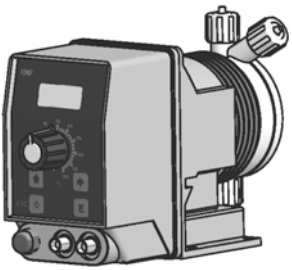
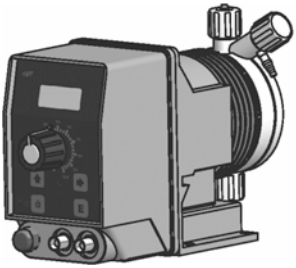
R990525

KMS MF - KMSA MF - KMS AC MF - KMS MF LPV
100 - 240

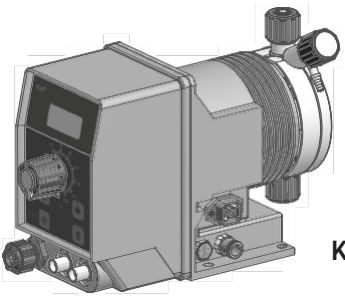
PRODUCT LABEL



KMSAMF



KMS MF



KMS AC MF

SOLENOID-DRIVEN DIAPHRAGM
DOSING PUMP

CE

EN

OPERATING MANUAL

This manual contains important SAFETY information regarding the installation and operation of the device.

Read and keep for future reference. Translation of original instructions.

Carefully follow this information to prevent personal injury and property damage.

The information in this manual may contain inaccuracies or typographical errors. The information contained in this manual is subject to change at any time without notice.

Version: R4-02-24

Product Identification Codes
(the "_" symbols complete the product code based on the configuration of the variants)
Codici Identificativi Prodotto
(i simboli "_" completano il codice del prodotto in base alla configurazione delle varianti)

KPO _____	KIP _____	KAN _____
KPA _____	KLA _____	KAF _____
KPL _____	KLC _____	KAD _____
KUA _____	KLU _____	KCD _____
KSP _____	KMF _____	KCF _____
KSU _____	KMX _____	KMH _____
KMU _____	KPI _____	KML _____
KAU _____	KEN _____	KMM _____
KAM _____	KFS _____	KPH _____
KCC _____	KDC _____	KRH _____
KCS _____	KAR _____	

GENERAL NOTES ON SAFETY

DURING INSTALLATION, TESTING AND INSPECTION IT IS MANDATORY TO COMPLY WITH THE FOLLOWING MANAGEMENT AND SAFETY INSTRUCTIONS.

SYMBOLS

The following symbols are used in this document. Familiarise yourself with the symbols and their meanings before proceeding with the installation or use of this tool.

Danger!
Indicates a potential hazard which could result in death or serious injury to persons if not avoided.

Caution!
Indicates a potential hazard which could result in minor injury to persons and/or damage to property if not avoided.
Both indicate important information to be observed in any case.

Important! - Indicates a potentially dangerous situation which may result in an undesirable outcome or state if not avoided. A practice unrelated to personal injury.

Cross-reference - This symbol indicates a reference to a specific page or paragraph in the manual.

PURPOSE OF USE AND SAFETY WARNINGS

EQUIPMENT INTENDED FOR DRINKING WATER TREATMENT

The pump must only be used for dosing liquid products.
It must not be used in explosive environments (EX).
It must not be used to dose flammable chemicals.
It must not be used with radioactive chemical material.

Only use the pump after installation.

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

Do not modify or use it in any other way than specified in the operating manual.

Keep the pump protected from sun and rain. Avoid splashing water.

During an emergency of any kind in the room where the pump is installed, immediately cut off the power to the system and disconnect the pump from the power socket.

If particularly aggressive chemical materials are used, regulations on the use and storage of these substances must be strictly followed.

Always observe local safety regulations.

The dosing pump manufacturer cannot be held liable for damage to persons or property caused by improper installation, misuse or incorrect use of the dosing pump!

Install the dosing pump so that it is easily accessible whenever maintenance is required.
Do not obstruct the location of the dosing pump!

The device must be connected to an external control system. In the event of a water shortage, dosing must be stopped.

Service and maintenance of the dosing pump and all its accessories must always be carried out by qualified personnel.

Before any installation and maintenance work:

- **Carefully read the chemical characteristics of the product to be dosed and refer to the product's safety data sheet;**
- **Wear suitable SAFETY DEVICES;**
- **Drain the dosing pump connection pipes;**
- **Carefully wash any hoses that have been used with particularly aggressive chemical materials.**

ENVIRONMENTAL SAFETY

Work area
Always keep the area where the pump is installed clean to avoid and/or detect emissions.

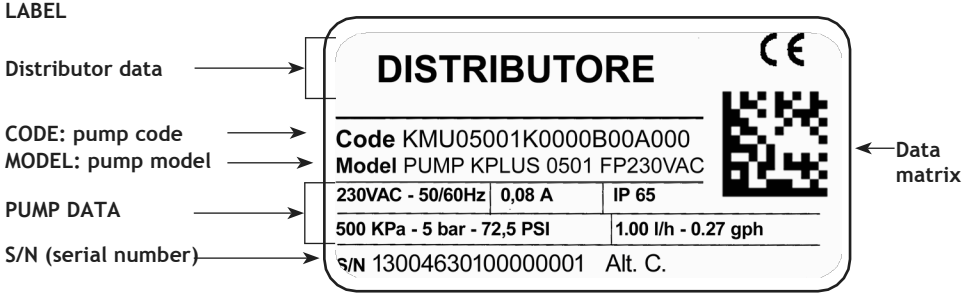
Recycling instructions

CER RECYCLING CODE: 16 02 14

Always recycle materials according to the following instructions:
1. Follow local laws and regulations regarding recycling if the unit or certain parts are accepted by an authorised recycling company.
2. If the unit or parts are not accepted by an authorised recycling company, return them to the nearest representative.

Waste and emission regulations
Comply with these safety regulations concerning waste substances and emissions.
- Dispose of all waste properly.
- Treat and dispose of pumped liquid in accordance with applicable environmental regulations.
- Clean up all liquid spills in accordance with environmental and safety procedures.
- Report all environmental emissions to the appropriate authorities.

LABEL



(example)

SPARE PARTS

Please refer to the pump label when ordering spare parts or in general for communications.
In particular, the code (**CODE**) and the serial number (**S/N**) uniquely identify the pump in question.

TRANSPORT AND STORAGE

The pump may become damaged by unsuitable transport or storage.

Store and transport the pump properly packed, preferably in its original packaging.

Observe the storage conditions for transport as well.

Even if packed, always protect the device from moisture and the action of chemicals.

Before returning the pump to the service department, remove all liquid inside the pump body and dry it BEFORE packing it in its original box. Follow the procedure described in Stop procedure.

After emptying the pump body, if there is still a chance that any highly corrosive liquid may cause damage, this must be declared on the REPAIR REPORT form.

DO NOT DISCARD PACKAGING. REUSE IT FOR TRANSPORT.

Packaging and transporting temperature.....10 to 50°C (32 to 122°F)
Atmospheric humidity .....95% relative humidity (non-condensing)

Package contents

QUANTITY	STANDARD CONTENT	KMS MF	KMSA MF	KMS MF LPV
4	dowels ø6	●	●	●
4	self-tapping screws 4.5 x 4	●	●	●
1	delay fuse 5 X 20	●	●	●
1	level probe with axial foot filter (PVDF)	●	●	
1	injection valve (PVDF) calibrated to 0.3 bar	● 1/2”	● 1/2”	● 3/4” STEEL BALL
m 2	delivery hose [1]	● PVDF	● PVDF	● PE
m 2	suction hose [1]	● PE/PVC	● PE	● PVC
m 2	bleed hose	● PE/PVC	● PE	
m 0.3	priming hose / syringe			● PVC
m 2.5	external signal cable	●	●	●
m 2	“stand-by” and “alarm” signal cable	●	●	●
1	operating manual	●	●	●

[1] If the measurement is 6x8, there is only one 4-metre opaque hose. Cut to obtain the two hoses.

NEVER DISCARD PACKAGING. THEY CAN BE REUSED TO TRANSPORT THE PUMP.

INTRODUCTION

KMS MF series

KMS MF is the multifunctional series because it allows different working modes to be set: Constant, Divide, Multiply, ppm, perc, mlq, batch, volt, mA, Timer.
In addition, you can:
- set automatic re-priming, with a flow sensor installed (sefl menu)
- enable the lost strokes recovery system (sefl menu)
- set an upkeep dosing in case of system downtime (ppm menu - upkeep setting)

The pump is equipped with:
- STAND-BY input
- SEFL input (flow sensor)
- LEVEL input (level control)
- ALARM contact output

Pump dosing is determined by the number of pulses and the capacity per single injection. Single injection adjustment is linear only over values between 30% and 100%.

The operating and control parameters are shown on an LCD display and managed via a keypad.

Some features described in this manual may require the use of additional accessories (not included).

KMSA MF series

The KMSA MF dosing pump is the **self-purging pump body** version of the KMS MF pump. The use of a self-purging pump body is necessary for dosing gas-generating chemicals (e.g. hydrogen peroxide, ammonia, sodium hypochlorite at certain temperatures).
For installation **"Connecting hydraulic components on self-purging mod. KMSA MF".**

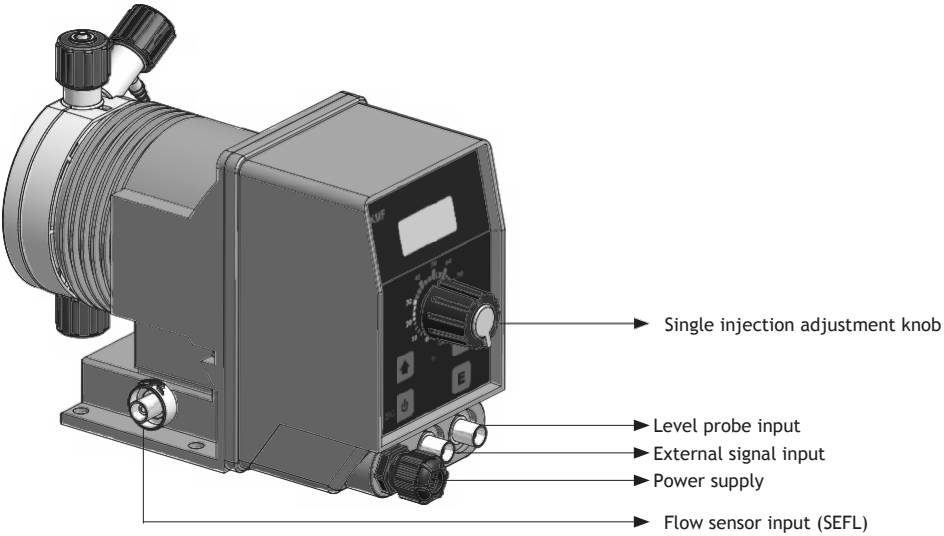
KMS AC MF series

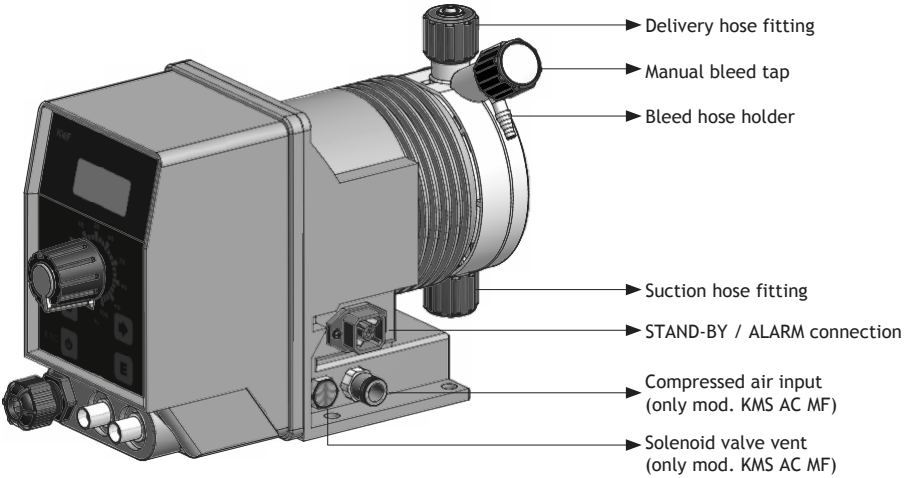
The KMS AC MF dosing pump is the version of the KMS MF pump with **dual power supply: compressed air and 230 VAC**.
Compressed air is supplied with lubricant-free air and condensate water; the supply air pressure must be between 6 and 10 bar.
For compressed air connection Figure 1.

Viscous liquids version: KMS MF LPV

The KMS MF LPV series is the **pump body version for VISCOSE LIQUIDS up to 8,000 cPs.**
Pump operation is the same as with the corresponding KMS MF.
The KMS MF LPV series has a PMMA pump body with manual bleed. In some applications, the pump body for low-viscosity liquids may reduce the pump capacity.
Hydraulic parts included in the package: 3/4" injection valve, 16x22 PVC suction hose, 8x12 PE delivery hose.

KMS MF

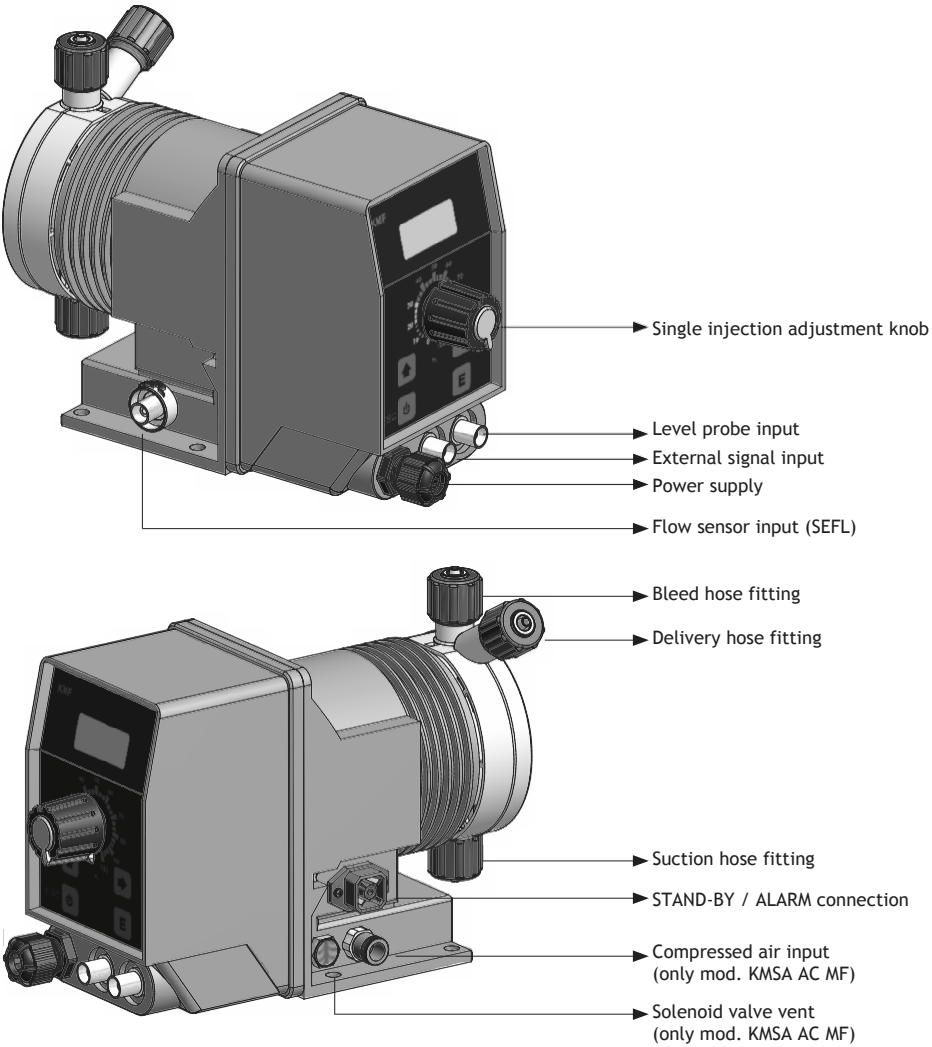




Mechanical single injection adjustment

The max. cc/pulse given in the manual (**Technical specifications and manufacturing materials**) refer to the dosing pump with the mechanical flow adjustment knob set to 100%. If the knob is (for example) set to 50%, the cc/pulse is halved. This knob can be used to adjust the pump flow rate per single injection when the dosing pump is switched on. Press and then turn the knob to the chosen value.
If the knob position is between 0 and 30%, it is necessary to check the flow rate as t at these two values may not be linear.
Note: if the knob is not set to 100%, the pump will dose at a higher pressure than the set value.

KMSA MF


Single injection adjustment knob
Level probe input
External signal input
Power supply
Flow sensor input (SEFL)
Bleed hose fitting
Delivery hose fitting
Suction hose fitting
STAND-BY / ALARM connection
Compressed air input
(only mod. KMSA AC MF)
Solenoid valve vent
(only mod. KMSA AC MF)

FUSE VALUES	
Solenoid diam.	100 - 240 VAC
75	1A

Number of injections per minute..0 - 180
Max Suction hose height ..... 5 metres

Room temperature for operation . 0 - 45°C (32 - 113°F)
Additive temperature: .....0 - 50°C (32 - 122°F)
Transporting and packaging
temperature: ..... -10 - 50°C (14 - 122°F)

Altitude .....2000 m
Installation Class: II
Level of pollution: 2

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

Degree of protection: .....KMS / KMSA / KMS AC: IP 65

Only for mod. KMS AC MF compressed air:
Intake air consumption.....6 l/h (intake air)
Suction air pressure.....7 bar
Compressed air dosing pumps require compressed air free of lubricant and condensate water.
The supply air pressure must be between 6 and 10 bar.

Table 1. KMS MF and KMSA MF model information

INFORMATION											
KMS MF KMS MF LPV [1]	FLOW RATE				cc / pulse[2]		Maximum pressure		imp/min	Hoses	Pump body
	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	180	4 x 6	I
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
0301	0.03	1	0.000008	0.26	0.03	0.09	3	43.5	180	4 x 6	I
0218	0.50	18	0.00013	4.76	0.50	1.67	2	29	180	6 x 8	M

INFORMATION											
KMSA	FLOW RATE				cc / pulse[2]		Maximum pressure		imp/min	Hoses	Pump body
	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
100.5	0.02	0.5	0.01	0.13	0.02	0.05	10	145	180	4 x 6	JA
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

[1] The indicated flow rates refer to measurement with water. Flow rates may vary depending on viscosity.
[2] cc per pulse: calculated with the mechanical flow rate adjustment knob set to 100%

Table 2. KMS AC MF model information

INFORMATION											
KMS AC MF model	Flow rate				cc / pulse		Pressure		Delivery Hose (PVDF)	Suction Hose	Pump body
	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

KMS MF manufacturing materials

✓ : standard
X: option available

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

KMS MF LPV manufacturing materials

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

Default parameters

	At first start-up	After the LOAD DEFAULT procedure
PASSWORD	0000	0000
WORKING MODE	mA	CONSTANT
	High mA 20.0: spm 180	100 SPM
	Low mA 0: spm 0	-
CS/ST	Depending on the flow rate (Table 1 and 2. cc per pulse)	0
UNIT	litres	litres
SEFL	Enabled (Enable - SEFL 020 STP YES - Recovery fault NO)	Disabled
STAND-BY	Enabled N.O. (normally open)	Disabled
OUT ALARM	Enabled N.O. (normally open)	Enabled N.O. (normally open)
ALARMS	All enabled (enable)	All disabled (disabled)
TIMEOUT	120 seconds	0

INSTALLATION

Installing the dosing pump

Installation and commissioning takes place in 5 phases:

1. Pump positioning
2. Hydraulic connection (hoses, level probe, injection valve)
3. Electrical connection
4. Priming
5. Programming

Before installation, check that all necessary precautions have been taken for the safety of the installer.

⚠ **ALWAYS wear protective masks, gloves, safety goggles and if necessary additional PPE during all installation phases and while handling chemicals!**

⚠ **Avoid splashing water and direct sunlight!**

Pump positioning

Secure the pump on a stable support at a maximum height of **1.5 m** above the bottom of the container.

The injection point must be higher than the storage container in order to avoid accidental product spillage.

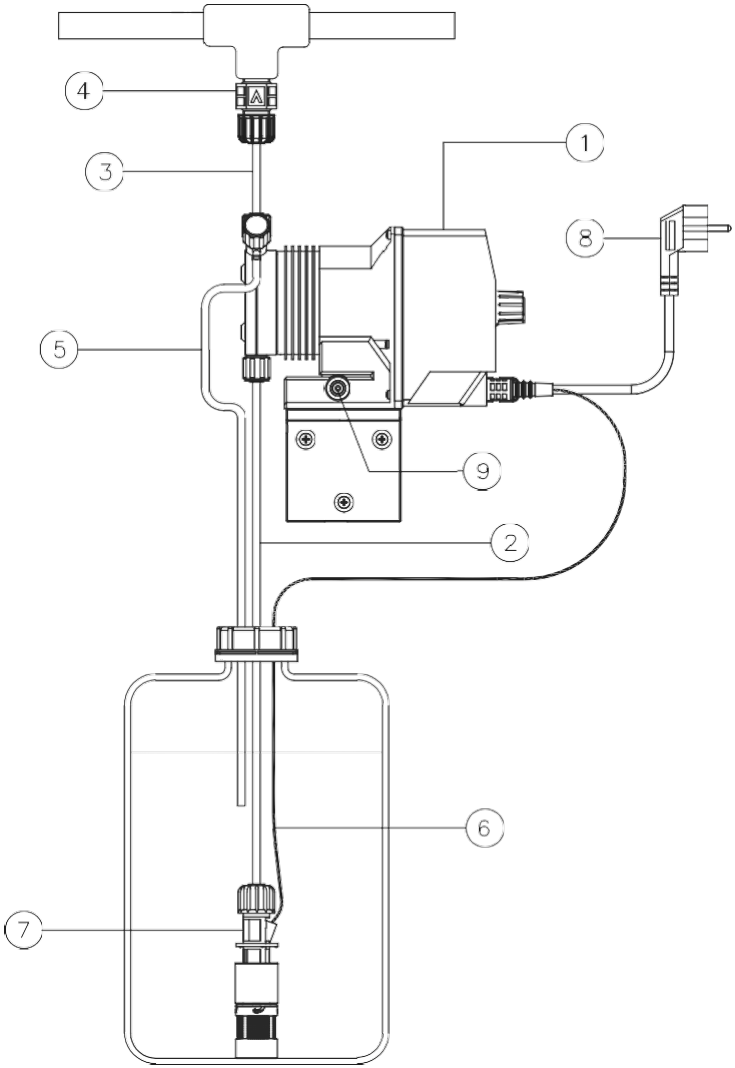
If this is not possible, a **multifunction valve** must be mounted on the delivery side of the dosing pump to prevent accidental chemical input.

Install the pump
- in a safe place and secure it so that the vibrations produced during its operation do not cause any movement;
- in an easily accessible place;
- with the base in a horizontal position:

Use only hoses compatible with the chemical to be dosed. Refer to the ⊞ Chemical compatibility table.
If the product is not in the table, consult the supplier.

Fig. 1. Installing the dosing pump

1 - Dosing Pump
2 - Suction Hose
3 - Delivery Hose
4 - Injection Valve
5 - Air Discharge
6 - Level probe
7 - Foot filter
8 - Power supply
9 - Stand-by / Alarm



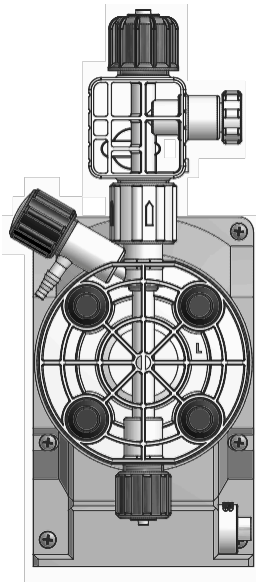
Flow sensor Installing (SEFL)

The flow sensor (SEFL) is an OPTIONAL device for monitoring correct pump operation. The SEFL detects the actual flow of liquid into the pump body.

1. Install the SEFL flow sensor by connecting it to the delivery connection of the pump body or using the mounting bracket on the delivery line.
2. Install the delivery hoses on the outlet of the SEFL (top) and secure it.
3. Make the electrical connection directly to the flow sensor input on the pump (**How to connect the pump**). During operation the SEFL opens and closes the contact.
4. Enable the sensor from the PROG 2 SETUP / SEFL menu.

The symbol ✳ (asterisk) the display indicates the presence of a SEFL (flow sensor)

Fig. 2. Installing the SEFL on the dosing pump



HYDRAULIC CONNECTION

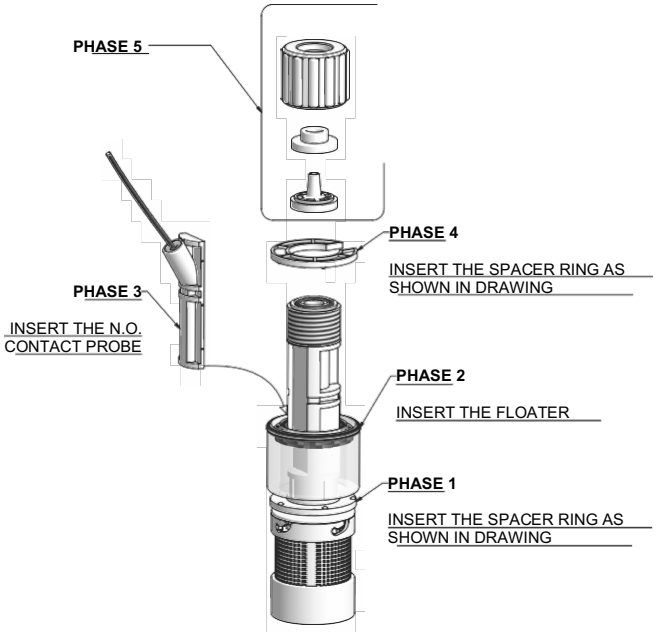
Level probe

The level probe is supplied already assembled and is equipped with a foot filter that prevents sediment from being sucked in.
Place the level probe on the bottom of the container.
Connect the BNC on the level probe to the level probe input on the pump.

If there is a mixer in the container, a suction lance must be installed.

Follow the diagram below when replacing parts on the level probe.

Fig. 3. Foot filter / level probe assembly

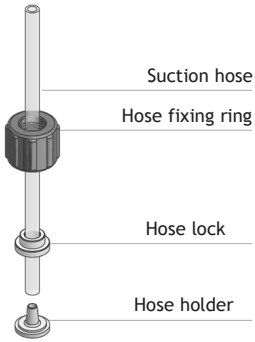


Suction hose / foot filter connection

The suction hose must be as short as possible and installed in a vertical position to prevent the suction of air bubbles!

Completely unscrew the suction ring on the pump body and remove the components required for assembly with the hose: fixing ring, hose lock, hose holder. Assemble as shown in Figure 5.
Insert the hose all the way into the hose holder.
Tighten the hose on the pump body by screwing the ring nut **using only the strength of your hands alone**.
Connect the other end of the hose to the foot filter using the same

procedure. Fig. 4. Suction hose / pump body assembly



Delivery hose / pump body assembly

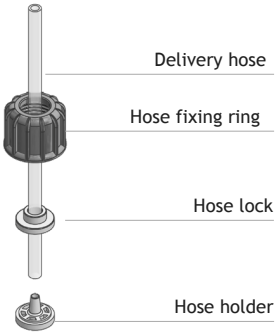
The suction and delivery valves must always be in the VERTICAL position.

All hose connections to the pump must be made using only the strength of your hands alone.
Do not use tools to tighten the rings.

The delivery hose must be secured so that it cannot produce sudden movements that could cause it to break or damage nearby objects!

Completely unscrew the ring on the pump body and remove the components required for assembly with the hose: fixing ring, hose lock, hose holder. Assemble as shown in Figure 6.
Insert the hose all the way into the hose holder.

Fig. 5. Delivery hose / pump body assembly



Tighten the hose on the pump body by screwing the ring nut **using only the strength of your hands alone**.

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

Injection valve

The injection valve must be installed on the system at the water inlet point.
The injection valve opens at pressures above 0.3 bar.
Valves calibrated to 1, 2, 3, 4 or 5 bar with corresponding connections are available on request.

Bleed hose

Insert one end of the bleed hose onto the bleed hose connection as shown in the figure below. Place the other end directly into the tank containing the product to be dosed.
In this way the liquid leaked out during the priming phase will be fed back into the tank.

Fig. 6. Description of pump body with manual bleed (KMS MF).

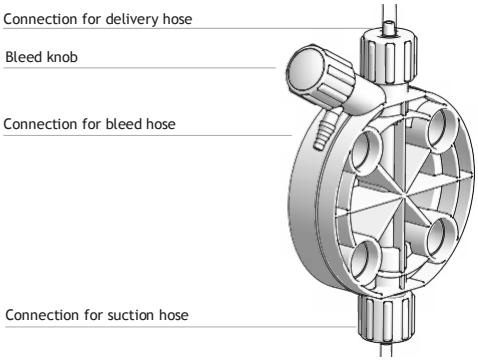
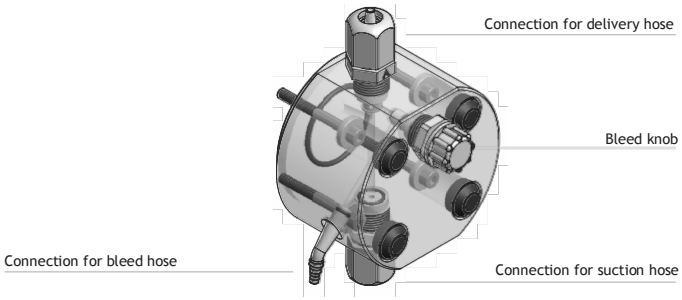


Fig. 7. Description of pump body in PMMA in with manual bleed (KMS MF).



The manual bleed procedure is described in **How to prime the pump.**

Bending the bleed hose slightly is permitted in order to insert the product to be dosed into the tank.

During the calibration phase (test), it is necessary to insert the discharge hose inside the tank.

Connecting hydraulic components on self-purging mod. KMSA MF

Refer to the figures below for the position of the delivery and bleed hoses. The assembly procedure for the suction, delivery and bleed hoses is the same as described above.

Fig. 8. Description of the self-purging pump body (KMSA MF pump)

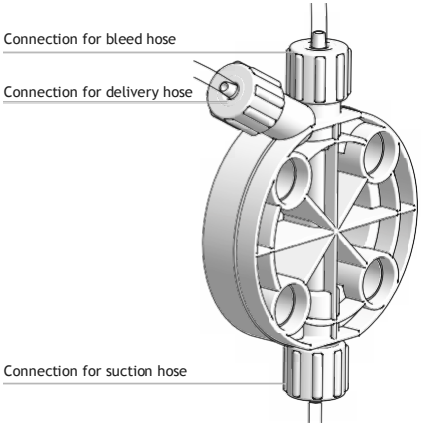
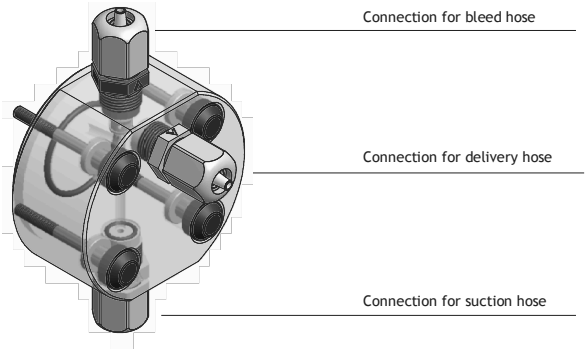


Fig. 9. Description of the self-purging pump body in PMMA (KMSA MF pump)



The suction, delivery and bleed valves are different.

ELECTRICAL CONNECTION

Preliminary checks

THE ELECTRICAL CONNECTIONS OF THE PUMP MUST BE CARRIED OUT BY SPECIALISED PERSONNEL.

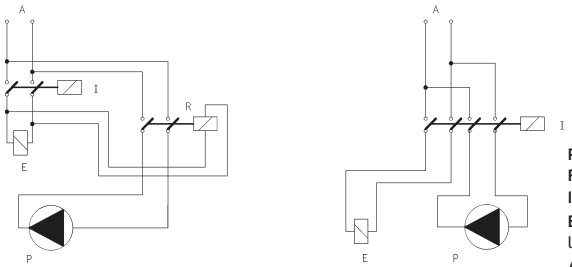
Before connecting the pump:

1. **Make sure that the values listed on the pump nameplate are compatible with those of the mains.** The pump nameplate is located on the side.

2. **Make sure that the pump is connected to a system with an efficient earth and equipped with a differential with a sensitivity of 0.03A.**

3. **Install a "relay" to prevent damage to the pump. Never install in parallel with inductive loads (e.g. motors). See figure below.**

Fig. 10. Electrical installation of the pump



P - Dosing pump
R - Relay
I - Switch or safety device
E - Solenoid valve or inductive load
A - Power supply

How to connect the pump

- Connect the “BNC” of the external signal to the “INPUT” connector.
  SCREEN (CABLE BRAID): -
  CENTRAL CONDUCTOR: +
  This signal can be used in one of the following modes:
  - Meter
  - Batch mode start contact
  - Voltage input volt mode
  - Current input mA

- Connect the alarm and/or stand-by signal as described in fig. a.

Fig. 11. Alarm/stand-by connection

1: (Green) “Stand-by” input
4: (Yellow) “Stand-by” ground

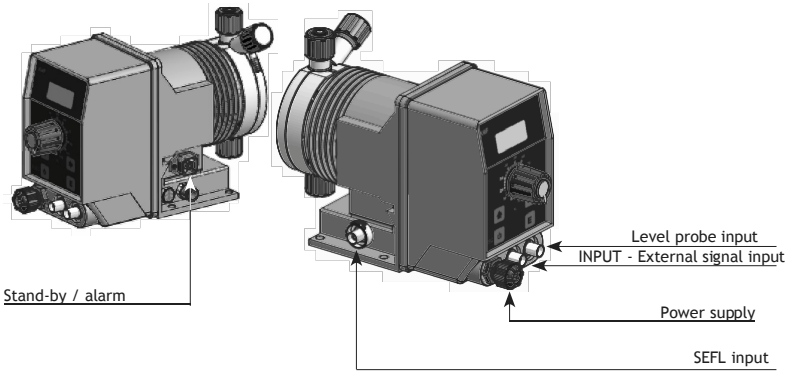
2: (Brown) Alarm Common (Relay)
3: (White) N.O. Alarm Contact (Relay)

Max load relay output: Free contact
1A 24VAC

If not in use, it is advisable to protect the MPM connector with the cap provided in the packaging.
The "Alarm” signal is not protected by a fuse.
The “Stand-by” signal has priority when activating/deactivating the pump.

- Connect the "SEFL" (**optional** Flow Sensor) to the SEFL input.

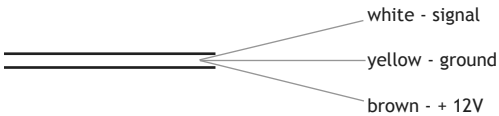
Fig. 12. Pump connections



Pulse water meter with HALL effect (option)

The version of the dosing pump for connection to a HALL effect pulse water meter has a 3-wire cable at the external signal input
If the Hall effect pulse water meter is supplied by the manufacturer, the external signal input will have an MPM connector to which to connect the meter.

Fig. 13. External signal cable for pulse water meter



PUMP BODY PRIMING

How to prime the pump

To prime the pump without coming into contact with the chemical:

1. Connect all hoses (delivery, suction and discharge hose).
2. Open the bleed valve by turning the bleed knob fully.
3. Make sure that the ADJUSTMENT KNOB is on 100%.
4. Power the pump. If an activation delay (DELAY) has been set, the display will show a countdown. Press a key to stop the countdown and enter the **MAIN MENU**.
5. Press the key ➧for 5 seconds.
6. The pump will prime for 30 seconds.
7. When the product begins to circulate within the discharge hose, close the bleed knob (self-purging pump bodies are excluded).
8. When finished, the pump will return to normal operating mode. If you do not wish to wait until the end of the pre-set time (the pump has primed the product) press the "**ESC**" key.

Keyboard functions

E	ENTER/EXIT MENU (WITH SAVE)
➡	SCROLL/INCREASE DIGITS
⬆	SCROLL/INCREASE DIGITS
ESC	ON/OFF / EXIT MENU (WITHOUT SAVING)
	SINGLE INJECTION ADJUSTMENT KNOB (0-100%)

Table 3. Function of keys

OPERATIONS	KEYS
switch on / switch off	ESC
enter / exit menu	E / ↵
save settings	E / ↵
exit menu without saving	ESC
set numerical data	⬆
scroll through screens	➡
scroll through options	⬆

Main menu

The main menu provides a summary of the pump's working information: Table 4. Main menu

STROKES	pulses per minute
UPKEEP ENABLED	upkeep dosing (if set)
MODE	working mode set
SUPPLY	power supply voltage
DOSING	current flow rate of the pump
INPUT (not present in Constant and Batch modes)	external control signal value (Volts and mA) or instantaneous system flow rate (Multiply, Divide and ppm)

Table 5. Symbols on the display

✳	Signals the presence of a SEFL (flow sensor); if SEFL is enabled, the symbol ✳flashes with each pulse, otherwise there may be a fault (**TROUBLESHOOTING**).
#	Signals the presence of an alarm (**ALARMS**).
⏸	change of state of the external contact which stopped the pump activity

Entering the programming area

The navigation language and measurement unit must be set when starting the pump for the first time. Use the arrows to scroll and then confirm with ENTER. From the main menu, access programming with key E. The standard protection password is 0000. An ***ADMIN*** and ***USER*** password can be set. For the first programming or for complete programming choose ***ADMIN***.

SET
LANGUAGE

The programming menu is divided into three main sub-menus:
- PROG 1 MODE: area for choosing the pump **working mode**
- PROG 2 SETUP: area for setting **working parameters**
- PROG 3 STAT: area for overall pump dosing **statistics**

PROG 1 MODE: Working mode

The pump can be programmed to work in one of the modes shown in Table 6.

Table 6. PROG1 MODE: pump working mode.

MODE	HOW IT WORKS
CONSTANT	The pump doses at a constant frequency in relation to the values of ”SPH” (strokes per hour), “SPM” (strokes per minute) or “LPH” (litres per hour) set during programming.
DIVIDE	The pulses supplied by a meter connected to the pump are divided by the value set during programming and determine the dosing frequency.
MULTIPLY	The pulses supplied by a meter connected to the pump are multiplied by the value set during programming and determine the dosing frequency.
PPM	The pulses supplied by a meter connected to the pump determine dosing according to the set PPM value. The concentration of the product dosed, the quantity for each single stroke and the pulse/litre values of the connected meter must be set during programming.
PERC	The pulses supplied by a meter connected to the pump determine dosing according to the set PERC value (%). The concentration of the product dosed, the quantity for each single stroke and the pulse/litre values of the connected meter must be set during programming.
MLQ	The pulses supplied by a meter connected to the pump determine dosing according to the set MLQ (millilitres per quintal) value. The concentration of the product dosed, the quantity for each single stroke and the pulse/litre values of the connected meter must be set during programming.
BATCH	The pulse supplied by an external contact starts dosing the amount of product set during programming.
VOLT	The voltage supplied to the pump (via the input signal) determines proportional dosing according to the two minimum and maximum values in which the strokes per minute were set during programming (0-10 VDC).
mA	The current supplied to the pump (via the input signal) determines proportional dosing according to the two minimum and maximum values in which the strokes per minute were set during programming.
TIMER	Weekly working mode with customised dosing repetition of up to 16 programs per week

In the working modes MULTIPLY, DIVIDE, PPM, PERC, MLQ, the pump connected to a pulse meter also becomes an **INSTANT FLOW METER**.

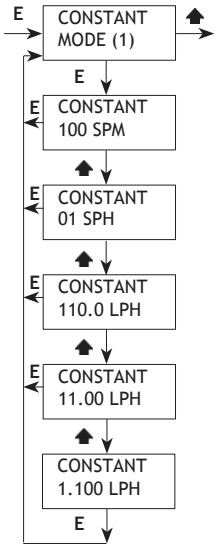
CONSTANT

The pump doses at a constant frequency in relation to the values of “SPH” (strokes per hour), “SPM” (strokes per minute) or “LPH” (litres per hour) set during programming.

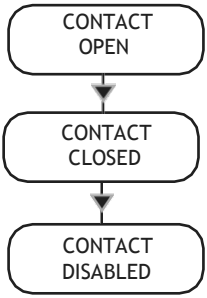
WHEN	In the absence of an external signal, hourly dosing of a product in the desired quantity must be carried out
PARAMETERS	Choose: • SPH (strokes per hour) • SPM (strokes per minute) • LPH (litres per hour) The accuracy of the LPH depends on the value set in the CC/ST menu (PROG 2 SETUP). The maximum LPH value that can be set depends on the maximum frequency of the pump (refer to the data listed on the nameplate). When a higher value is set, the pump will display the # symbol (ALARM STROKE - (⊞ **ALARMS**).

Press E on the displayed mode to activate the selection.

Fig. 14. Constant menu.



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.

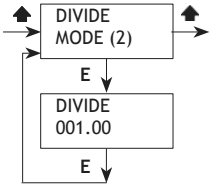


DIVIDE

The pulses supplied by a meter connected to the pump are divided by the value set during programming and determine the dosing frequency.

WHEN	In the presence of an external signal sending too many pulses (small size water meter, e.g. CTFI model), it is necessary to divide them to dose the correct amount of product
PARAMETERS	• DIVIDE (divisor factor). Min value accepted: 001.00.

Fig. 15. Divide menu.



In this working mode, the pump also becomes an INSTANT FLOW METER when connected to a pulse water meter.

Calculating the division value

Use the formula:

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

N Division value to set
[imp/l] pulses/litre from pulse water meter
[cc] quantity of dosed product per single injection (expressed in cc) of the dosing pump to be used
[ppm] quantity of product to be dosed expressed in parts per million (gr/m^3)
[K] dilution coefficient of the product to be dosed

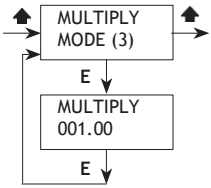
If N, calculated above, is < 1, it is necessary to install a pulse water meter that delivers a higher number of pulses per litre or a dosing pump with a higher unit flow rate (CC). This problem can be solved by setting the pump to “MULTIPLY” mode and multiplying 1/N. In some particular applications, this can be solved by reducing the dilution factor of the additive to be dosed. If the dosed quantity is greater than required, simply increase the division factor (N) set with the knob on the dosing pump.

MULTIPLY

The pulses supplied by a meter connected to the pump are multiplied by the value set during programming and determine the dosing frequency.

WHEN	In the presence of an external signal sending too little pulses (large size water meter, e.g. CWFA model), it is necessary to multiply them to dose the correct amount of product
PARAMETERS	• MULTIPLY (multiplication factor). Min value accepted: 001.00. • TIMEOUT (working parameter in PROG 2 SETUP menu)

Fig. 16. Multiply menu.



In this working mode, the pump, connected to a pulse water meter, also becomes an **INSTANT FLOW METER**.

Calculating the multiplication value

Use the formula:

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

N multiplication value to set
[imp/l] pulses/litre from pulse water meter
[cc] quantity of dosed product per single injection (expressed in cc) of the dosing pump to be used
[ppm] quantity of product to be dosed expressed in parts per million (gr/m^3)
[K] dilution coefficient of the product to be dosed

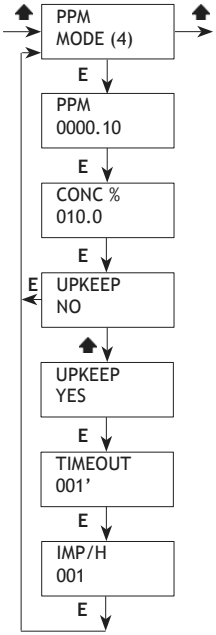
If N, calculated above, is < 1, it is necessary to install a pulse water meter that delivers a higher number of pulses per litre or a dosing pump with a higher unit flow rate (CC). This problem can be solved by setting the pump to “DIVIDE” mode and dividing 1/N. In some particular applications, this can be solved by reducing the dilution factor of the additive to be dosed. If the dosed quantity is greater than required, simply increase the division factor (N) set with the knob on the dosing pump.

PPM

The pulses supplied by a meter connected to the pump determine the dosage according to the PPM value, product concentration and quantity for each single stroke set during programming.

WHEN	In the presence of an external signal sending pulses, it is necessary to dose the correct amount of product by specifying only the PPM (parts per million) and leaving the pump to manage the incoming pulses
PARAMETERS	• PPM (quantity of product in parts per million) • CONC (% product concentration) • UPKEEP (maintenance dosing) • WMETER (meter pulses - working parameter in PROG 2 SETUP menu) • CC/ST (cc/pulse- working parameter in PROG 2 SETUP menu) • TIMEOUT (working parameter in PROG 2 SETUP menu)

Fig. 17. PPM menu.



In this working mode, the pump, connected to a pulse water meter, also becomes an **INSTANT FLOW METER**.

Upkeep dosing

In the event of system downtime, the pump can perform upkeep (maintenance) dosing within the circuit.
To activate this function set:

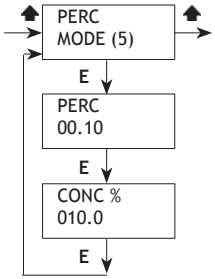
- "UPKEEP YES" (activation of maintenance);
- "TIMEOUT" (time after which, in the absence of pulses, the maintenance dosing must start);
- “IMP/H” (number of pulses/hour that the pump must deliver during maintenance).

PERC

The pulses supplied by a meter connected to the pump determine the dosage according to the PERC (%), product concentration and quantity for each single stroke set during programming.

WHEN	In the presence of an external signal sending pulses, it is necessary to dose the correct amount of product by specifying only the PERC (percentage) and leaving the pump to manage the incoming pulses
PARAMETERS	• PERC (quantity of product in percentage) • CONC (% product concentration: 100% pure product) • WMETER (meter pulses - working parameter in PROG 2 SETUP menu) • CC/ST (cc/pulse- working parameter in PROG 2 SETUP menu) • TIMEOUT (working parameter in PROG 2 SETUP menu)

Fig. 18. PERC menu.



In this working mode, the pump, connected to a pulse water meter, also becomes an **INSTANT FLOW METER**.

Choosing a water meter

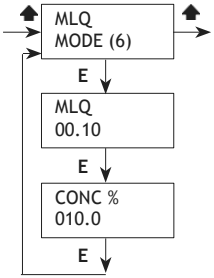
Use a water meter capable of providing the maximum number of pulses possible. Note: maximum frequency for this pump is 1Khz (1000 pulses/second).

MLQ

The pulses supplied by a meter connected to the pump determine the dosage according to the MLQ (millilitres per quintal), product concentration and quantity for each single stroke set during programming.

WHEN	In the presence of an external signal sending pulses, it is necessary to dose the correct amount of product by specifying only the MLQ (millilitres per quintal) and leaving the pump to manage the incoming pulses
PARAMETERS	• MLQ (quantity of product in millilitres per quintal) • CONC (% product concentration: 100% pure product) • WMETER (meter pulses - working parameter in PROG 2 SETUP menu) • CC/ST (cc/pulse- working parameter in PROG 2 SETUP menu) • TIMEOUT (working parameter in PROG 2 SETUP menu)

Fig. 19. MLQ menu



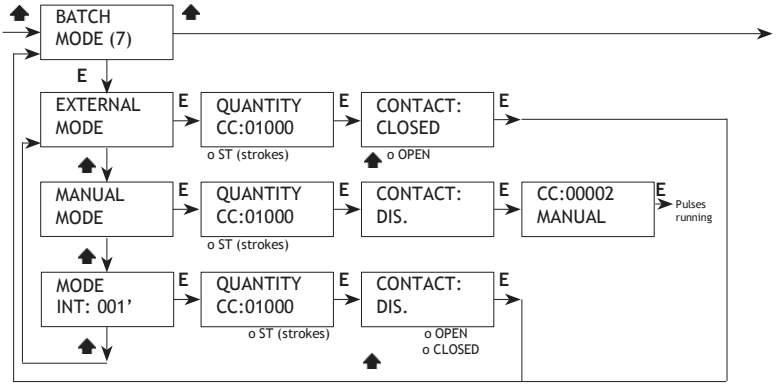
In this working mode, the pump, connected to a pulse water meter, also becomes an **INSTANT FLOW METER**.

BATCH

Pulses supplied from an external contact start the pump according to the strokes required to dose the quantity of product set during programming or for the desired quantity.
For best result, calibrate the pump carefully (test - PROG 2 SETUP menu).

WHEN	To start the pump for dosing a certain amount of product after receiving a pulse from external equipment
PARAMETERS	• MODE (working mode) • CC (quantity of product be dosed) • ST (pulses to be supplied to the magnet) • CONTACT (contact status) • CC/ST (cc/pulse- working parameter in PROG 2 SETUP menu)

Fig. 20. BATCH menu

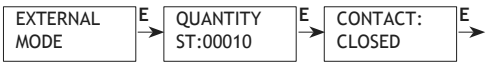


EXTERNAL: an external signal regulates dosing

An external contact (N.O. or N.C.) starts dosing at the maximum frequency ("CC") or the set number of strokes ("ST").

EXAMPLE 1

Set as below:



Any change in contact status starts the dosing of the set number of strokes.

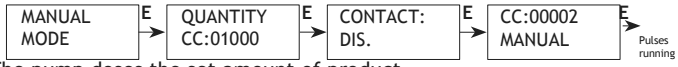
Fig. 21. Batch -external mode- contact status and pump working mode

MANUAL: manual dosing

Manual dosing mode used for priming. Set a quantity to dose at maximum frequency (“CC”) or the number of strokes (“ST”). The contact is disabled.

EXAMPLE 2

Set as below:



The pump doses the set amount of product.

Fig. 22. Batch -manual mode- pump working mode

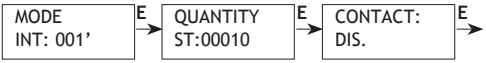
INTERNAL: pause-work cycle

In this mode, the dosing activity involves defining the
- quantity to be dosed at maximum frequency;
- pause time between dosing (“INT”: 1 to 999 minutes).

This establishes a work phase in which there is dosing and a pause phase in which the pump is stopped. The pause-work cycle is determined by the setting of an external contact (N.C.-N.O.).
In its set status (N.C. or N.O.), the contact regulates the dosing cycle (pause/work). If it changes status, the pump remains in waiting (WAITING).
If the contact is disabled, the pause/work cycle repeats smoothly as long as the pump is powered.

EXAMPLE 3

Set as below:

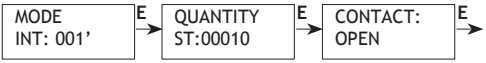


The pump doses in a constant pause-work cycle:

Fig. 23. Batch -internal mode- pump working mode with constant pause-work cycle.

EXAMPLE 4

Set as below:



The pump doses in a constant pause-work cycle. Changing the contact status (Open → Closed) stops the cycle.
The cycle always starts in pause mode.

Fig. 25. Batch -internal mode- pump working mode with pause-work cycle regulated by an external contact. Case 1.

The contact changes state during a pump pause phase.
When the contact returns to its previous state, the pump resumes normal operation.

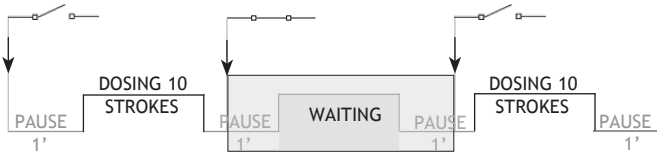
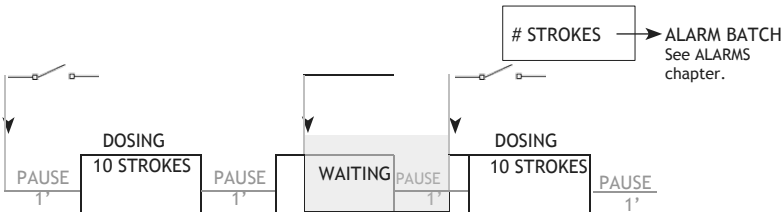


Fig. 24. Batch -internal mode- pump working mode with pause-work cycle regulated by an external contact. Case 2.

The contact changes state during a pump work phase.
When the contact returns to its previous state, the pump resumes normal operation but the display signals a BATCH alarm.

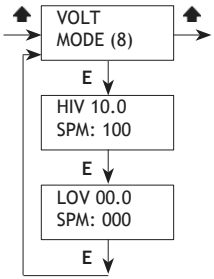


VOLT

The voltage supplied to the pump (via the input signal) determines proportional dosing according to the two minimum and maximum values in which the strokes per minute were set during programming.

WHEN	In the presence of an external voltage signal, it is necessary to dose the correct amount of product.
PARAMETERS	• HIV (maximum voltage) • LOV (minimum voltage) • SPM (strokes per minute)

Fig. 26. VOLT menu



The input signal value (Volts) can be displayed when this mode is set.

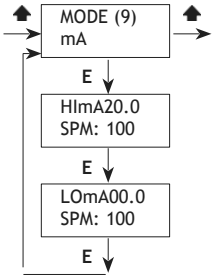
Caution: if any setting errors occur (e.g. the same value set for HIV and LOV) a **WRONG ENTRY** error screen will appear. Set the correct parameters.

mA

The current supplied to the pump (via the input signal) determines proportional dosing according to the two minimum and maximum values in which the strokes per minute were set during programming.

WHEN	In the presence of an external current signal, it is necessary to dose the correct amount of product.
PARAMETERS	• HImA (maximum current) • LOmA (minimum current) • SPM (strokes per minute)

Fig. 24. mA mode



The input signal value (mA) can be displayed when this mode is set.

Caution: if any setting errors occur (e.g. the same value set for HImA and LOmA) a **WRONG ENTRY** error screen will appear. Set the correct parameters.

TIMER

Weekly programming mode with possibility of repeating up to 16 programs per week and possibility of setting start time, duration, quantity of product to be dosed.

WHEN	One or more (max 16) weekly scheduled dosing activities are needed
PARAMETERS	• Start (start-up time) • Time (duration) • Quantity (quantity be dosed) • Day of the week

Key logic: (>) next parameter I (^) change value I (↵) confirm/store I (ESC) exit.

Note: the transition between START TIME (ST) and DURATION (TM) occurs with (>). Pressing (↵) after ST moves directly to QUANTITY.

PROGRAM (PXX)
↓
DISABLED
^ ENABLED
↓
START TIME (ST)
↓
DURATION (TM)
↓
QUANTITY (litres / gallons)
↓
DAYS
YES ^ NO
↓
(>) SCROLL DAYS
(↵) SAVE
(ESC) END

PROG 2 SETUP: Working settings

This menu defines the settings for the working parameters of the dosing pump.

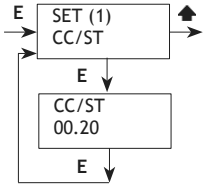
Table 7. PROG 2 SETUP: parameter setting menu

MENU		PARAMETERS TO BE SET
1	CC/ST	Cubic centimetres per stroke obtained by the Test function (next sub-menu).
2	TEST	Test function for pump calibration: defines the precise cc (cubic centimetres)¤ quantity of the pump.
3	LEVEL	Level pre-alarm (product in reserve).
4	SEFL	Presence of a flow sensor and relative alarm. Function of **automatic re-priming with strokes recovery system.**
5	STAND-BY	External signal (connected to the Stand-by input, see chapter **How to connect the pump**) that enables/disables the pump.
6	OUT AL	Alarm relay output (**How to connect the pump**)
7	ALARMS	Enabling pump alarm relay output contact (level, stand-by, flow sensor, ppm, perc, mlq, batch). The event that generates the alarm is displayed in the Main Menu (ALARM sub-menu) - **ALARMS**.
8	WMETER	When a pulse water meter is installed, enter pulses supplied by the meter.
9	TIMEOUT	Maximum time between one pulse and another within which the pump distributes dosing evenly.
10	UNIT	Pump unit of measurement (litres or gallons).
11	DELAY	Waiting time at pump start-up.
12	PASSWORD	Password setting.
13	FACTORY	Restores the pump parameters to default.
14	CLOCK	Date and time setting of the pump.

CC/ST

Enter the result of the CC/ST (cubic centimetres/pulse) obtained from the TEST function (next menu) in this sub-menu.

Fig. 28. CC/ST menu

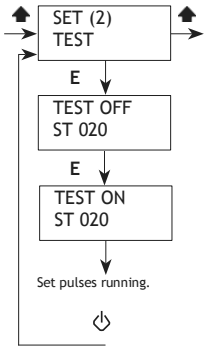


TEST

This test must be carried out in order to define the amount of cc/st (cubic centimetres/pulse) that the pump delivers.

1. Install the pump on the system, taking care to insert the suction hose (complete with foot filter) into a BEKER type test tube graduated in ml (1ml = 1cc). If the pump is of the self-priming type, connect the bleed hose and insert it into the test tube.
2. Power up the pump and turn the single injection adjustment knob to 100%.
3. Fill the graduated test tube to a known value with the product that will be used during normal operation of the system.
4. From the setup menu, select “TEST” and enter “20” as the value of strokes that will be produced.
5. Press “E”. The pump will start to produce 20 strokes and suction the liquid into the test tube.
6. When finished, read the amount of liquid left in the test tube on the graduated scale.
7. Subtract the remaining product from the initial product value.
8. Divide the result by the number of strokes delivered by the pump (20).
9. Enter the value in the “CC/ST” menu.
10. If the result obtained is not reliable (values too small or too large), try increasing or decreasing the number of strokes produced by the pump during the “TEST” phase.

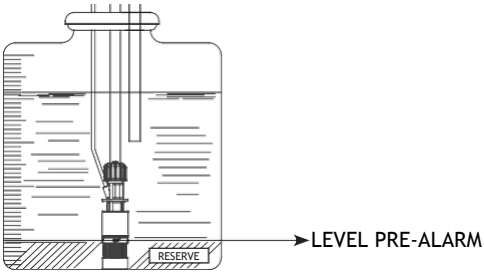
Fig. 29. TEST menu



LEVEL

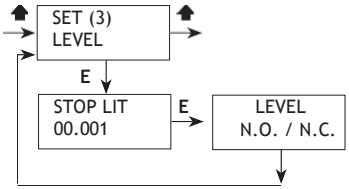
This function defines a **pre-alarm status** warning of the imminent finishing of the product that is being dosed, and which is contained in the sampling tank. The value to be entered must be calculated taking into account the litres or gallons remaining between the level of the foot filter and the suction level of the pump.

Fig. 31. Level pre-alarm.



If the pre-alarm is activated, the pump will continue dosing but the symbol # (ALARM LEVEL - **ALARMS**) will appear on the display. It is possible to set the type of level contact to N.O. normally open or N.C. normally closed.

Fig. 30. LEVEL menu



SEFL

If a **flow sensor** has been installed on the pump, from this menu you must:

- enable the sensor;
- set the number of pulses lost (SEFL) beyond which the pump signals an alarm (symbol # on the main menu. ALARM SEFL - **ALARMS**);
- define whether the pump should continue dosing or stop (STOP YES or NO) in the event of a SEFL alarm;
- set the recovery of failures (RECOVERY FAULT): if the flow sensor should give empty pulses (due to lack of product or air bubbles), the pump will perform an automatic re-priming (recovery of pulses lost in synchrony with the sensor). In this case, enter the number of pulses to be carried out for re-priming (RECOVERY AFTER) in the menu.

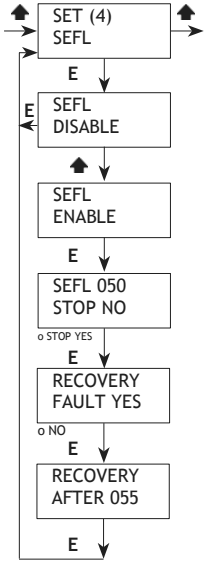
After the pulses have been completed, or even before, if re-priming is complete, the pump will start to recover the lost pulses (SEFL).

Otherwise, if there has been no re-priming, the pump will signal an alarm (ALARM SEFL).

If there is no synchronisation with SEFL during the recovery of lost pulses, the number of failures is not scaled.

“SEFL” is an optional device.

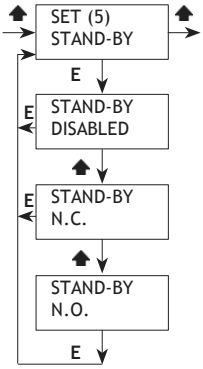
Fig. 32. SEFL menu



STAND-BY

This setting allows an **external signal** connected to the Stand-by input to enable/disable the pump.
The signal can be enabled as a N.O. (normally open) or N.C. (normally closed) contact or else disabled.

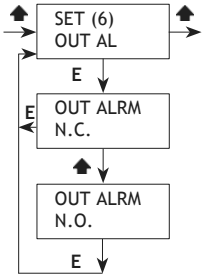
Fig. 33. Stand-by menu.



OUT AL

This setting is used to manage the status of the **alarm relay output contact**. The alarm can be enabled as a N.O. (normally open) or N.C. (normally closed) contact.

Fig. 34. Out al menu



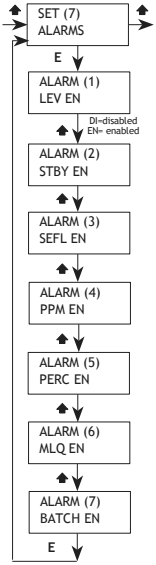
ALARMS

This menu allows you to enable (EN) or disable (DI) the **alarm relay output contact**; with the contact enabled, the relay output changes status in the event of an alarm. To connect the alarm signal cable **How to connect the pump**. The relay output can be set for the alarms shown in the table:

Table 8. Events connected to the alarm relay output contact

Alarm		Event
LEV	level	end of product
STBY	stand-by	pump stop
SEFL	flow sensor	exceeding of the number of lost pulses or failed re-priming
PPM	ppm	exceeding of working frequency in PPM working mode
PERC	percentage	exceeding of working frequency in PERC working mode
MLQ	mlq	exceeding of working frequency in MLQ working mode
BATCH	batch	In BATCH working mode, a change of contact status interrupts dosing.

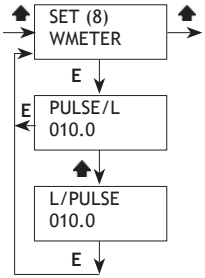
Fig. 35. Alarms menu.



WMETER

This menu allows you to set the **characteristics of your pulse water meter**. You can enter the value of pulses supplied by the meter itself, based on which the pump will optimise operation in PPM/MLQ/PERC mode and update the data in the statistics menu. Choose the pulse/litre ratio if the meter supplies many pulses. Choose the litre/pulse ratio if the meter supplies few pulses.
If the value is set to 000.0, the pump will not accept the signal and will not allow saving.

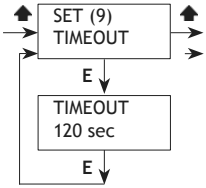
Fig. 36. Wmeter menu.



TIMEOUT

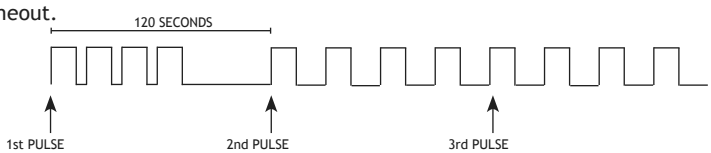
In this menu, **set the maximum time that should elapse between one pulse and the next**.
When the pump receives a pulse from the meter, it starts dosing the product by distributing it in the time between the first and the next pulse.
At the first pulse, the pump distributes the amount to be dosed in the shortest possible time. Subsequently, when other pulses arrive, it will distribute the product evenly as it is aware of the time interval between pulses.
Timeout is the maximum time between pulses. Beyond this time, the pump re-initiates dosing, as if it were the first pulse.
The default setting is 120 seconds.

Fig. 37. Timeout menu.



This setting only applies to the MULTIPLY, PPM, PERC and MLQ working modes when the calculation result is a multiplication.
The pulse Timeout does not intervene in DIVIDE mode or in any modes where the result of the calculation is a division.

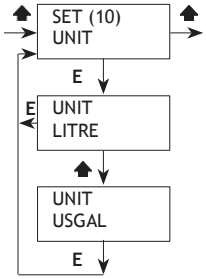
Fig. 38.
Timeout.



UNIT

Set the **unit of measurement** in litres (LITRE) or gallons (USGAL).

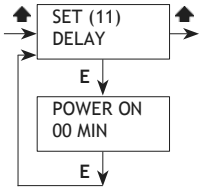
Fig. 39. Unit menu.



DELAY

This menu lets you set a waiting time when powering up the pump.
You can set a time from 0 to 10 minutes.
It is however possible to interrupt this delay by pressing any key to cancel the remaining time.

Fig. 40. Delay menu.

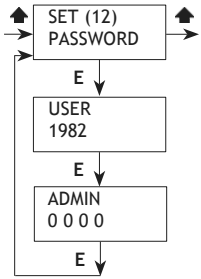


PASSWORD

The password protects the pump's programming menus.

The default password is 0000. It is advisable to change it. If the password is lost, it is necessary to reset the password by means of the **RESET PASSWORD Procedure** described below.
The "USER" password only allows access to the selected working mode.

Fig. 41. Password menu.



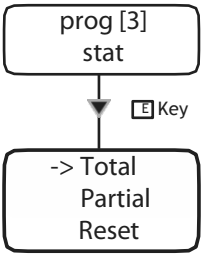
PROG 3 STAT: Statistics

This menu displays the **overall dosing statistics** of the pump, litres of product dosed and number of strokes carried out. All counters can be reset.

Table 9. PROG 3 STAT: statistics menu.

MENU		STATISTICS
1	TOT DOS	Litres of product dosed.
2	COUNTER	Number of pulses carried out.

Fig. 42. Statistics management menu.



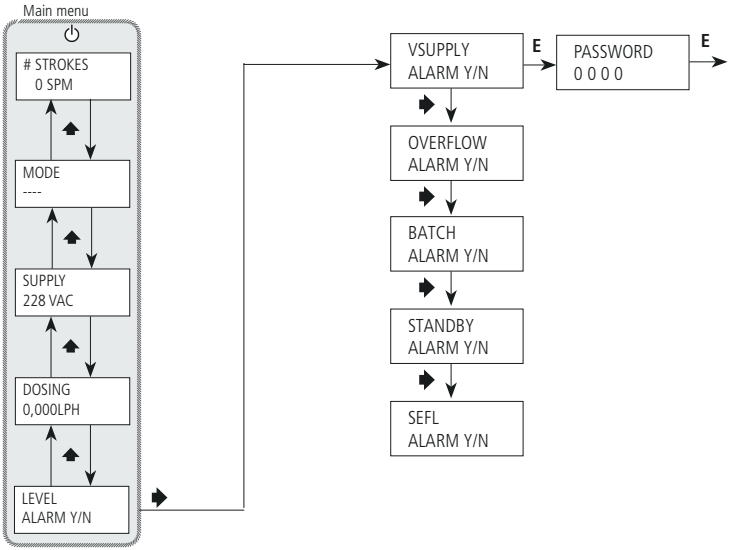
Partial or total statistics for LITRES, m3, l/m3
Reset to zero data (YES)

“TOTAL” indicates product dosed since pump start-up or last reset (DEFAULT).
“PARTIAL” indicates the product dosed since the last reset.

ALARMS

(hashtag) in the main menu indicates the presence of one or more alarms.
To view them, move the arrow ⬆ to the ALARM QTY screen: xx.
Enter the sub-menu using the arrow ➡

Fig. 43. Active alarms menu.



Active windows indicate active alarms

Note: The symbol "#" appears on the display in the event of an alarm during normal operation!

Table 10. Alarm management

ALARM	PROBLEM	WHAT TO DO
LEVEL	End of product	Refill product
SEFL	Exceeding of the number of lost pulses Re-priming failed	Check SEFL Re-prime the pump manually as described in **How to prime the pump** Switch the pump off and on again
OVER FLOW	Working frequency higher than the frequency listed on the nameplate	Check set data Check pump flow rate Switch the pump off and on again
POWER	Power supply beyond the permitted range	Check that the power supply matches the data listed on the pump nameplate Switch the pump off and on again
STROKE	Pump flow rate higher than the flow rate listed on the nameplate	Check set data Check pump flow rate Switch the pump off and on again
BATCH	Dosing interruption due to change of contact status (Batch mode)	Check correspondence between the supplied contact and the pump setting Switch the pump off and on again

TROUBLESHOOTING

Table 11. Troubleshooting.

PROBLEM	CAUSE	WHAT TO DO
The pump does not switch on	• There is no power supply. • Protection fuse blown • Faulty circuit	• Connect the pump to the mains • Replace the fuse following **Fuse replacement procedure.** • Replace the circuit following **Circuit replacement procedure.**
The pump is not dosing but the magnet is working	• Foot filter obstructed • Unprimed pump (suction hose empty) • Air bubbles in the hydraulic circuit • Product used generates gas	• Clean the foot filter • Perform the priming procedure • Check fittings and hoses and drain air inside • Open the bleed tap to let the air vent out. Replace the pump body with a self-purging model
The pump is not dosing and the magnet is not working or the stroke is severely attenuated	• Crystal formation is blocking the balls • Injection valve obstructed	• Clean the valves and try circulating 2-3 litres of water instead of the chemical • Replace valves
Pump displays ERROR MEM	Data storage error	Reset to default values by following the **LOAD DEFAULT procedure.**
Pump displays ERROR DATA	Data entry error	Check the values entered. If correct and the error is still displayed, the pump may be undersized
Invalid password	Error entering password	If forgotten, reset the default password by following the **RESET PASSWORD procedure**
Pump displays INPUT OPEN	Only in mA or Volt working mode: no input signal	Check pump INPUT (external signal)
SEFL enabled but flashing asterisk does not appear on display	• Obstruction of hoses and/or valves • SEFL not connected	• Clean the valves and try circulating 2-3 litres of water instead of the chemical • Replace valves • Switch off the pump, connect the SEFL and switch back on

INFO MENU.

FURTHER INFORMATION ABOUT THE OPERATING STATUS OF THE DOSING PUMP CAN BE VIEWED FROM THE MAIN SCREEN BY PRESSING THE “UP” KEY:

STROKES PER MINUTE SET
"RECOVERY FAULT" STATUS
MAINS SUPPLY VOLTAGE SET
DOSING LITRES/HOUR
ALARM LEVEL STATUS
SET WORKING MODE

FACTORY procedure

This operation involves the total deletion of the programming data. Proceed as follows:

- disconnect the pump power supply
- enter the main menu (SET) and scroll to "SET [09] FACTORY". Press E. Change the option to "Y" and press E

RESET PASSWORD procedure

This operation resets the password to the default value (“0000”). Proceed as follows:

- Disconnect the power supply to the pump
- Press the ⬆and **ESC** keys simultaneously to reconnect the power supply
- The display shows RESET PASSWORD for a few seconds before returning to normal operation.

Fuse replacement procedure

This operation must be carried out by **qualified technical personnel**.
Fuse replacement requires two 3x16 and 3x15 Phillips screwdrivers and a fuse identical to the type of the blown one.
Proceed as follows:

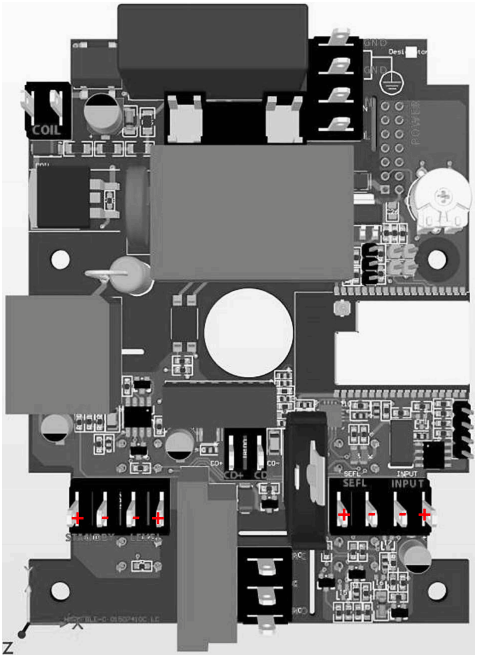
- Disconnect the pump from the mains and the hydraulic system.
- Turn the ADJUSTMENT KNOB to 0%.
- Remove the screws at the rear of the pump.
- Remove the rear part of the pump until it is completely detached from the front part, however until the circuit located on the front part of the pump is accessible. Take care with the spring located on the axis of the injection knob.
- Locate the fuse and replace with one of EQUAL value.
- Taking care with the spring between the magnet and the injection knob axis, reinsert the rear part of the pump until complete contact is made with the front part.
- Tighten the screws on the pump.

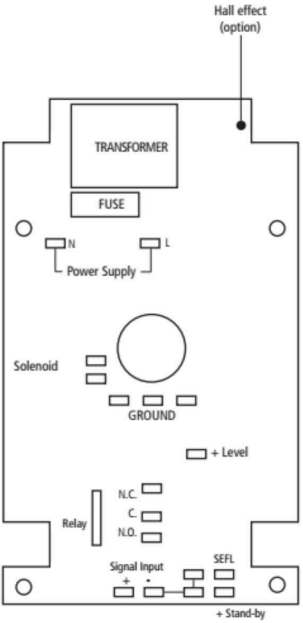
Circuit replacement procedure

This operation must be carried out by **qualified technical personnel**.
Fuse replacement requires two 3x16 and 3x15 Phillips screwdrivers and a circuit with the same electrical characteristics (power supply) as the one to be replaced.
Proceed as follows:

- Disconnect the pump from the mains and the hydraulic system.
- Turn the ADJUSTMENT KNOB to 0%.
- Remove the screws at the rear of the pump.
- Remove the rear part of the pump until it is completely detached from the front part, disconnect all wires connected to the circuit. Take care with the spring located on the axis of the injection knob.
- Remove the screws securing the circuit.
- Replace the circuit after noting the position of the wires (see **Circuit diagram**) and secure the circuit to the pump by tightening the fixing screws.
- Taking care with the spring between the magnet and the injection knob axis, reinsert the rear part of the pump until complete contact is made with the front part.
- Tighten the screws on the pump.

Circuit diagram Fig. 44. KMS MF circuit diagram





Maintenance planning

In order to guarantee the potability requirements of the treated drinking water and the maintaining of the improvements as stated by the manufacturer, this equipment must be checked AT LEAST once a month.

OPERATOR PROTECTION
ALWAYS wear safety equipment in accordance with company regulations. In the work area, during installation, maintenance and while handling chemicals use:

- **Protective mask**
- **Protective gloves**
- **Safety goggles**
- **Ear plugs or headphones**
- **Additional PPE, if required**

Always turn the power off before performing any installation or maintenance work. Failure to turn off the power supply could result in serious bodily injury.

All service work should only be carried out by experienced and authorised personnel.

Always use original spare parts.

Maintenance inspections

Maintenance planning includes the following types of inspection

- Routine maintenance and inspections
- Quarterly inspections
- Annual inspections

If the pumped liquid is abrasive or corrosive, shorten the inspection intervals appropriately.

Routine maintenance and inspections
Carry out the following operations when performing routine maintenance:

- Check the mechanical seal and make sure there are no leaks.
- Check electrical connections.
- Check for unusual noises, vibrations (noise must not exceed the dbA stated in the manual).
- Check for leaks in the pump and hoses.
- Check for corrosion on pump parts and/or hoses.

Quarterly inspections
Perform the following operations every three months:

- Check that fixing is stable.
- If the pump has been idle, check the mechanical seal and replace if necessary.

Annual inspections
Carry out the following operations once a year:

- Check the pump capacity (must match the capacity listed on the nameplate).
- Check the pump pressure (must match the pressure listed on the nameplate).
- Check the pump performance (must match the performance listed on the nameplate).

If the performance of the pump does not meet the process requirements, and these requirements have remained unchanged, carry out the following steps:

1. Dismantle the pump.
2. Inspect the pump.
3. Replace worn parts.

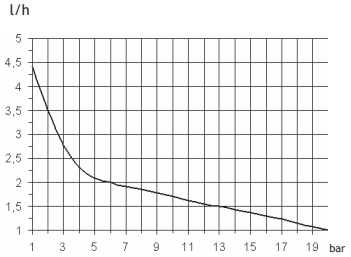
Before returning the pump to the service department, remove all liquid inside the pump body and dry it BEFORE packing it in its original box! After emptying the pump body, if there is still a chance that any highly corrosive liquid may cause damage, this must be declared on the REPAIR REPORT form.

Fill in the “REPAIR REPORT” form on page 23 at the back of the manual and send it with the pump.
Repairs without a REPAIR REPORT form will not be accepted.

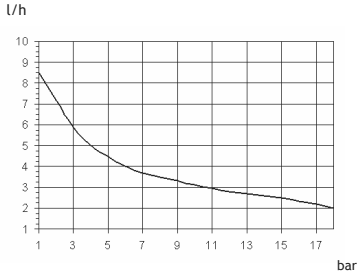
All flow rate indications refer to measurements made with H_2O at 20 °C at the indicated back pressure.
The dosing accuracy is ± 2% at a constant pressure of ± 0.5 bar.

Fig. 46. KMS MF flow rate curves

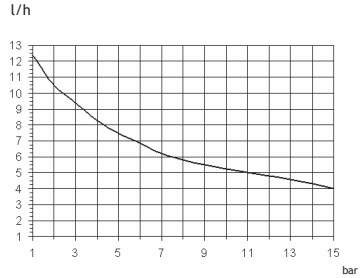
2001: l/h 01 bar 20
Pump body mod. I



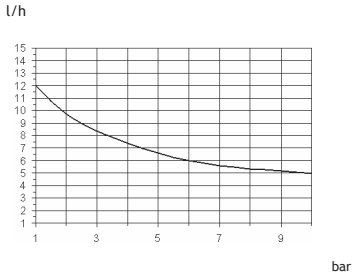
1802: l/h 2 bar 18
Pump body mod. L



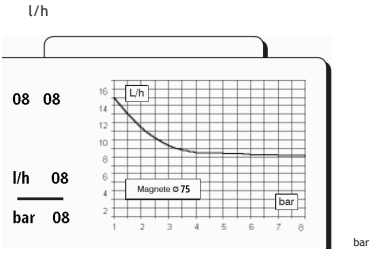
1504: l/h 4 bar 15
Pump body mod. L



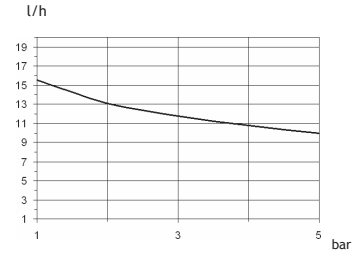
1005: l/h 5 bar 10
Pump body mod. L



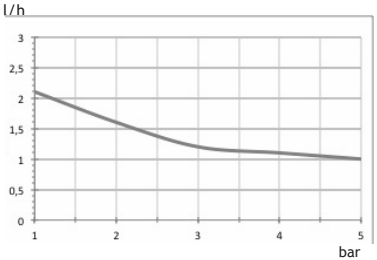
0808: l/h 8 bar 8
Pump body mod. L



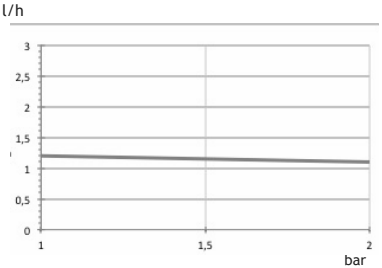
0510: l/h 10 bar 5
Pump body mod. L



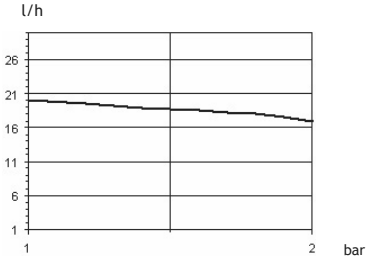
0501: l/h 1 bar 5
Pump body mod. I



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



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



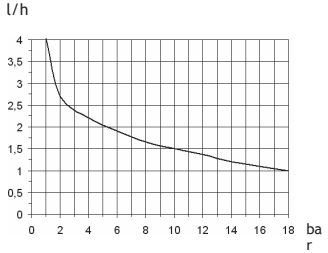
KMS AC SERIES

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

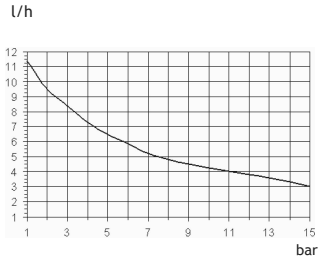
140 SPM

Fig. 47. KMSA MF flow rate curves

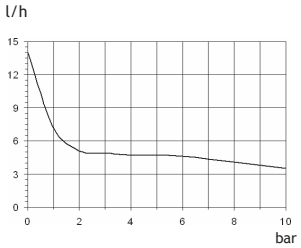
1801: l/h 1 bar 18
Pump body mod. LA



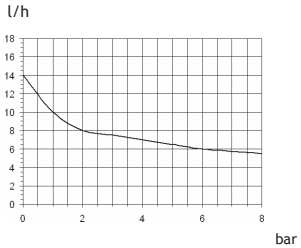
1503: l/h 3 bar 15
Pump body mod. LA



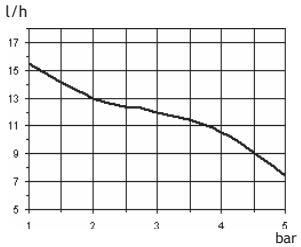
103.5: l/h 3.5 bar 10
Pump body mod. LA



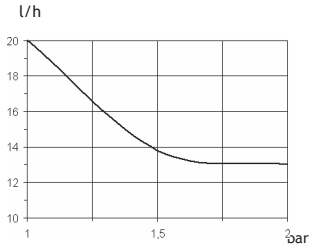
085.5: l/h 5.5 bar 8
Pump body mod. LA



057.5,5: l/h 7.5 bar 5
Pump body mod. LA



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



100.5: l/h 0.5 bar 10
Pump body mod. JA

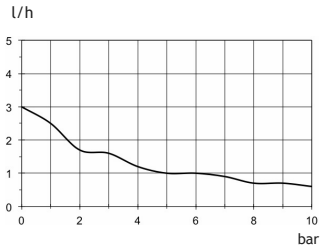
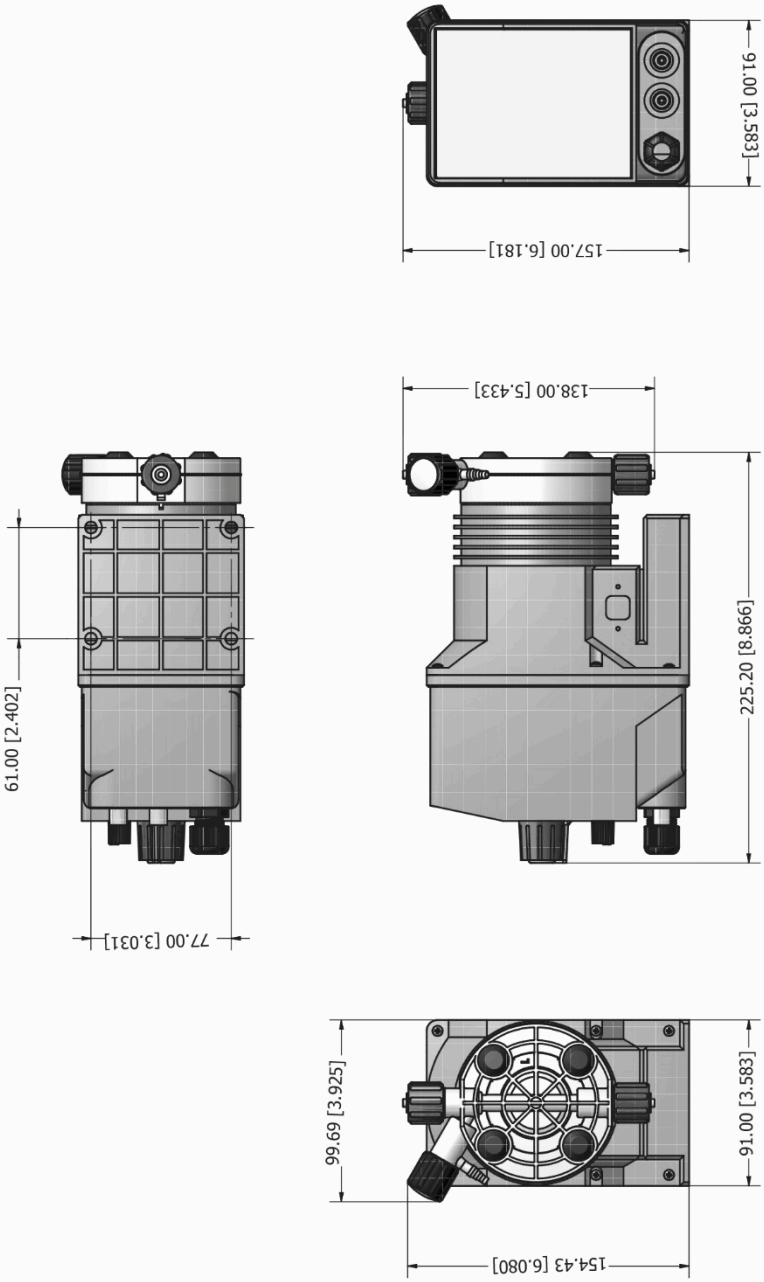


Fig. 48. Pump dimensions



Chemical compatibility table

Dosing pumps are widely used for dosing chemical products.
Select the most suitable material for the liquid to be dosed in the CHEMICAL COMPATIBILITY TABLE. The information in the table is checked periodically and believed to be correct at the date of publication. The data contained in the table are based on information provided by the manufacturers and their experience, but as the resistance of materials depends on many factors; this table is provided as an initial guide only. The manufacturer accepts no responsibility for the contents of the table.

Table 12. 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
Concentrated hydrochloric acid	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 bisulphate	NaHSO3	1	1	1	1	2	1	1	1	1	1	1	1
Sodium carbonate (Soda)	Na2CO3	2	1	1	1	1	1	1	1	2	1	1	1
Ferric chloride	FeCl3	1	1	1	1	3	1	1	1	1	1	1	1
Calcium hydroxide	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 hypochlorite	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%	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 sulphate	CuSO4	1	1	1	1	1	1	1	1	1	1	1	1

1 - Component with very good resistance
2 - Component with moderate resistance
3- Component with no resistance

Pump manufacturing materials

Polyvinyldene fluoride (PVDF)..... Pump bodies, valves, fittings, hoses
Polypropylene (PP)..... Pump bodies, valves, fittings, floater
PVC ..... Pump bodies
Stainless steel (SS 316)..... Pump bodies, valves
Polymethyl Metacrilate Acrylic (PMMA) Pump bodies
Hastelloy C-276 (Hastelloy)..... Injection valve spring
Polytetrafluoroethylene (PTFE)..... Diaphragm
Fluorocarbon (FPM) ..... Seals
Ethylene propylene (EPDM)..... Seals
Nitrile (NBR) ..... Seals
Polyethylene (PE) ..... Hoses

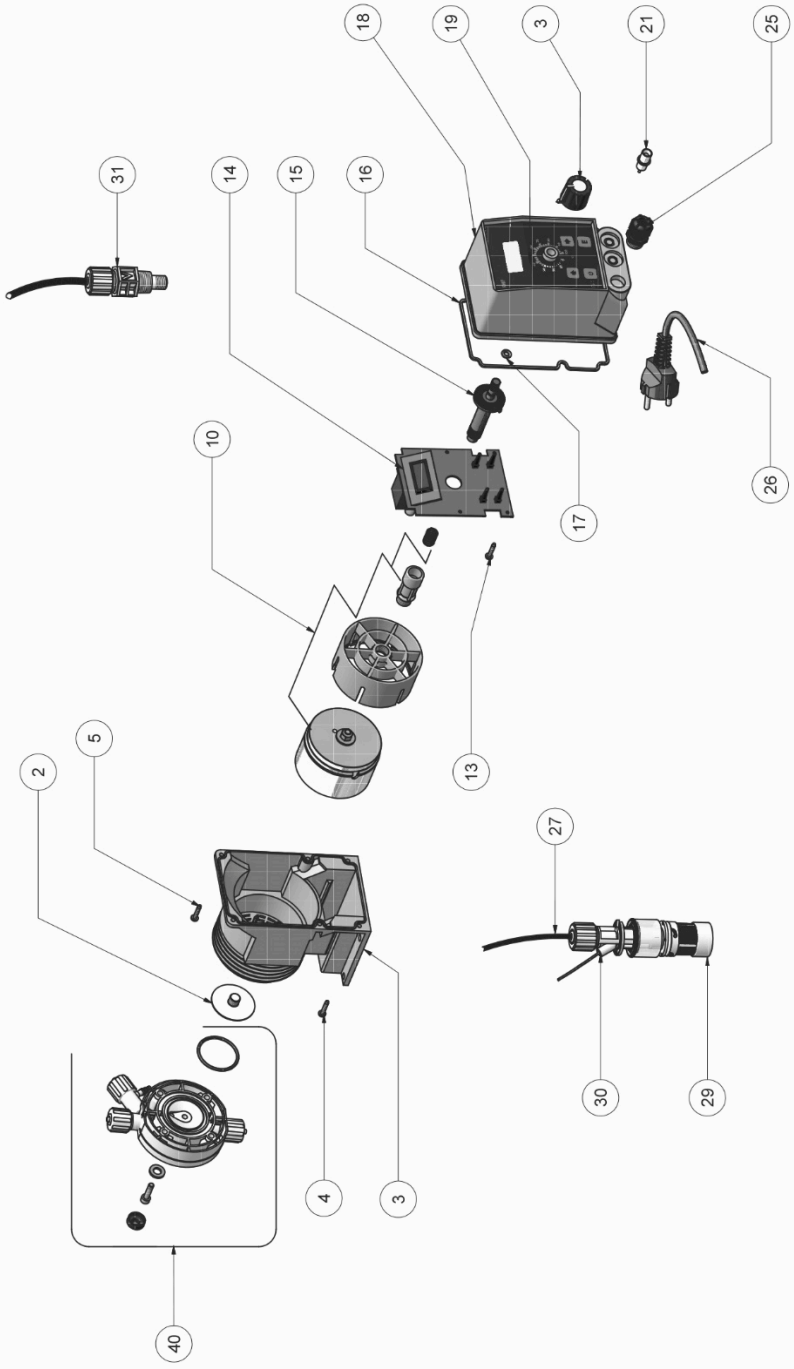
Hose characteristics

The technical characteristics of the hoses are of essential importance for accurate and safe dosing.
Each pump model is supplied by the manufacturer for optimal functioning of the hydraulic connections according to dosing capacity.
The information in the table is checked periodically and believed to be correct at the date of publication. The data contained in the table are based on information provided by the manufacturers and their experience, but as the resistance of materials depends on many factors; this table is provided as an initial guide only. The manufacturer accepts no responsibility for the contents of the table.

Table 13. Hose characteristics

Tubo aspirazione / scarico			
4x6 mm PVC (trasparente)	4x8 mm PE (opaco)	6x8 mm PE (opaco)	8x12 mm PVC (trasparente)

Tubo mandata	Pressione di esercizio	Pressione di scoppio
4x6 mm PE 230 (opaco)	20°C 30°C 40°C 50°C 12 bar 10.5 bar 8.5 bar 6.2 bar	20°C 30°C 40°C 50°C 36 bar 31.5 bar 25.5 bar 18.5 bar
4x8 mm PE 230 (opaco)	20°C 30°C 40°C 50°C 19 bar 15.7 bar 12 bar 7.5 bar	20°C 30°C 40°C 50°C 57 bar 47 bar 36 bar 22.5 bar
6x8 mm PE 230 (opaco)	20°C 30°C 40°C 50°C 8.6 bar 6.8 bar 4.8 bar 2.3 bar	20°C 30°C 40°C 50°C 26 bar 20.5 bar 14.5 bar 7 bar
8x12 mm PE 230 (opaco)	20°C 30°C 40°C 50°C 12 bar 10.5 bar 8.5 bar 6.2 bar	20°C 30°C 40°C 50°C 36 bar 31.5 bar 25.5 bar 18.5 bar
4x6 mm PVDF Flex 2800 (opaco)	20°C 30°C 40°C 50°C 60°C 80°C 90°C 40 bar 34 bar 30 bar 27 bar 24.8 bar 20 bar 10 bar	
6x8 mm PVDF Flex 2800 (opaco)	20°C 30°C 40°C 50°C 60°C 80°C 90°C 29 bar 25.5 bar 22 bar 20 bar 18 bar 14.5 bar 7.3 bar	
8X10 mm PVDF Flex 2800 (opaco)	20°C 30°C 40°C 50°C 60°C 80°C 90°C 18 bar 15.5 bar 13.5 bar 12.5 bar 11.2 bar 9 bar 4.5 bar	
¼ PE 230 (opaco)	20°C 17.6 bar	
⅜ PE 230 (opaco)	20°C 10.6 bar	
½ PE 230 (opaco)	20°C 10.6 bar	


31
14
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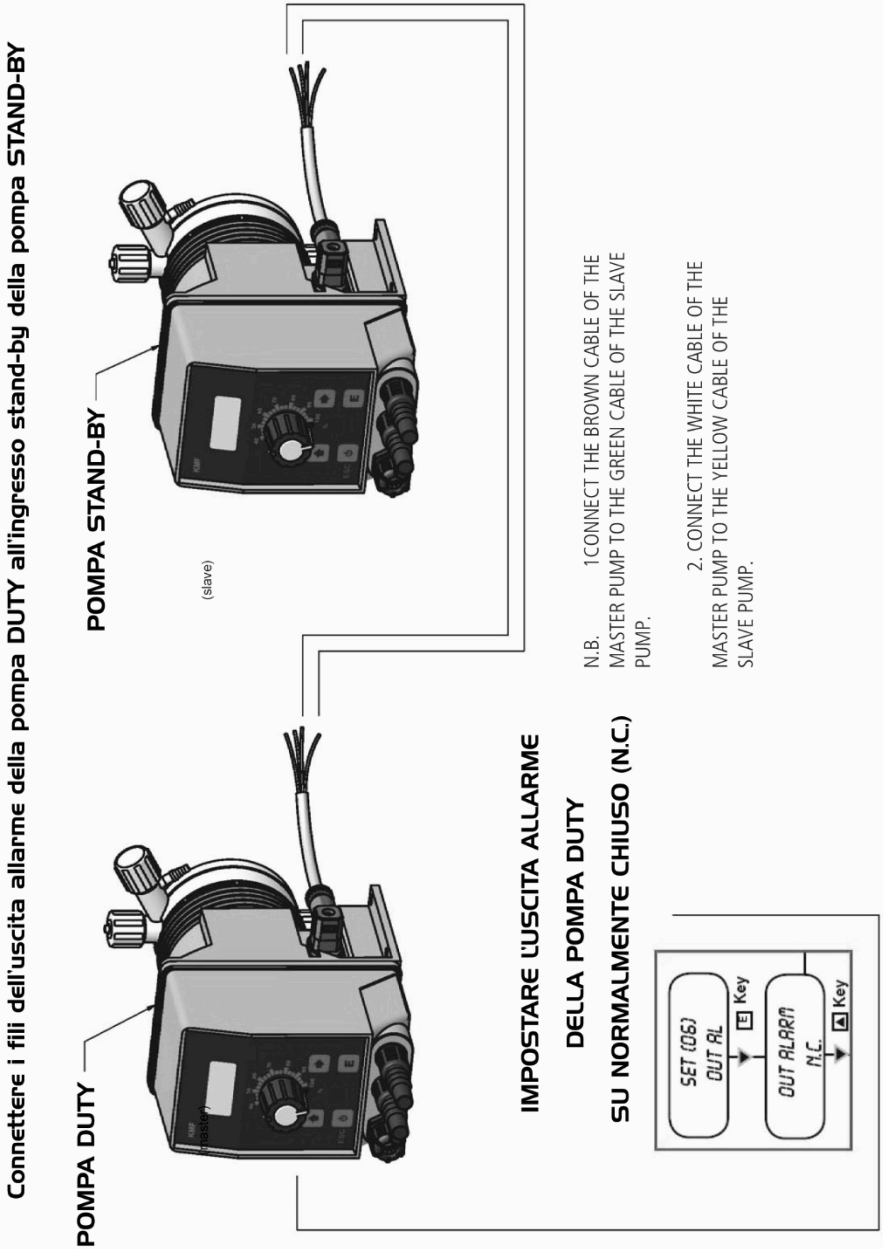
Connettere i fili dell'uscita allarme della pompa DUTY all'ingresso stand-by della pompa STAND-BY
POMPA DUTY
(master)
POMPA STAND-BY
(slave)
IMPOSTARE L'USCITA ALLARME
DELLA POMPA DUTY
SU NORMALMENTE CHIUSO (N.C.)
SET (06)
OUT AL
E Key
OUT ALARM
N.C.
▲ Key
N.B. 1CONNECT THE BROWN CABLE OF THE MASTER 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.

REPAIR REPORT

ENCLOSE THIS COMPLETED AND SIGNED FORM WITH THE TRANSPORT DOCUMENT

DATE .....

SENDER
Company name.....
Address .....
Telephone .....
Contact person .....

PRODUCT (see pump label)
CODE.....
S/N (serial number).....

OPERATING CONDITIONS

Installation location/description .....
.....
Chemical dosed .....
Start-up (date) ..... Running time (approx.) .....
Remove all liquid inside the pump body and dry it BEFORE packing it in its original box.

DESCRIPTION OF DEFECT

☐ MECHANICAL
- Worn parts .....
- Breakage or other damage .....
- Corrosion .....
- Other .....

☐ ELECTRICAL
- Connections, connector, cables .....
- Controls (keyboard, display, etc.) .....
- Electronics .....
- Other .....

☐ LEAKS
- Connections .....
- Pump body.....

☐ INADEQUATE OPERATION/MALFUNCTION/OTHER
.....
.....

I declare that the product is free of any hazardous, biological or radioactive chemicals.

Signature of person compiling information

Company stamp

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PRECAUTIONS RELATING TO DIRECTIVES, REGULATIONS AND STANDARDS

§ CE/EU and UKCA marking

We guarantee that this product meets the essential requirements of the applicable Directives and Regulations based on the following specifications. Please carefully consider the following specifications for use of the product in European Union member countries and the United Kingdom.

• CE/EU harmonized directives and standards

Directives
DIRECTIVE 2006/42/EC
DIRECTIVE 2014/35/EU
DIRECTIVE 2014/30/EU
DIRECTIVE 2011/65/EU
DELEGATED DIRECTIVE (EU) 2015/863

Harmonized standards
EN ISO 12100
EN 809
EN ISO 20361
EN IEC 61326-1
EN 61010-1
EN IEC 63000

• UKCA harmonized regulations and standards

Regulations
2008 No. 1597
2008 2016 No. 1091
2016 No. 1101
2012 No. 3032

Harmonized standards
BS EN ISO 12100
BS EN 809
BS EN ISO 20361
BS EN IEC 61326-1
BS EN 61010-1
BS EN IEC 63000

Disposal of end-of-life equipment by users

This symbol warns against disposing of the product with normal waste. Respect human health and the environment by delivering the discarded equipment to a designated collection point for the recycling of electronic and electrical equipment. For further information please visit the online site.

All materials used in the construction of the dosing pump and for this manual can be recycled and thus help to preserve the incalculable environmental resources of our Planet. Do not dispose of harmful materials in the environment! Enquire with the relevant authority about recycling programs for your area!