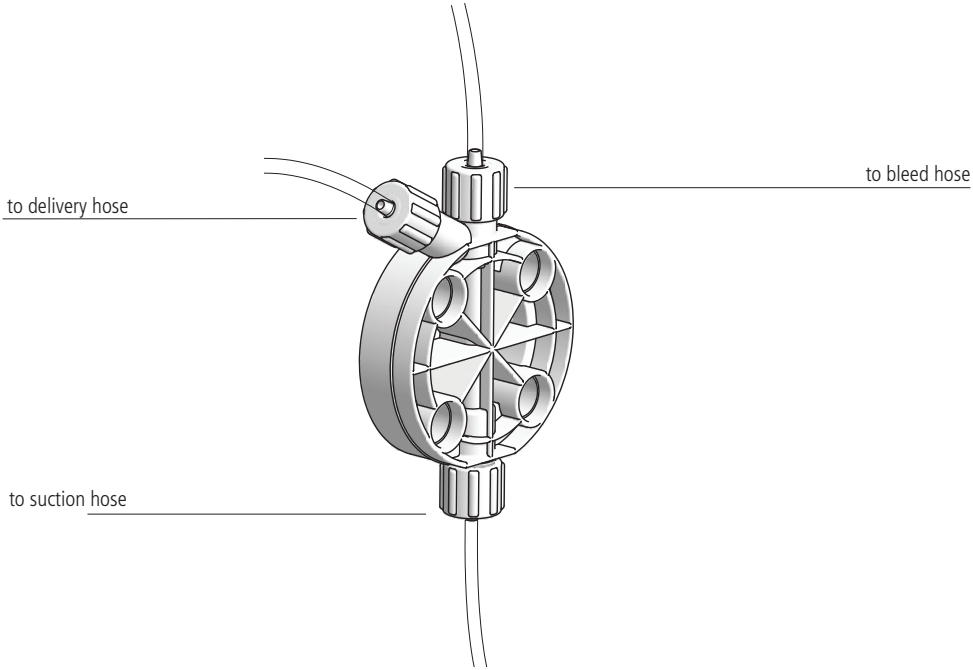


fig (C)

For priming procedure see the paragraph "Priming".

Self-venting pump head.



Self-venting pump head must be used when using chemicals that produce gas (i.e. hydrogen peroxide, ammonium, sodium hypoclorite at particular conditions).

Hoses assembling procedure (including purge hose) is described in fig. (A).

Notes:

- suction, delivery and purge valves are DIFFERENT! Do not exchange them!

- delivery and purge hoses are made of same material!

- it's allowed to lightly bend discharge hose!

- during calibration procedure ("TEST") insert discharge hose into BECKER test-tube!

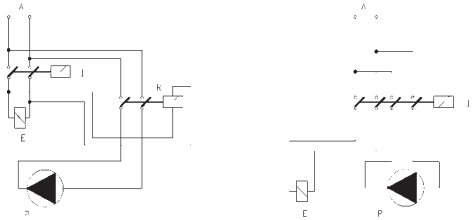
7. ELECTRICAL INSTALLATION

All electrical connections must be performed by AUTHORIZED AND QUALIFIED personnel only.
Before to proceed, please, verify the following steps:

- verify that pump's label values are compatible with main power supply.

- pump must be connected to a plant with a differential switch (0,03A sensitivity) if there isn't a good ground.

- to avoid damages to the pump do not install it in parallel with heavy inductance load (for example: engines). A relay switch must be used. See below picture.



P - Dosing Pump
R - Relay
I - Switch or safety device
E - Electrovalve or inductance load
A - Main Power

WARNING
IF EQUIPMENT <u>IS SUPPLIED</u> WITH A PLUG:

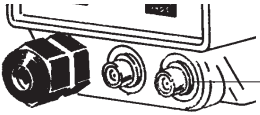
If an appliance coupler or separable plug is used as the disconnecting device, it shall be readily identifiable and easily reached by the operator. For single-phase portable equipment, a plug on a cord of length not greater than 3m is considered to be easily reached.

WARNING
IF EQUIPMENT <u>IS NOT SUPPLIED</u> WITH A PLUG:

a) a switch or circuit-breaker shall be included in the building installation
b) it shall be in close proximity to the equipment and within easy reach of the operator
c) it shall be marked as the disconnetting device for the equipment

Once verified previous steps proceed as follows:

- check that "BNC" of level probe has been connected as described in "Hydraulic Installation" chapter.



Level Probe Input

- connect alarm and/or stand-by signal as described below fig (D):

1: (Green) "Stand-by" Input
4: (Yellow) "Stand-by" Ground

2: (Brown) Alarm (Relay) Common
3: (White) N.O. Alarm(Relay) Contact

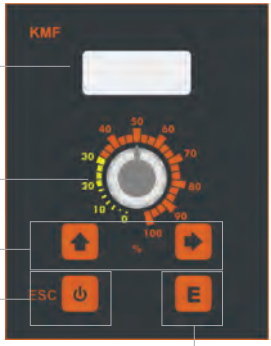
Max load relay output: free contact 1A 24VAC

fig (D)

Notes:
- "Alarm" signal isn't fuse protected
- "Standby" signal has main priority on pump's enabling / disabling.

IF NOT USED, PROTECT THE MINI DIN PLUG WITH THE BLACK RUBBER CAP LOOSE IN THE ACCESSORIES BAG.

8. BASIC SETTINGS



LCD backlit display

Storke Lenght Knob

Scroll and increase digit

Turn the pump on or off and exit from setup menu (without saving parameters)

Enter / exit from setup menu (saving parameters)

The "KMS DC" pump is equipped with a keyboard.To avoid any misunderstanding during next chapters all keys will be described as shown on this legend:

▲ "UP" key

ON/OFF ESC "ESC" key

▶ "RIGHT" key

E "E" key

Menu navigation:

To enter into programming mode press and keep pressed **"E" key** from main screen (fig.3):

fig.3

After about 4 seconds the pump will show the password screen (fig.5):

fig.5

Default password is "0000". Just press **"E"** key. Otherwise insert password using **"UP"** and **"RIGHT"** keys.

Saving / Discarding changes / Activating working mode

Once edited data into setup menu it's possible to save them by pressing **"E"** key or to discard them by pressing **"ESC"** key.

To activate a working mode (Constant) select the required mode and confirm it using **"E"** key.

Turning on and off the pump

"ESC" key has a double function. It can be used to discard all changes made into setup mode or to turn on/off the pump. To turn on/off the pump press and keep pressed this key while in main screen (fig.3). The pumps will show:

fig.6

To return into operating mode press **"ESC"** key.

Alarm output logical working.

The pump has an "Alarm" output that changes its status (from N.O. to N.C. or viceversa) when a signal is received from "LEVEL" and/or "STAND-BY". To set this alarm refer to related chapter.

Full menu / Short Menu mode

When entering into SETUP display shows access mode menu:

If this is the first time into SETUP menu then the pump will automatically set itself into "FULL" menu mode as shown in fig. A. Just press "E" key to confirm. This mode will show all pump functions and working modes.

fig. A

fig. B

Next time the SETUP menu will be reached it will possible to operate with "SHORT" menu configuration to change only selected mode parameters as shown in fig. B. Press "E" to confirm.

Note: "SHORT" menu option is not available during first time into SETUP menu or after a reset.

9. PRIMING

PRIMING

To proceed follow these steps: connect all hoses to the pump; open dischage valve by completely turning the discharging knob (counter clock-wise). Power up the pump and turn stroke lenght knob to 100%. After pump's intro (fig.1):

fig.1

the pump will show the "Delay" (pump's activation delay) as shown fig.2:

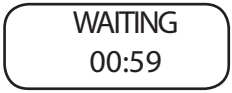


fig.2

Press any key to skip the "Delay". Pump will show "Srokes" (actual strokes) as shown in fig.3:

fig.3

Press and keep pressed the "RIGHT" key to enter into priming mode. Pump will go for 30 seconds into priming mode as shown in fig.5.

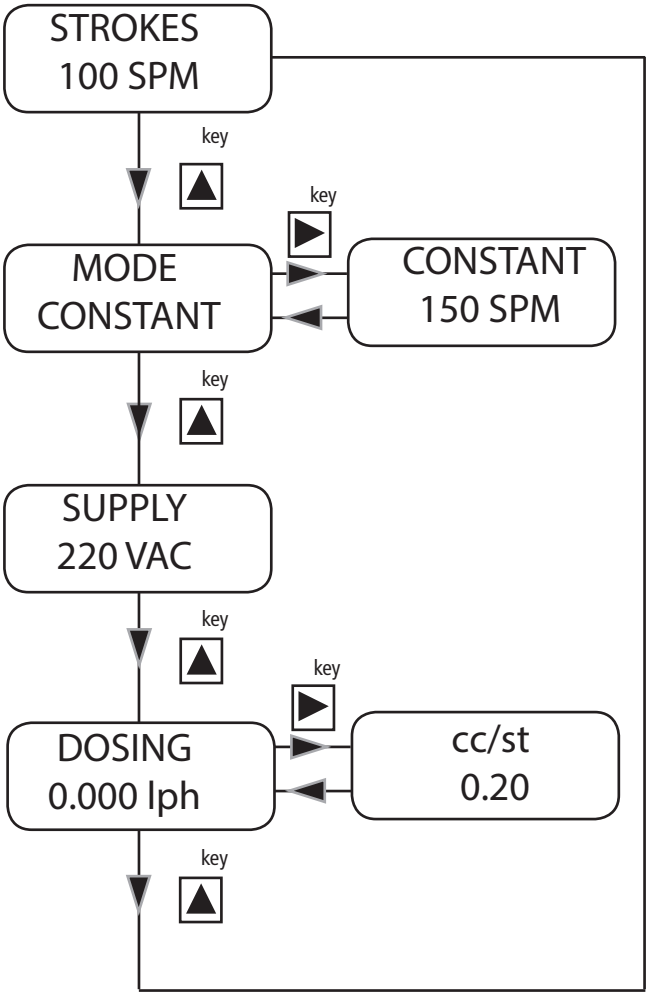
fig.4

When the chemical begins to flow out from the outgassing hose then completely close the outgassing knob (except for self-venting pump heads). This ends the priming procedure. If countdown for priming is not yet ended press "ESC" key.

Now the pump is operative. Proceed to setup and programming.

Pump's functions summary

During pump's working mode is it possible to see furthers working information.
Press more times the "UP" key to cycle through following information:



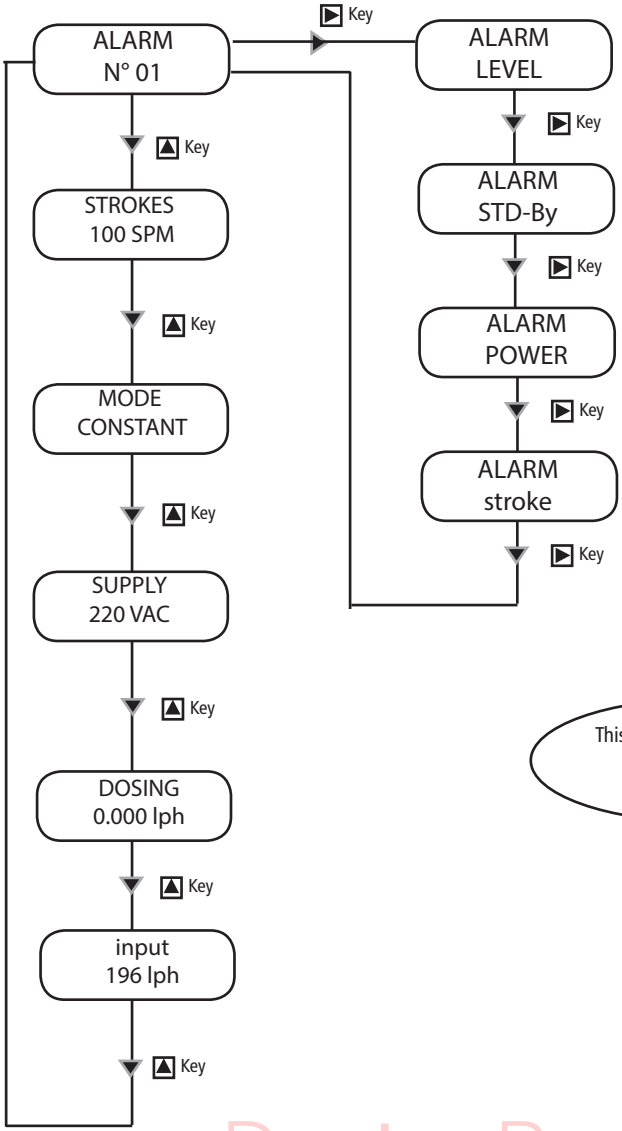
Working Mode

Power Supply Voltage

Liters/Hour or Gallons/ Hour Dosage

10. PUMP'S FUNCTIONS SUMMARY- ALARMS

If any alarm is active, in the menù "**Pump's functions summary**" a general alarm display will show the **number** of alarm active at the moment. Enter into this menu with "**RIGHT**" key.
The windows displayed show which alarms are active.



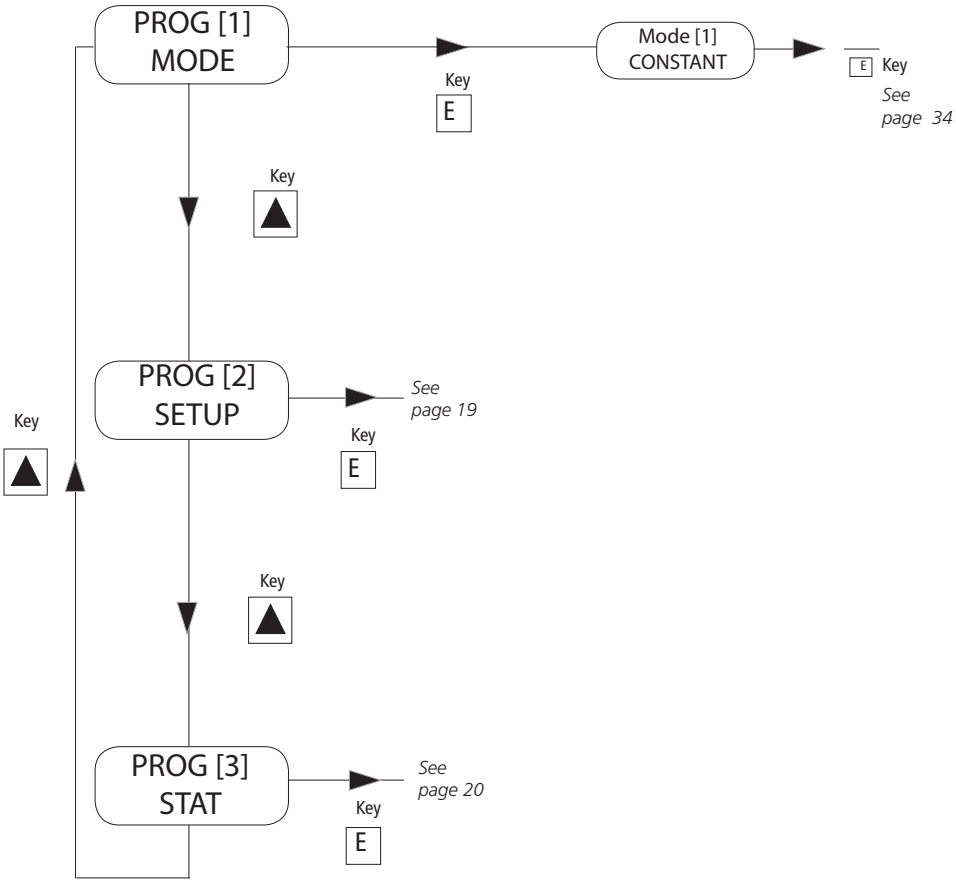
Level alarm: the level probe signals the product end.

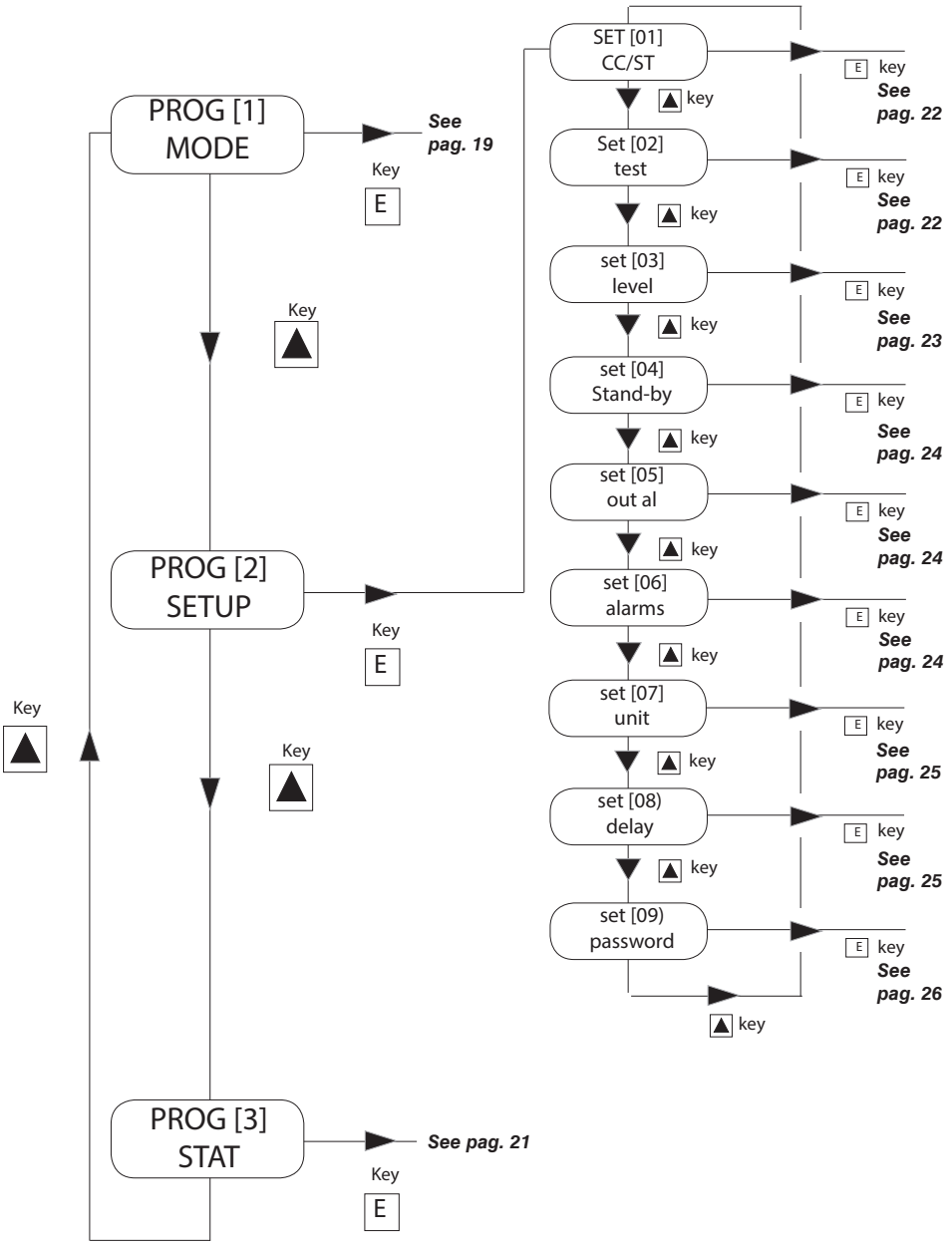
Stand-by alarm signals the pump stop.

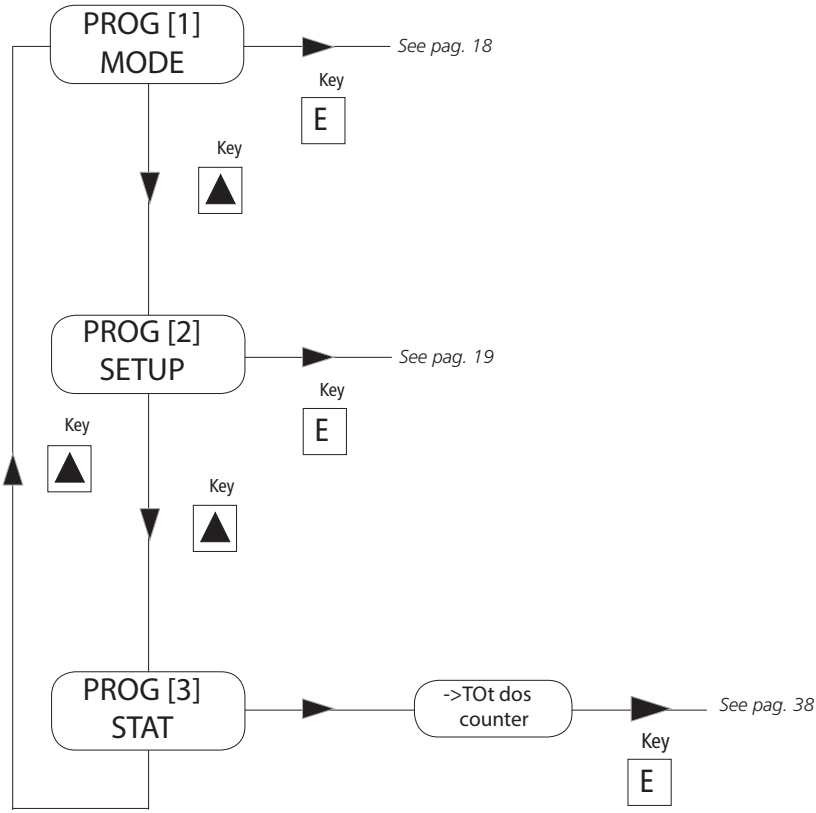
Power alarm signals the power supply is out of range (from 180 to 260 VAC).

Stroke alarm signals that it has been set a capacity higher than the value on the label.

This diagram shows all the possible alarms.

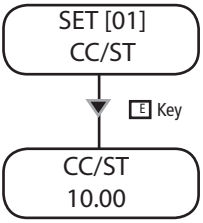






Pump's initial setup

Apart of choosen working mode, the pump must be prepared to operate by setting the main parameters into "SETUP" menu. To enter into this menu please follow the "Quick Guide through menu" at page 20.



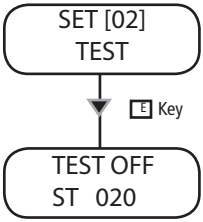
CC per Stroke.

Enter here the cc/stroke value obtained during "Test" mode (calibration).

Use "UP" key to increase of one unit the blinking digit "_".

Press "RIGHT" key to skip on next digit.

Press "E" key to save data and "ESC" exit to main menu.
Otherwise press "ESC" to discard data and exit to main menu.



Calibration.

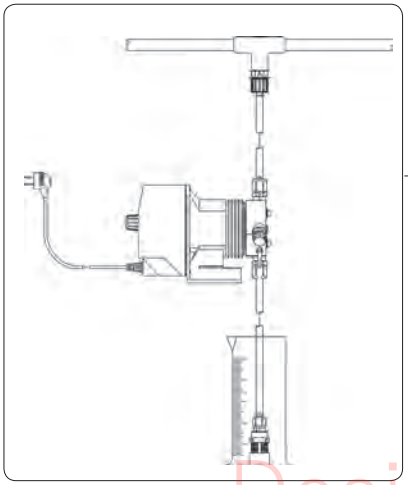
This procedure defines the cc quantity (cubical centimeters) that the pump feed every single injection. To determine this value the pump must be calibrated.

1) Install the pump on plant and insert the suction hose (with its level probe / foot filter) into a BEKER "test-tube".
If pump's model is self-priming put the discharge hose into the "test-tube" too.

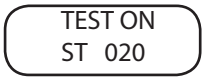
2) Power up the pump and turn the flow's knob to required position.

3) Fill up the "test-tube" with the chemical until to reach a known value.

4) From setup menu choose "TEST", and insert 20". This value is the strokes that the pump will produce during the procedure.



6) Press "E". The pump will begin to produce the 20 strokes and to suck the chemical from the "test-tube".



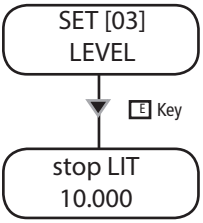
7) At the end of 20 strokes the pump will stop. Read the value of chemical left into "test-tube".

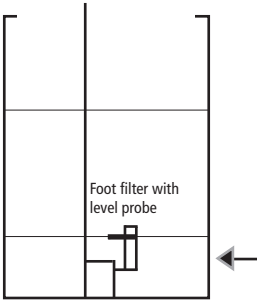
8) Substract the initial value to the left value.

9) Divide the result with the ST value (20).

10) Type this value into "CC/ST" (Set [01]) as previously described.

11) If obtained result is too small or too big, please, try to change strokes value (20).





Customizable Reserver (liters / gallons)

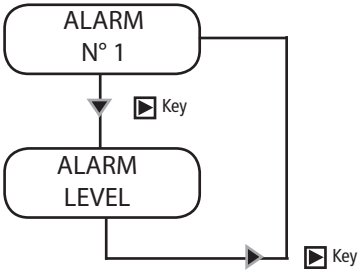
Pre Level Alarm (Reserve).

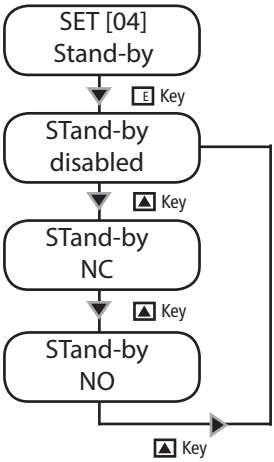
This function defines a pre-alarm status to inform user that the dosing product is near to end. Reserve value to be set, must be calculated on product quantity left between foot filter and pump's suction level.

- Use **"UP"** key to increase the blinking "_" digit.
- Press **"RIGHT"** key to skip on next digit.
- Press **"E"** key to save data and "ESC" exit to main menu.

Otherwise press **"ESC"** to discard data and exit to main menu.

During the alarm the pump continues to dose but it'll show the following picture:



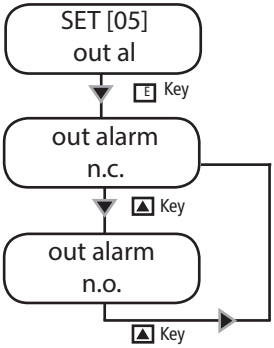


"Stand-By" signal.

This function allows the pump to dose only when an external signal is received from "Stand-by" input. This signal can be enabled as a N.O. contact (Normally Opened) , N.C. contact (Normally Closed) or disabled.

- Use "UP" key to change working mode for "Stand by" signal.

-Press "E" key to save data and "ESC" to exit to main menu. Otherwise press "ESC" to discard data and exit to main menu.

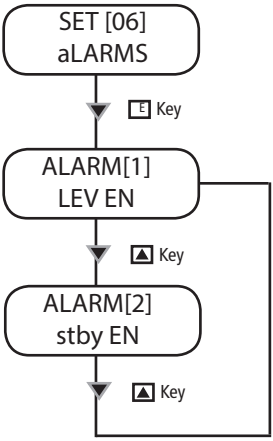


"Out Alarm" signal.

This function allows to manage the alarm output contact . The alarm can be set as "N.O." contact (Normally Open) or "N.C." contact (Normally Closed).

- Use "UP" key to change working mode for "Out Al" signal.

-Press "E" key to save data and exit to main menu. Otherwise press "ESC" to discard data and exit to main menu.



Alarms Management.

Use this function to enable/disable the relay output for level alarm (lev) and/ or standby (stby).

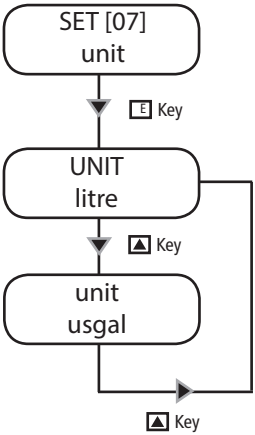
If alarm is activated for one or more events then the output relay will be enabled, the pump will show the alarm status and it'll stop or not the dosing activity.

If alarm is not activated for one or more events then the output relay will be disabled, the pump will show the alarm status and it'll stop or not the dosing activity.

- Use "UP" key to choose the alarm to set.

-Use "RIGHT" key to enable (EN) or disable (DI) the alarm.

-Press "E" key to save data and "ESC" to exit to main menu. Otherwise press "ESC" to discard data and exit to main menu.

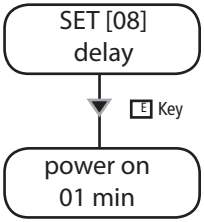


Unit Change.

This function allows to choose between liters or gallons measurement unit.

-Use **"UP"** key to switch between liter or gallons measurement unit.

-Press **"E"** key to save data and **"ESC"** to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.



Startup Delay Setup.

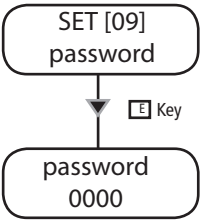
When the pump is powered is it possible to have a delay time (from 0 to 10 minutes) before dosing activities.

-Use **"UP"** key to choose the alarm to set.

-Use **"RIGHT"** key for next digit.

-Press **"E"** key to save data and **"ESC"** to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.

Note: Press any key during delay time to skip it.



Password Setup.

"Setup" menu is password protected. Default value to enter into "setup" menu is "0000" (only numeric units). To change this password proceed as follows:

- Use **"UP"** key to change first digit.

-Press **"RIGHT"** key to move cursor over next digit.

-Press **"E"** key to save data and **"ESC"** to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.

Note: For lost password, please, follow the "Load default" procedure.

15. "LOAD DEFAULT" AND "RESET PASSWORD" PROCEDURE

"LOAD DEFAULT" procedure

This procedure deletes all programming data set. It reloads the default data of the pump.

Follow this instructions:

- unplug power supply;

- pressing both "UP" and "RIGHT" keys, plug in power supply.

For few seconds, the display shows LOAD DEFAULT before start up the pump.

"RESET PASSWORD" procedure

This procedure resets the password set and reloads the default password of the pump ("0000").

Follow this instructions:

- unplug power supply;

- pressing both "UP" and "ESC" keys, plug in power supply.

For few seconds, the display shows RESET PASSWORD before start up the pump.

16. WORKING PROCEDURE SETUP

Introduction.

CONSTANT mode.
Pump doses at a constant rate set in "SPH" (strokes for hour), "SPM" (strokes for minute) or "LPH" (litres per hour) parameters set during program session.

When to use this mode ?
This mode is useful when there isn't an input signal to control the dosing activity. Pump doses requested product quantity in constantly.

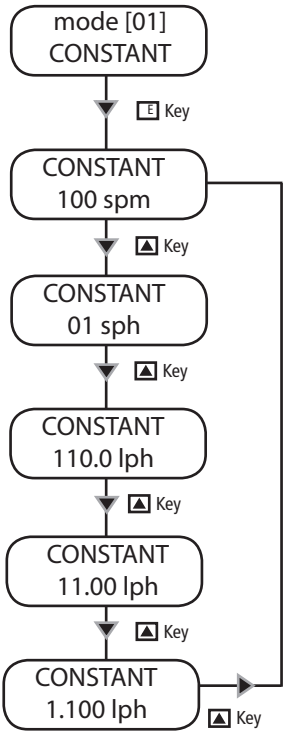
Which parameters must be set ?
SPH (strokes per hour), SPM (strokes per minute) LPH (litres per hour)

17. "CONSTANT" WORKING MODE

CONSTANT mode.

Pump doses at a constant rate set in "SPH" (strokes for hour), "SPM" (strokes for minute), "LPH" (litres per hour) parameters set during program session.

Which parameters must be set ?
SPH (strokes per hour), SPM (strokes per minute), LPH (litres per hour).



Choose "CONSTANT" working mode: "SPH" (strokes per hour), "SPM" (strokes per minute), "LPH" (litres per hour).

Use **"UP"** key to choose between these two modes. Use **"RIGHT"** key to change value. For next digit press again "RIGHT" key.

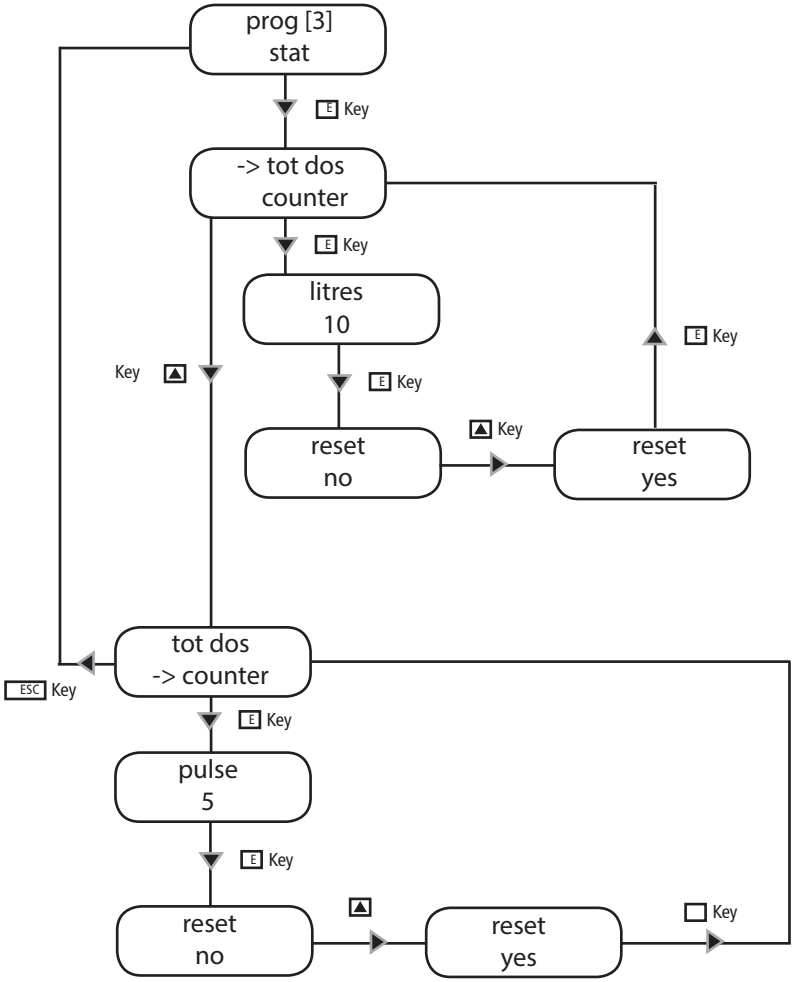
"LPH" value accuracy depends on cc/st value set into the Setup menu (SET [01] CC/ST).
LPH max value depends on the max frequency of the pump (refer to the pump's label). If an higher value is set, the pump will show an alarm message (ALARM STROKE).

Press **"E"** key to save data and "ESC" to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.

Note: last mode displayed before press the "E" key will be the active one.

Stat.

To see dosing statistics choose "STAT" from main menu.



"TOT DOS" means total dosed product since pump last reset.
"COUNTER" means strokes numbers since pump last reset.

Problem	Possible Cause
Pump doesn't turn on.	Pump isn't powered. Connect it to main supply. Pump's protection fuse is broken. Replace it. See page 37 for replacement procedure. Pump's main board is broken. Replace it. See page 37 for replacement procedure.
Pump is not dosing and solenoid is operating.	The foot filter is obstructed. Clean it. Suction hose is empty. Pump must be primed. Repeat priming procedure. Air bubbles inside hydraulic circuit. Check valves - hoses - fittings. Product to dose is generating gas. Turn discharge knob and let air flow away. Use a self-venting pump head.
Pump is not dosing and solenoid isn't operating or slightly operating.	Crystals presence inside valves. Check them and try to dose 2-3 liters of normal water. Change valves. Injection valve obstructed. Change it.
Pump's display shows "ERROR MEM" o "ERROR DATA"	ERROR MEM: error in data storage. it is necessary to reload pump's default data, as described in "Load default procedure" on page 32. ERROR DATA: error in data setting. Check the values set. If they are correct, but the message still appears, the pump is underdimensioned.

20. FUSE AND MAIN BOARD REPLACEMENT

Fuse or main board replacement is allowed to qualified personnel only. Before to operate disconnect the pump from main power and all hydraulic connections.

For fuse replacement is necessary to use a 3x16 and 3x15 screwdriver and a new fuse (same model of old one).

For main board replacement is necessary to use a 3x16 and 3x15 screwdriver and a new main board (same model of old one).

Fuse replacement procedure:

- Turn pump's injection knob on 0%.

- Remove 6 screws from pump's back.

- Pull pump's back cover until it's completed separated from pump's front. Be careful of the knob's spring.

- Locate the blown fuse and replace it.

- Reassemble the pump. Be careful to put back the knob's spring.

- Reinsert screws.

Main board replacement procedure:

- Turn pump's injection knob on 0%.

- Remove 6 screws from pump's back.

- Pull pump's back cover until it's completed separated from pump's front. Be careful of the knob's spring.

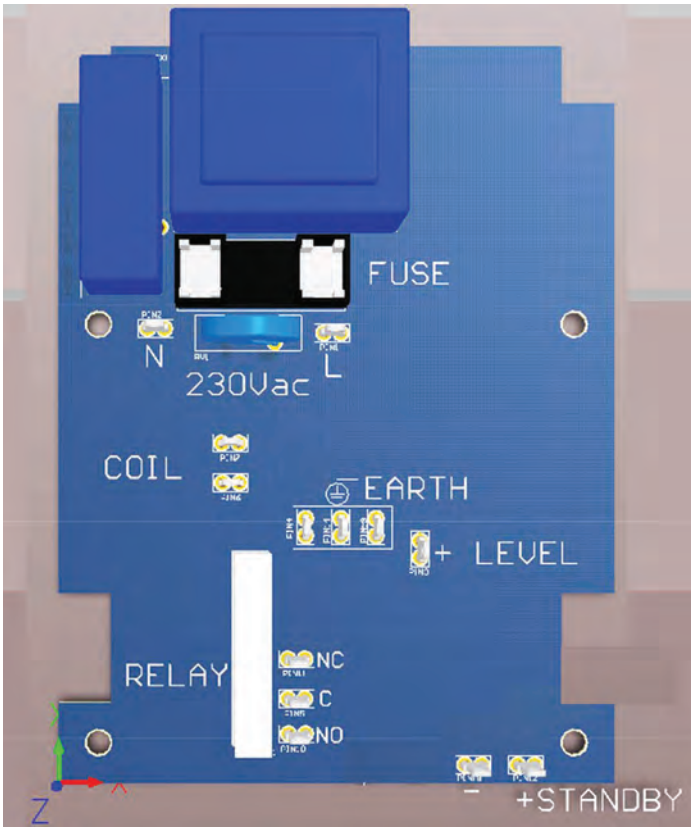
- Remove board's screws.

- Completely disconnect wires from main board and replace it. Reinsert screws.

- Reconnect wires to the main board (see enclosed picture).

- Reassemble the pump. Be careful to put back the knob's spring.

- Reinsert screws.



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 to the motor 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 73.4 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).

f 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.

B APPENDIX. CONSTRUCTION MATERIALS AND TECHNICAL INFO

TECHNICAL FEATURES

Power supply:	230 VAC (190-265 VAC) - 50/60 Hz
Power supply:	115 VAC (90-135 VAC) - 50/60 Hz
Power supply:	24 VAC (20-32 VAC) - 50/60 Hz
Power supply:	12 VDC (10-16 VDC)
Pump Strokes:	0 - 180 (0 - 140 for KMS AC DC)
Suction Height:	1,5 metres
Environment Temperature:	0 - 45°C (32 - 113°F)
Chemical Temperature:	0 - 50°C (32 - 122°F)
Installation Class:	II
Pollution Level:	2
Audible Noise:	73.4 dbA
Packaging and Transporting Temperature:	-10 - 50°C (14 - 122°F)
Protection degree:	IP 65

MANUFACTURING MATERIALS

Case:	PP
Pump head:	PVDF, Acrilic, SS *
Diaphragm:	PTFE
Balls:	CERAMIC, PTFE, SS *
Suction Pipe	PVC
Delivery Pipe:	PVDF
Valve Body:	PVDF, PE, SS *
O-ring:	FP, EP, PTFE *
Injection connector	PVDF (ceramic, HASTELLOY C276 spring)
Level Probe:	PVDF
Level probe cable:	PE
Foot Filter:	PVDF

*as ordered.

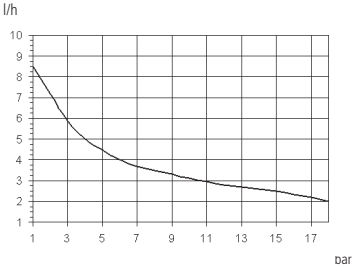
TECHNICAL INFORMATION											
KMS	CAPACITY				cc / stroke		Max pressure		imp/min	Hoses	Pump head
	min cc/h	max l/h	Min GPH	Max GPH	min	max	bar	PSI			
1802	0,06	2	0,000016	0,53	0,06	0,19	18	261	180	4 x 6	L
1504	0,11	4	0,000029	1,06	0,11	0,37	15	217	180	4 x 6	L
1005	0,14	5	0,000037	1,32	0,14	0,46	10	145	180	4 x 6	L
0808	0,22	8	0,000058	2,11	0,22	0,74	8	116	180	4 x 6	L
0510	0,28	10	0,000074	2,64	0,28	0,93	5	72	180	4 x 6	L
0501	0,03	1	0,000008	0,26	0,03	0,09	5	72	120	4 x 6	I
0218	0,50	18	0,00013	4,76	0,50	1,67	2	29	180	6 x 8	M

TECHNICAL INFORMATION											
KMSA	CAPACITY				cc / stroke		Max pressure		imp/min	Hoses	Pump head
	min cc/h	max l/h	Min GPH	Max GPH	min	max	bar	PSI			
1801	0,03	1	0,000008	0,26	0,03	0,09	18	261	180	4 x 6	LA
1503	0,08	3	0,000021	0,79	0,08	0,28	15	217	180	4 x 6	LA
103.5	0,10	3,5	0,000026	0,92	0,10	0,32	10	145	180	4 x 6	LA
085.5	0,15	5,5	0,000040	1,45	0,15	0,51	8	116	180	4 x 6	LA
057.5	0,21	7,5	0,000055	1,98	0,21	0,69	5	72	180	4 x 6	LA
0213	0,37	13	0,000098	3,43	0,37	1,20	2	29	180	6 x 8	MA

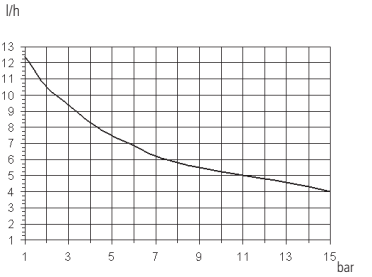
C APPENDIX. DELIVERY CURVES

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

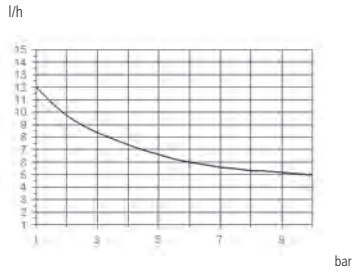
1802: l/h 2 bar 18
Pump head mod. L



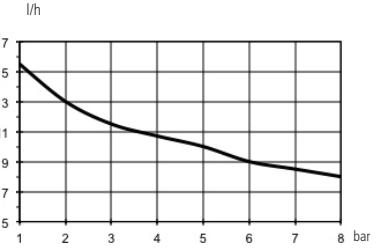
1504: l/h 4 bar 15
Pump head mod. L



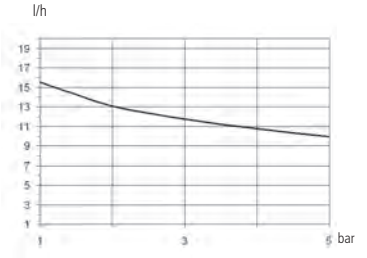
1005: l/h 5 bar 10
Pump head mod. L



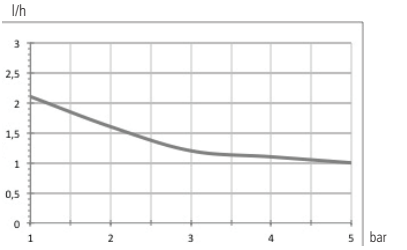
0808: l/h 8 bar 8
Pump head mod. L



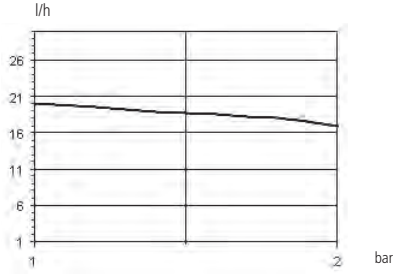
0510: l/h 10 bar 5
Pump head mod. L



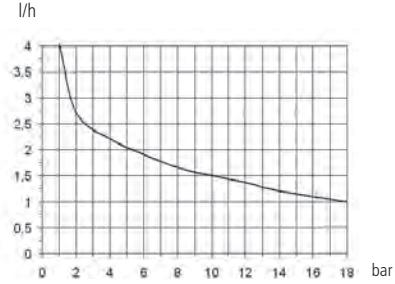
0501: l/h 1 bar 5
Pump head mod. I



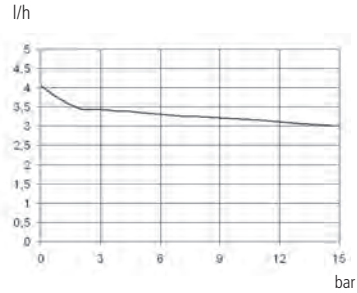
0218: l/h 18 bar 2
Pump head mod. M



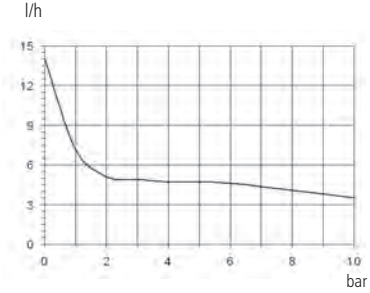
1801: l/h 1 bar 18
Pump head mod. LA



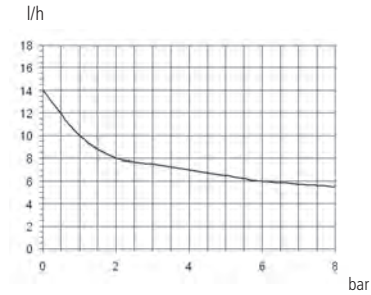
1503: l/h 3 bar 15
Pump head mod. LA



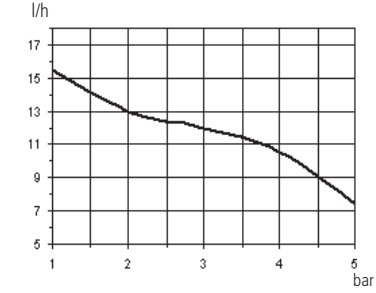
103,5: l/h 3,5 bar 10
Pump head mod. LA



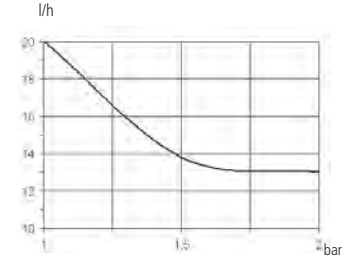
085,5: l/h 5,5 bar 8
Pump head mod. LA



057,5,5: l/h 7,5 bar 5
Pump head mod. LA

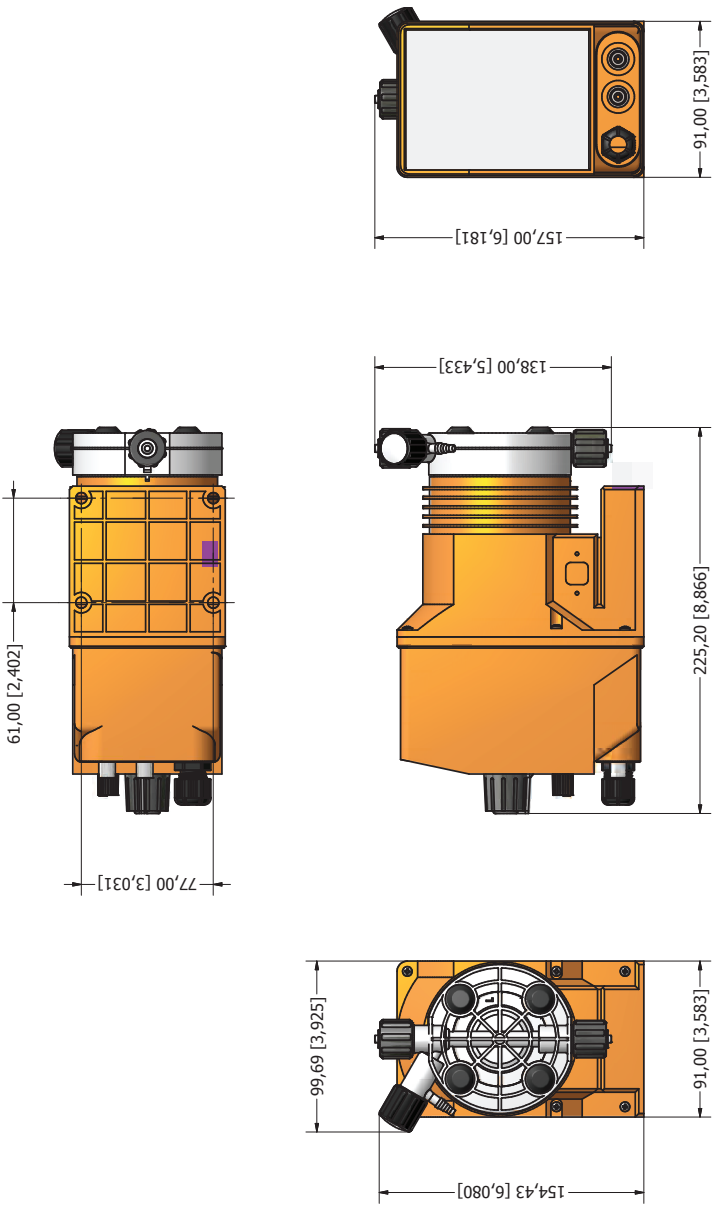


0213: l/h 13 bar 2
Pump head mod. MA



bold : mm
( ) : inches

Dimensions



E APPENDIX. 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.

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	3	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	1	1	1	1	1	1	1	2	1	2	1
Calcium Hypochlor.(Chlor.ted Lime) [1]	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] Calcium Hypochlor.(Chlor.ted Lime): WQA test was based on 1% Calcium Hypochlorite solution.

Resistance rating

Resistant	1
Fairly resistant	2
Not resistant	3

MATERIALS

Polyvinyldene fluoride	PVDF	Pump Heads, valves, fitting, tubing
Polypropylene	PP	Pump Heads, valves, fitting, level floater
PVC	PVC	Pump Heads
Stainless steel	SS 316	Pump Heads, valves
Polymethyl Metacr.(Acrylic)	PMMA	Pump Heads
Hastelloy	C-276	Injection valve spring
Polytetrafluoroethylene	PTFE	Diaphragm
Fluorocarbon (Viton® B)	FPM	Sealings
Ethylene propylene	EPDM	Sealings
Nitrile	NBR	Sealings
Polyethylene	PE	Tubing

F APPENDIX. HOSES 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.

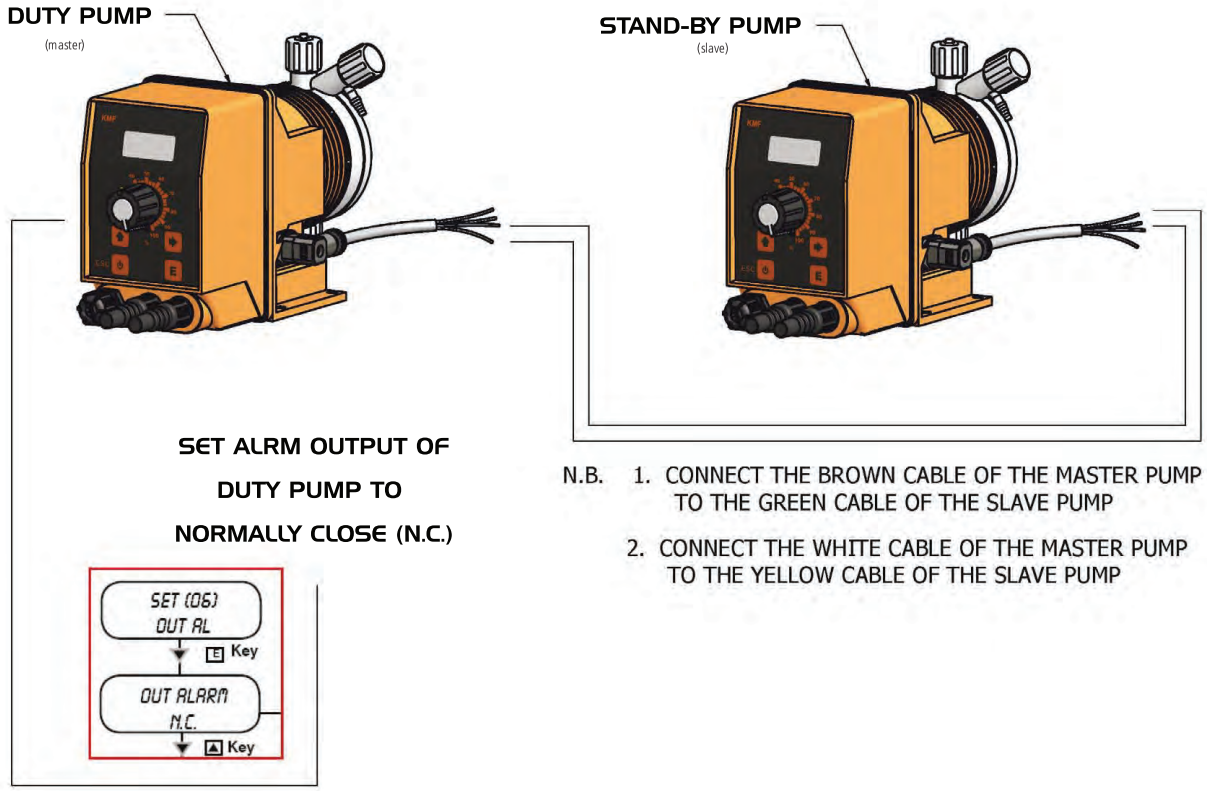
Suction / Delivery Hose			
4x6 mm PVC (transparent)	4x8 mm PE (opaque)	6x8 mm PE (opaque)	8x12 mm PVC (transparent)

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

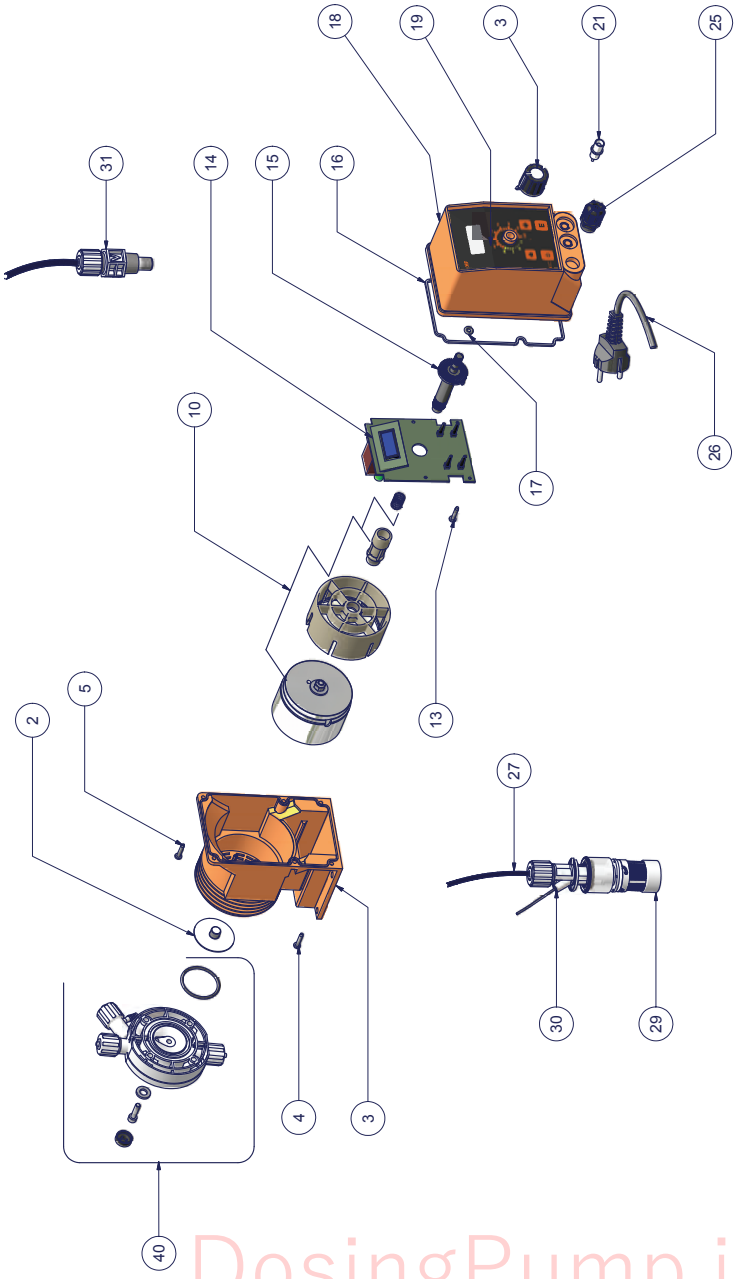
1/4 PE 230 (opaque)	20°C 17.6 bar
3/8 PE 230 (opaque)	20°C 10.6 bar
1/2 PE 230 (opaque)	20°C 10.6 bar

CONNECT ALARM OUTPUT WIRES OF DUTY PUMP TO STAND-BY INPUT OF STAND-BY PUMP



N.B. 1. CONNECT THE BROWN CABLE OF THE MASTER PUMP TO THE GREEN CABLE OF THE SLAVE PUMP

2. CONNECT THE WHITE CABLE OF THE MASTER PUMP TO THE YELLOW CABLE OF THE SLAVE PUMP



NOTICE: always specify the pump's label when ordering spare parts.

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

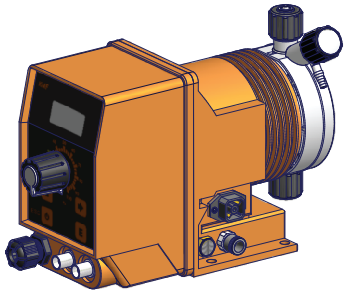
Company stamp

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.

"KMS" and "KMSA" series metering pumps Data Sheet



- Foot mounted
- Microprocessor technology
- Manual stroke length adjustment
- Manual venting (KMS) or self venting (KMSA) PVDF pump head
- Liquid ends (pump head, injection valve, foot filter, delivery hose).....PVDF
- Enclosure .....PP
- Environment temperature.....10-45°C (55-113°F)
- Chemical temperature.....0-50°C (32-122°F)
- Transportation and storage temperature .....-10-50°C (14-122°F)
- Installation class II
- Pollution level.....2
- Audible noise.....73.4db(A)
- Protection degree .....IP65 (% working RU: 85% T<=40°C; 70% T=50°C - without condensing water)

CE

c UL us LISTED (on request)

Configuration Code

MODELS			
KMS Code	**KMSA Code**	**MOD.**	**DESCRIPTION**
DC	**AD**	KMS DC	Digital constant pump, stand-by input and alarm output and level control.
MF	**AF**	KMS MF	Digital multifunction pump (Constant, Divide, Multiply, PPM, Batch, Volt, mA, %, ml/q) , stand-by and flow sensor input, alarm output and level control. Recovery fault mode, work-pause mode and upkeep mode.
ML	**LA**	KMS CL	Proportional pump for free chlorine (Cl2) control (from 0 to 10,00 mg/l) with level control, supplied without chlorine probe. It operates with chlorine cells mod. ECL1 and ECL6/7/12 (not provided).
EN	**AN**	KMS EN	Pump with weekly timer, microprocessor, digital controls, LCD display, level probe and electrovalve control.
PH	**MH**	KMS PH	Proportional pump driven by internal built-in pH meter (0-14 pH) and level control, supplied without pH probe.
RH	**AR**	KMS RH	Proportional pump driven by internal built-in ORP meter (0-1000 mV) and level control, supplied without ORP probe.

K **MF** **2001** **K** 00 **00**

CAPACITIES				
KMS			**Hoses**	**Pump head**
2001	1 l/h at 20 bar	0.26 GPH at 290 PSI	1/4"	I
1802	2 l/h at 18 bar	0.53 GPH at 261 PSI	1/4"	L
1504	4 l/h at 15 bar	1.06 GPH at 217 PSI	3/8"	L
1005	5 l/h at 10 bar	1.32 GPH at 102 PSI	3/8"	L
0808	8 l/h at 8 bar	2.11 GPH at 116 PSI	3/8"	L
0510	10 l/h at 5 bar	2.64 GPH at 58 PSI	3/8"	L
0218	18 l/h at 2 bar	4.76 GPH at 29 PSI	1/2"	M
KMSA			**Hoses**	**Pump head**
1801	1 l/h at 18 bar	0.26 GPH at 261 PSI	1/4"	LA
1503	3 l/h at 15 bar	0.79 GPH at 217 PSI	3/8"	LA
103.5	3.5 l/h at 10 bar	0.92 GPH at 102 PSI	3/8"	LA
100.5	0.5 l/h at 10 bar	0.13 GPH at 102 PSI	3/8	JA
085.5	5.5 l/h at 8 bar	1.45 GPH at 116 PSI	3/8"	LA
057.5	7.5 l/h at 5 bar	1.98 GPH at 58 PSI	3/8"	LA
0213	13 l/h at 2 bar	3.43 GPH at 29 PSI	3/8"	MA

POWER SUPPLY	
00	230 VAC Schuko plug
05	230 VAC australian plug
01	230 VAC without plug
03	115 VAC US plug
04	24 VAC without plug
05	12 VDC *
07	24 VDC
* On some models only.	

LIQUID ENDS								
	HEAD	**ORINGS**	**VALVE**		**DIAPHRAGM**	**HOSES [1]**		**VISCOSITY**
			Body	Balls		Delivery	Suction	Max CPS
K	PVDF	FKM B	PVDF	Ceramic	PTFE	PVDF	PVC	100
P	PVDF	EPDM	PVDF	Ceramic	PTFE	PVDF	PVC	100
Y	PVDF	Nytrile	PVDF	Ceramic	PTFE	PVDF	PVC	100
V	PP	FKM B	PP	Ceramic	PTFE	PVDF	PVC	100
D	PP	EPDM	PP	Ceramic	PTFE	PE	PVC	100
W	PP	Nytrile	PP	Ceramic	PTFE	PE	PVC	100
J	PVDF	FKM B + PTFE	PVDF	Ceramic	PTFE	PVDF	PVC	100
A	Acrylic	FKM B	PVDF	Ceramic	PTFE	PVDF	PVC	100
Z	SS [3]	FKM B	SS	SS	PTFE	N/A	N/A	100

SS ACCESSORIES [3]	
Pump head	Fittings
Li	3/8"
Mi	1/2"
Ni	1/2"
Si	3/4"
Ti	3/4"

[1] Size may be different from standard.
[2] Using high viscosity pump head mod. $, pump output may results lower in some applications.
[3] Specify on order, the external thread of the valves: conical, cylindrical or NPT. Stainless Steel pump does not fit installation kit (accessories and hoses). Refer to "SS Accessories" table for fittings.

Via Donatori di Sangue, 1 - 02100 Rieti (Italy)
+39 074622841 | emecpumps.com

emec SIMPLE AS WATER

IQNet CERTIFIED MANAGEMENT SYSTEM
Qualityaustria SYSTEM CERTIFIED
ISO 9001:2015
ISO 14001:2015
BS OHSAS 18001:2007

"KMS" and "KMSA" series metering pumps Data Sheet

Technical features

KMS MODELS								
Models	Strokes speed		Stroke length range reliability	Power consumption at max flow (230 VAC)	Power consumption at max flow (115 VAC)	Power consumption at max flow (24 VAC)	Power consumption at max flow (12 VAC)	Weight
	min strokes hour	max strokes minute						
2001	1	180	from 30% to 100%	19 Watt	24 Watt	12 Watt	8.8 Watt	4.1 Kg (9.02 Lbs)
1802	1	180						
1504	1	180						
1005	1	180						
0808	1	180						
0510	1	180						
0218	1	180						
KMSA MODELS								
1801	1	180	from 30% to 100%	19 Watt	24 Watt	12 Watt	8.8 Watt	4.1 Kg (9.02 Lbs)
1503	1	180						
103.5	1	180						
100.5	1	180						
085.5	1	180						
057.5	1	180						
0213	1	180						

KMS								
Model	FLOW				cc per Stroke		Max Pressure	
	min cc/h	max l/h	Min GPH	Max GPH	min	max	bar	PSI
2001	0,03	1	0,000008	0,26	0,03	0,09	20	290
1802	0,06	2	0,000016	0,53	0,06	0,19	18	261
1504	0,11	4	0,000029	1,06	0,11	0,37	15	217
1005	0,14	5	0,000037	1,32	0,14	0,46	10	145
0808	0,22	8	0,000058	2,11	0,22	0,74	8	116
0501	0,02	1	0,000007	0,26	0,03	0,09	5	72
0510	0,28	10	0,000074	2,64	0,28	0,93	5	72
0218	0,50	18	0,00013	4,76	0,50	1,67	2	29

KMSA								
Model	FLOW				cc per Stroke		Max Pressure	
	min cc/h	max l/h	Min GPH	Max GPH	min	max	bar	PSI
1801	0,03	1	0,000008	0,26	0,03	0,09	18	261
1503	0,08	3	0,000021	0,79	0,08	0,28	15	217
103.5	0,10	3,5	0,000026	0,92	0,10	0,32	10	145
100.5	0.02	0.5	0.01	0.13	0.02	0.05	10	145
085.5	0,15	5,5	0,000040	1,45	0,15	0,51	8	116
057.5	0,21	7,5	0,000055	1,98	0,21	0,69	5	72
0213	0,37	13	0,000098	3,43	0,37	1,20	2	29

QUANTITY	PACKAGE CONTENT
n. 1	Assembly kit
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
m 2	Suction hose
m 2	Discharge hose
m 2,5	Input signal cable
m 2	Alarm/Stand-by cable (MF model)
n.1	Operating manual

POWER SUPPLY	FUSE
230 VAC (190-265 VAC) - 50/60 Hz	1 A
115 VAC (90-135 VAC) - 50/60 Hz	500 mA
24 VAC (20-32 VAC) - 50/60 Hz	2A
12 VDC (10-16 VDC)	3.15A

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+39 074622841 | emecpumps.com

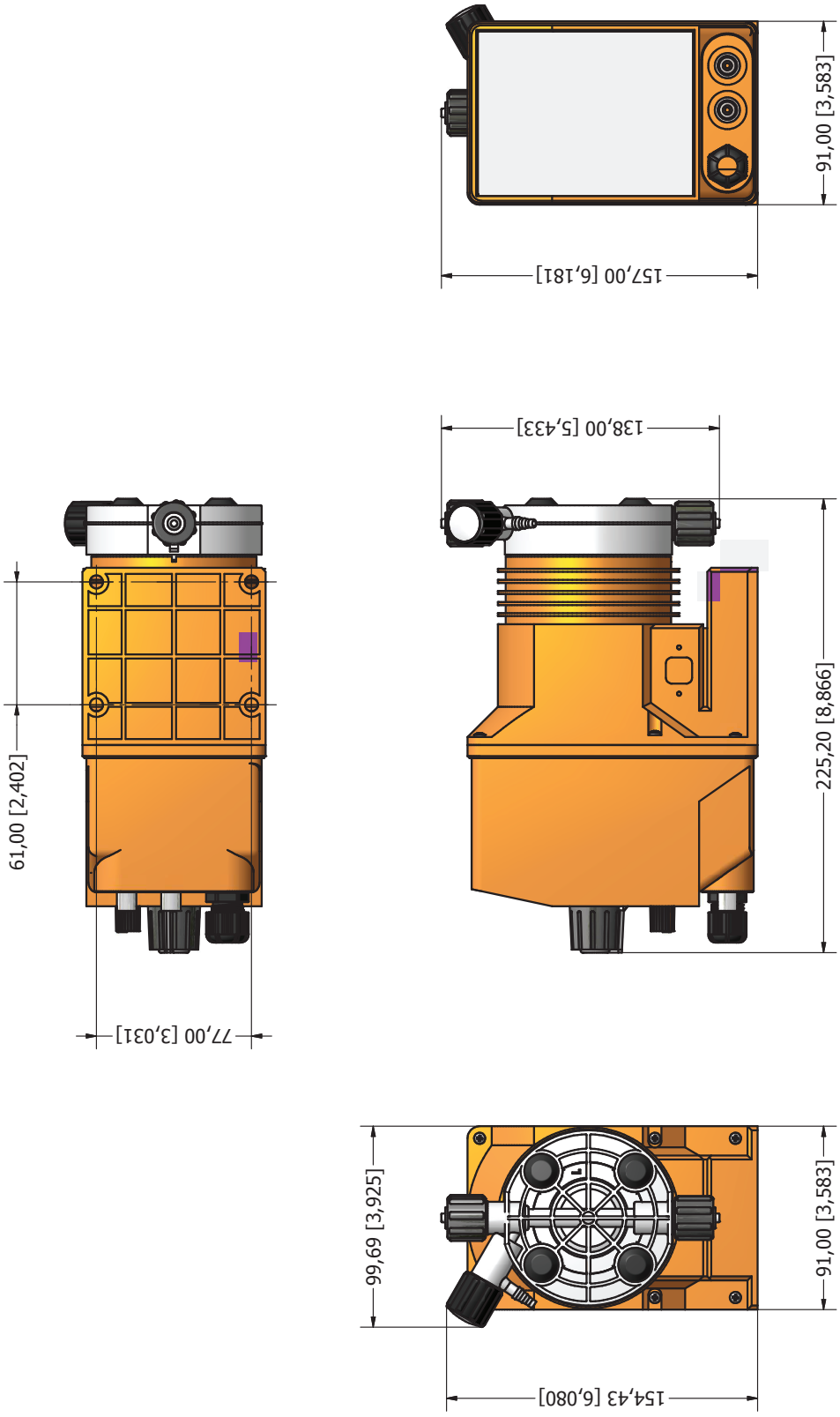
emec SIMPLE AS WATER

Specifications subject to change without notice | R11-19

qualityaustria SYSTEM CERTIFIED
ISO 9001:2015
ISO 14001:2015
BS OHSAS 18001:2007

Dimension

mm [inches]



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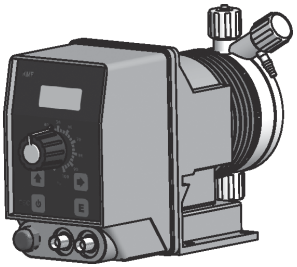
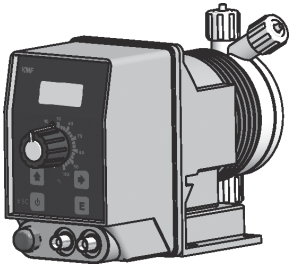
emec SIMPLE AS WATER

KMS MF - KMSA MF - KMS AC MF - KMS MF LPV

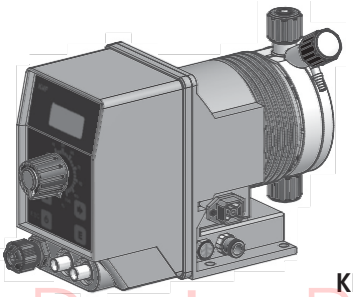
PRODUCT LABEL



KMS MF



KMSA MF



KMS AC MF

SOLENOID DRIVEN METERING PUMPS
WITH DIAPHRAGM

EN

OPERATING MANUAL

R50523

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

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

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 uses 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 AND DRINKING WATER TREATMENT.

Do not use in explosive area (EX).
Do not use with flammable chemical.
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 fluids.

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.

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.**

This equipment requires regular maintenance to ensure potability requirements of the water and maintenance of improvements as declared by the manufaturer.

ENVIRONMENTAL SAFETY

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

Recycling guidelines

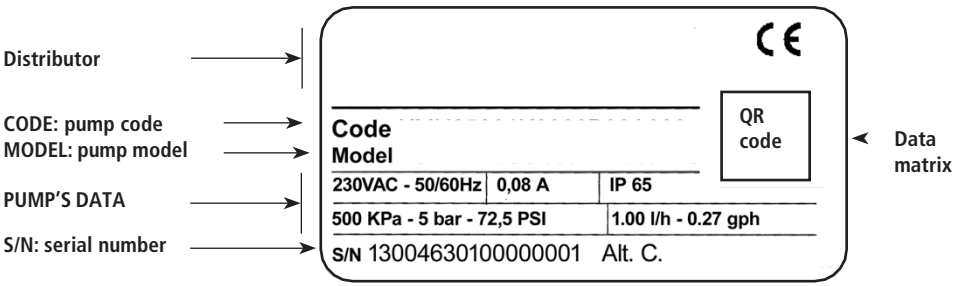
EWC code: 16 02 14

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

Figure 1. Product 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 original 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)
Humidity ..... 95% relative humidity (not condensed)

1. INTRODUCTION

1.1 KMS MF Series

KMS MF is designed for low/middle dosing of chemicals.
The pump has different working modes: Constant, Divide, Multiply, ppm, perc, mlq, batch, volt, mA.

KMS MF has got:
- STAND-BY input
- SEFL (flow sensor) inpu
- LEVEL input
- ALARM contact output.

Flow rate is determined by the stroke length and by the stroke speed. The stroke length is adjustable from 0 to 100% using the stroke length adjustment knob. However dosing accuracy is guarantee within an adjustment range from 30% to 100%.

All control and setup parameters are available through a digital keyboard and they are displayed on an LCD backlit display.

Note: some functions described into this manual may need accessories not included into the pump packaging.

1.2 KMSA MF Series

KMSA MF is the KMS MF version with **self-venting pump head**.
Self-venting pump head must be used when using chemicals that produce gas (i.e., hydrogen peroxide, ammonium, sodium hypochlorite at particular conditions).
For connections “**Self-Venting pump head installation”.**

1.3 KMS AC MF Series

KMS AC MF is the KMS MF version with **double supply: compressed air and power supply.** Compressed air without lubrifiant and/or condensed ater. Air supply pressure range must be from 6 to 10 bar.
For connections p. 5.

1.4 KMS MF LPV: viscosity up to 8.000 cPs

KMS MF LPV is the KMS version with PMMA pump head for **liquids with max viscosity 8.000 cPs.**
Functioning mode is the same as KMS MF.
Flow may change according to viscosity. Flow rates indicated refer to a measure with water.
Liquid ends: 3/4” injection valve, 16x22 PVC suction hose and 8x12 PE injection hose.
Not included: Stainless steel foot filter with valve.

1.5 Working modes

Pump can work in different ways:

MODE	WORKING MODES
CONSTANT	Pump doses at a constant rate set in “SPH” (strokes for hour), “SPM” (strokes for minute) or “LPH” (liters per hour) parameters set during program session.
DIVIDE	External pulses from a water meter are divided by a value set during program session. The pump doses with a rate determined by this parameter.
MULTIPLY	External pulses from a water meter are multiplied by a value set during program session. The pump doses with a rate determined by this parameter.
PPM	Dosing rate is determined by pulses from a water meter on the base of set PPM, chemical product concentration (%) and quantity for each single stroke set during program session.
PERC	Dosing rate is determined by pulses from a water meter on the base of set PERC (%), chemical product concentration (%) and quantity for each single stroke set during program session.
MLQ	Dosing rate is determined by pulses from a water meter on the base of set MLQ (milliliters per quintal), chemical product concentration (%) and quantity for each single stroke set during program session.
BATCH	Signal from an external contact starts the pump to dose the set quantity.
VOLT	Voltage from an external device drives the pump that doses proportionally using a minimum and maximum of strokes for minute set during program session (0–10 VDC).
mA	Current from an external device drives the pump that doses proportionally using a minimum and maximum of strokes for minute set during program session.

In MULTIPLY, DIVIDE, PPM, PERC, MLQ working modes, the pump, connected to a pulse emitter water meter, shows the instant flow .

2. UNPACKING

Included into package:

QUANTITY	STANDARD PACK	KMS MF	KMSA MF	KMS MF LPV
n. 4	ø6 dibbles	●	●	●
n. 4	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)	● 1/2"	● 1/2"	● 3/4" STAINLESS STEEL
m 2	delivery hose [1]	● PVDF	● PVDF	● PE
m 2	suction hose [1]	● PVC	● PE	● PVC
m 2	venting hose	● PVC	● PE	
m 0,3	hose / syringe			● PVC
m 2,5	external signal cable	●	●	●
m 2	stand-by/alarm cable	●	●	●
n.1	operating manual	●	●	●

[1] If hose is 6x8 there is only a 4meters long hose. Cut to obtain suction and delivery hoses.

PLEASE DO NOT TRASH PACKAGING.
IT CAN BE USED TO RETURN THE PUMP.

LEGEND:

a. **Alternating Current;**

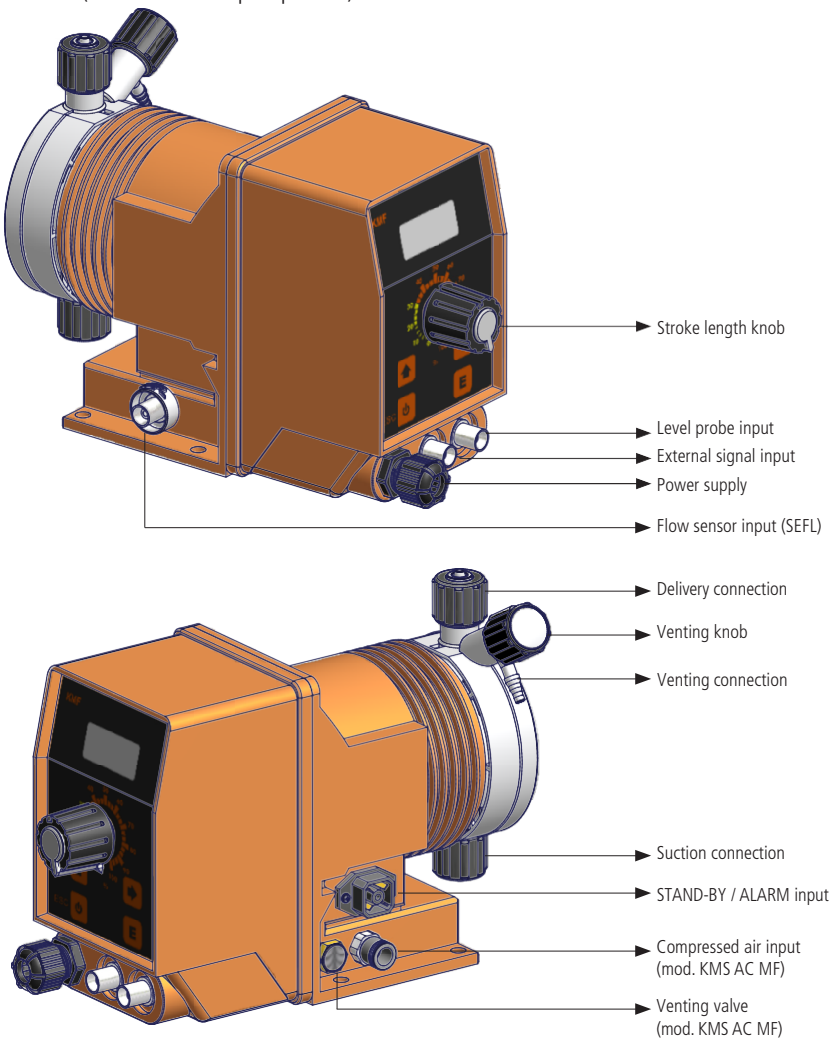
b. **DC,**

c. **Protective Earth;**

d. **Standby;**

e. **Warning -**

KMS MF (standard PVDF pump head)



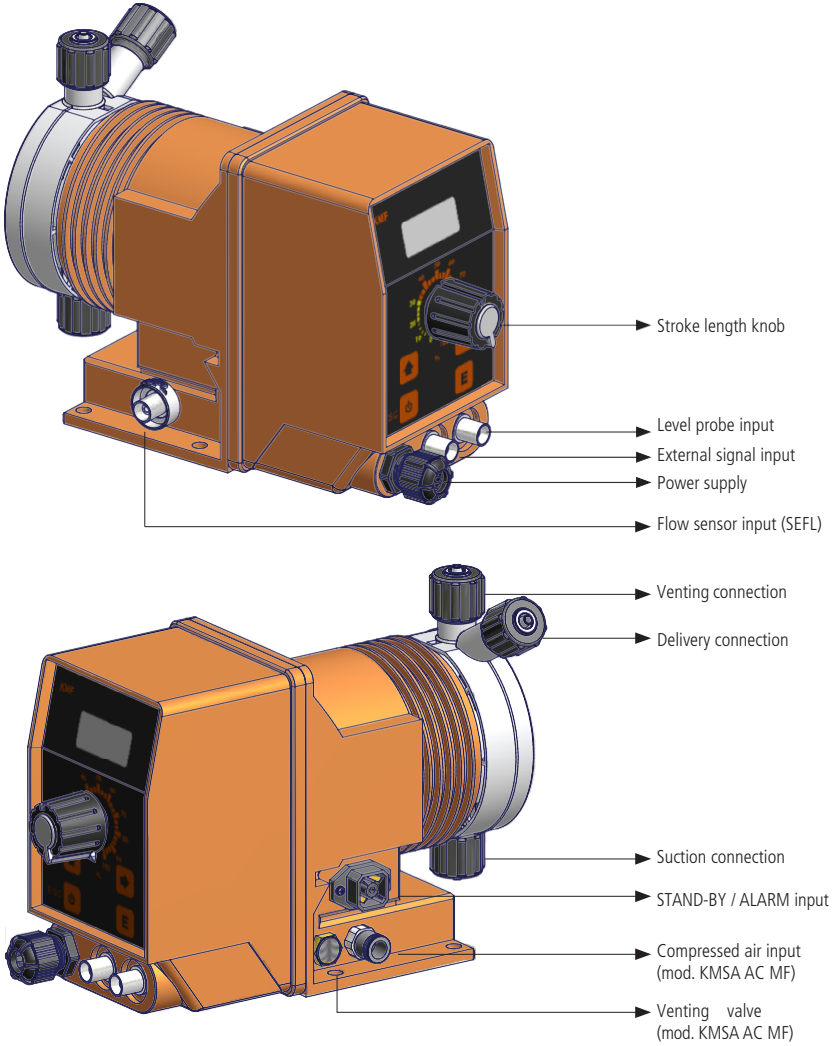
Manual stroke length adjustment

Max CC/stroke (**Construction Materials and Technical info**) are referred to Stroke length knob on 100%.
If Stroke length knob is on 50% cc/stroke will be halved.
To regulate pump's capacity: turn on the pump then press and rotate the knob.

Dosing accuracy is guarantee within an adjustment range from 30% to 100%.

Note: if knob isn't on 100% position, then the pump will dose at a pressure greater than the onedeclared on label.

KMSA MF (standard PVDF pump head)



4. BEFORE TO INSTALL WARNINGS

Pump's installation and operativity is made in 4 main steps:

Pump's installation
Hydraulic Installation (hoses, level probe, injection valve)
Electrical Installation (main power connection, SEFL installation, priming)
Programming the pump.

Before to start, please read carefully the following safety information.

Protective clothes

Wear always protective clothes as masks, gloves, safety glasses, ear plugs or ear muffs and further security devices during ALL installation procedure and while handling chemicals.

Installation location

Pump must be installed in a safety place and fixed to the table / all to avoid vibration problems!

Pump must be installed in an easy accessible

place!Pump must be installed in horizontal

position!

Hoses and Valves

Avoid water splashes and direct sun!

Suction and delivery hoses must be installed in vertical position!
All hoses connections must be performed using only hands' force!
No tongs required!

Delivery hose must be firmly fixed to avoid suddenly movements that could damage near objects!

Suction hose must be shorter as possible and installed in vertical position to avoid air bubbles suction!

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

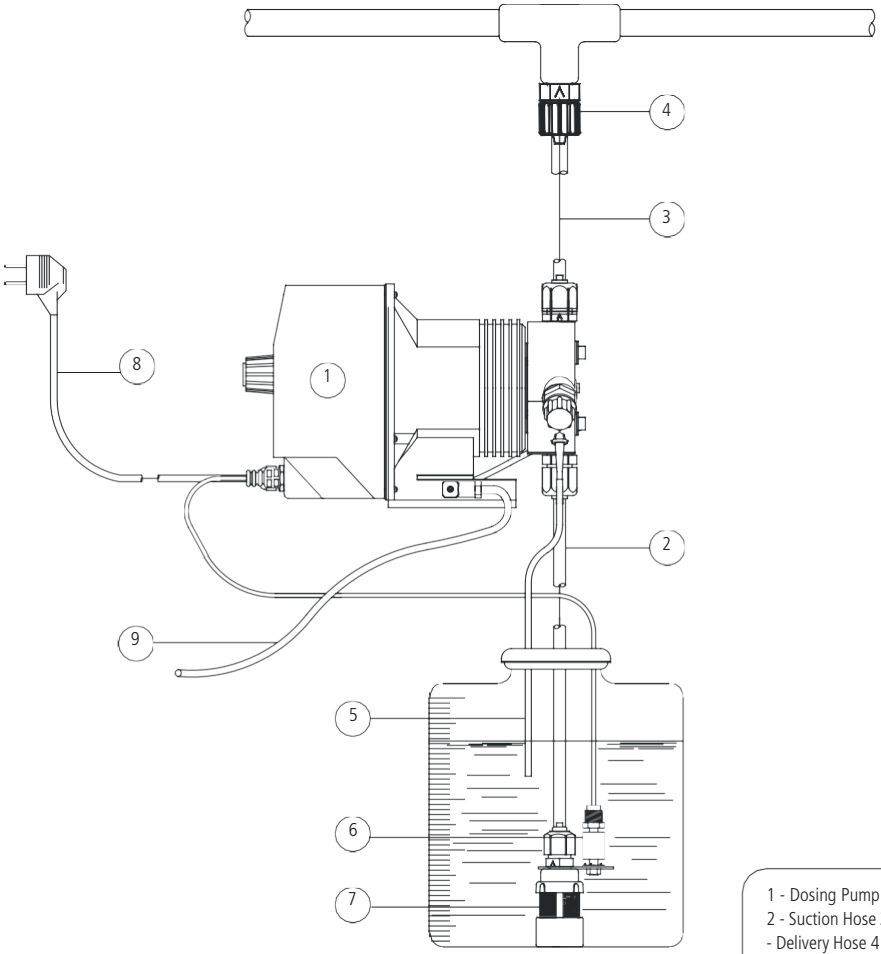
Feeder should be interlocked with a no-flow protection device to automatically shut-off the pumps when there is no flow!

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

Chemical feeding must be stopped during backwash cycles and periods of no flow as these conditions may introduce the potential for chemical overdosing. Not doing so may result in elevated chemical concentrations and hazardous gas introduction into the pool or spa.

5. INSTALLATION DRAW

Pump must be installed in a stable support (for example a table) at a maximum height (**from tank's bottom**) of **1,5 meters**.



1 - Dosing Pump
2 - Suction Hose 3
- Delivery Hose 4 -
Injection Valve
5 - Air venting
6 - Level Probe
7 - Foot Filter
8 - Power Cable
9 - Standby / Alarm

6. HYDRAULIC INSTALLATION

Hydraulic connections are:

Suction Hose with level probe and foot filterDelivery Hose with injection valve
Venting Hose

Suction Hose.

Completely unscrew tightening nut from pump's head and remove assembling components: tightening nut, holding ring and pipe holder.

Assembly as shown in fig (A). Insert hose into pipe holder until it reaches the bottom.

Lock hose on pump's head by screwing down the tightening nut.
Use only hands to do it!

Connect other side of the hose to the foot filter using the same procedure .

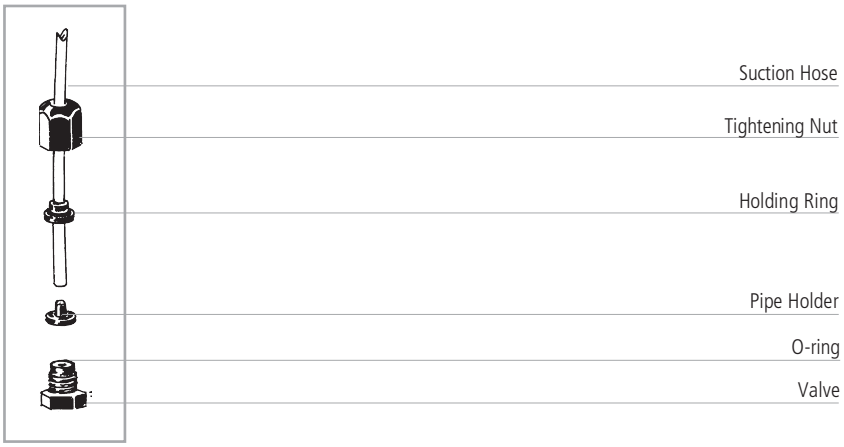
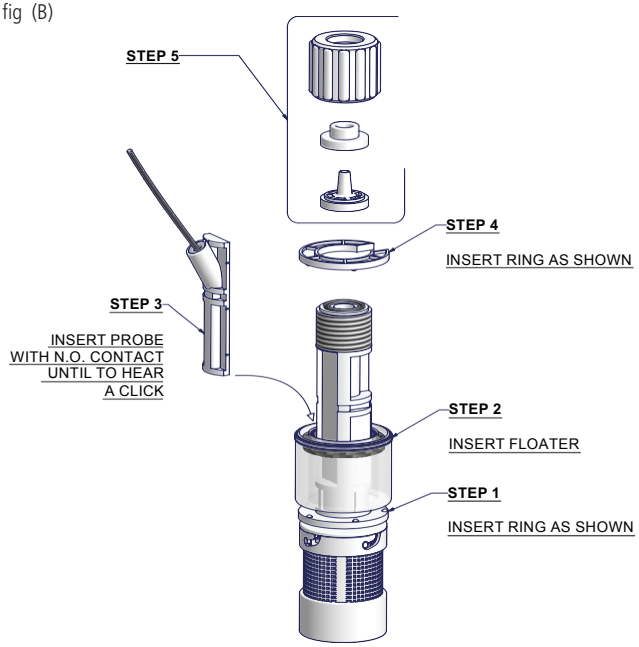


fig (A)

Assembling foot filter with level probe.

Level probe must be assembled with foot filter using the provided kit
Foot valve is made to be installed into tank's bottom without sediments priming problem.

fig (B)



Connect BNC from level probe into pump's level input (front side of the pump).
Put level probe assembled with foot filter into tank s bottom.

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

Delivery Hose.

Completely unscrew tightening nut from pump's head and remove assembling components: tightening nut, holding ring and pipe holder.

Assembly as shown in fig (A). Insert hose into pipe holder until it reaches the bottom.

Lock hose on pump's head by screwing down the tightening nut.
Use only hands to do it!

Connect other side of the hose to the injection valve using the same procedure.

Injection Valve.

Injection valve must be installed on plant from water's input.
Injection valve will open at pressure greater than 0,3bar.

Venting hose.

Insert one side of venting hose into venting connector as shown in fig (C/C1).

Insert other side of venting hose into product's tank.
During priming procedure product exceeding will flow into tank
for priming procedure see the paragraph "Priming".

Flow direction is indicated by the arrow on the valves.

fig (C) pump head connections.

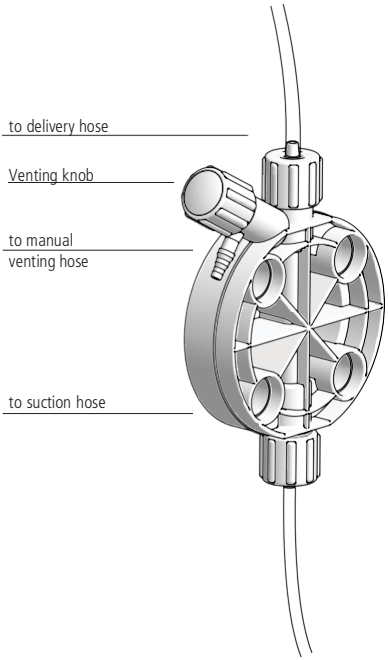
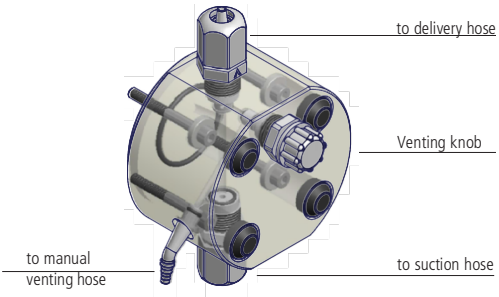


fig (C1) PMMA pump head connections.



Self-venting pump head.

Flow direction is indicated by the arrow on the valves.

fig (D) pump head connections.

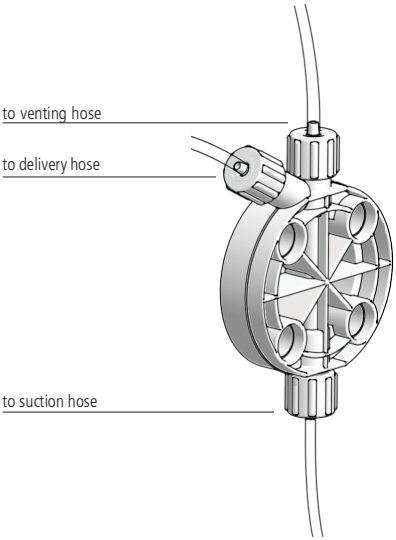
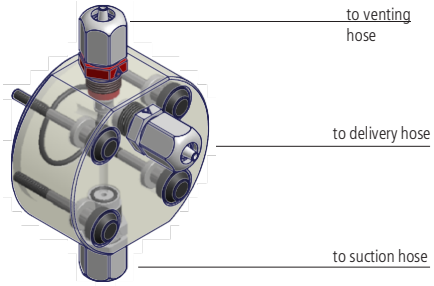


fig (D1) PMMA pump head connections.



Self-venting pump head must be used when using chemicals that produce gas (i.e., hydrogen peroxide, ammonium, sodium hypochlorite at particular conditions).

Hoses assembling procedure (including purge hose) is described in fig (A).

Notes:

- suction, delivery and purge valves are DIFFERENT! Do not exchange them!

- delivery and purge hoses are made of same material!

- it's allowed to lightly bend venting hose!

- during calibration procedure ("TEST") insert venting hose into BECKER test-tube!

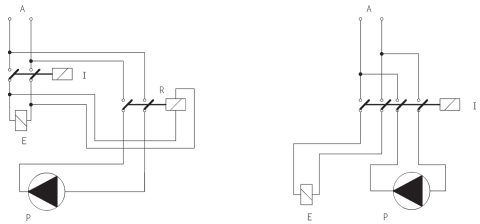
7. ELECTRICAL INSTALLATION

All electrical connections must be performed by AUTHORIZED AND QUALIFIED personnel only.
Before to proceed, please, verify the following steps:

- verify that pump's label values are compatible with main power supply.

- pump must be connected to a plant with a differential switch (0,03A sensitivity) if there isn't a good ground.

- to avoid damages to the pump do not install it in parallel with heavy inductance load (for example: engines). A relay switch must be used. See below picture.



P - Dosing Pump
R - Relay
I - Switch or safety device
E - Electro valve or inductance load
A - Main Power

WARNING
IF EQUIPMENT IS SUPPLIED WITH A PLUG:

If an appliance coupler or separable plug is used as the disconnecting device, it shall be readily identifiableand easily reached by the operator. For single-phase portable equipment, a plug on a cord of length not greater than 3m is considered to be easily reached.

WARNING
IF EQUIPMENT IS NOT SUPPLIED WITH A PLUG:

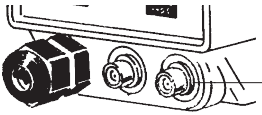
a) a switch or circuit-breaker shall be included in the building installation
b) it shall be in close proximity to the equipment and within easy reach of the operator
c) it shall be marked as the disconnecting device for the equipment

Once verified previous steps proceed as follows

- check that "BNC" of level probe has been connected as described in "Hydraulic Installation" chapter.
- connect "BNC" and external signal to pump's "INPUT" connectors.
- braided shield cable; +center conductor

This input may be used as follows:

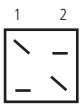
- as pulse sender water meter or
- as startup contact for "BATCH" mode or
- as voltage input for "VOLT" mode or
- as current input for "mA" mode



Level Probe Input

External Signal Input

- connect alarm and/or stand-by signal as described below fig (E)



1: (Green) "Stand-by" Input
4: (Yellow) "Stand-by" Ground

2: (Brown) Alarm (Relay) Common
3: (White) N.O. Alarm(Relay) Contact

Max load relay output: free contact 1A 24VAC

fig (E

Notes:
- "Alarm" signal isn't fuse protected
- "Standby" signal has main priority on pump's enabling / disabling.

IF NOT USED, PROTECT THE MINI DIN PLUG WITH THE BLACK RUBBER CAP LOOSE IN THE ACCESSORIES BAG.

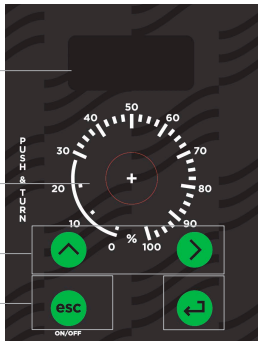
- proceed to "SEFL" connection (Flow sensor is optional) as described in page 56.

Connection to water meter with HALL effect (option)

Metering pumps for connection to a Hall effect water meter have got a three wires signal cable.If the water meter is equipped with the pump, there is a MPM plug to connect the pump.
Refer to **Main board** connection.

Wires cable connections

8. BASIC SETTINGS



LCD backlit display

Stroke Length Knob

Scroll and increase digit

Turn the pump on or off and exit from setup menu (without saving parameters)

Enter / exit from setup menu (saving parameters)

The "KMS MF" pump is equipped with a keyboard. To avoid any misunderstanding during next chapters all keys will be described as shown on this legend:

▲ "UP" key

ON/OFF ESC "ESC" key

▶ "RIGHT" key

E "E" key

Menu navigation:

To enter into programming mode press and keep pressed **"E" key** from main screen (fig.3)

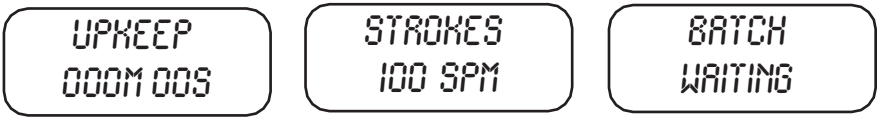


fig.

Main screen (fig.3) may appear different if "PPM" or "BATCH" mode is enabled. After about 4 seconds the pump will show the password screen (fig.5)

fig.

Default password is "0000". Just press **"E"** key. Otherwise insert password using **"UP"** and **"RIGHT"** keys.

Saving / Discarding changes / Activating working mode

Once edited data into setup menu it's possible to save them by pressing "E" key or to discard them by pressing "ESC" key.

To activate a working mode (Constant, Divide, Multiply, PPM, PERC, MLQ, Batch, Volt, mA) select the required mode and confirm it using "E" key.

Turning on and off the pump

"ESC" key has a double function. It can be used to discard all changes made into setup mode or to turn on/off the pump. To turn on/off the pump press and keep pressed this key while in main screen (fig.3) The pumps will show:

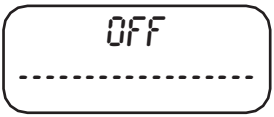


fig.

To return into operating mode press "ESC" key.

Alarm output logical working.

The pump has an "Alarm" output that changes its status (from N.O. to N.C. or vice versa) when a signal is received from "LEVEL" and/or "SEFL" and/or "STAND-BY". To set this alarm refer to related chapter.

Full menu / Short Menu mode

When entering into SETUP display shows access mode menu:

If this is the first time into SETUP menu then the pump will automatically set itself into "FULL" menu mode as shown in fig A. Just press "E" key to confirm This mode will show all pump functions and working modes.

fig A

fig B

Next time the SETUP menu will be reached it will possible to operate with "SHORT" menu configure action to change only selectedmode parameters as shown in fig B. Press "E" to confirm

Note: "SHORT" menu option is not available during first time into SETUP menu or after a reset.

At the first start-up, the dosing pump with multilanguage support requests to set the system language. Press "enter" to confirm or use arrows buttons to choose a different language.

9. PRIMING

PRIMING

To proceed follow these steps: connect all hoses to the pump; open discharge valve by completely turning the discharging knob (counter clock-wise). Power up the pump and turn stroke length knob to 100%. After pump's intro (fig.1)

fig.1

the pump will show the "Delay" (pump's activation delay) as shown fig.2

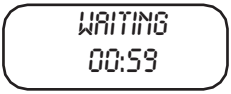


fig.2

Press any key to skip the "Delay". Pump will show "Strokes" (actual strokes) as shown in fig.3

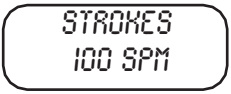


fig.3

In any working mode, if a SEFL is installed and enabled (see SEFL Setup procedure), the display will show the icon (asterisk as in fig 4):
- if SEFL works correctly, the asterisk blinks to any pulses given by the solenoid;
- if the asterisk does not appear, there is an anomaly (i.e.: hoses and/or valves are obstructed, SEFL in not connected, etc.).

fig.4

Press and keep pressed the "RIGHT" key to enter into priming mode. Pump will go for 30 seconds into priming mode as shown in fig.5

fig.5

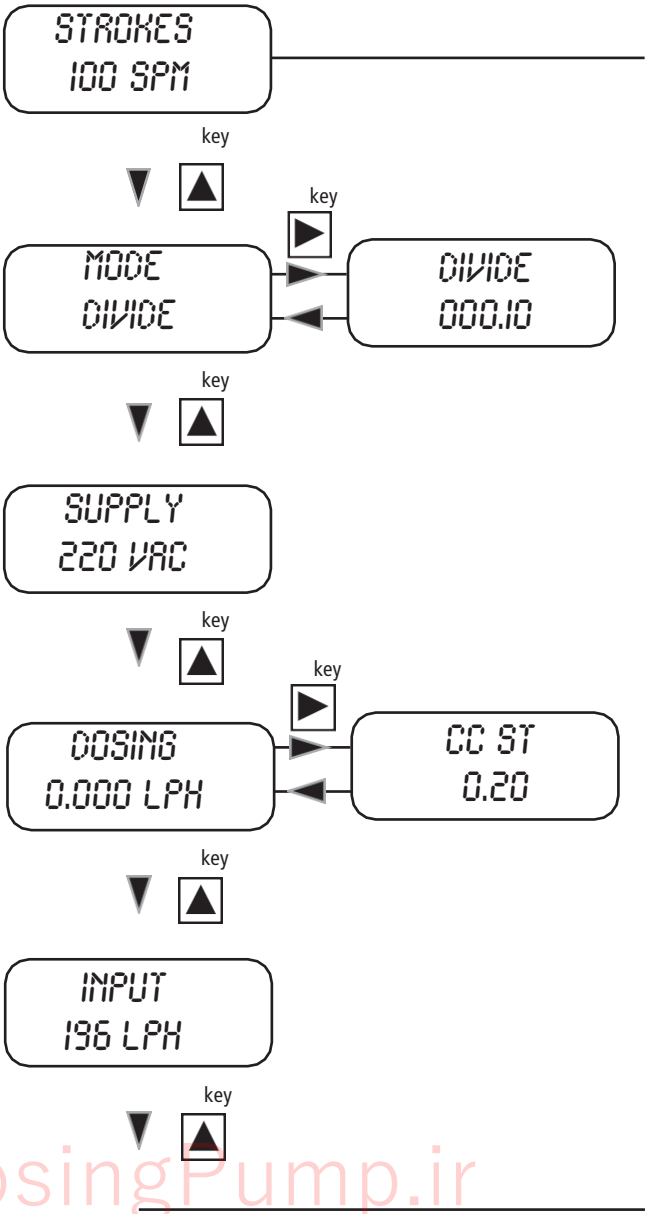
When the chemical begins to flow out from the outgassing hose then completely close the outgassing knob (except for self-venting pump heads). This ends the priming procedure. If countdown for priming is not yet ended press **"ESC"** key.

Now the pump is operative. Proceed to setup and programming.

10. PUMP'S FUNCTIONS SUMMARY

Pump's functions summary

During pump's working mode is it possible to see furthers working information.
Press more times the "UP" key to cycle through following information:



Working Mode

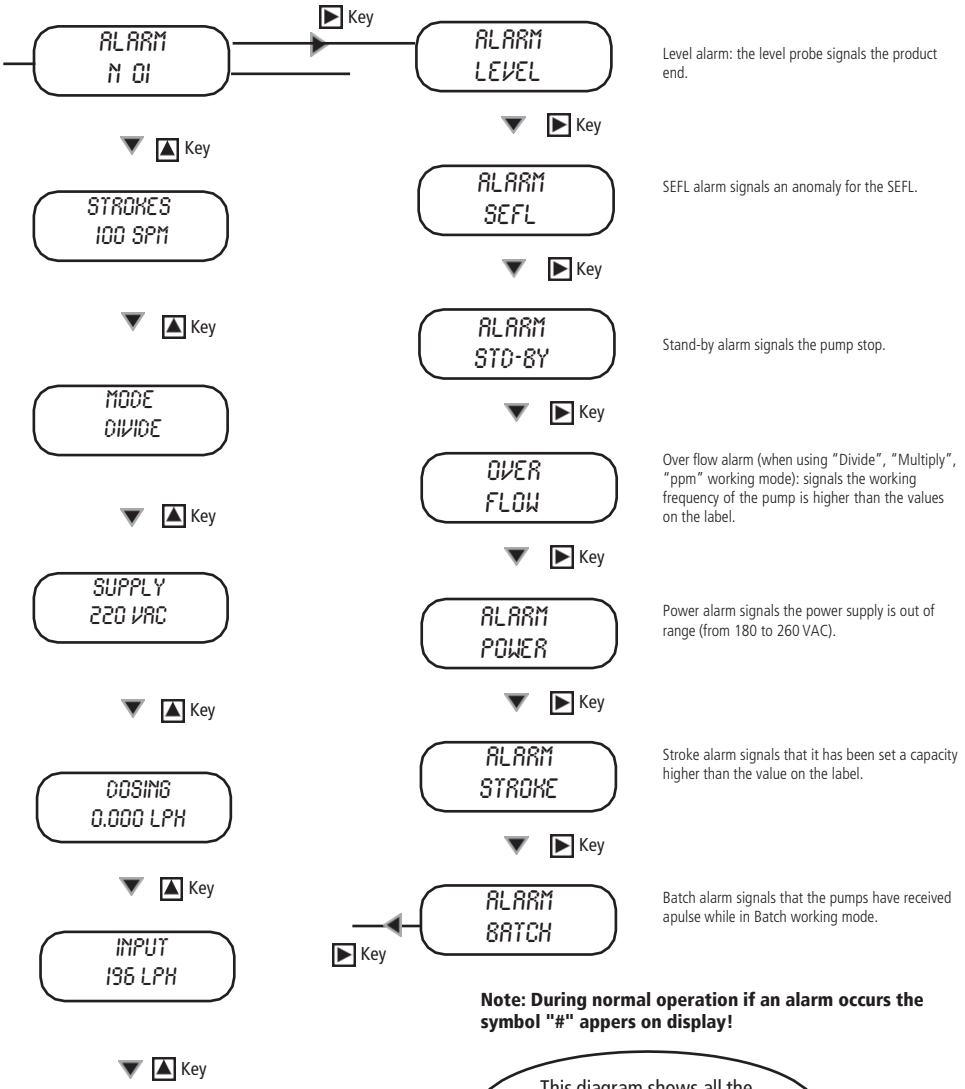
Power Supply Voltage

Liters/Hour or Gallons/ Hour Dosage

External signal value (in Volt and mA working mode) or actual system flow (Multiply, Divide and PPM working mode). This item is not present in Constant working mode.

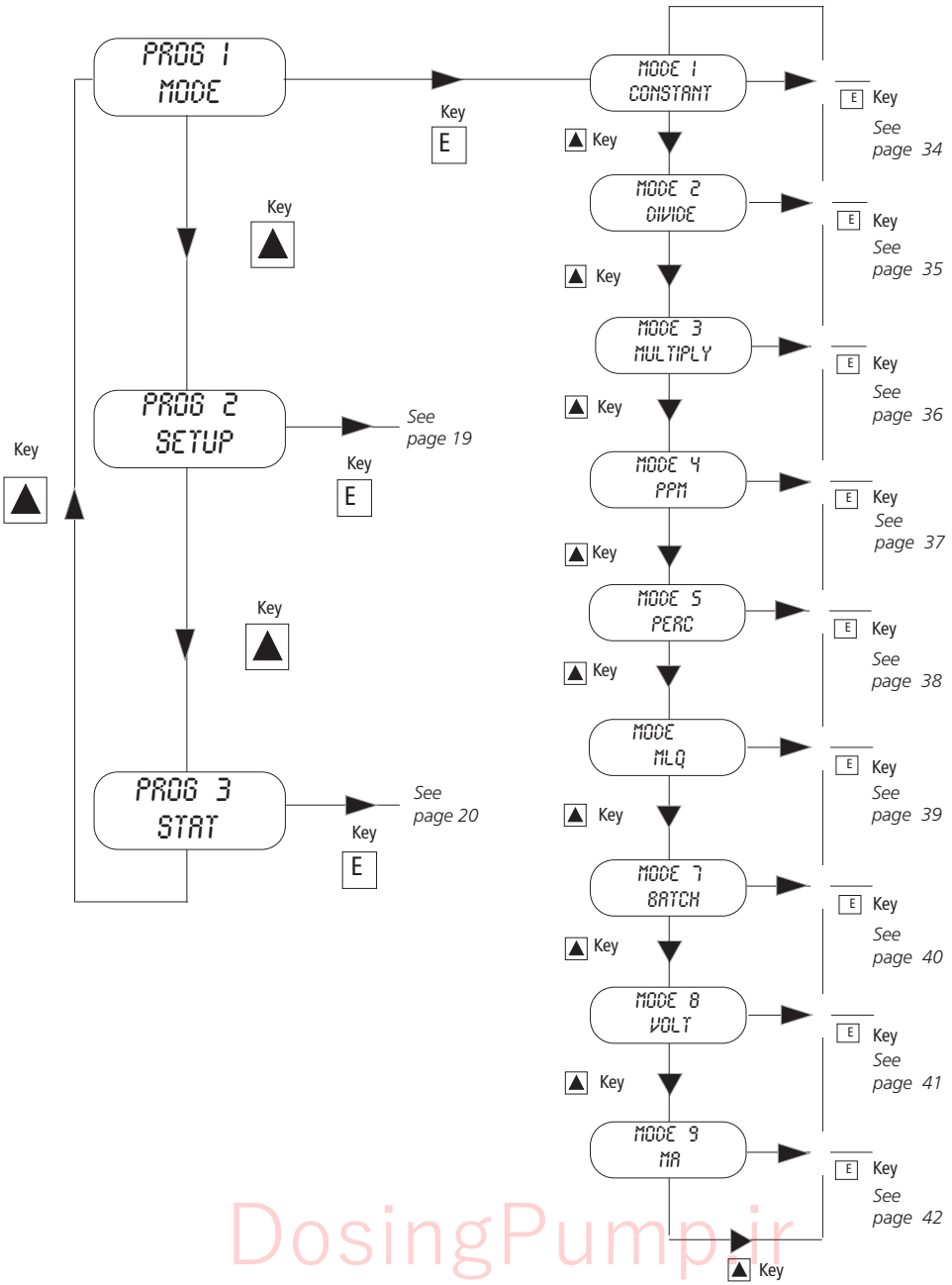
10. PUMP'S FUNCTIONS SUMMARY- ALARMS

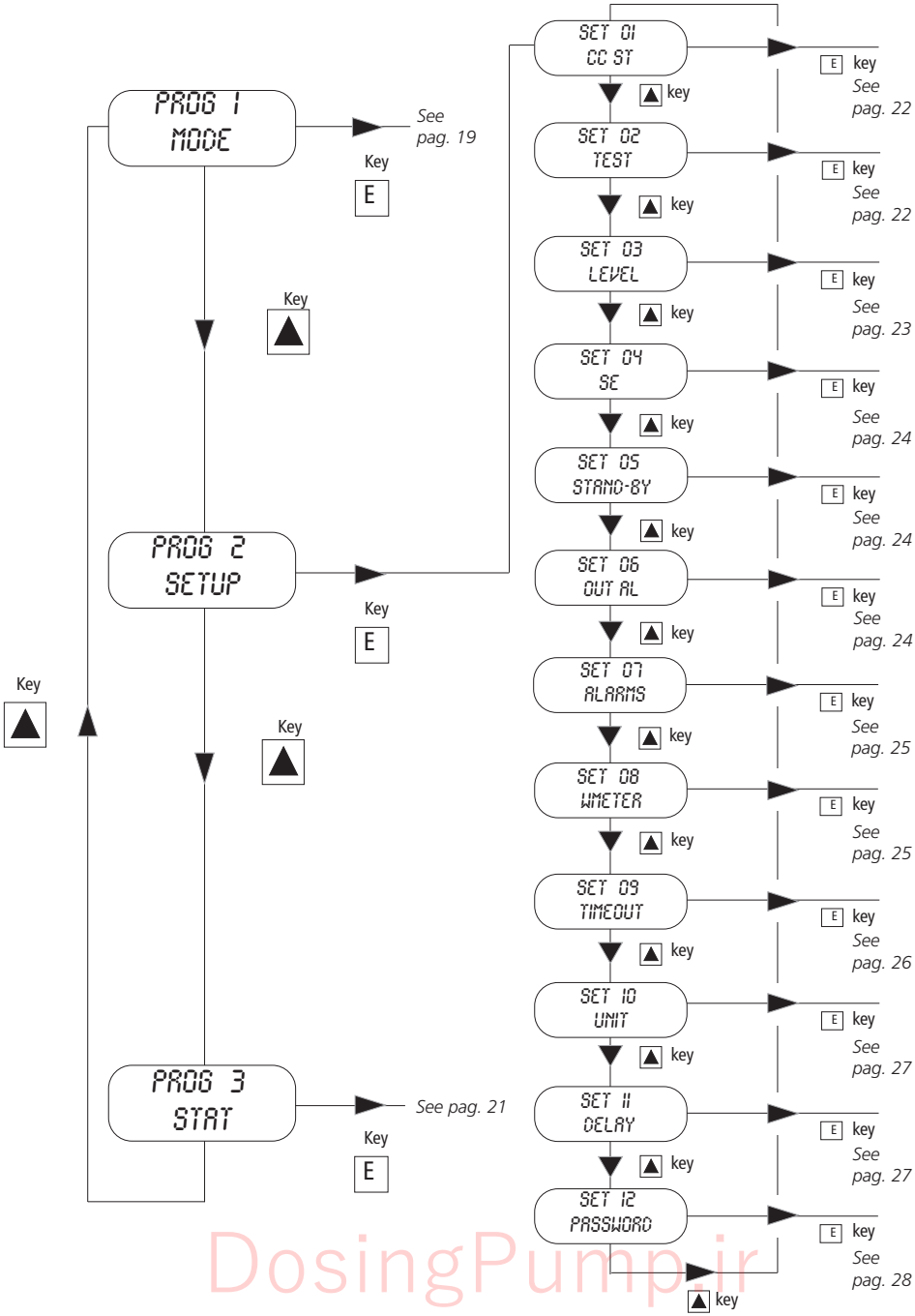
If any alarm is active, in the menu "**Pump's functions summary**" a general alarm display will show the **number** of alarm active at the moment. Enter into this menu with "**RIGHT**" key.
The windows displayed show which alarms are active.

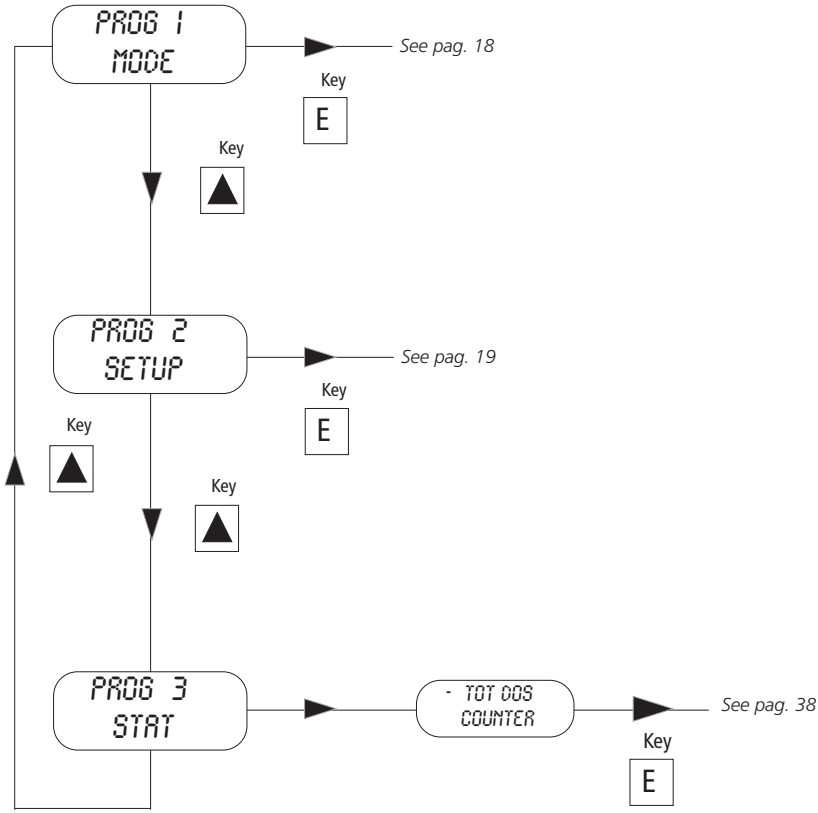


Note: During normal operation if an alarm occurs the symbol "#" appers on display!

This diagram shows all the possible alarms.

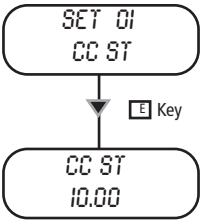






Pump's initial setup

Apart of chosen working mode, the pump must be prepared to operate by setting the main parameters into "SETUP" menu. To enter into this menu please follow the "Quick Guide through menu" at page 20.



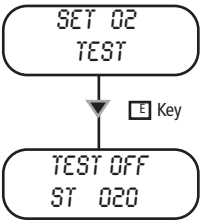
CC per Stroke.

Enter here the cc/stroke value obtained during "Test" mode (calibration).

Use **"UP"** key to increase of one unit the blinking digit "_".

Press **"RIGHT"** key to skip on next digit.

Press **"E"** key to save data and "ESC" exit to main menu.
Otherwise press **"ESC"** to discard data and exit to main menu.



Calibration.

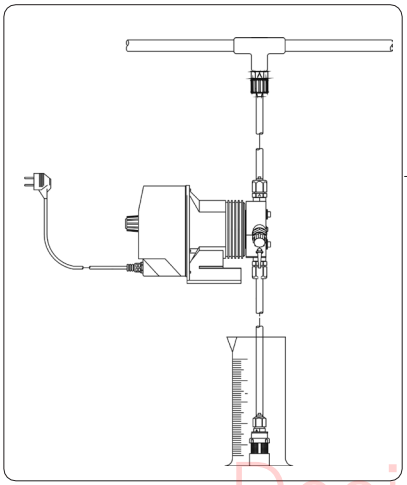
This procedure defines the cc quantity (cubical centimeters) that the pump feed every single injection. To determine this value the pump must be calibrated.

1) Install the pump on plant and insert the suction hose (with its level probe / foot filter) into a BEKER "test-tube"
If pump's model is self-priming put the venting hose into the "test-tube" too.

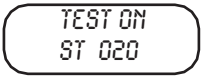
2) Power up the pump and turn the flow s knob to required position.

3) Fill up the "test-tube" with the chemical until to reach a known value.

4) From setup menu choose "TEST", and insert 20". This value is the strokes that the pump will produce during the procedure.



6) Press **"E"**. The pump will begin to produce the 20 strokes and to suck the chemical from the "test-tube".



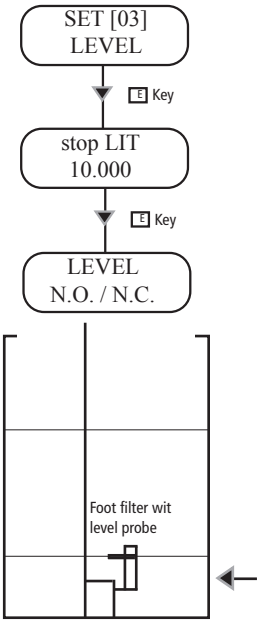
7) At the end of 20 strokes the pump will stop. Read the value of chemical left into "test-tube".

8) Subtract the initial value to the left value.

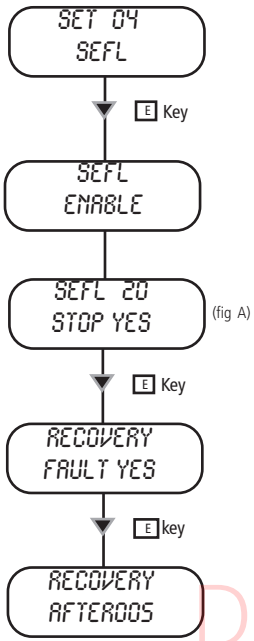
9) Divide the result with the ST value (20).

10) Type this value into "CC/ST" (Set [01]) as previously described.

11) If obtained result is too small or too big, please, try to change strokes value (20).



Customizable Reserver (liters / gallons)



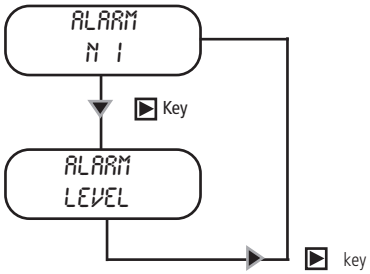
Pre-Level Alarm (Reserve).

This function defines a pre-alarm status to inform user that the dosing product is near to end. Reserve value to be set, must be calculated on product quantity left between foot filter and pump s suction level.

- Use "UP" key to increase the blinking "_" digit.
-Press "RIGHT" key to skip on next digit.
-Press "E" key to save data and "ESC" exit to main menu.

Otherwise press "ESC" to discard data and exit to main menu. **It's possible to set contact working mode between normally open (N.O.) or normally closed (N.C.)**

During the alarm the pump continues to dose but it'll show the following picture:



Flow Sensor (SEFL).

This function enables an external alarm and, eventually, stops the dosage if the pump does not receive a "confirmation signal" from the "SEFL". ("SEFL" accessories is optional).

- Use **"UP"** key to increase the blinking "_" digit and set the number of failing strokes before to stop or not the pump. It is possible to set a number from 1 to 99. Setting 00, the SEFL will be disabled (DIS).

-Press **"RIGHT"** key to skip on next digit.

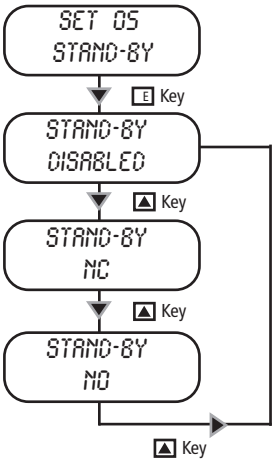
-Press again **"RIGHT"** key to choose the working procedure.

-Press **"UP"** key to choose if pump must be stopped after a numbers of pulses (YES) or continue to dose (NO).

- Press **"E"** key to setup fault recovery (recovery fault) options. Setting **"YES"** as selected option if the flow sensor will have unreliable strokes it will recover them while flow sensor is still working in synching with it. Set this function by choosing how many unreliable strokes will be needed to recover dosage. If entered value is lower than previous one (fig A) then SEFL function will be disabled.

While into recovering mode, if there is not synchrony with SEFL, the unreliable strokes numbers will not decrease. The maximum unreliable strokes numbers are determined by the number of failing strokes previously set. Passing over this value an alarm (ALARM SEFL) will be generated by the pump. Press "**UP**" to set Recovery fault on NO.

-Press **"E"** key to save data and **"ESC"** to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.

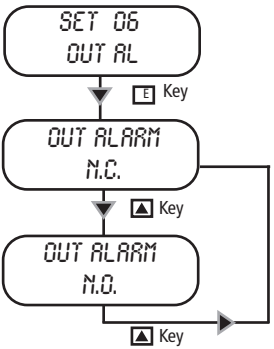


"Stand-By" signal.

This function allows the pump to dose only when an external signal is received from "Stand-by" input. This signal can be enabled as a N.O. contact (Normally Opened) , N.C. contact (Normally Closed) or disabled.

- Use "UP" key to change working mode for "Stand by" signal.

-Press **"E"** key to save data and **"ESC"** to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.

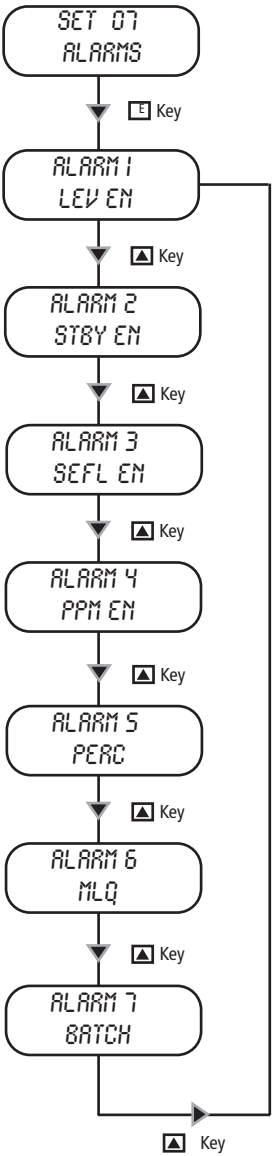


"Out Alarm" signal.

This function allows to manage the alarm output contact . The alarm can be set as "N.O." contact (Normally Open) or "N.C." contact (Normally Closed).

- Use "UP" key to change working mode for "Out Al" signal.

-Press **"E"** key to save data and exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.



Alarms Management.

Use this function to enable/disable the relay output for level alarm (lev) and/or standby (stby) and/or flow sensor (sefl) and/or ppm and/or percentage (PERC) and/or MLQ and/or Batch.

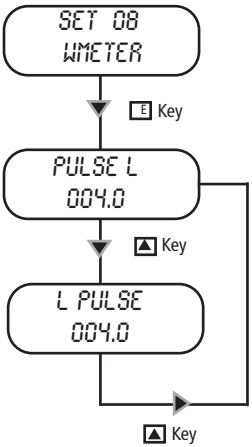
If alarm is activated for one or more events then the output relay will be enabled, the pump will show the alarm status and it'll stop or not the dosing activity.

If alarm is not activated for one or more events then the output relay will be disabled, the pump will show the alarm status and it'll stop or not the dosing activity.

- Use **"UP"** key to choose the alarm to set.

-Use **"RIGHT"** key to enable (EN) or disable (DI) the alarm.

-Press **"E"** key to save data and **"ESC"** to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.



Water Meter Setup.

Use this function to setup the water meter information.

By entering the amount of pulses produced by the water meter the pump will optimize the working mode when programmed to work in ppm and update the stats menu.

- Use "UP" key to choose from "Pulse/L" (pulse/liter) or "L/Pulse" (liter/pulse).

Choose "Pulse/L" for a water meter that produces many pulses.

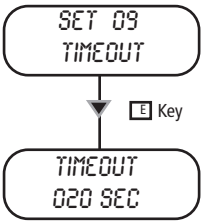
Choose "L/Pulse" for a water meter that produces few pulses.

Setting "000.0", the pump does not accept the signal and it is not possible to save the data.

- Use **"UP"** key to increase the blinking "_" digit. Enter number of pulses that pump must receive to stop or not the pump.

-Press **"RIGHT"** key for next digit / field

-Press **"E"** key to save data and **"ESC"** to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.



Pulses Timeout (only for "Multiply" working mode and "PPM", "PERC" and "MLQ" working mode when the result is a multiplication).

When the pump receives a pulse from the water meter it starts the dosing activity through an amount of time (from the first pulse to the following one). At the beginning the pump doesn't know the time lapse between the first and the second pulse. So it'll dose the product in the fastest way. From the second pulse, the pump will dose the product correctly.

This function set the maximum time between a pulse and the following one. Once that this time is exceeded the pump will reinitialize the dosing activity as the first time that a pulse has been received

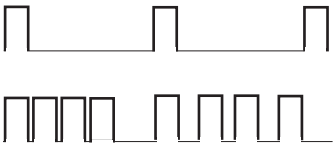
Default value is 120 seconds.
To set "Timeout" function, between the minimum (1 sec.) and the maximum (999 sec.), proceed as follow:

- Use **"UP"** key to increase the blinking "_" digit. Enter number of pulses that pump must receive to stop or not the pump.

-Press **"RIGHT"** key for next digit / field

-Press **"E"** key to save data and **"ESC"** to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.

Pulses Timeout does not take part in "Divide" working mode and in all working modes when the result is a division.

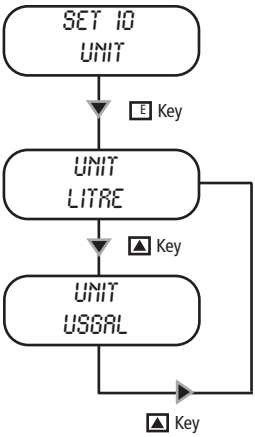


External Pulses

The first time that the pump receives a pulse it doesn't know the the time between this pulse and the following one. So the pump will run faster as possible. "Timeout" function forces the pump to work in this way, once a specified amount of time has been exceeded.

After second pulse the pump will know the time between a pulse and the following one.

So it'll dose optimizing the dosage through the time.

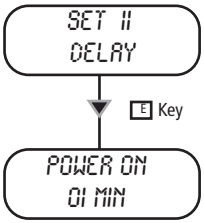


Unit Change.

This function allows to choose between liters or gallons measurement unit.

-Use "UP" key to switch between liter or gallons measurement unit.

-Press "E" key to save data and "ESC" to exit to main menu. Otherwise press "ESC" to discard data and exit to main menu.



Startup Delay Setup.

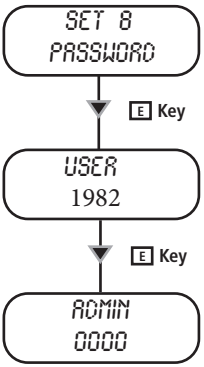
When the pump is powered is it possible to have a delay time (from 0 to 10 minutes) before dosing activities.

-Use "UP" key to choose the alarm to set.

-Use "RIGHT" key for next digit.

-Press "E" key to save data and "ESC" to exit to main menu. Otherwise press "ESC" to discard data and exit to main menu.

Note: Press any key during delay time to skip it.



Password Setup.

"Setup" menu is password protected. Default value to enter into "setup" menu is "0000" (only numeric units). To change this password proceed as follows:

- Use "UP" key to change first digit
- Press "RIGHT" key to move cursor over next digit.
- Press "E" key to save data and "ESC" to exit to main menu. Otherwise press "ESC" to discard data and exit to main menu.

Note: For lost password, please, follow the "Load default" procedure.

*user password allows to change working mode parameters only

16. "LOAD DEFAULT" AND "RESET PASSWORD" PROCEDURE

"LOAD DEFAULT" procedure

This procedure deletes all programming data set. It reloads the default data of the pump.

Follow this instructions:

- unplug power supply;

- pressing both "UP" and "RIGHT" keys, plug in power supply.

For few seconds, the display shows LOAD DEFAULT before start up the pump.

"RESET PASSWORD" procedure

This procedure resets the password set and reloads the default password of the pump ("0000").

Follow this instructions:

- unplug power supply;

- pressing both "UP" and "ESC" keys, plug in power supply.

For few seconds, the display shows RESET PASSWORD before start up the pump.

17. WORKING PROCEDURE SETUP

Introduction.

"MF" pump can work in different modes.

CONSTANT mode.

Pump doses at a constant rate set in "SPH" (strokes for hour), "SPM" (strokes for minute) or "LPH" (liters per hour) parameters set during program session.

When to use this mode ?
This mode is useful when there isn't an input signal to control the dosing activity. Pump doses requested product quantity in constantly.

Which parameters must be set ?
SPH (strokes per hour), SPM (strokes per minute) LPH (liters per hour)

DIVIDE mode.

External pulses from a water meter are divided by a value set during program session. The pump doses with a rate determined by this parameter.

When to use this mode ?
This mode is useful using an external signal from a pulse sender water meter that produces elevated quantities of pulses. Pump divides these pulses to allow a correct dosing activity.

Which parameters must be set ?
DIVIDE (division factor)

MULTIPLY mode.

External pulses are multiplied by a value set during program session. The pump doses with a rate determined by this parameter.

When to use this mode ?
This mode is useful using an external signal from a pulse sender water meter that produces low quantities of pulses. Pump multiplies these pulses to allow a correct dosing activity.

Which parameters must be set ?
MULTIPLY (multiply factor)
TIMEOUT

PPM mode.

Dosing rate is determined by pulses from a water meter, desired concentration in PPM, chemical product concentration (%) and quantity for each single stroke set during program session.

When to use this mode ?
This mode is useful using an external signal from a pulse sender water meter and it's necessary to specify only PPM (parts per million) and product concentration, leaving the pump to manage coming pulses.

Which parameters must be set ?
PPM (parts per million product quantity)
CONC (% of product's concentration)
Water Meter Pulses
CC/Stroke
TIMEOUT

PERC mode.

Dosing rate is determined by pulses from a water meter, percentage (%), chemical product concentration and quantity for each single stroke set during program session.

When to use this mode ?
This mode is useful using an external signal from a pulse sender water meter and it's neces--sary to specify only % , leaving the pump to manage coming pulses.

Which parameters must be set ?
% (percentual product to dose)
CONC (percentual of product concentration)
Water Meter Pulses
CC/STROKE
TIMEOUT

Water meter:
Use a water meter to reach its maximum pulsating capabilities.
Note: maximum frequency for this pump is 1Khz (1000 pulses per second).

MLQ mode.

Dosing rate is determined by pulses from a water meter on the base of set MLQ (mil liliters per quintal), chemical product concentration (%) and quantity for each single stroke set during program session.

When to use this mode ?
This mode is useful when with an external signal from a pulse sender (as a water meter), it is necessary to dose the product quantity set specifying the MLQ (milliliters per quintal) and leaving the pump to manage the coming pulses.

Which parameters must be set ?
MLQ (product quantity in milliliters per quintal)
CONC (% of product's concentration): set 100% if product is pure
Water Meter Pulses
CC/Stroke
TIMEOUT

BATCH mode.

Signal from an external contact starts the pump to dose product or to producea number of strokes set during program session.

When to use this mode ?
This function allows to begin dosing activities when pump receives an external signal.

Which parameters must be set ?
ST (strokes)
CC (product's quantity to dose)

VOLT mode.

Voltage from an external device drives the pump that doses proportionally using a minimum and maximum of strokes for minute set during program session.

When to use this mode ?
This mode is used with controllers provided of a proportional output in voltage.

Which parameters must be set ?
HIV (maximum tension)
LOV (minimum tension)
SPM (strokes per minute)

mA mode.

Current from an external device drives the pump that doses proportionally using a minimum and maximum of strokes for minute set during program session.

When to use this mode ?
This mode is used with controllers provided of a proportional output in current.

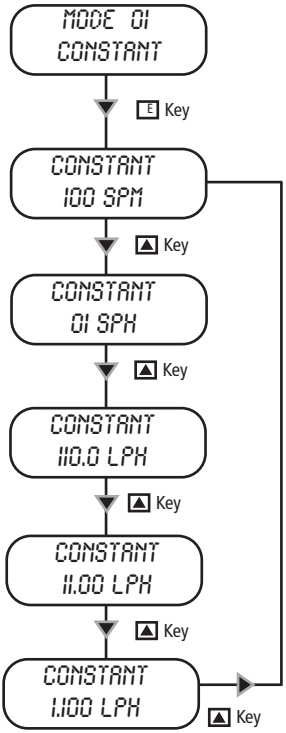
Which parameters must be set ?
HImA (maximum current)
LOmA (minimum current)
SPM (strokes per minute)

18. "CONSTANT" WORKING MODE

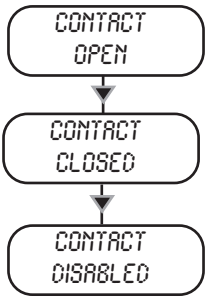
CONSTANT mode.

Pump doses at a constant rate set in"SPH" (strokes for hour), "SPM" (strokes for minute), "LPH" (liters per hour) parameters set during program session.

Which parameters must be set ?
SPH (strokes per hour), SPM (strokes per minute), LPH (liters per hour).



This option allows to operate selected working mode if external contact (i.e.: from water meter) is OPEN or CLOSED. Choose "DISABLED" to disable option.



Choose "CONSTANT" working mode: "SPH" (strokes per hour), "SPM" (strokes per minute), "LPH" (liters per hour).

Use **"UP"** key to choose between these two modes. Use **"RIGHT"** key to change value. For next digit press again "RIGHT" key.

"LPH" value accuracy depends on cc/st value set into the Setup menu (SET [01] CC/ST).
LPH max value depends on the max frequency of the pump (refer to the pump's label). If a higher value is set, the pump will show an alarm message (ALARM STROKE).

Press **"E"** key to save data and "ESC" to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.

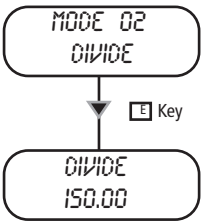
Note: last mode displayed before press the "E" key will be the active one.

19. "DIVIDE" WORKING MODE

DIVIDE mode.

External pulses are divided by a value set during program session. The pump doses with a frequency determined by this parameter.

Which parameters must be set ?
DIVIDE (divisor factor)



Use this mode if connected pulse sender water meter produces many pulses and pump must divide them for correct dosing activities. See formula below to verify this value.

Minimum value accepted is 001.00. Setting a lower value the pump does not save the data.

Use **"UP"** key to modify the value. Press **"RIGHT"** key to move on next digit.

Press **"E"** key to save data and "**ESC**" to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.

Use the following formula to find the divider to keep desired concentration.

$$\left(\frac{[\text{imp/l}] \times [\text{cc}]}{[\text{ppm}] \times [\text{K}]}\right) \times 1000 = N$$

N - divisor value to enter into the pump
[imp/l]- pulses/liter from pulse sender water meter
[cc] - single injection quantity of dosing pump
[ppm] - part per millions product quantity to dose (gr/m^3)
[K] - product dilution coefficient

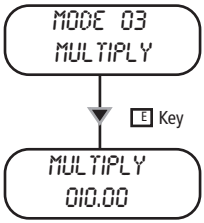
If obtained "N" is < 1 then install a pulse sender water meter that produces more pulses. Otherwise use the "MULTIPLY" mode and multiply for 1/N. It's also possible to fix the problem trying to decrease product dilution

20. "MULTIPLY" WORKING MODE

MULTIPLY mode.

External pulses are multiplied by a value set during program session. The pump doses with a frequency determined by this parameter.

Which parameters must be set ?
MULTIPLY (multiply factor)
TIMEOUT



Use this mode if: connected pulse sender water meter produces few pulses and pump must multiply them for correct dosing activities. See formula below to verify this value.

Minimum value accepted is 001.00. Setting a lower value the pump does not save the data.

Use **"UP"** key to modify the value. Press **"RIGHT"** key to move on next digit.

Press **"E"** key to save data and "**ESC**" to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.

Use the following formula to find the divider to keep desired concentration.

$$\left(\frac{[ppm] \times [K]}{([imp/l] \times [cc]) \times 1000}\right) = N$$

N - multiplier value to enter into the pump
[imp/l]- pulses/liter from pulse sender water meter
[cc] - single injection product quantity of dosing pump
[ppm] - part per millions product quantity to dose (gr/m^3)
[K] - product dilution coefficient

If obtained "N" is < 1 then install a pulse sender water meter that produces less pulses. Otherwise use the "DIVIDE" mode and device for 1/N. It's also possible to fix the problem trying to decrease product dilution

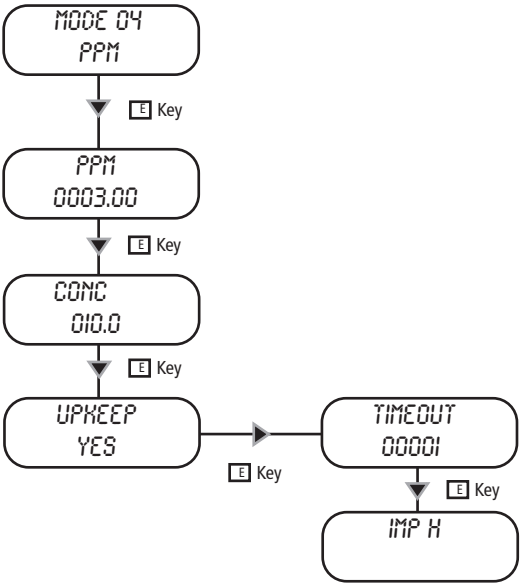
Note: before to use this mode please set the "TIMEOUT" parameter as described at page 26.

21. "PPM" WORKING MODE

PPM mode.

Dosing rate is determined by pulses from a water meter, PPM, chemical product (%) concentration and quantity for each single stroke set during program session.

Which parameters must be set ?
PPM (parts per million product quantity)
CONC (% of product's concentration)
TIMEOUT
WMETER (pulse sender water meter)
CC/ST (see related page)



Use "UP" key to change selected unit ("_" blinking cursor) of PPM.

To move on next digit press "RIGHT" key.

To modify quantity of product concentration press "E" key.

Use "UP" key to change selected unit ("_" blinking cursor) of CONC%.

To move on next digit press "RIGHT" key.

Press "E" key to save data and "ESC" to exit to main menu. Otherwise press "ESC" to discard data and exit to main menu.

To change "TIMEOUT" option, pump activation without external pulses for a set time, choose "YES" from "UPKEEP" menu. Then set pulses/hour to dose at the end of set time.

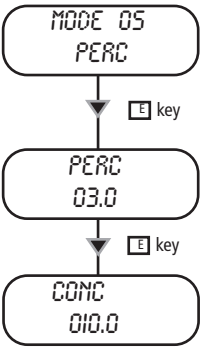
Note: before to use this mode we suggest to set the "TIMEOUT" parameter. "TIMEOUT" take part when the result is a multiplication.

22. "PERC" WORKING MODE

PERC mode.

Dosing rate is determined by pulses from a water meter, percentage (%), chemical product concentration and quantity for each single stroke set during program session.

Which parameters must be set ?
% (percentage of product quantity to dose)
CONC (% of product's concentration): set 100% if product is pure
CC/STROKE (refer to CC/ST setup)
WMETER (water meter)
TIMEOUT



Selectionable from 0.1 to 100.0%

Use "UP" key to change selected unit ("_" blinking cursor) of PPM.

To move on next digit press "RIGHT" key.

To modify quantity of product concentration press "E" key.

Use "UP" key to change selected unit ("_" blinking cursor) of CONC%.

To move on next digit press "RIGHT" key.

Press "E" key to save data and "ESC" to exit to main menu. Otherwise press "ESC" to discard data and exit to main menu.

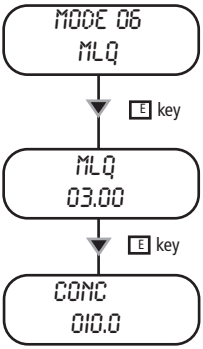
Note: before to use this mode we suggest to set the "TIMEOUT" parameter.
"TIMEOUT" take part when the result is a multiplication.

23. "MLQ" WORKING MODE

MLQ mode.

Dosing rate is determined by pulses from a water meter on the base of set MLQ (milli liters per quintal), chemical product concentration (%) and quantity for each single stroke set during program session.

Which parameters must be set ?
MLQ (product quantity in milliliters per quintal)
CONC (% of product's concentration): set 100% if product is pure
CC/STROKE (refer to CC/ST setup)
WMETER (water meter)
TIMEOUT



Use "UP" key to change selected unit ("_" blinking cursor) of MLQ.

To move on next digit press "RIGHT" key.

To modify quantity of product concentration press "E" key.

Use "UP" key to change selected unit ("_" blinking cursor) of CONC%.

To move on next digit press "RIGHT" key.

Press "E" key to save data and "ESC" to exit to main menu. Otherwise press "ESC" to discard data and exit to main menu.

Note: before to use this mode we suggest to set the "TIMEOUT" parameter.
"TIMEOUT" take part when the result is a multiplication.

24. "BATCH" WORKING MODE

BATCH mode.

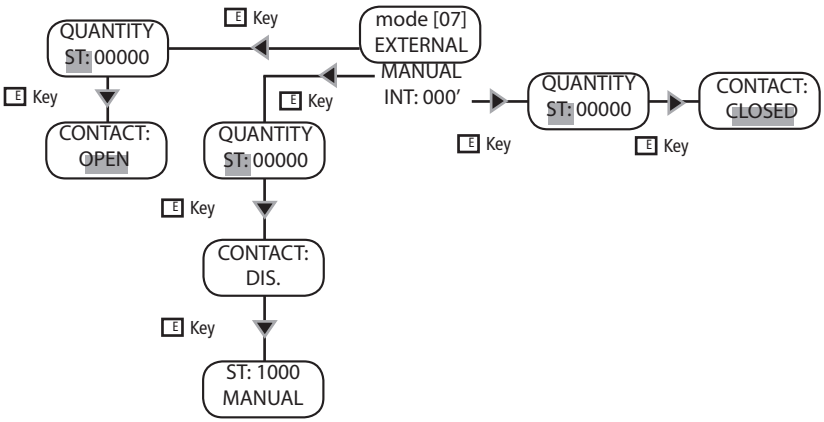
Signal from an external contact starts the pump to dose the needed quantity set during program session or for the set number of strokes.

When to use this mode ?

This function allows to begin dosing activities when pump receives an external signal or to dose in WORK-PAUSE mode.

Which parameters must be set ?

MODE (EXTERNAL - MANUAL - INTERNAL)
ST (strokes)
CC (product's quantity to dose only if programmed to feed a set amount of chemical)
CC/STROKE (see "setup CC/ST")
CONTACT (OPEN or CLOSED)



Choose working mode:

E TERNAL Pump doses within an amount of time if an external signal is received. External contact can be set as OPEN (normally open) or CLOSED. (normally closed). Press **"E"** from main mode, choose to dose in ST or CC using **"UP"** key. Set quantity dose and press **"E"** to continue. Define contact type using **"UP"** key. Press "E" to end procedure.

MANUAL Pomp doses at the end of procedure. Press "E" from main mode, choose to dose in ST or CC using "UP" key. Set quantity to dose. Press "E" to continue, review contact status and press "E". Pump will begin to dose immediately showing quantity left.

INTERNAL This is a "WORK-PAUSE" mode. Dosing will start for set CC or ST quantity and will stop for set time. Press **"E"** from main mode, choose to dose in ST or CC using **"UP"** key. Set quantity dose and press **"E"** to continue. Define contact type (OPEN or CLOSED) using **"UP"** key. Press "E" to end procedure.

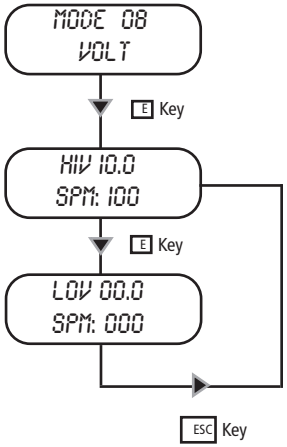
NOTE Pump must be calibrated ("TEST" function) in order to wor properly into this mode. It s not possible to program the pump for both modes. Last entry overwrites previous ones.

25. "VOLT" WORKING MODE

VOLT mode.

Voltage from an external device drives the pump that doses proportionally using a minimum and maximum of strokes for minute set during program session.

Which parameters must be set ?
HIV (maximum tension)
LOV (minimum tension)
SPM (strokes per minute)



To work in this mode is necessary to specify the "HIV" (maximum working tension), "LOV" (minimum working tension) and "SPM" (strokes per minute) values that pump will produce between the parameters.

To setup this values enter into "VOLT" mode. The cursor will blink on first digit ("HIV" field) Insert maximum tension value that will be supplied to the pump (**"UP"** key). To move on next digit press **"RIGHT"** key.

The cursor will blink on "SPM" field Insert strokes per minute that pump will produce near "HIV" value (**"UP"** key). To move on next digit press **"RIGHT"** key.

Press **"E"** key to move on "LOV".

The cursor will blink on first digit ("LOV" field) Insert minimum tension value that will be supplied to the pump (**"UP"** key). To move on next digit press **"RIGHT"** key.

The cursor will blink on "SPM" field Insert strokes per minute that pump will produce near "LOV" value (**"UP"** key). To move on next digit press **"RIGHT"** key.

Press **"E"** key to save data and "ESC" to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.

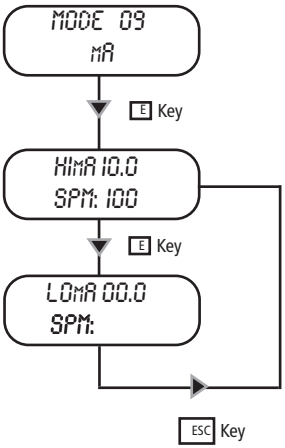
Attention: if a wrong data is set (for example, it has been set the same value for HIV and LOV) an error message (WRONG ENTRY) will appear.

26. "MA" WORKING MODE

mA mode.

Current from an external device drives the pump that doses proportionally using a minimum and maximum of strokes for minute set during program session.

Which parameters must be set ?
HImA (maximum current)
LOmA (minimum current)
SPM (strokes per minute)



To work in this mode is necessary to specify the "HImA" (maximum working current), "LOmA" (minimum working current) and "SPM" (strokes per minute) values that pump will produce between the parameters.

To setup this values enter into "mA" mode. The cursor will blink on first digit ("HImA" field) Insert maximum current value that will be supplied to the pump (**"UP"** key). To move on next digit press **"RIGHT"** key.

The cursor will blink on "SPM" field Insert strokes per minute that pump will produce near "HImA" value (**"UP"** key). To move on next digit press **"RIGHT"** key.

Press **"E"** key to move on "LOmA".

The cursor will blink on first digit ("LOmA" field) Insert minimum current value that will be supplied to the pump (**"UP"** key). To move on next digit press **"RIGHT"** key.

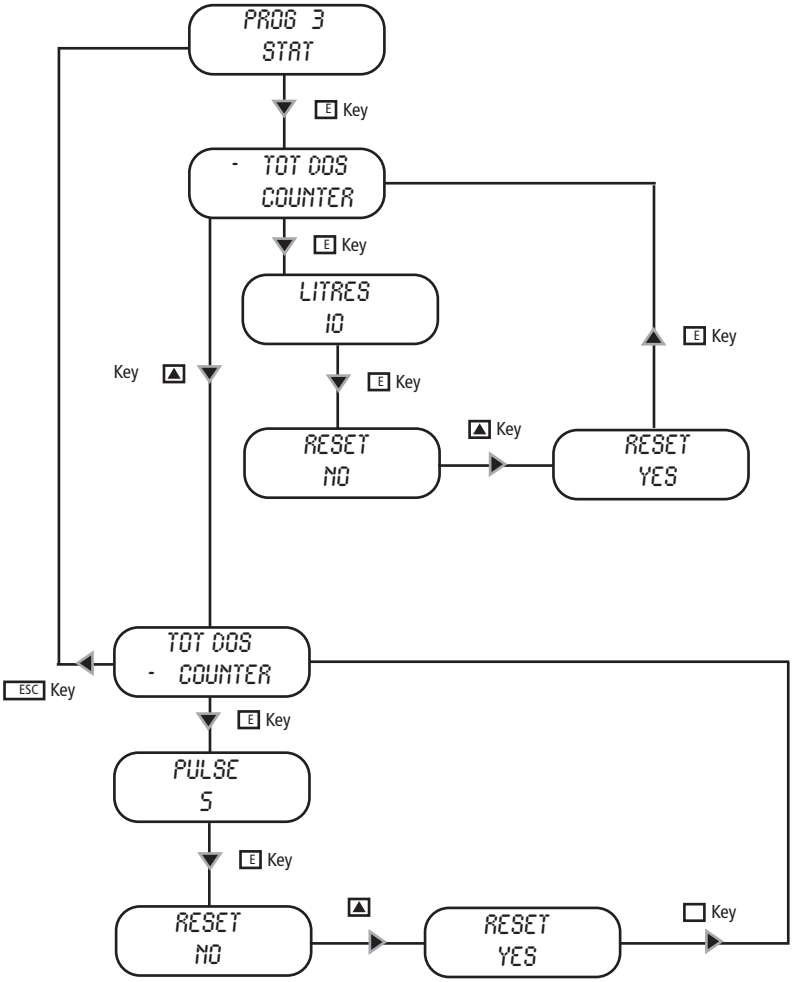
The cursor will blink on "SPM" field Insert strokes per minute that pump will produce near "LOmA" value (**"UP"** key). To move on next digit press **"RIGHT"** key.

Press **"E"** key to save data and "ESC" to exit to main menu. Otherwise press **"ESC"** to discard data and exit to main menu.

Attention: if a wrong data is set (for example, it has been set the same value for HIV and LOV) an error message (WRONG ENTRY) will appear.

Stat.

To see dosing statistics choose "STAT" from main menu. See quick guide at pag. 21



"TOT DOS" means total dosed product since pump last reset.
"COUNTER" means strokes numbers since pump last reset.

28. TROUBLESHOOTING

PROBLEM	CAUSE	HOW MANAGE
Pump does not turn on	• There is not power supply. • Protection fuse is broken • Main board failure	• Connect pump to main supply • Replace fuse, see **Fuse replacement procedure**. • Replace circuit, see **Main board replacement procedure**.
Pump is not dosing but solenoid is operating	• Foot filter is obstructed • Unprimed pump (suction hose is empty) • Air bubbles in the hydraulic circuit • Product to dose is generating gas	• Clean foot filter • Prime the pump, see **How to prime pump head** • Check valves, hoses and fittings and let air flowaway • Turn on venting valve and let air flow away. Use a self-venting pump head model.
Pump is not dosing and solenoid isn't operating or slightly operating.	• Crystals block the balls inside the valves • Injection valve obstructed	• Clean valves and try to dose 2-3 liters of normal water • Change valves
Display shows ERROR MEM	Error in data storage	Restore default value, see **LOAD DEFAULT procedure**.
Display shows ERROR DATA	Error in data setting	Check the value set. If correct and the error still persist, the pump could be undersized
Display shows WRONG PASSWORD	Error in password enter	Restore a new password, see **RESET PASSWORD procedure**
Display shows INPUT OPEN	In mA and VOLT working mode only: no signal input	Check INPUT signal

INFO MENU

For further information about the operating status of the dosing pump, it is possible to view from the main screen by pressing the "UP" key:

SET MINUTE STROKES
"RECOVERY FAULT" STATUS
MAINS POWER SUPPLY VOLTAGE
DOSAGE LITERS / HOUR SET
ALARM STATUS LEVEL
SET WORKING MODE

29. FUSE AND MAIN BOARD REPLACEMENT

Fuse or main board replacement is allowed to qualified personnel only. Before to operate disconnect the pump from main power and all hydraulic connections.

For fuse replacement is necessary to use a 3x16 and 3x15 screwdriver and a new fuse (same model of old one).

For main board replacement is necessary to use a 3x16 and 3x15 screwdriver and a new main board (same model of old one).

Fuse replacement procedure:

- Turn pump's injection knob on 0%.

- Remove 6 screws from pump's back.

- Pull pump's back cover until it's completed separated from pump's front. Be careful of the knob's spring.

- Locate the blown fuse and replace it.

- Reassemble the pump. Be careful to put back the knob's spring.

- Reinsert screws.

Main board replacement procedure:

- Turn pump's injection knob on 0%.

- Remove 6 screws from pump's back.

- Pull pump's back cover until it's completed separated from pump's front. Be careful of the knob's spring.

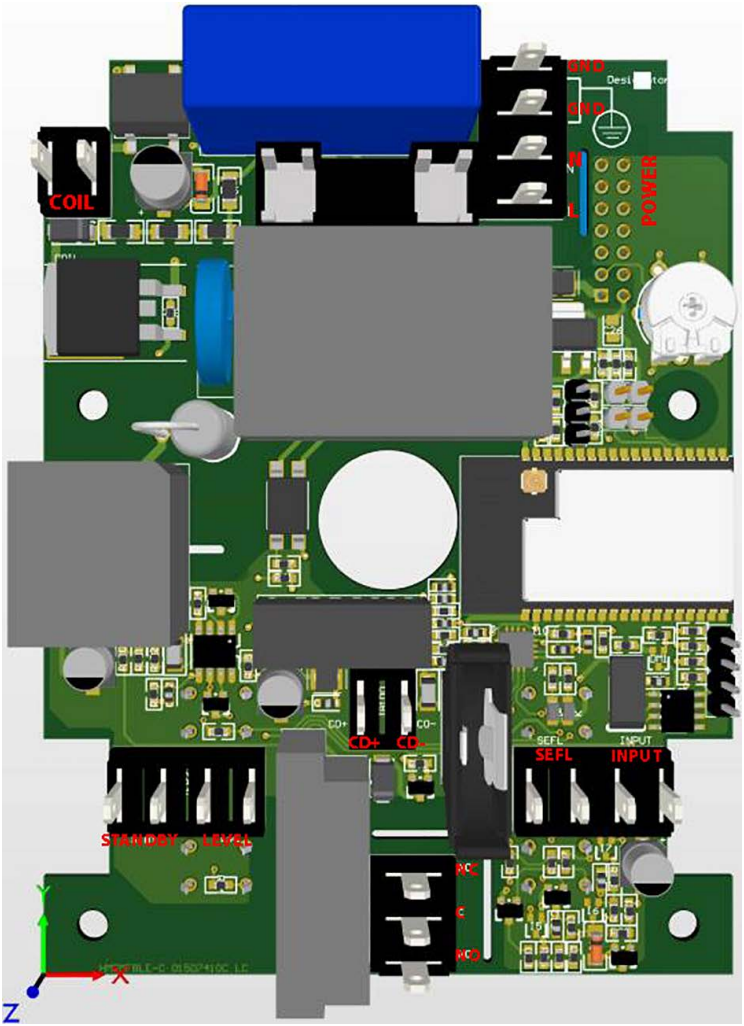
- Remove board's screws.

- Completely disconnect wires from main board and replace it. Reinsert screws.

- Reconnect wires to the main board (see enclosed picture).

- Reassemble the pump. Be careful to put back the knob's spring.

- Reinsert screws.



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 to the motor 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 maintenance 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 74 dB A; ± 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 tightening.
- 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 discharge pipe from the venting valve.Rinse the pump head and clean all valves.

Features

POWER SUPPLY	FREQ.	FUSE
230 VAC (180-270 VAC)	50/60 Hz	1,25 A
115 VAC (90-135 VAC)	50/60 Hz	1,6 A
24 VAC (20-32 VAC)	50/60 Hz	6,3 A
12 VDC (10-16 VDC)		5 A
24 VDC (20-32 VDC)		500 mA

injections/minute..... 0–180 (0–140 for KMS AC MF)
Suction hose max height..... 1,5 m

Environment temperature ....0-45°C (32-113°F)
Chemical temperature: ....0-50°C (32-122°F)
Transportation and storage temperature: ...-10-50°C (14-122°F)

Altitude..... 2000 m
Installation Class: II

Audible noise: ..... KMS/KMSA: 73.4 db(A);
.....KMS/KMSA silenced: 70.4 db(A);
.....KMS/KMSA ultrasilenced: 69.4 db(A);
.....KMS AC: 78.3 db(A)

Protection degree: ..... KMS / KMSA / KMS AC: IP 65

Only compressed air KMS AC MF:
Compressed air consumption 30 l/h (suction air)
Suction air pressure 7 bar
Compressed air metering pumps work only with compressed air without lubricant and/or condensedwater.
Air supply pressure range must be from 6 bar to 10 bar.

TECHNICAL INFORMATION											
KMS	CAPACITY				cc / stroke		Max pressure		imp/min	Hoses	Pump head
	min cc/h	max l/h	Min GPH	Max GPH	min	max	bar	PSI			
1802	0,06	2	0,000016	0,53	0,06	0,19	18	261	180	4 x 6	L
1504	0,11	4	0,000029	1,06	0,11	0,37	15	217	180	4 x 6	L
1005	0,14	5	0,000037	1,32	0,14	0,46	10	145	180	4 x 6	L
0808	0,22	8	0,000058	2,11	0,22	0,74	8	116	180	4 x 6	L
0510	0,28	10	0,000074	2,64	0,28	0,93	5	72	180	4 x 6	L
0501	0,03	1	0,000008	0,26	0,03	0,09	5	72	120	4 x 6	I
0218	0,50	18	0,00013	4,76	0,50	1,67	2	29	180	6 x 8	M

TECHNICAL INFORMATION											
KMSA	CAPACITY				cc / stroke		Max pressure		imp/min	Hoses	Pump head
	min cc/h	max l/h	Min GPH	Max GPH	min	max	bar	PSI			
1801	0,03	1	0,000008	0,26	0,03	0,09	18	261	180	4 x 6	LA
1503	0,08	3	0,000021	0,79	0,08	0,28	15	217	180	4 x 6	LA
103.5	0,10	3,5	0,000026	0,92	0,10	0,32	10	145	180	4 x 6	LA
085.5	0,15	5,5	0,000040	1,45	0,15	0,51	8	116	180	4 x 6	LA
057.5	0,21	7,5	0,000055	1,98	0,21	0,69	5	72	180	4 x 6	LA
0213	0,37	13	0,000098	3,43	0,37	1,20	2	29	180	6 x 8	MA

Materials
KMS MF

✓ : standard
✗: option

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

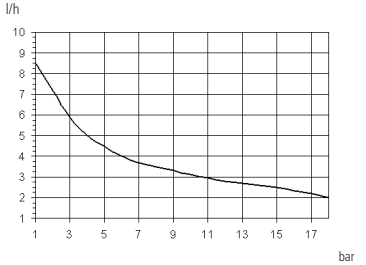
Materials
KMS MF LPV

	PVDF	PP	PPV0	PMMA	PVC	PE	CE	GLASS	PTFE	SS	FKM B	EPDM	WAX	SI
BOX		✓	✗											
PUMP HEAD				✓										
DIAPHRAGM									✓					
BALLS										✓				
SUCTION HOSE					✓									
DELIVERY HOSE						✓								
PRIMING HOSE					✓									
O RING											✓	✗	✗	

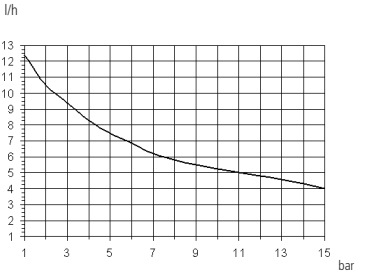
C APPENDIX. DELIVERY CURVES

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

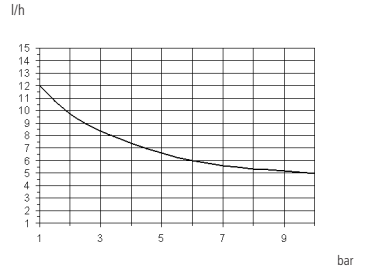
1802: l/h 2 bar 18
Pump head mod. L



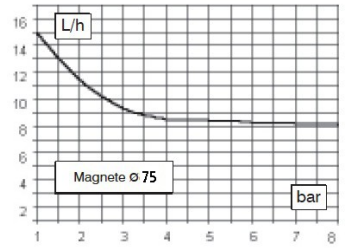
1504: l/h 4 bar 15
Pump head mod. L



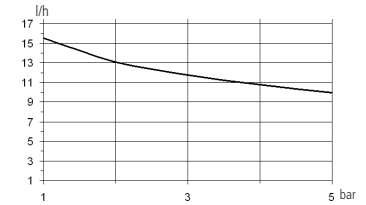
1005: l/h 5 bar 10
Pump head mod. L



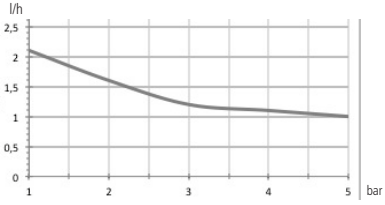
0808: l/h 8 bar 8
Pump head mod. L



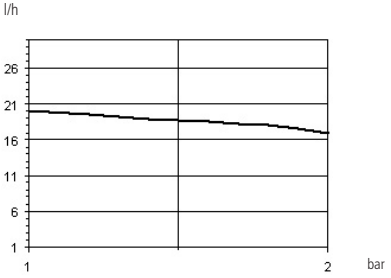
0510: l/h 10 bar 5
Pump head mod. L



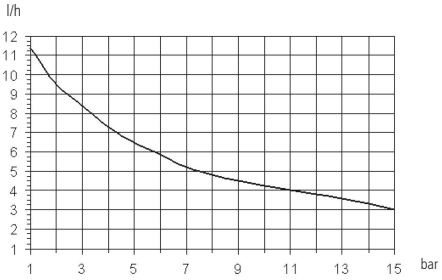
0501: l/h 1 bar 5
Pump head mod. I



0218: l/h 18 bar 2
Pump head mod. M

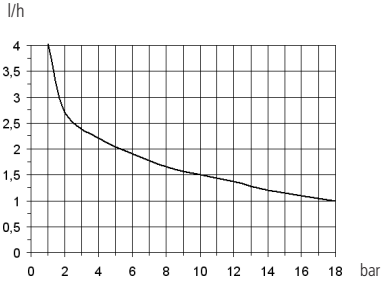


1503: l/h 3 bar 15
Pump Head mod. LA

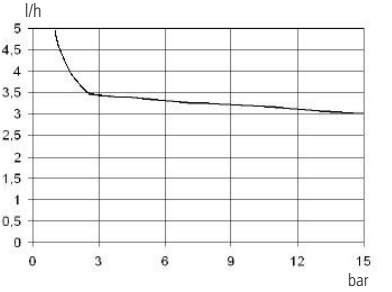


C APPENDIX. DELIVERY CURVES FOR SELF-PURGE PUMP HEAD

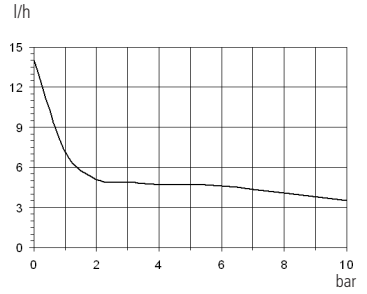
1801: l/h 1 bar 18 Pump head mod. LA



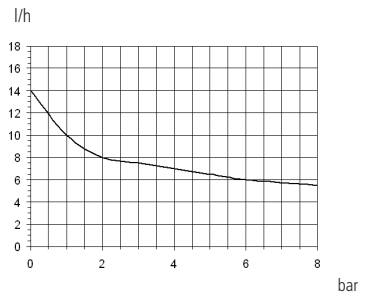
1503: l/h 3 bar 15 Pump head mod. LA



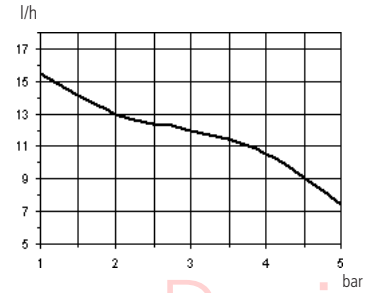
103,5: l/h 3,5 bar 10 Pump head mod. LA



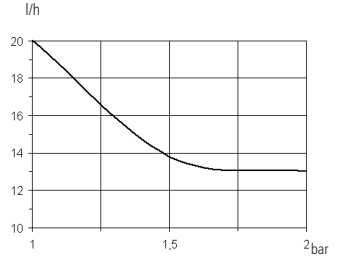
085,5: l/h 5,5 bar 8 Pump head mod. LA



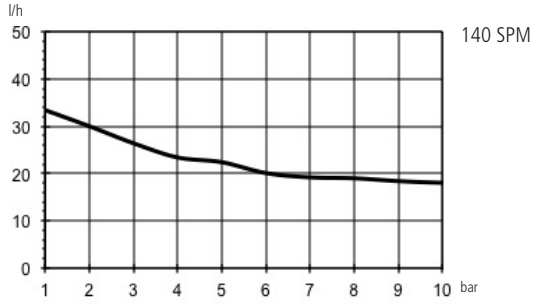
057,5,5: l/h 7,5 bar 5 Pump head mod. LA



0213: l/h 13 bar 2 Pump head mod. MA

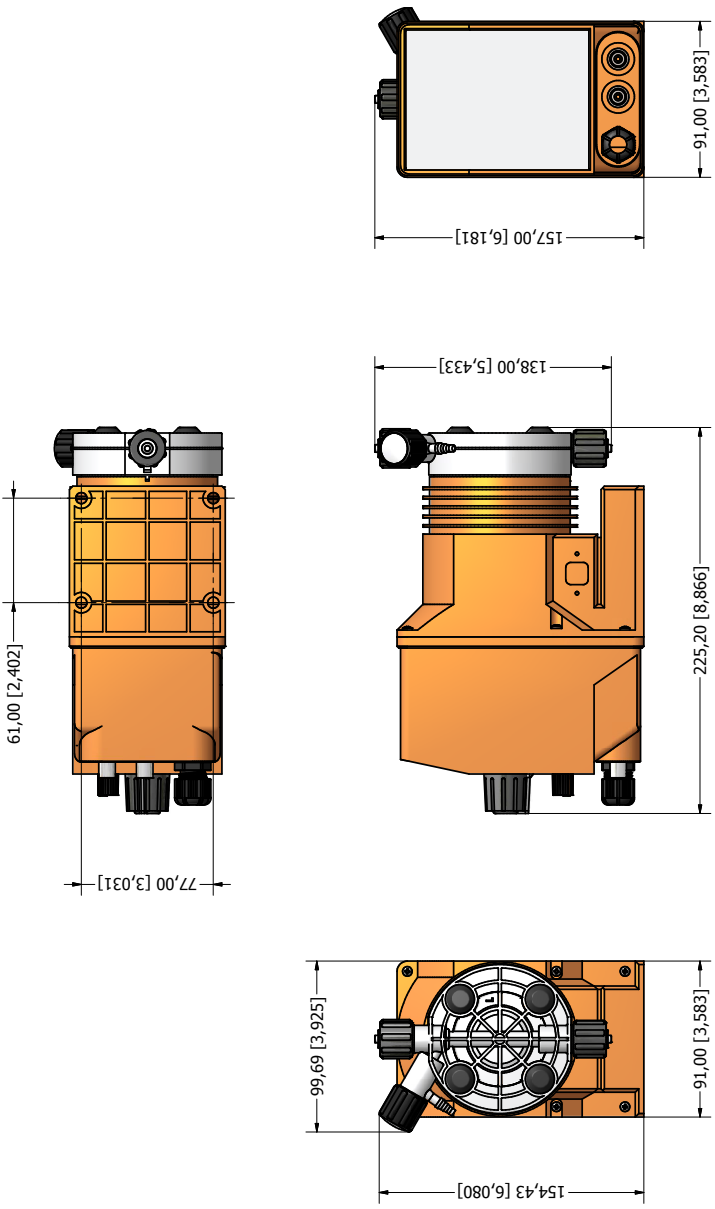


1018: l/h 18 bar 10
Pump head mod. M



bold : mm
( ) : inches

Dimensions



E APPENDIX. CHEMICAL COMPATIBILITY TABLE

Solenoid driven metering pumps are widely used to dose chemical fluids and it is important that the most suitable materialin contact with fluid is selected for each application. This compatibility table serves as a useful help in this respect. All theinformation in this list is verified periodically and believed to be correct on the date of issuance. All the information in this list is 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 information provided in this list.

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
Sulphury Acid, 85%	H2SO4	1	1	1	1	2	3	1	1	1	3	3	1
Sulphury 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	3	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	1	1	1	1	1	1	1	2	1	2	1
Calcium Hypochlorous.(Chlorite Lime) [1]	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
Aluminum 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] Calcium Hypochlorous.(Chlorite Lime): WQA test was based on 1% Calcium Hypochlorite solution.

Resistance rating

Resistant	1
Fairly resistant	2
Not resistant	3

MATERIALS

Polyvinyldene fluoride	PVDF	Pump Heads, valves, fitting, tubing
Polypropylene	PP	Pump Heads, valves, fitting, level floater
PVC	PVC	Pump Heads
Stainless steel	SS 316	Pump Heads, valves
Polymethyl Metacr.(Acrylic)	PMMA	Pump Heads
Hastelloy	C-276	Injection valve spring
Polytetrafluoroethylene	PTFE	Diaphragm
Fluorocarbon (Viton® B)	FPM	Sealings
Ethylene propylene	EPDM	Sealings
Nitrile	NBR	Sealings
Polyethylene	PE	Tubing

F APPENDIX. HOSES 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.

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

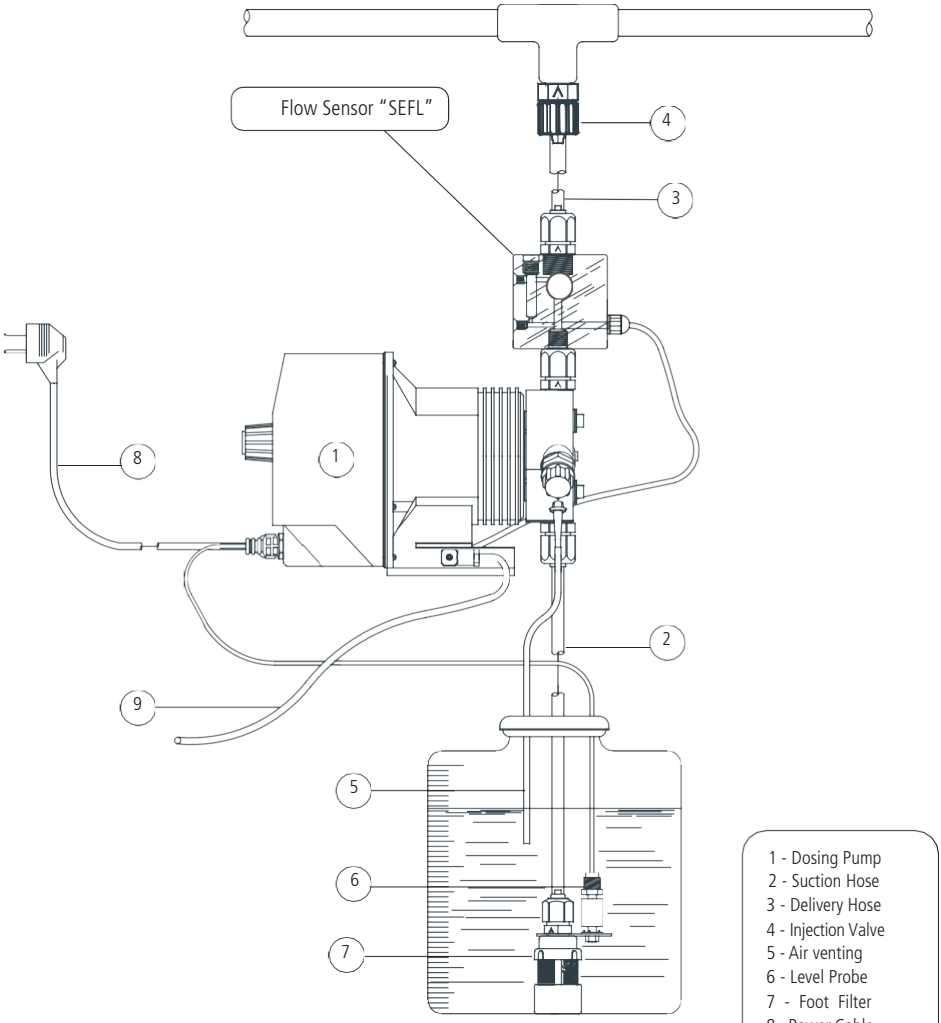
4x6 mm PVDF Flex 2800 (opaque)	20°C 40 bar	30°C 34 bar	40°C 30 bar	50°C 27 bar	60°C 24.8 bar	80°C 20 bar	90°C 10 bar
6x8 mm PVDF Flex 2800 (opaque)	20°C 29 bar	30°C 25.5 bar	40°C 22 bar	50°C 20 bar	60°C 18 bar	80°C 14.5 bar	90°C 7.3 bar
8X10 mm PVDF Flex 2800 (opaque)	20°C 18 bar	30°C 15.5 bar	40°C 13.5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

G APPENDIX. "SEFL" INSTALLATION

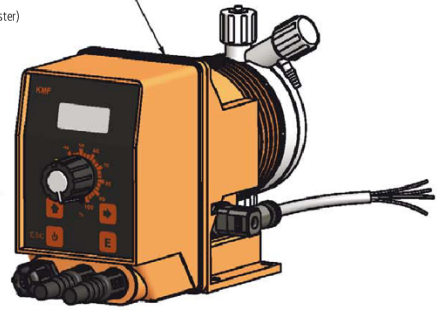
Connect SEFL flow sensor as shown

For a proper installation please put SEFL "signal wire" perpendicularly to pump's solenoid.

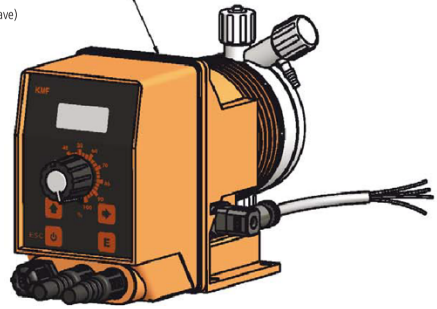


CONNECT ALARM OUTPUT WIRES OF DUTY PUMP TO STAND-BY INPUT OF STAND-BY PUMP

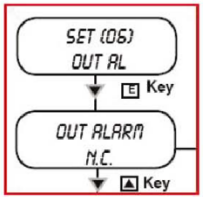
DUTY PUMP
(master)



STAND-BY PUMP
(slave)

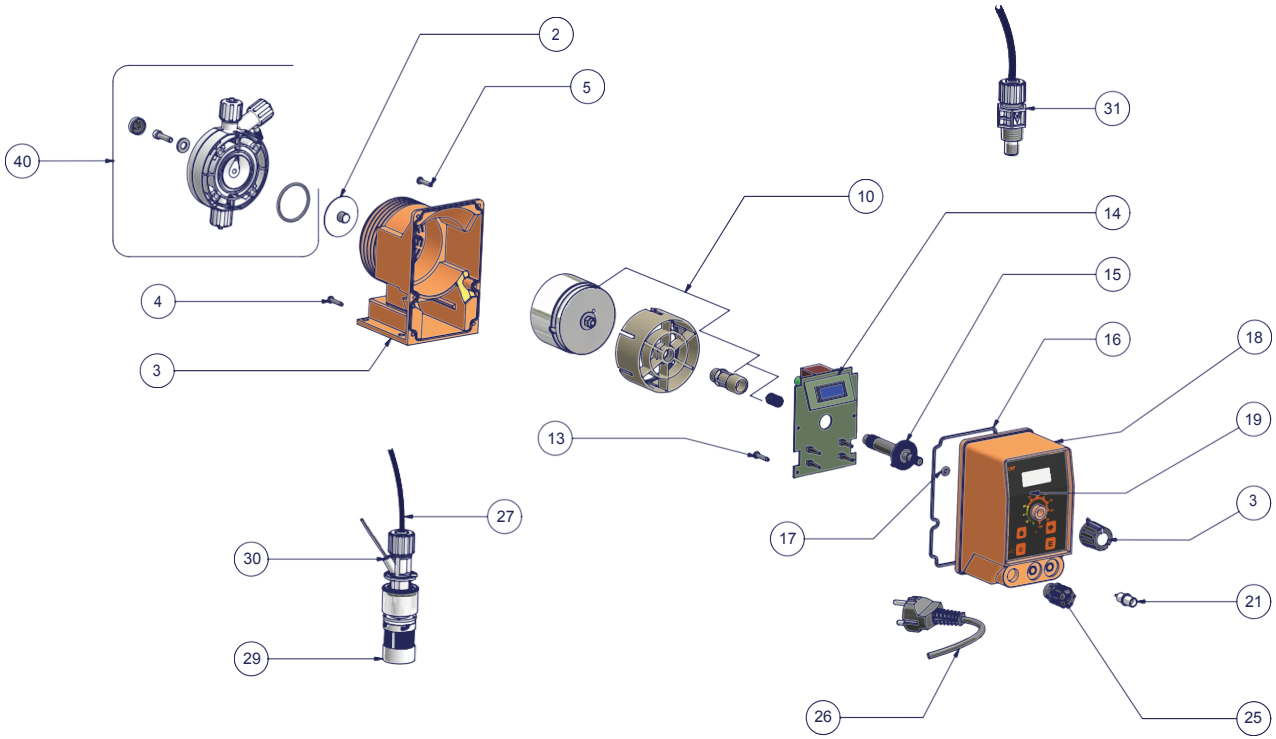


SET ALRM OUTPUT OF
DUTY PUMP TO
NORMALLY CLOSE (N.C.)



N.B. 1. CONNECT THE BROWN CABLE OF THE MASTER PUMP TO THE GREEN CABLE OF THE SLAVE PUMP

2. CONNECT THE WHITE CABLE OF THE MASTER PUMP TO THE YELLOW CABLE OF THE SLAVE PUMP



NOTICE: always specify the pump's label when ordering spare parts.

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.....
- Breakage/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

SUMMARY

Disposal of end-of-life equipment by users

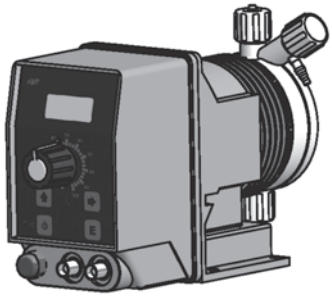
This symbol warns you not to dispose of the product with normal waste. Respect human health and the environment by giving the discarded equipment to a designated collection center for the recycling of electronic and electrical equipment. For more information visit the online site.

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.

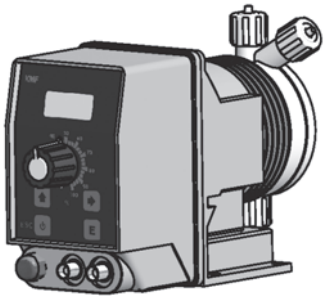
KMS - KMSA - KMS LPV

PRODUCT LABEL

EN



KMS



KMSA

SOLENOID DRIVEN METERING PUMPS
WITH DIAPHRAGM

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.

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

Version: R1-02-14

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**

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 AND DRINKING WATER TREATMENT.

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 fluids.

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.

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.**

This equipment requires regular maintenance to ensure potability requirements of the water and maintenance of improvements as declared by the manufaturer.

ENVIRONMENTAL SAFETY

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

Recycling guidelines

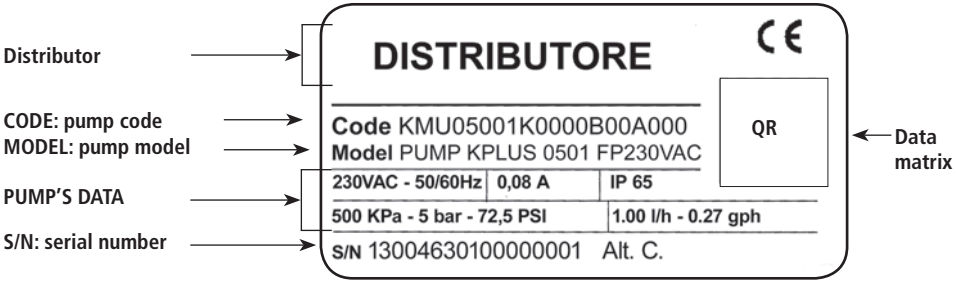
EWC code: 16 02 14

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

Fig. 1. Product 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)

1. Introduction

Introduction:
Metering Pumps "KMS" Series are the ideal solution for low / middle dosing of chemicals. All control and setup parameters are available through a digital keyboard and they are displayed on a LCD backlit display. Stand-by input (N.O. contact)available on some models.

Pump's capacity
Flow rate is determined by the stroke length and by the stroke speed. The stroke length is adjustable from 0 to 100% using the stroke length adjustment knob. However dosing accuracy is guarantee within an adjustment range from 30% to 100%.

Models:

KMS EN
Pump with weekly timer, microprocessor, digital controls, LCD display, level probe and electrovalve control.

KMS PH
Proportional pump driven by internal built-in pH meter (0÷14 pH) and level control. pH electrode input (electrode not included).

KMS RH
Proportional pump driven by internal built-in Redox (ORP) meter (0÷1000mV) and level control. Redox electrode input (electrode not included).

KMS CL
Proportional pump for free chlorine (Cl_2) control (from 0 to 10,00 mg/l) with level control, supplied without chlorine probe. It operates with chlorine cells mod. ECL1 or ECL 4/5/6/7/12.

KMS LPV: viscosity up to 8.000 cPs

KMS LPV is the KMS version with PMMA pump head for **liquids with max viscosity 8.000 cPs.**
Funtioning mode is the same as KMS.
Flow may change according to viscosity. Flow rates indicated refer to a measure with water.
Liquid ends: 3/4" injection valve, 16x22 PVC suction hose and 8x12 PE injection hose.
Not included: Stainless steel foot filter with valve.

Capacity:

Pressure (bar)	Capacity (l/h)
20	01
18	02
15	04
10	05
08	08
05	10
02	18

Self-venting models	
Pressure (bar)	Capacity (l/h)
18	01
15	03
10	3.5
05	7.5
02	13

Legend:

a. Alternating Current;

b. DC,

c. Protective Earth;

d. Standby;

e. Warning -

2. Unpacking

Included into package:

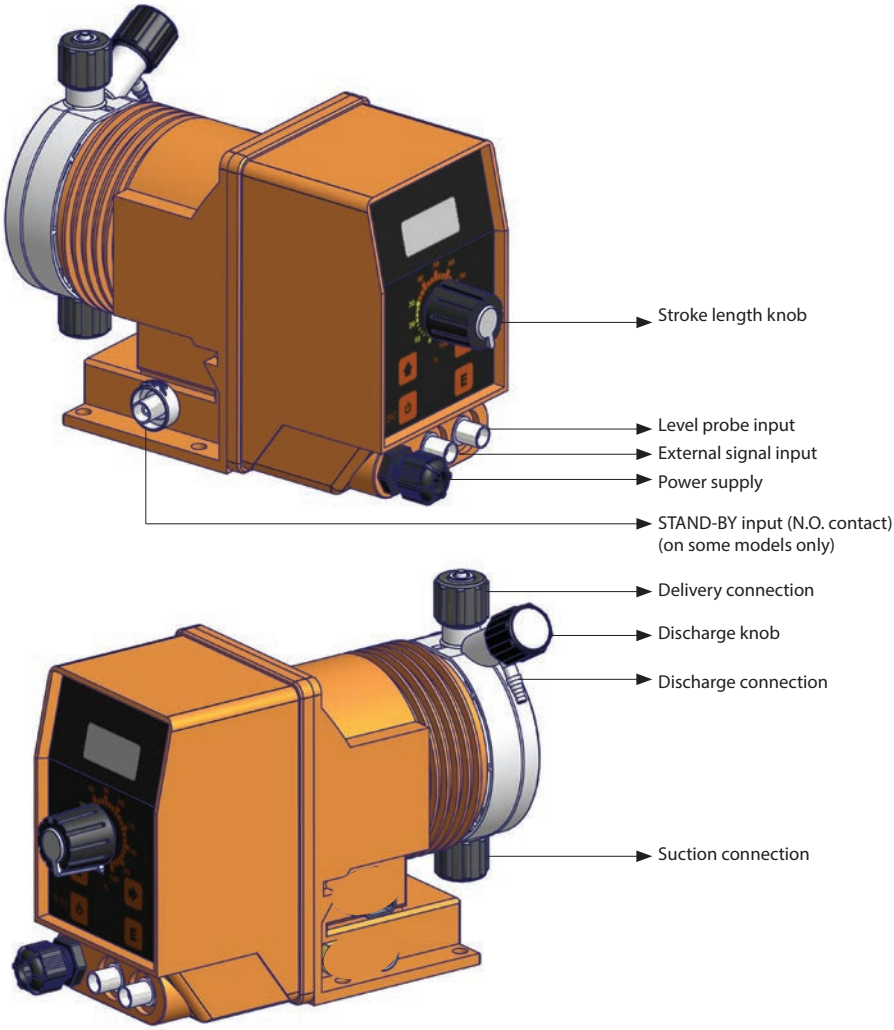
QUANTITY	STANDARD CONTENT	KMS	KMSA	KMS LPV
n. 4	ø6 dibbles	●	●	●
n. 4	4,5 x 40 self tapping screws	●	●	●
n. 1	5 X 20 delayed fuse	●	●	●
n. 1	level probe with axial foot filter (PVDF)	●	●	
n. 1	0,3 bar injection valve (PVDF)	● 1/2"	● 1/2"	● 3/4" SS BALLS
m 2	delivery hose [1]	● PVDF	● PVDF	● PE
m 2	suction hose [1]	● PE	● PE	● PVC
m 2	venting hose	● PVC		
m 0,3	priming hose and syringe			● PVC
m 2,5	stand-by/alarm cable	●	●	●
n.1	operating manual	●	●	●

[1] If hose is 6x8 there is only a 4meters long hose. Cut to obtain suction and delivery hoses.

PLEASE DO NOT TRASH PACKAGING.
IT CAN BE USED TO RETURN THE PUMP.

3. Pump's description

KMS



Manual stroke length adjustment

Max CC/stroke (**Construction Materials and Technical info**) are referred to Stroke length knob on 100%.
If Stroke length knob is on 50% cc/stroke will be halved.
To regulate pump's capacity: turn on the pump then press and rotate the knob.

Dosing accuracy is guarantee within an adjustment range from 30% to 100%.

Note: if knob isn't on 100% position then the pump will dose at a pressure greater than the one declared on label.

4. Before to Install warnings

Pump's installation and operativity is made in 4 main steps:

Pump's installation
Hydraulic Installation (hoses, level probe, injection valve)
Electrical Installation (main power connection, priming)
Programming the pump.

Before to start, please read carefully the following safety information.

Protective clothes

Wear always protective clothes as masks, gloves, safety glasses and further security devices during ALL installation procedure and while handling chemicals.

Installation location

Pump must be installed in a safety place and fixed to the table / wall to avoid vibration problems!

Pump must be installed in a easy accessible place!

Pump must be installed in horizontal position!

Avoid water splashes and direct sun!

Hoses and Valves

Suction and delivery hoses must be installed in vertical position!
All hoses connections must be performed using only hands' force!
No tongs required!

Delivery hose must be firmly fixed to avoid suddenly movements that could damage near objects!

Suction hose must be shorter as possible and installed in vertical position to avoid air bubbles suction!

Use only hoses compatibles with product to dose! See Chemical Compatibility Table. If dosing product is not listed please consult full compatibility table or contact chemical's manufacturer!

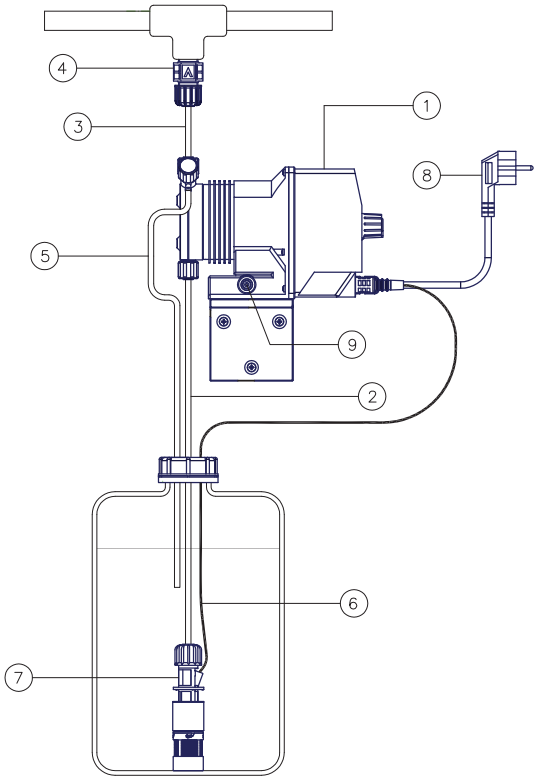
Feeder should be interlocked with a no-flow protection device to automatically shut-off the pumps when there is no flow!

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.

5. Installation Draw

Pump must be installed in a stable support (for example a table) at a maximum height (**from tank's bottom**) of **1,5 meters**.



1 - Dosing Pump
2 - Suction Hose
3 - Delivery Hose
4 - Injection Valve
5 - Air discharge
6 - Level Probe
7 - Foot Filter
8 - Power Cable

6. Hydraulic Installation

Hydraulic connections are:

Suction Hose with level probe and foot filter
Delivery Hose with injection valve
Discharge Hose

Suction Hose.

Completely unscrew tightening nut from pump's head and remove assembling components: tightening nut, holding ring and pipe holder.

Assembly as shown in fig. (A). Insert hose into pipe holder until it reaches the bottom.

Lock hose on pump's head by screwing down the tightening nut.
Use only hands to do it!

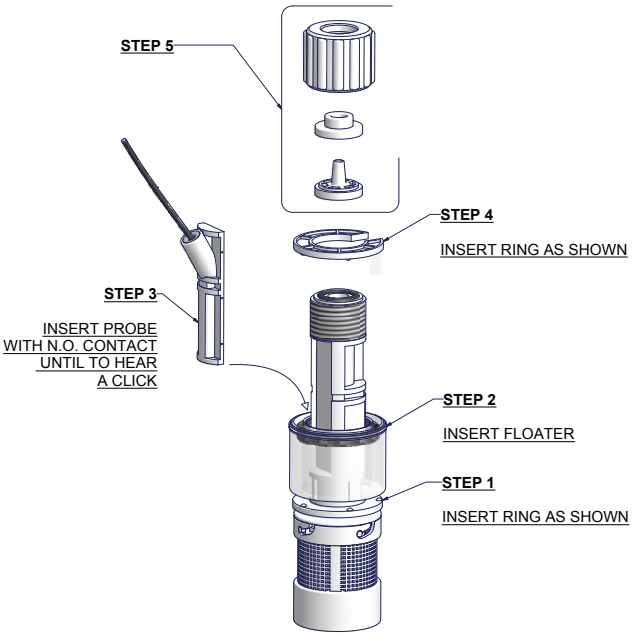
Connect other side of the hose to the foot filter using the same procedure.

fig. (A)

6. Hydraulic Installation

Assembling foot filter with level probe.

Level probe must be assembled with foot filter using the provided kit.
Foot valve is made to be installed into tank's bottom without sediments priming problem.



Connect BNC from level probe into pump's level input (front side of the pump).
Put level probe assembled with foot filter into tank's bottom.

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

Delivery Hose.

Completely unscrew tightening nut from pump's head and remove assembling components: tightening nut, holding ring and pipe holder.

Assembly as shown in fig. (A). Insert hose into pipe holder until it reaches the bottom.

Lock hose on pump's head by screwing down the tightening nut.
Use only hands to do it!

Connect other side of the hose to the injection valve using the same procedure.

6. Hydraulic Installation

Injection Valve.

Injection valve must be installed on plant from water's input.
Injection valve will open at pressure greater than 0,3bar.

Dicharge hose.

Insert one side of discharge hose into discharge connector as shown in fig (C).

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

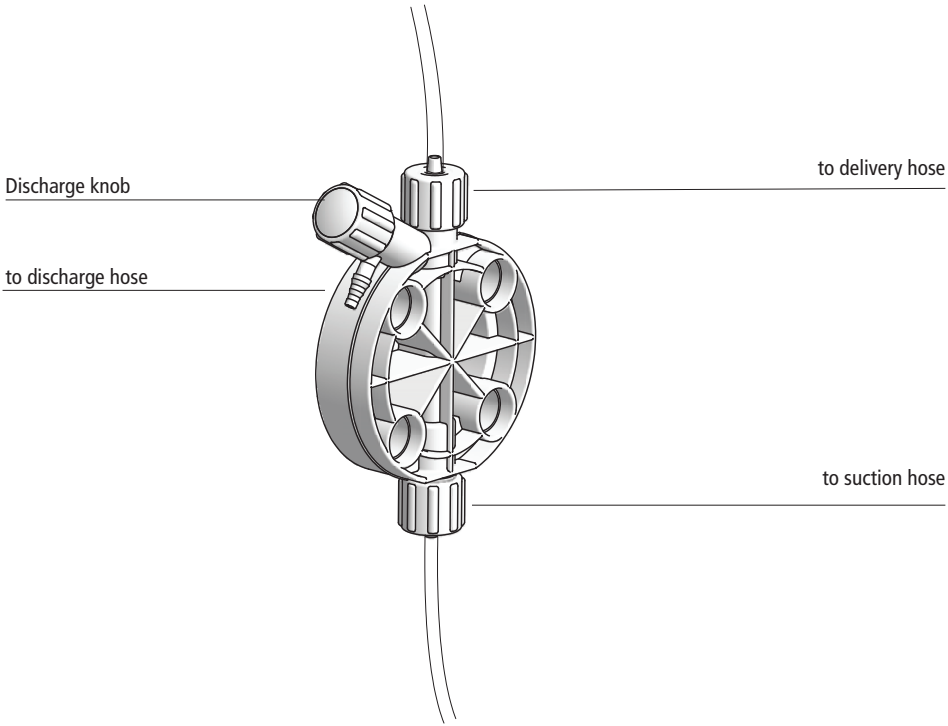
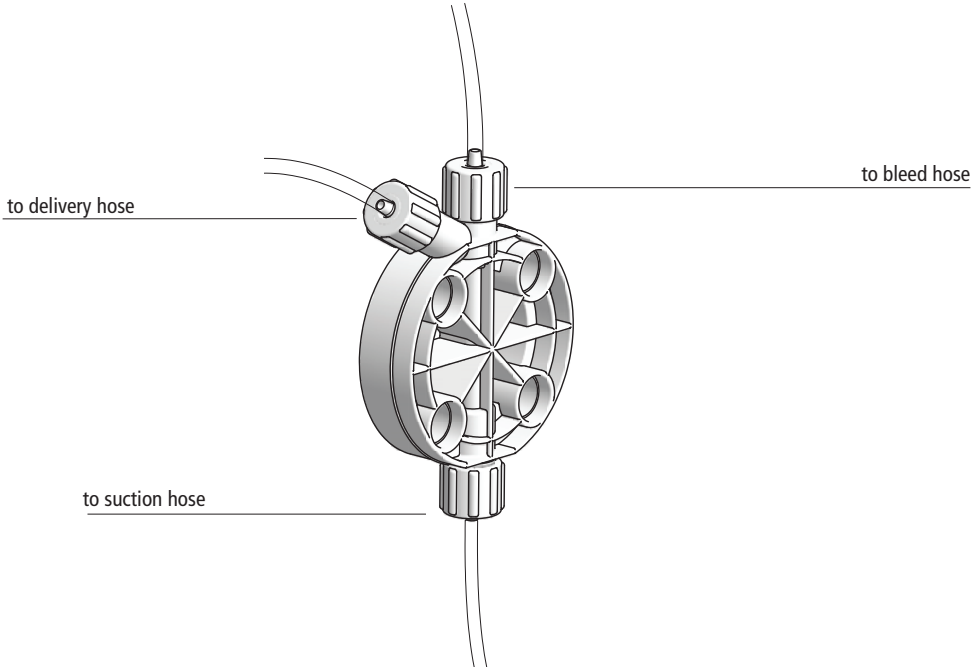


fig (C)

For priming procedure see the paragraph "Priming".

6. Hydraulic Installation

Self-venting pump head.



Self-venting pump head must be used when using chemicals that produce gas (i.e. hydrogen peroxide, ammonium, sodium hypoclorite at particular conditions).

Hoses assembling procedure (including purge hose) is described in fig. (A).

Notes:

- suction, delivery and purge valves are DIFFERENT! Do not exchange them!

- delivery and purge hoses are made of same material!

- it's allowed to lightly bend discharge hose!

- during calibration procedure ("TEST") insert discharge hose into BECKER test-tube!

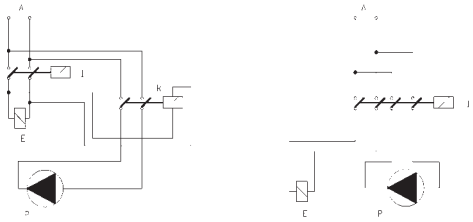
7. Electrical Installation

All electrical connections must be performed by **AUTHORIZED AND QUALIFIED** personnel only.
Before to proceed, please, verify the following steps:

- verify that pump's label values are compatible with main power supply.

- pump must be connected to a plant with a differential switch (0,03A sensitivity) if there isn't a good ground.

- to avoid damages to the pump do not install it in parallel with heavy inductance load (for example: engines). A relay switch must be used. See below picture.



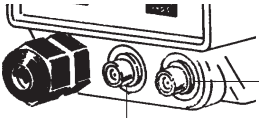
P - Dosing Pump
R - Relay
I - Switch or safety device
E - Electrovalve or inductance load
A - Main Power

7. Electrical Installation

Once verified previous steps proceed as follows:

- check that "BNC" of level probe has been connected as described in "Hydraulic Installation" chapter.

- connect "BNC" and external signal to pump's "INPUT" connectors.



WARNING
IF EQUIPMENT IS SUPPLIED WITH A PLUG:

If an appliance coupler or separable plug is used as the disconnecting device, it shall be readily identifiable and easily reached by the operator. For single-phase portable equipment, a plug on a cord of length not greater than 3m is considered to be easily reached.

WARNING
IF EQUIPMENT IS NOT SUPPLIED WITH A PLUG:

a) a switch or circuit-breaker shall be included in the building installation
b) it shall be in close proximity to the equipment and within easy reach of the operator
c) it shall be marked as the disconnetting device for the equipment

8. Priming

PRIMING

Power on the pump. The display will show "F150M" (default setting).

To prime the pump without touching chemicals please perform these operations:

1. Connect all hoses into proper places (delivery hose, suction hose, outgassing hose).

2. Open outgassing valve and turn on the pump.

3. Set pump's single injection at 100%.

4. For KMS EN pump's model: select programming mode "Manual"; keep pressed "UP" key.
   For KMS PH / KMS RH / KMS CL pump's model: keep pressed "RIGHT" key.
   The display will show "MAN" (50% pulses set for priming).
   All air inside the pump head will exit through the outgassing outlet.

5. When product will leak from it, close immediately the outgassing valve. If dosing product is particularly dense, to facilitate the priming, insert on vent pipe a syringe of 20 cc and suck inside.

9. Programming the pump

All dosing pumps are equipped with a keyboard that basically works in the same way for all pump's model. To avoid any misunderstanding during this chapter all keys will be described as shown on this legend:


is the "UP" key


is the "DOWN" key


is the "RIGHT" key

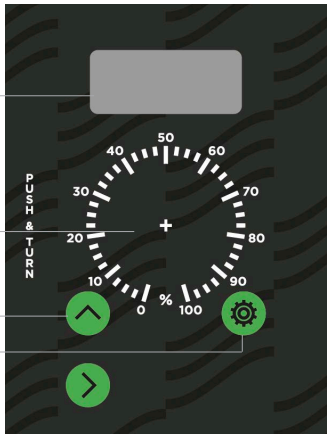

is the "P" key


is the "ENTER" key

The buttons feature automatic fast advancement: keeping pressed the button it will gradually advance the value shown.
Voltage Visualization: keeping pressed "Down" the display will show the actual mains voltage.

10. Programming the pump KMS EN

PROGRAMMING "KMS EN" PUMP



Model pump (KMS EN only)

Turn "ON" the pump. Display shows:

< NEXT >
Tue10:57

This is the next dosing time. For example on Tuesday at 10:57 o'clock. Press the **"RIGHT"** key the display shows:

Cc/day
0.0

This is the product's flow quantity for each day. Press the **"RIGHT"** key the display shows:

Total cc
624.6

Press the **"RIGHT"** key the display shows:

DATE Mon
24/07/00
Press the **"RIGHT"** key the display shows:

TIME
9:44:14

Press the **"RIGHT"** key again, the display will shows the initial picture.

HOW TO PROGRAM "KMS EN" ?

10. Programming the pump

Keep pressed **"P"** key for at least 4 second. The display shows:

CODE
->0 0 0 0

This is the code (password) to enter into pump's "programming mode". Press **"RIGHT"** key to scroll through the numbers and insert the proper code. Default code is 0000. To confirm, press **"P"** key. The display shows:

-> Manual
Clock

Use **"UP"** (scroll up) and **"RIGHT"** keys (scroll down). Options are:

Manual
Clock
Progr.
Inject
Water
Code
LineVo
Exit

Manual option:

To select "Manual" press **"P"** key (option is selected when -> is on it). The display shows:

Cc
65.0

To start the pump keep pressed the **"UP"** key. The pump will begin to dose. The dosed quantity does not affect pump's "Total Counter". To stop the pump leave the **"UP"** key. To reset this counter press **"RIGHT"** key. To exit from "Manual" mode press **"P"** key.

Clock option:

The display shows date and time. Using **"UP"** (scroll) and **"RIGHT"** (change value) keys. Date's format is: DD/MM/YY. To confirm press **"P"** key.

Progr. Option:

To select "Progr." press **"P"** key (option is selected when the -> arrow is on it). The display shows:

1) 0:00
Mon Off

The 1) is the program 1 of 16. This pump can be set for a maximum of 16 daily programs.

10. Programming the pump

0:00 is the starting time.

Mon is the dosing day. It is possible to scroll it and choose/add another day. An asterisk* means that dosing is activated for that day.

Off is program's status.

Using **"RIGHT"** key the display shows:

0000 cc
000 min

0000 cc is product's quantity to dose.
000 min is dosing time (minutes).

Example:

The pump must dose 400cc every Tuesday and Friday at 14:30.

In "Progr." Menu the display shows:

1) 0:00
Mon Off

Select the program's number using **"UP"** key. In this case leave it as appears but remember that it is possible to scroll through 16 programs. Press **"UP"** key and edit start time (0:00) using **"RIGHT"** key and enter 1 - 4 - 3 - 0 using **"UP"** key (the cursor blinks on selected value). Press **"RIGHT"** key until the cursor will blink on "Mon". Press **"UP"** key until the display shows "Tue". To enable this day press **"P"** key. An *asterisk confirm selected day. Press **"UP"** key until display shows "Tue". To enable this day press **"P"** key. An *asterisk confirm selected day. Now press **"RIGHT"** key until the cursor blinks on "On". Leave as it is. To disable the current program 1 press the **"UP"** key. Press **"RIGHT"** key until display shows:

0000 cc
000 min

To change the cc value of each digit press **"UP"** key. To move the cursor to next digit or to "min" press **"RIGHT"** key. To change min value (minutes required for dosing) for each digit press **"UP"** key.
Move cursor to next digit with **"RIGHT"** key. **The "min" parameter must be calculated on pump's flow capacity.** For example: to dose 400cc using a pump with 0.9 cc/stroke (150 stroke/min) and knob set on 100%, dosing time is about 3 minutes (150x0.9=135cc/min. 400/135=3 minutes). Once entered the values press **"P"** to confirm and save the program. It is possible to confirm/save the programmed mode during every program's step.
Important note: Do not set two programs with a common time's period during the same day. Doing this, pump will not accomplish last edited program.

Inject option:

The display shows:

Cc/imp

10. Programming the pump

01.00

This value is set using pump's knob with pump's flow after a complete test of plant: flow, backpressure, product to dose, etc...

Water option:

The display shows:

B -> 04 sec
A 05 sec

"B" means "Before" (min:0 seconds ; max: 60 minutes); "A" means "After" (min:0 seconds; max: 60 minutes). Pump has a 220Vac output for a relay. This function is useful for opening an electrovalve before/after the dosing time. "B" means that output is activated 4 seconds before the program ends. "A" means that output is activated 5 seconds after the program ends. Use **"UP"** key to change selected value. If entered value is greater than 60 seconds the pump will change unit from seconds to minutes.

Code option:

The display shows:

Mod Code
->0 0 0 0

This is the code (password) for pump "programming mode". Press **"RIGHT"** key to scroll through the numbers and enter proper code. Default code is 0000. Press **"P"** key to enter.

LineVo option:

Not editable. It shows (real-time) the power supply voltage according to pump's working range.

Exit option:

To exit from programming mode.

HOW TO RESET THE PUMP?

Unplug pump's power cable from supply and while pressing **"UP"** and **"RIGHT"** keys connect the pump's power cable. The display shows:

ERROR CK

10. Programming the pump

MAKE SET
Press P
To reset

Press **"P"** key and pump will shows:

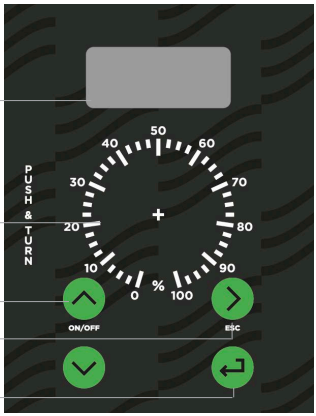
ERASE
EPROM

Remember that after pump's reset all programming values, inject value, date and time, etc have been deleted and must be entered again.

11. Programming the pump KMS PH

PROGRAMMING "KMS PH" PUMP

Pump model (KMS "PH")



Note: it is possible to program the pump for dosing either acid or alkaline, ensuring that o-rings match the additive chemical compatibility

Entering in program mode

Turn on the pump. Keep pressed **"E"** key for at least 4 seconds to enter in program mode. Pump's display shows:

PASSWORD:
—> 0000 **fig.1**

Use **"UP"** and **"DOWN"** keys to edit the password, press **"RIGHT"** to move on next digit.

"SETUP" program

Once entered the password, pump's display shows:

—> SETUP
PARAM **fig.2**

Move arrow on SETUP then press **"E"** key:

"SET POINT" program

Setup
1) Point **fig.3**

Press **"E"** key:

11. Programming the pump

a)—> **00%**
7.30pH **fig.4**

The display shows that pump does not work at 00% if pH is 7.30. Make sure that arrow is on "7.30 pH" to change this value, then use **"UP"** and **"DOWN"** keys to enter a new value. Use **"RIGHT"** key to move on next value. Once on "00%", change it with **"UP"** and **"DOWN"** keys.

b) -> 100%
7.80pH **fig.5**

The display shows that pump works when pH is 7.80. Make sure that arrow is on "7.80pH" to change this value, then use **"UP"** and **"DOWN"** keys to enter a new value. Use **"RIGHT"** to move on next value. Once on "100%", change it with **"UP"** and **"DOWN"** keys. Press **"E"** key to confirm values and quit from programming mode. Display shows for a few seconds: DATA SAVED. To exit from program mode press "RIGHT" key twice. Now the pump will modify proportionally its own dosing capacity in the range between 7.30pH and 7.80pH. On previous example, dosing mode is for "acid".

Probe calibration

To obtain a reliable measurement it is necessary (during installation) calibrate the probe. To do this, two buffer solutions are needed: a 7.00pH buffer solution and a 4.00pH or 9.00pH buffer solution. Proceed as follows:
1) Measure buffer solution temperature and verify if it is the same printed on solution's label.
2) Insert probe's connector (blue colour) into pump's input connector.
3) Remove protective cap from probe and wash it into water. Then dry it.

Into "Setup" menu (fig.3), choose "2)Calib" then press **"E"** key. The display shows:

R: 7.20 pH
C: 7.00 pH **fig.6**

"R" means buffer solution reading value and "C" the calibration to refer to. During the calibration the "R" value could be different from the buffer solution value. Wait a stable reading in "R". Dip probe in a 7.00 pH buffer solution and use **"UP"** and **"DOWN"** keys to change the value in "C:" to have buffer solution value. Wait a stable reading in "R:" then press **"E"** key to confirm this first calibration. Pump will show:

R: 7.00 pH
C: 4.00 pH **fig.7**

Remove the probe from first buffer solution and repeat the cleaning procedure. Then dip probe into second buffer solution (for example 4.00 pH) and use **"UP"** and **"DOWN"** keys to change the value in "C:" to have buffer solution value. Wait a stable reading in "R:" then press **"E"** key to confirm. The pump will show the new values for a while and will return to main menu.

59mV / pH
- 000 mV **fig.8**

If calibration process fails the pump will show "PH CALIB FAILED". Not changing any value the program will return to "Calib" mode. To exit press "RIGHT" key twice.
DELAY

In main menu choose "PARAM" (fig.2) and press **"E"** key. Display shows:

11. Programming the pump

DEL.: —>00
0 0 0 0 **fig.9**

The -> arrow is on "DEL". This value is pump's waiting time after any start up procedure: pump will wait set time before start dosing every time it is powered on. Use **"UP"** and **"DOWN"** keys to change this value. Waiting time may be set from 1 to 60 minutes.

PASSWORD

In main menu choose "PARAM" (fig.2) and press **"E"** key. Display shows:
DEL.: —>00
0 0 0 0 **fig.9**

Press **"RIGHT"** key to move on 0 0 0 0. All new pumps have "0 0 0 0" as default password, use **"UP"** and **"DOWN"** keys to change this value. Press **"E"** to confirm new data. The pump shows the new password for about two seconds then it'll return to main menu. Press **"RIGHT"** key to leave main menu.

MAXIMUM TIME DOSING ALARM

This alarm prevents the pump to dose if a set time is reached. To set this alarm enter into "Setup menu" as shown in fig.3. Use "DOWN" key to choose "3) Alarm" and press "E" key. The pump shows:

-> AL OFF
DOSING **fig.10**

To activate the alarm use "UP" or "DOWN" keys to set the time (from 1 to 100 minutes or "AL OFF"). To setup the alarm mode use the "RIGHT" key. Cursor moves on "DOSING". Use "UP" or "DOWN" keys to change this voice. On "STOP" mode the pump will stop the dosing procedure once the set time is reached. The pump's display will show the alarm condition and requires to press a key to continue. On "DOSING" mode the pump will NOT stop the dosing procedure once the set time is reached. The pump's display will show the alarm condition and requires to press a key to continue.

Special functions

- Keep pressed the **"UP"** key to turn off the pump. Display shows "OFF" and it will switch off. Keeping pressed the **"UP"** key the pump will switch on.

- Keep pressed the **"DOWN"** key to read on display the power supply input.

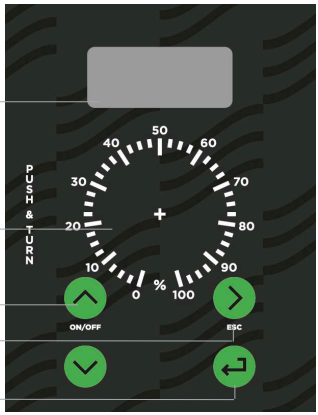
- Keep pressed the **"E"** key for manual dosing.

- Pump's reset: turn off the pump, keep pressed **"UP"** and **"DOWN"** keys then turn on the pump. Release **"UP"** and **"DOWN"** keys and proceed to pump's set-up. This procedure will return the pump to its shipment condition.

12. Programming the pump KMS RH

PROGRAMMING "KMS RH" PUMP

Pump model (KMS "RH")



Note: it is possible to program the pump for dosing either oxidant or anti-oxidant, ensuring that o-rings match the additive chemical compatibility

Turn on the pump. Keep pressed **"E"** key for at least 4 seconds to enter in program mode. Pump's display shows:

PASSWORD :
—> 0000 **fig.1**

Use **"UP"** and **"DOWN"** keys to edit the password, press **"RIGHT"** to move on next digit.

"SETUP" program

Once entered the password, pump's display shows:

—>SETUP
PARAM **fig.2**

Move arrow on "SETUP" then press the **"E"** key:

"SET POINT" program

Setup
1) Point **fig.3**

Press **"E"**, the display will show:

a) ->100%
650mV **fig.4**

12. Programming the pump

The pump works at 100% of its capacity if ORP value is 650mV. Make sure that arrow is on "650mV" to change it and then use **"UP"** and **"DOWN"** keys to enter a new value. Use **"RIGHT"** key to move on next digit. Move arrow on 100% and change using the **"UP"** and **"DOWN"** keys.

b)->00%
700mV **fig.5**

The display shows that pump stops when ORP is 700mV. Make sure that arrow is on 700mV to change this value then use **"UP"** and **"DOWN"** keys to enter a new value. Use **"RIGHT"** key to move on next digit. Move arrow on 100% and change using the **"UP"** and **"DOWN"** keys. Press **"E"** key to confirm values and quit from programming mode. Display shows for a few seconds: DATA SAVED. Pump will change proportionally its dosing capacity between 650mV and 700mV. Now the pump will modify proportionally its own dosing capacity in range between 650mV and 700mV. In previous example pump will dose "chlorine".

Probe calibration

To obtain a reliable measurement it is necessary (during installation) calibrate the probe. To do this, a known buffer solutions is needed. Proceed as follows:
1) Measure buffer solution temperature and verify if it is the same printed on solution's label.
2) Insert probe's connector (blue color) into pump's input connector.
3) Remove protective cap from probe and wash it into water. Then dry it.
Into "Setup" menu (fig.3), choose "2)Calib" then press **"E"** key. The display shows:

R: 600 mV
C: 650 mV **fig,6**

"R" means buffer solution reading value and "C" the calibration to refer to. During the calibration the "R" value could be different from the buffer solution value. Wait a stable reading in "R". Dip probe in a 650mV buffer solution and use **"UP"** and **"DOWN"** keys to change the value in "C": to have buffer solution value. Wait a stable reading in "R:" then press **"E"** key to confirm. Display shows probe's data before to return at main menu. If calibration process fails the pump will show "MV CALIB FAILED". Not changing any value the program will return to "Calib" mode. To exit press "RIGHT" key twice.

DELAY

In main menu choose "PARAM" (fig.2) and press **"E"** key. Display shows:

DEL.: —>00
0 0 0 0 **fig.9**

The —> arrow is on "DEL". This value is pump's waiting time after any start up procedure: pump will wait set time before start dosing every time it is powered on. Use **"UP"** and **"DOWN"** keys to change this value. Waiting time may be set from 1 to 60 minutes.

PASSWORD

In main menu choose "PARAM" (fig.2) and press **"E"** key. Display shows:

12. Programming the pump

DEL.: —>00
0 0 0 0 **fig.9**

Press **"RIGHT"** key to move on 0 0 0 0. All new pumps have "0 0 0 0" as default password, use **"UP"** and **"DOWN"** keys to change this value. Press **"E"** to confirm new data and "RIGHT" to exit from programming mode.

MAXIMUM TIME DOSING ALARM

This alarm prevents the pump to dose if a set time is reached. To set this alarm enter into "Setup menu" as shown in fig.3. Use "DOWN" key to choose "3) Alarm" and press "E" key. The pump shows:

-> AL OFF
DOSING **fig.10**

To activate the alarm use "UP" or "DOWN" keys to set the time (from 1 to 100 minutes or "AL OFF"). To setup the alarm mode use the "RIGHT" key. Cursor moves on "DOSING". Use "UP" or "DOWN" keys to change this voice. On "STOP" mode the pump will stop the dosing procedure once the set time is reached. The pump's display will show the alarm condition and requires to press a key to continue. On "DOSING" mode the pump will NOT stop the dosing procedure once the set time is reached. The pump's display will show the alarm condition and requires to press a key to continue.

Special functions

- Keep pressed the **"UP"** key to turn off the pump. Display shows "OFF" and it will switch off. Keeping pressed the **"UP"** key, the pump will switch on.

- Keep pressed the **"DOWN"** key to read on display the power supply input.

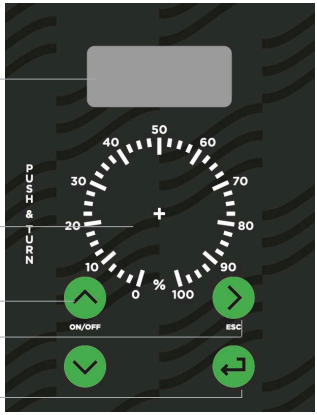
- Keep pressed the **"E"** key for manual dosing.

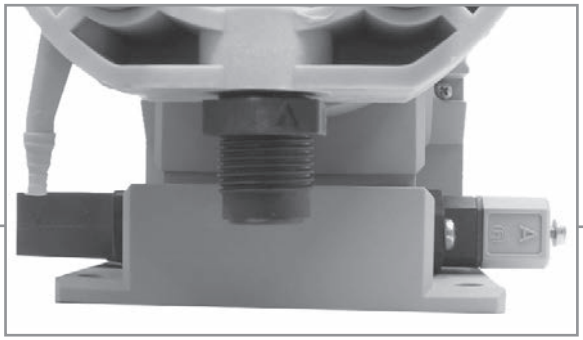
- Pump's reset: turn off the pump, keep pressed **"UP"** and **"DOWN"** keys then turn on the pump. Release **"UP"** and **"DOWN"** keys and proceed to pump's set up. This procedure will return the pump to its shipment condition.

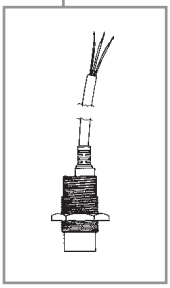
13. Programming the pump KMS CL

PROGRAMMING "KMS CL" PUMP

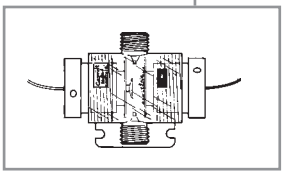
Pump model (KMS "CL")







Connection for proximity probe mod. "SEPR".



Connection for free chlorine cell.

13. Programming the pump

Connect the pump to the main power. If pump is switched on for the first time, the display will show:

-.-- Cl
Lowlev

If chlorine probe is connected, the pump will display the read value. **"Lowlev"** advice means pump is out of liquid or there is not water flow into probe holder. Verify that proximity probe led is "On" (there is flow) or "Off " (there is no flow).

HOW TO PROGRAM "KMS CL" ?

Keep pressed **"E"** key for about 4 seconds. The display shows:

PASSWORD
->0 0 0 0

This is the access code (password) for pump programming mode. Press "**RIGHT**" key to move on digits and use "**UP**" and "**DOWN**" keys to enter the right password. Default password is "0000". Press "**E**" key to confirm. If password is correct the display will show:

-> Setup
Param

If entered password is wrong, the display will show "Wrong Password" and will move back to main menu.

Use **"UP"** and **"DOWN"** keys to move cursor on functions. If it is the first time that you are using the pump, choose setup and press "**E**". The display shows:

Setup
1)Point

Press "**E**". The display shows:

-> 100%
0.50Cl

This is the pump first set point of read chlorine value. The pump works at 100% of its capacity. If chlorine will reach a value under 0.5 Cl, the pump will continue to work at 100%. Use "**UP**" and "**DOWN**" keys to modify the set point. Press "**RIGHT**" to move on next digit (100%).

Press "**RIGHT**" again to move on next set point:

-> 00%
1.00Cl

This is the second set point of the pump. In this condition, the pump do not dose. If read chlorine will reach a value higher than 1.00 Cl, the pump will continue to not dose. Use **"UP"** and **"DOWN"** keys to modify the set point. Press **"RIGHT"** to move on next digit (0%).

The read values are referred to chlorine dosage into PROPORTIONAL mode. Invert percentage values for a dechlorine dosage.

The metering pump may also works into "On/Off" mode. To set it replace maximum and minimum percentage value of both set point with On/Off using **"UP"** and **"DOWN"** keys.

Press "E" to exit from "1)Point" menu. The pump will show a confirmation message "DATA SAVED".

HOW TO CALIBRATE "KMS CL" WITH ECL4/5/6 ?

- If the probe is equipped with an MPM connector, connect it to the pump. If the probe does not have MPM connector, use a screwdriver on grey plug from the pump (left side - connection for free chlorine cell). Remove plug blocker then connect RED or BROWN wire of amperometric cell to plug's terminal n.4. Connect BLUE or BLACK wire to terminal n.1.

- regulate the flow of amperometric cell and the PEF probe holder to about 48 liter per hour (max). Turn the stroke length adjustment knob until to match the upper part of floating with the graduated label.

- eliminate air bubbles in the amperometric cell because they can compromise the read value.

- let circulate the water of plant in the amperometric cell for about 30 minutes.

- close water flow to amperometric cell and wait few minutes. Select "Setup" from main menu, press **"E"**, select "2) Calib" and press **"E"**. The display shows:

-> ZERO
SLOPE

Leave the cursor on "ZERO" and press "E". The display shows:

R: -.-- Cl
C: 0.00 Cl

"R" is the read value, "C" is the referring value "0". During the calibration the "R" value could be different from the buffer solution value. Wait a stable reading in "R". Press **"E"** to confirm and exit from calibration menu. **Restore the water flow to the amperometric cell and wait few minutes.**

Check the free chlorine value in the water using a photometer instrument or by DPD1 system.

Select "Setup" from the main menu, press **"E"**, select "2)Calib" and press **"E"**. The display shows:

-> ZERO
SLOPE

Move the cursor on "SLOPE" and press "E". The display shows:

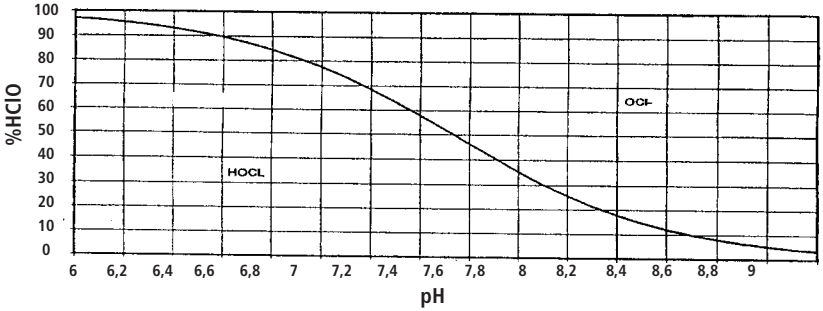
13. Programming the pump

R: 0.80 Cl
C: 1.00 Cl

Use **"UP"** and **"DOWN"** keys to insert in set "C" the result of photometric analysis.
Press **"E"** to confirm, then press **"RIGHT"** until the display moves back to the main menu.

Repeat cell calibration during the firsts days or when needed (see the "HClO Dissociation Curve").

HClO Dissociation Curve



PARAM FUNCTION FOR DELAY

Keep pressed **"E"** key for about 4 seconds. The display shows:

PASSWORD
->0 0 0 0

This is the password for entering into pump program mode.
Press "**RIGHT**" key to move on digits and then use **"UP"** and **"DOWN"** keys to enter the correct password. The default password is "0000". Press "**E**" key to confirm. If the password is correct the display will show:

-> Setup
Param

If password is wrong, the display will show "Wrong Password" and it will go back to the main menu. Move the arrow on "Param" and press "**E**".

13. Programming the pump

The display shows:

DEL.: -> 00
0 0 0 0

It is possible to set a delay during pump boot-up phase using **"UP"** and **"DOWN"** keys on "00" value. Minimum value: 0 minutes. Maximum value: 60 minutes.

Using the "**RIGHT**" key for moving on "0000". To insert a different password use **"UP"** and **"DOWN"** keys to modify the digits. Press "**E**" to confirm. For a few seconds the display will show the new password, then it will move back to the setup menu. Press "**RIGHT**" key to move back to the working mode.

Special functions

- Keep pressed the **"UP"** key to turn off the pump. Display shows "OFF" and it will switch off. Keeping pressed the **"UP"** key the pump will switch on.

- Keep pressed the **"DOWN"** key to read on display the power supply input.

- Keep pressed the **"RIGHT"** key for manual dosing. This function is not available if pump's display shows "Lowlev".

- Pump's reset: turn off the pump, keep pressed **"UP"** and **"DOWN"** keys then turn on the pump. Release **"UP"** and **"DOWN"** keys and proceed to pump's setup. This procedure will return the pump to its shipment condition.

MAXIMUM TIME DOSING ALARM

This alarm prevents the pump to dose if a set time is reached. To set this alarm enter into "Setup menu" as shown in fig.3. Use **"DOWN"** key to choose "3) Alarm" and press **"E"** key. The pump shows:

-> AL OFF
DOSING

fig.10

To activate the alarm use **"UP"** or **"DOWN"** keys to set the time (from 1 to 100 minutes or "AL OFF"). To setup the alarm mode use the **"RIGHT"** key. Cursor moves on "DOSING". Use **"UP"** or **"DOWN"** keys to change this voice. On "STOP" mode the pump will stop the dosing procedure once the set time is reached. The pump's display will show the alarm condition and requires to press a key to continue. On "DOSING" mode the pump will NOT stop the dosing procedure once the set time is reached. The pump's display will show the alarm condition and requires to press a key to continue.

13. Programming the pump

ECL1/X CELL CALIBRATION

Once pump is correctly installed, to calibrate ECL1/x amperometric chlorine cell, proceed as follow:

- unscrew bottom protection cap (do not touch or remove the membrane!)

- fill the membrane cap with electrolyte keeping electrode in vertical position then reassemble the cell avoiding that hands come in contact with metal parts. If electrolyte drips out when putting cap back, is not a problem.

- if cell is not connected: connect the cell using yellow wire on block n.1, brown wire on block n.2. white wire on block n.3, green wire on block n.4

- run water from system to be treated into Cell and PEF and regulate incoming flow rate to about 30 l/h: adjust flow rate by means of PEF flux meter screw until floater top reaches PEF indicated level.

- remove all air bubbles into the Cell to prevent reading error then let water flow into Cell ECL1/x for approximate 30 minute.

- enter into pump's programming mode and adjust the "Zero" using water without chlorine into amperometric cell.

- from pump's main menu select "Setup" from main menu, press **"E"**, select "2)Calib" and press **"E"**. The display shows:

-> ZERO
SLOPE

Leave the cursor on "ZERO" and press "ENTER". The display shows:

R: -.-- Cl
C: 0.00 Cl

"R" is the read value, "C" is the referring value "0". During the calibration the "R" value could be different from the buffer solution value. Wait a stable reading in "R". Press **"E"** to confirm and exit from calibration menu. **Restore the water flow to the amperometric cell and wait few minutes.**

Select "Setup" from the main menu, press **"E"**, select "2)Calib" and press **"E"**. The display shows:

-> ZERO
SLOPE

Move the cursor on "SLOPE" and press "E". The display shows:

R: 0.80 Cl
C: 1.00 Cl

Use "UP" and "DOWN" keys to insert in set "C" the result of photometric analysis.
Press **"E"** to confirm, then press **"RIGHT"** until the display moves back to the main menu.

Repeat cell calibration during the firsts days or when needed (see the "HClO Dissociation Curve").
Check the free chlorine value in the water using a photometer instrument or by DPD1 system.

ECL1/x CELL CLEANING AND MAINTENANCE

After a certain period of operation (6 months/1 year and according to the water quality parameters), or whenever calibration

is not longer possible, chlorine cell must be cleaned. To carry out electrodes cleaning refer to instructions enclosed with Cell. If cleaning operation was succesful, after approximate 24 hours measurement will stabilize, on the contrary change the electrodes.

WIRINGS CONNECTION

Pump can be connected to: ECL1 probe or ECL4/5/6, proximity sensor mod. "SEPR" and probe holder mod. "PEF1". Use provided connectors for using them.

ECL1
Yellow wire on block n.1, brown wire on block n.2. white wire on block n.3, green wire on block n.4.

ECL4/5/6
Yellow wire on block n.1 (-), green wire on block n.4 (+)

SEPR
Blue wire on block n.1, brown wire on block n.2, Black wire on block n.4.

If "SEPR" is not installed, the pump will not work. The user must connect block n.2 and n.4 together.

If "PEF1" and "SEPR" are not installed, reading accuracy is not guarantee.

14. Pump's messages

PUMP'S MESSAGES

During normal operating mode, the pump may show some messages.

Message: "LOW VOLT"
Description: The pump is low voltage powered. Check main power.

Message: "HIGH VOL"
Description: The pump is high voltage powered. Check main power.

Message: "LOW LEVEL"
Description: Product to dose is near to end. Verify the tank.

Message: "STAND-BY"
Description: The pump is waiting (a specified time) to become operative.

Message: "DOSING" or "AL OFF"
Description: The pump is on "max dosing time alarm". See related chapter to set this function.

Message: "DATA SAVED"
Description: Data have been saved succesfully.

Message: "OFFSET CL ERROR" or "SLOPE CL ERROR" (only for mod. KMS CL)
Description: Calibration error. Repeat the procedure following the instruction.

15. Troubleshooting

Problem	Possible Cause
Pump doesn't turn on.	Pump isn't powered. Connect it to main supply. Pump's protection fuse is broken. Replace it. See page 36 for replacement procedure. Pump's main board is broken. Replace it. See page 36 for replacement procedure.
Pump is not dosing and solenoid is operating.	The foot filter is obstructed. Clean it. Suction hose is empty. Pump must be primed. Repeat priming procedure. Air bubbles inside hydraulic circuit. Check valves - hoses - fittings. Product to dose is generating gas. Turn discharge knob and let air flow away. Use a self-venting pump head.
Pump is not dosing and solenoid isn't operating or slightly operating.	Crystals presence inside valves. Check them and try to dose 2-3 liters of normal water. Change valves. Injection valve obstructed. Change it.

16. Fuse and main board replacement

Fuse or main board replacement is allowed to qualified personnel only. Before to operate disconnect the pump from main power and all hydraulic connections.

For fuse replacement is necessary to use a 3x16 and 3x15 screwdriver and a new fuse (same model of old one).

For main board replacement is necessary to use a 3x16 and 3x15 screwdriver and a new main board (same model of old one).

Fuse replacement procedure:

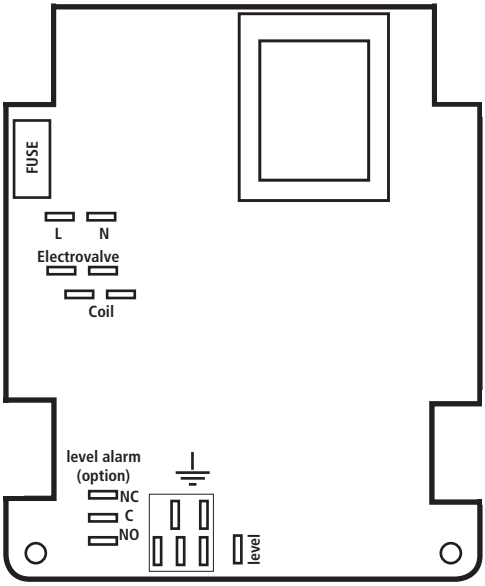
- Turn pump's injection knob on 0%.
- Remove 6 screws from pump's back.
- Pull pump's back cover until it's completed separated from pump's front. Be careful of the knob's spring.
- Locate the blown fuse and replace it.
- Reassemble the pump. Be careful to put back the knob's spring.
- Reinsert screws.

Main board replacement procedure:

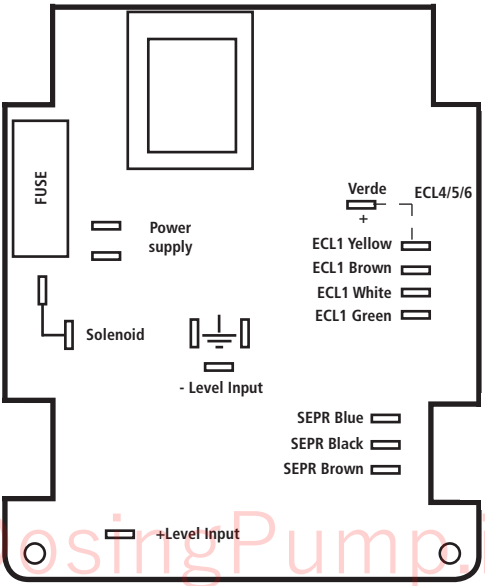
- Turn pump's injection knob on 0%.
- Remove 6 screws from pump's back.
- Pull pump's back cover until it's completed separated from pump's front. Be careful of the knob's spring.
- Remove board's screws.
- Completely disconnect wires from main board and replace it. Reinsert screws.
- Reconnect wires to the main board (see enclosed picture).
- Reassemble the pump. Be careful to put back the knob's spring.
- Reinsert screws.

17. Main Board

KMS EN

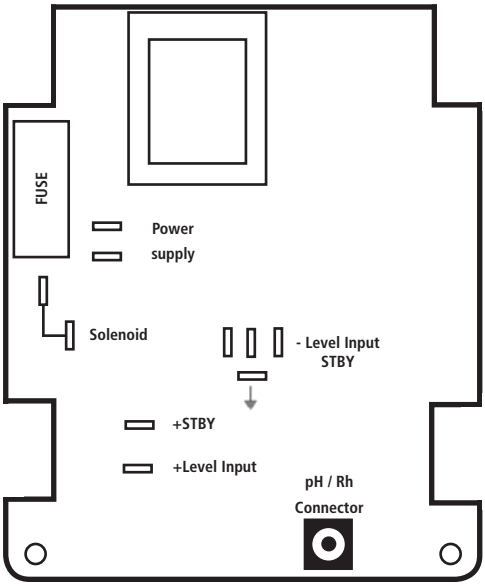


KMS-CL



17. Main Board

KMS pH / Rh



A Appendix. 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 to the motor 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 74 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).

f 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.

B Appendix. Construction Materials and Technical info

TECHNICAL FEATURES

Power supply:	230 VAC (190-265 VAC) - 50/60 Hz
Power supply:	115 VAC (90-135 VAC) - 50/60 Hz
Power supply:	24 VAC (20-32 VAC) - 50/60 Hz
Power supply:	12 VDC (10-16 VDC)
Suction Height:	1,5 metres
Environment Temperature:	0-45°C (32-113°F)
Chemical Temperature:	0-50°C (32 -122°F)
Installation Class:	II
Pollution Level:	2
Audible Noise:	74dbA
Packaging and Transporting Temperature:	-10-50°C (14-122°F)
Protection degree:	IP 65

UR working % : 85% with t ≤40 °C; 70% at 50 °C (non condensing).

MANUFACTURING MATERIALS

Case:	PP
Pump head:	PVDF, Acrilic, SS *
Diaphragm:	PTFE
Balls:	CERAMIC, PTFE, SS *
Suction Pipe	PVC
Delivery Pipe:	PVDF
Valve Body:	PVDF, PE, SS *
O-ring:	FP, EP, PTFE *
Injection connector	PVDF (ceramic, HASTELLOY C276 spring)
Level Probe:	PVDF
Level probe cable:	PE
Foot Filter:	PVDF

***as ordered.**

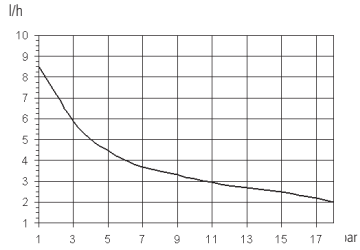
TECHNICAL INFORMATION											
KMS	CAPACITY				cc / stroke		Max pressure		imp/min	Hoses	Pump head
	min cc/h	max l/h	Min GPH	Max GPH	min	max	bar	PSI			
1802	0,06	2	0,000016	0,53	0,06	0,19	18	261	180	4 x 6	L
1504	0,11	4	0,000029	1,06	0,11	0,37	15	217	180	4 x 6	L
1005	0,14	5	0,000037	1,32	0,14	0,46	10	145	180	4 x 6	L
0808	0,22	8	0,000058	2,11	0,22	0,74	8	116	180	4 x 6	L
0510	0,28	10	0,000074	2,64	0,28	0,93	5	72	180	4 x 6	L
0501	0,03	1	0,000008	0,26	0,03	0,09	5	72	180	4 x 6	I
0218	0,50	18	0,00013	4,76	0,50	1,67	2	29	180	6 x 8	M

TECHNICAL INFORMATION											
KMSA	CAPACITY				cc / stroke		Max pressure		imp/min	Hoses	Pump head
	min cc/h	max l/h	Min GPH	Max GPH	min	max	bar	PSI			
1801	0,03	1	0,000008	0,26	0,03	0,09	18	261	180	4 x 6	LA
1503	0,08	3	0,000021	0,79	0,08	0,28	15	217	180	4 x 6	LA
103.5	0,10	3,5	0,000026	0,92	0,10	0,32	10	145	180	4 x 6	LA
085.5	0,15	5,5	0,000040	1,45	0,15	0,51	8	116	180	4 x 6	LA
057.5	0,21	7,5	0,000055	1,98	0,21	0,69	5	72	180	4 x 6	LA
0213	0,37	13	0,000098	3,43	0,37	1,20	2	29	180	6 x 8	MA

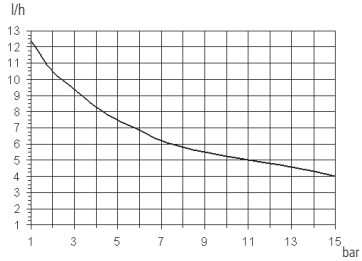
C Appendix. Delivery Curves

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

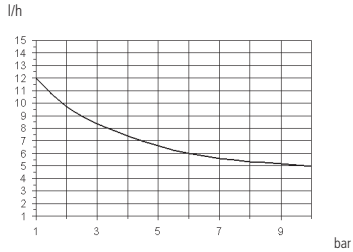
1802: l/h 2 bar 18
Pump head mod. L



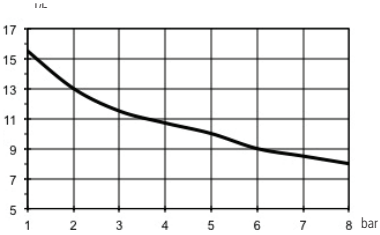
1504: l/h 4 bar 15
Pump head mod. L



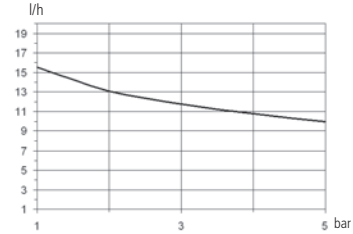
1005: l/h 5 bar 10
Pump head mod. L



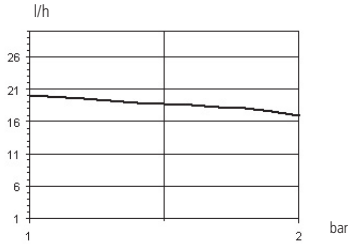
0808: l/h 8 bar 8
Pump head mod. L



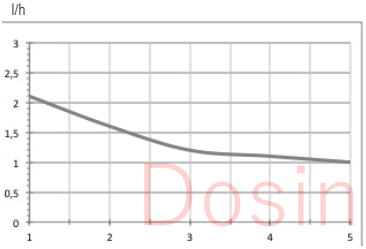
0510: l/h 10 bar 5
Pump head mod. L



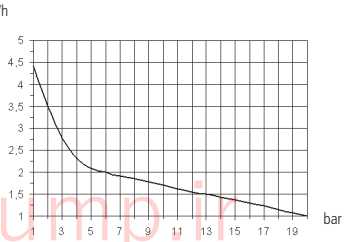
0218: l/h 18 bar 2
Pump head mod. M



0501: l/h 1 bar 5
Pump head mod. I



2001: 01 l/h bar 20
Pump head mod. I

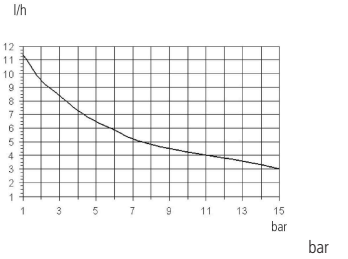


C Appendix. Delivery Curves for self-venting pump head

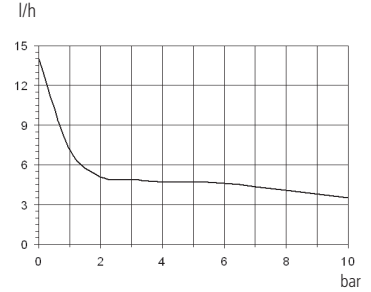
Flow rate indicated is for H_2O at 20°C at the rated pressure. Dosing accuracy ± 2% at constant pressure ± 0,5 bar.

1801: l/h 1 bar 18
Pump head mod. LA

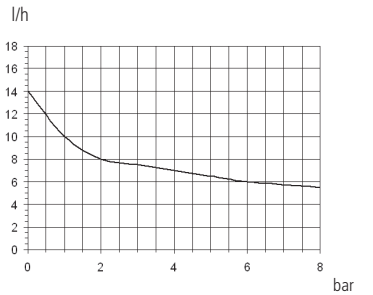
1503: l/h 3 bar 15
Pump head mod. LA



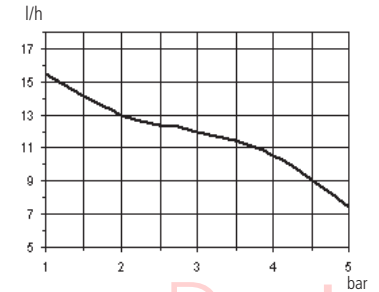
103,5: l/h 3,5 bar 10
Pump head mod. LA



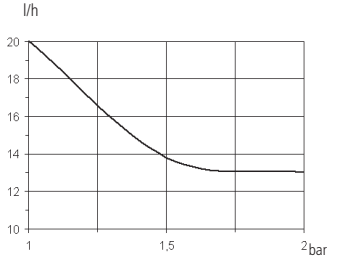
085,5: l/h 5,5 bar 8
Pump head mod. LA



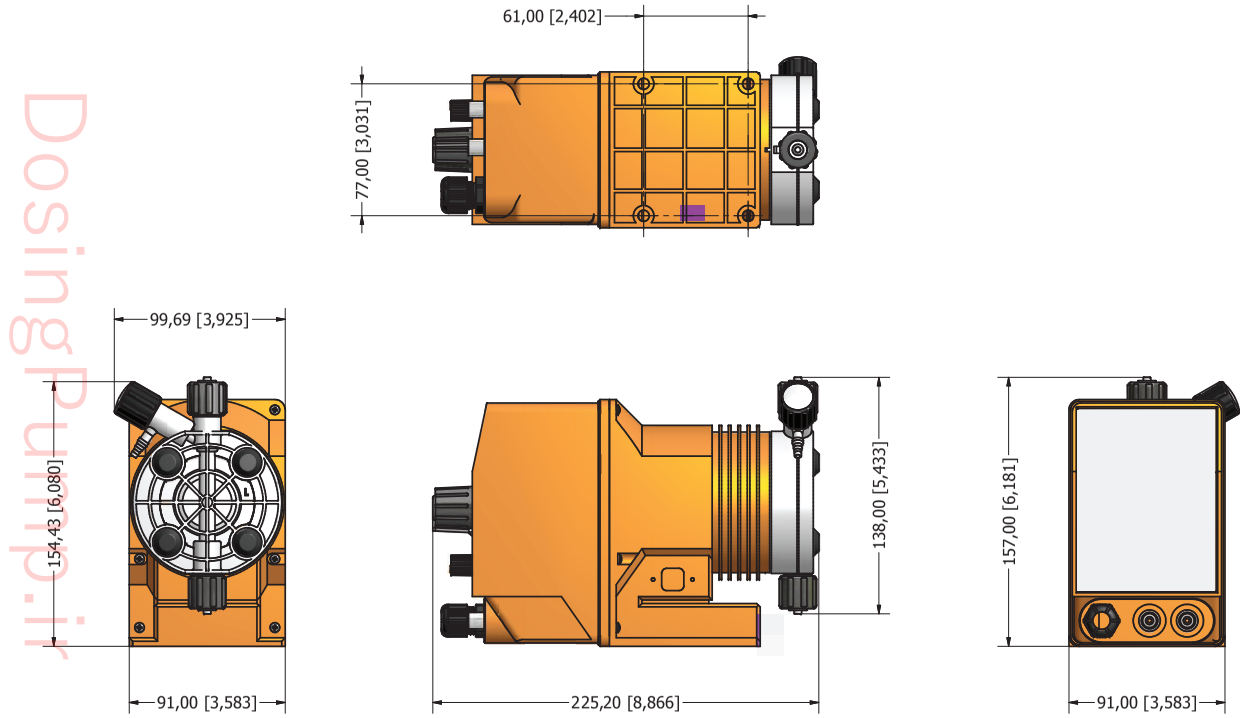
057,5,5: l/h 7,5 bar 5
Pump head mod. LA



0213: l/h 13 bar 2
Pump head mod. MA



Dimensions



bold : mm
( ) : inches

E Appendix. 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.

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	3	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	1	1	1	1	1	1	1	2	1	2	1
Calcium Hypochlor.(Chlor.ted Lime) [1]	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] Calcium Hypochlor.(Chlor.ted Lime): WQA test was based on 1% Calcium Hypochlorite solution.

Resistance rating

Resistant	1
Fairly resistant	2
Not resistant	3

MATERIALS

Polyvinyldene fluoride	PVDF	Pump Heads, valves, fitting, tubing
Polypropylene	PP	Pump Heads, valves, fitting, level floater
PVC	PVC	Pump Heads
Stainless steel	SS 316	Pump Heads, valves
Polymethyl Metacr.(Acrylic)	PMMA	Pump Heads
Hastelloy	C-276	Injection valve spring
Polytetrafluoroethylene	PTFE	Diaphragm
Fluorocarbon (Viton® B)	FPM	Sealings
Ethylene propylene	EPDM	Sealings
Nitrile	NBR	Sealings
Polyethylene	PE	Tubing

F Appendix. Hoses 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.

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

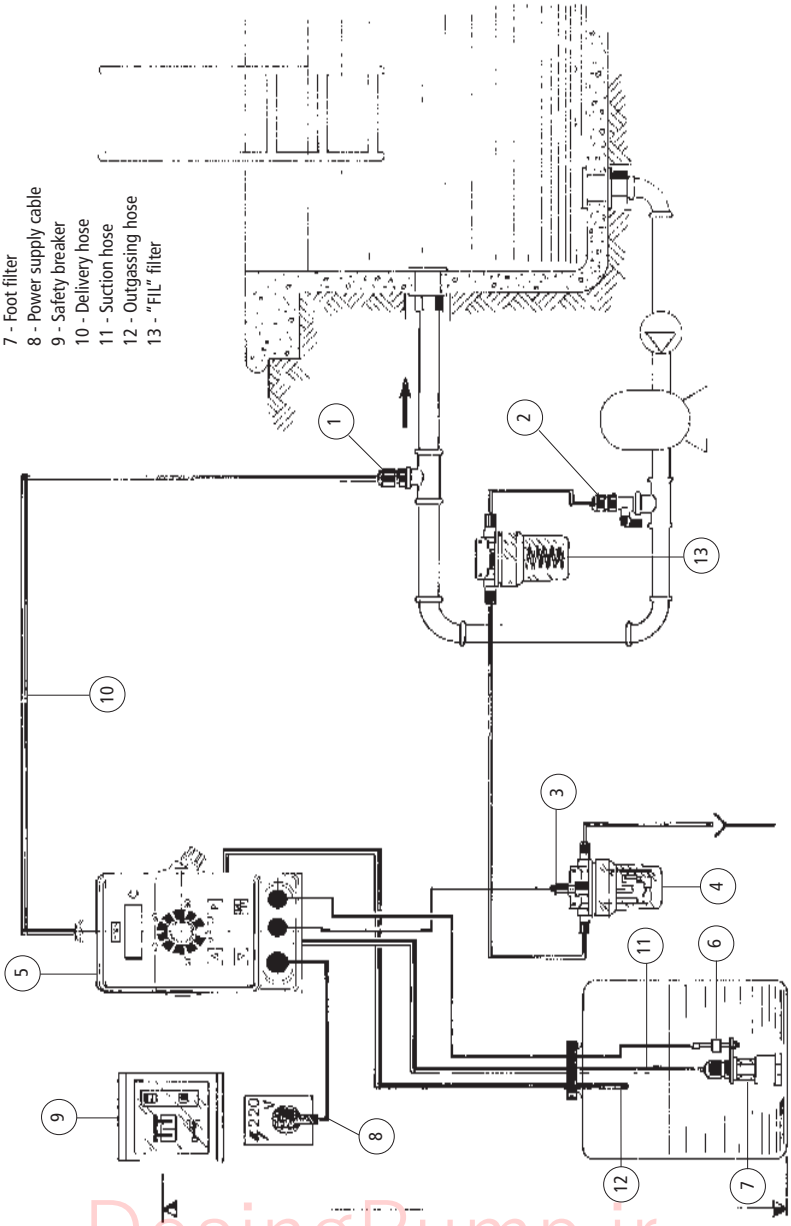
Delivery Hose	Working Pressure				Breaking Pressure			
4x6 mm PE 230 (opaque)	20°C 12 bar	30°C 10.5 bar	40°C 8.5 bar	50°C 6.2 bar	20°C 36 bar	30°C 31.5 bar	40°C 25.5 bar	50°C 18.5 bar
4x8 mm PE 230 (opaque)	20°C 19 bar	30°C 15.7 bar	40°C 12 bar	50°C 7.5 bar	20°C 57 bar	30°C 47 bar	40°C 36 bar	50°C 22.5 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

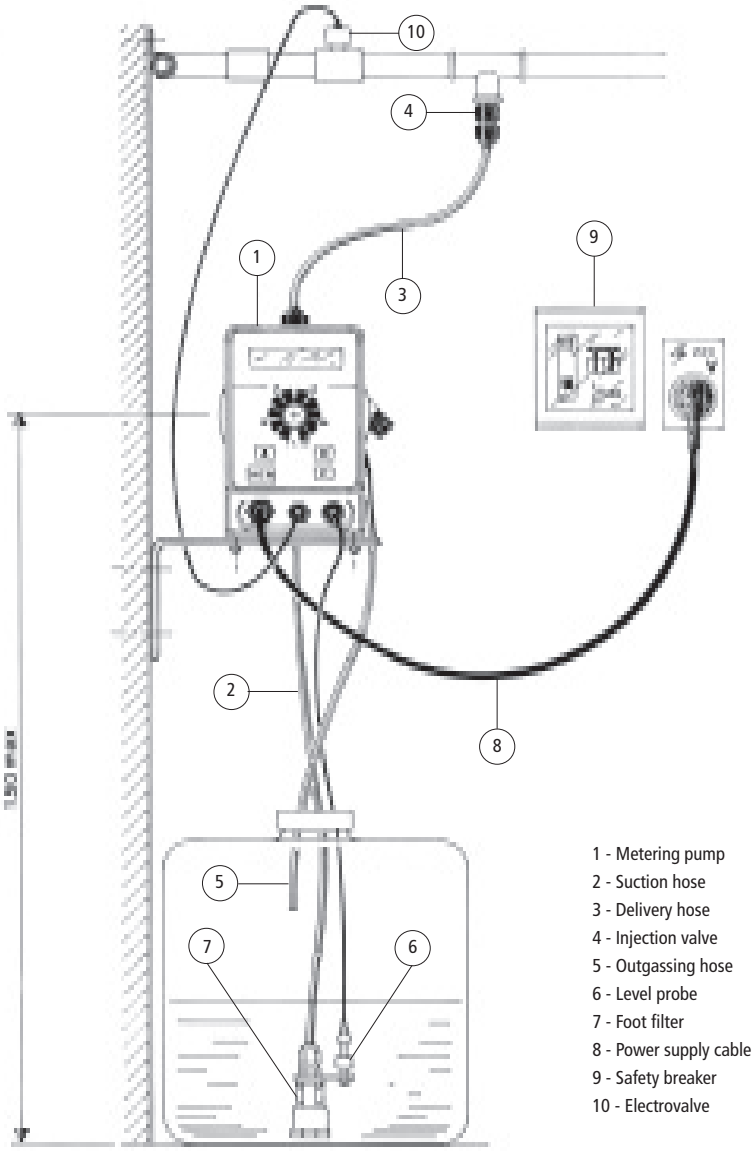
1/4 PE 230 (opaque)	20°C 17.6 bar
3/8 PE 230 (opaque)	20°C 10.6 bar
1/2 PE 230 (opaque)	20°C 10.6 bar

G Appendix. Installation draw for "KMS PH/RH" metering pumps

1 - Injection valve
2 - Sampler point
3 - Probe
4 - Probe holder
5 - Metering pump
6 - Level probe
7 - Foot filter
8 - Power supply cable
9 - Safety breaker
10 - Delivery hose
11 - Suction hose
12 - Outgassing hose
13 - "FIL" filter

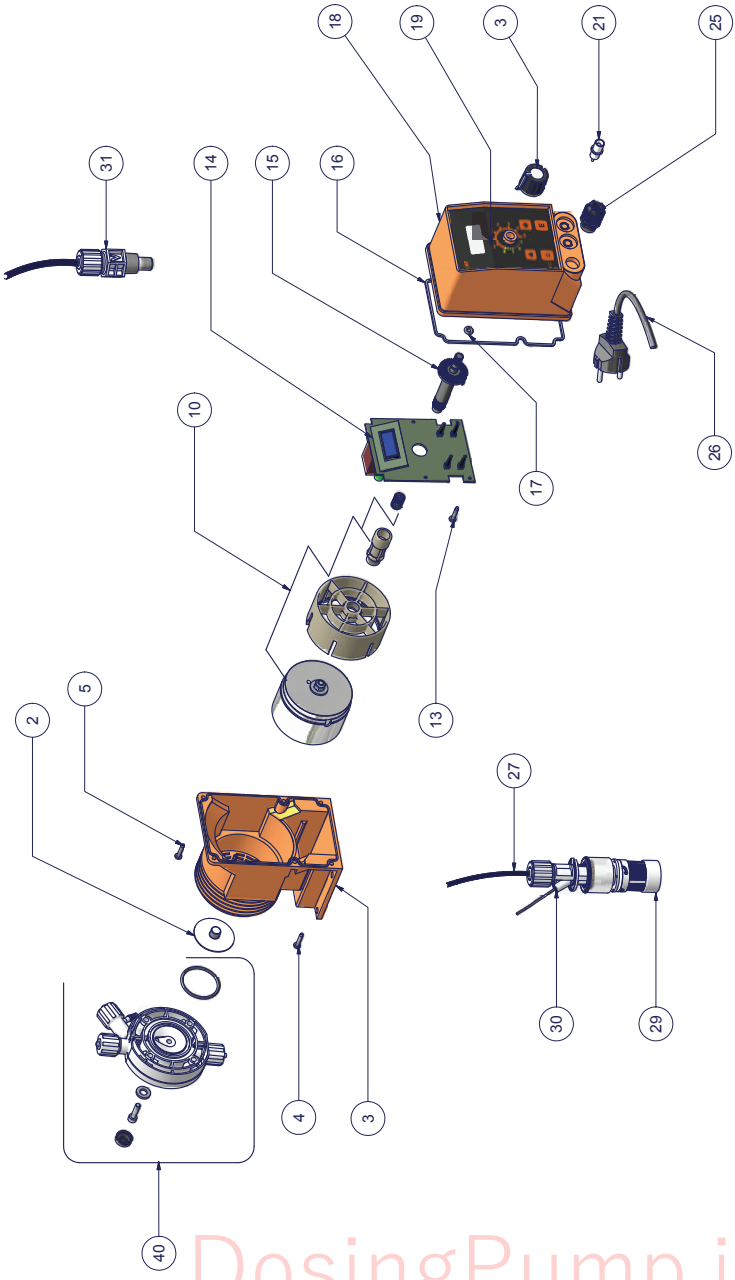


G Appendix. Installation draw for "KMS EN" metering pumps



1 - Metering pump
2 - Suction hose
3 - Delivery hose
4 - Injection valve
5 - Outgassing hose
6 - Level probe
7 - Foot filter
8 - Power supply cable
9 - Safety breaker
10 - Electrovalve

H Appendix. Exploded view



NOTICE: always specify the pump's label when ordering spare parts.

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

Index

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.