

# DLX - DLXB MA/M - MB



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**IT** NORME DI INSTALLAZIONE, USO E MANUTENZIONE

**UK** OPERATING INSTRUCTIONS AND MAINTENANCE

**(IT) DIRETTIVA "RAEE" 2002/96/CE E SUCCESSIVA MODIFICA 2003/108/CE SUI RIFIUTI DI APPARECCHIATURE ELETTRICHE ED ELETTRONICHE**

Il simbolo sotto riportato indica che il prodotto non può essere smaltito come normale rifiuto urbano.

Le Apparecchiature Elettriche ed Elettroniche (AEE) possono contenere materiali nocivi per l'ambiente e la salute e pertanto devono essere oggetto di raccolta differenziata: smaltite quindi presso apposite discariche o riconsegnate al distributore a fronte dell'acquisto di una nuova, di tipo equivalente o facente le stesse funzioni.

La normativa sopracitata, alla quale rimandiamo per ulteriori particolari e approfondimenti, prevede sanzioni per lo smaltimento abusivo di detti rifiuti.

**(UK) WASTE OF ELECTRICAL AND ELECTRONIC EQUIPMENT DIRECTIVE (WEEE, RAEE in Italy) 2002/96/EC AND SUBSEQUENT AMENDMENT 2003/108/EC**

*The marking shown below indicates that the product cannot be disposed of as part of normal household waste.*

*Electrical and Electronic Equipment (EEE) can contain materials harmful to health and the environment, and therefore is subject to separate waste collection: it must be disposed of at appropriate waste collection points or returned to the distributor against purchase of new equipment of similar type or having the same functions.*

*The directive mentioned above, to which make reference for further details, provides for punitive actions in case of illegal disposal of such waste.*



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## **1.0 - HINTS AND WARNINGS**

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Please read the warning notices given in this section very carefully, because they provide important information regarding safety in installation, use and maintenance of the pump.

- Keep this manual in a safe place, so that it will always be available for further consultation.
- The pump complies with EEC directives No.89/336 regarding "electromagnetic compatibility" and No.73/23 regarding "low voltages", as also the subsequent modification No.93/68.

**N.B. The pump has been constructed in accordance with best practice. Both its life and its electrical and mechanical reliability will be enhanced if it is correctly used and subjected to regular maintenance.**

### **1.1 - WARNING:**

**Any intervention or repair to the internal parts of the pump must be carried out by qualified and authorized personnel. The manufacturers decline all responsibility for the consequences of failure to respect this rule.**

**GUARANTEE: 1 year (the normal wearing parts are excluded, i.e.: valves, nipples, tube nuts, tubing, filter and injection valve). Improper use of the equipment invalidates the above guarantee. The guarantee is ex-factory or authorized distributors.**

### **1.2 - SHIPPING AND TRANSPORTING THE PUMP**

The pump should always be moved in a vertical (and never in a horizontal) position. No matter what the means of transport employed, delivery of the pump, even when free to the purchaser's or the addressee's domicile, is always at the purchaser's risk. Claims for any missing materials must be made within 10 (ten) days of arrival, while claims for defective materials will be considered up to the 30th (thirtieth) day following receipt. Return of pumps or other materials to us or the authorized distributor must be agreed beforehand with the responsible personnel.

### **1.3 - PROPER USE OF THE PUMP**

- The pump should be used only for the purpose for which it has been expressly designed, namely the dosing of liquid additives. Any different use is to be considered improper and therefore dangerous. The pump should not therefore be used for applications that were not allowed for in its design. In case of doubt, please contact our offices for further information about the characteristics of the pump and its proper use. The manufacturers cannot be held responsible for damage deriving from improper, erroneous or unreasonable use of the pump.

### **1.4 - RISKS**

- After unpacking the pump, make sure it is completely sound. In case of doubt, do not use the pump and contact qualified personnel. The packing materials (especially bags made of plastics, polystyrene, etc.) should be kept out of the reach of children: they constitute potential sources of danger.
- Before you connect the pump, make sure that the voltage ratings, etc., correspond to your particular power supply. You will find these values on the rating plate attached to the pump.
- The electrical installation to which the pump is connected must comply with the standards and good practice rule in force in the country under consideration.
- Use of electrical equipment always implies observance of some basic rules: In particular:
  - 1 - do not touch the equipment with wet or damp hands or feet;
  - 2 - do not operate the pump with bare feet (Example: swimming pool equipment);
  - 3 - do not leave the equipment exposed to the action of the atmospheric agents;
  - 4 - do not allow the pump to be used by children or unskilled individuals without supervision;
- In case of breakdown or improper functioning of the pump, switch off, but do not touch. Contact our technical assistance for any necessary repairs and insist on the use of original spares. Failure to respect this condition could render the pump unsafe for use.
- When you decide to make no further use of an installed pump, make sure to disconnect it from the power supply.

**Before carrying out any service on the item, check:**

1. **Disconnect the pins from the mains or by means of a two poles switch with 3 mm minimum distance between the contacts. (Fig. 4).**
2. **Relieve all the pressure from the pump head and injection tube.**
3. **Drain or flush all dosing liquid from the pump head. This operation can also be done with the pump disconnected from the plant by turning the pump upside-down for 15 to 30 seconds and without connecting the tubing to the nipples: if this operation is not possible, dismount and remount the pump head using the four mounting screws.**

**In event of possible losses in the hydraulic system of the pump (breakage of the "O" ring gasket, the valves or the hoses) the pump should immediately be brought to a stop, emptying and depressurizing the delivery hose while taking all due safety precautions (gloves, goggles, overalls, etc.).**

## **1.5 - TOXIC AND/OR DANGEROUS LIQUID DOSAGE**

To avoid risk from contact with the hazardous liquids or toxic fumes, always adhere to the notes in this instruction manual:

- Follow the instructions of the dosing liquid manufacturer.
- Check the hydraulic part of the pump and use it only if it is in perfect condition.
- Use only the correct materials for the tubing, valves and seals to suit the liquid to be dosed; where possible shield the tubing with PVC conduit.
- Before disconnecting the metering pump, make sure to flush out and neutralize the pump head with the proper reagent liquid.

## **1.6 - ASSEMBLING AND DISMANTLING THE PUMP**

### **1.6.1 - ASSEMBLY**

All metering pumps are normally supplied fully assembled. For greater clarity, please consult the exploded view of the pump appended at the end of the manual, which shows all the pump details and a complete overview of all the pump components. These drawings are in any case quite indispensable whenever defective parts have to be re-ordered. For the same purpose, the appendix also contains other drawings showing the hydraulic parts (pump head and valves).

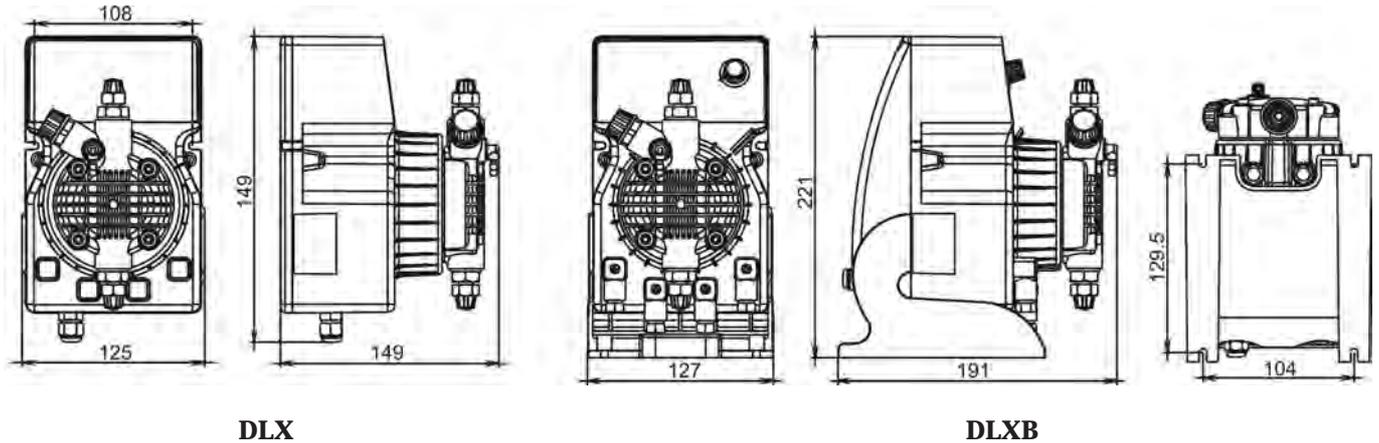
### **1.6.2 - DISMANTLEMENT**

Proceed as follows before you dismantle the pump or before performing any other operation on it:

1. Disconnect the pins from the mains or by means of a two poles switch with 3 mm minimum distance between the contacts. (Fig. 4).
2. Relieve all the pressure from the pump head and injection tube.
3. Drain or flush all dosing liquid from the pump head. This operation can also be done with the pump disconnected from the plant by turning the pump upside-down for 15 to 30 seconds and without connecting the tubing to the nipples: if this operation is not possible, dismantle and remount the pump head using the four mounting screws. (Fig. 10).

This operation calls for special attention, and you should therefore consult the drawings in Appendix and Chapter 1.4 "RISKS" before you commence work.

## OVERALL DIMENSIONS (Fig. 1)



## 2.0 - DLX and DLXB SERIES METERING PUMPS

### 2.1 - OPERATION

The metering pump is activated by a teflon diaphragm mounted on a piston of an electromagnet. When the piston of the electromagnet is attracted, a pressure is produced in the pump body with an expulsion of liquid from the discharge valve. Once the electric impulse is finished a spring brings the piston back to the initial position, with a recall of liquid through the suction valve. The operation is simple the pump does not need lubrication, therefore maintenance is reduced almost to zero. The materials used for the construction of the pump make it particularly suitable for aggressive liquids. The metering pump has been designed to feed liquids with capacities from 0 to 15 l/h and pressures from 0 to 15 bar (depending on the model selected).

### 2.2 - TECHNICAL SPECIFICATIONS

- The products are manufactured according **CE** regulation.
- Environmental Conditions: IP 65 protection, altitude up to 2000m, ambient temperature 5C to 40C, maximum relative humidity 80% for temperatures up to 31 C decreasing linearly to 50% relative humidity at 40 C.
- Pollution degree 2
- Overvoltage cat. II
- Antiacid plastic casing.
- Control panel protection assured by an adhesive polyester film, weatherproof and resisting UV ray
- Standard power supply (fluctuations not to exceed  $\pm 10\%$ ):  
230 V a.c.50 Hz single phase.
- Optional power supply (fluctuations not to exceed  $\pm 10\%$ ):  
240 V a.c.50-60 Hz single phase;  
110 V a.c. 50-60 Hz single phase.
- Upon request: manual stroke length adjustment. This control provides accurate flow adjustment. (only DLXB series)

### MAIN FEATURES

Tipo Type	Portata max Max flow	Pressione max Max press	Max imp./min. Max imp./min.	Dosaggio per imp. Output per stroke	Corsa Stroke	Altez. aspiraz. Suction height	Aliment. elettr. standard Standard power supply	Potenza ass. Power comp.	Corrente ass. Current comp.	Peso netto Net weight
	l/h	bar		ml	mm	m	Volts - Hz	Watts	Ampere	kg
1-15	1	15	120	0.14	0.80	2.0	230 V 50-60 Hz	37	0.16	2.3
2-10	2	10	100	0.33	0.80	2.0	230 V 50-60 Hz	37	0.16	2.3
5-7	5	7	100	0.83	1.00	2.0	230 V 50-60 Hz	37	0.16	2.3
5-12	5	12	100	0.83	1.00	2.0	230 V 50-60 Hz	58	0.25	2.9
8-10	8	10	120	1.11	1.40	2.0	230 V 50-60 Hz	58	0.25	2.9
15-4	15	4	120	2.08	2.20	2.0	230 V 50-60 Hz	58	0.25	2.9
20-3	20	3	120	2.60	2.20	2.0	230 V 50-60 Hz	58	0.25	2.9

Data refers to standard mode

### 2.3 - LIQUID ENDS MATERIALS

DIAPHRAGM: PTFE

PUMP HEAD: Polypropylene; upon request: PVC, 316 Stainless, PTFE, PVDF

NIPPLES: polypropylene

FILTER: polypropylene

INJECTION NIPPLE: polypropylene

SUCTION HOSE: PVC - flexible

DISCHARGE HOSE: polyethylene

VALVES "lip" type: FPM (viton), (upon request available in EPDM (Dutral), NBR, Silycon). "Ball Check" VALVES upon request type in SS 316 and Glass PYREX. Available with Spring Return and "KALRETZ" Valve.

SEALS: FPM upon request EPDM (Dutral), NBR, Silycon, PTFE only for ball checks valves

### 2.4 - HRS MODE

This dosing pump has two different operating modes: standard and HRS advanced modes.

**HRS** (High Rating System) is a patented concept that allows working range pump widening. **By setting working pressure (within a preset range of values) the pump automatically self-controls the flow rate at operator's desired working values.** Flow rate can be set within 0,1l/h step value. Compared to ordinary pumps HRS (High Rating System) allows an improved pump performance and an enlarged operating range, making possible the correct flow rate setting at different pressures avoiding volume fluctuations connected to different working pressures, even with high viscous liquids. In the following ghraphs it is showed flow rate vs. system pressure in standard and HRS modes.

### 2.5 - FLOW RATE CALIBRATION PROCEDURE

The flow rate values, expressed in liters per hour showed by the chart on the front panel have been obtained using water at 25°C, for a set of pressure values that varies within 1 bar fixed steps. To have an accurate dosing with liquids of different viscosity and density or dosing at different pressure values it's possible to calibrate the flow setting as following:

1. First of all measure the flow rate the pump doses (with the discharge line connected);
2. To activate the HRS CALIBRATION PROCEDURE the pump has to display the flow rate in L/H in stand-by status;
3. Press contemporarily the arrow buttons (buttons #2-3) for about 1 second. The value of the display will start flashing; press arrow buttons to set the measured flow rate;
4. Press START/STOP(#4) button to confirm.

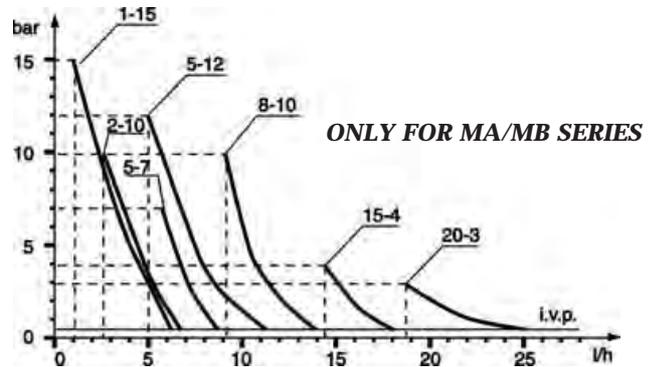
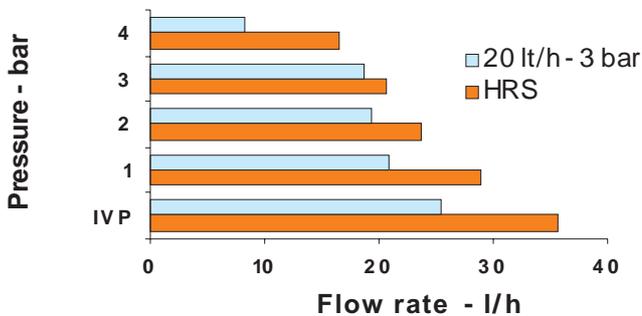
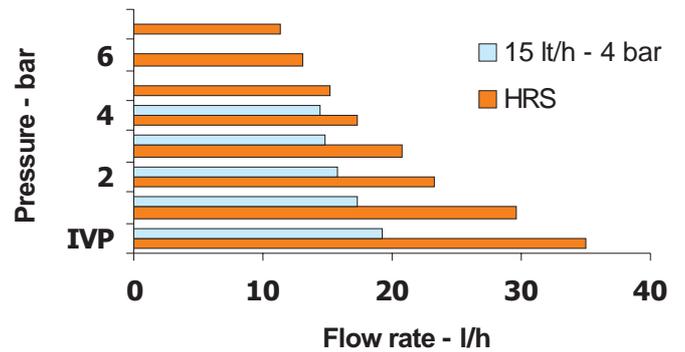
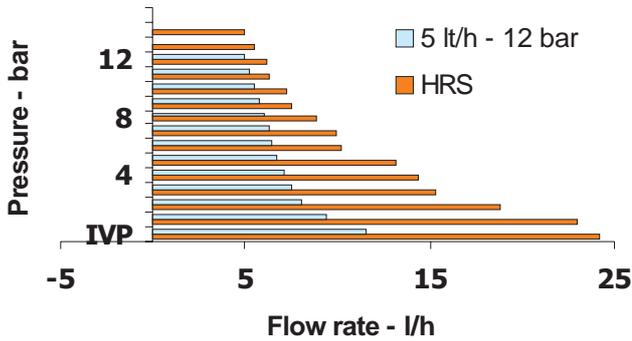
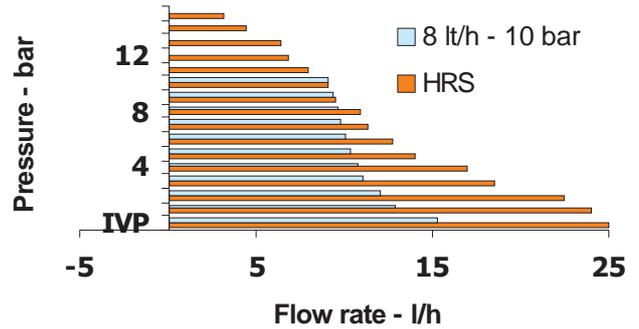
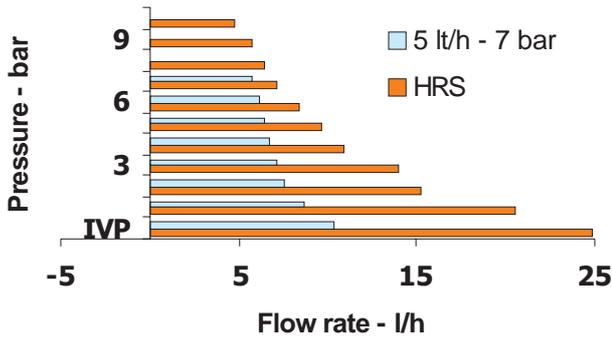
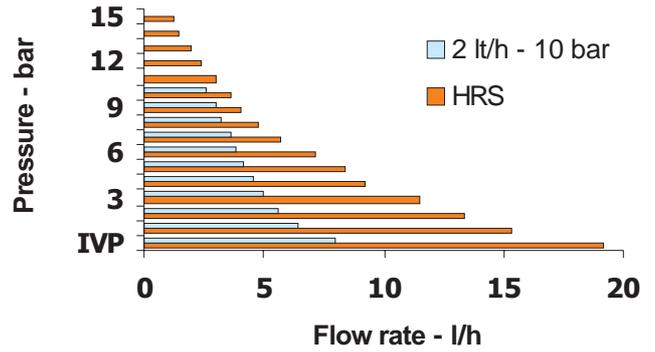
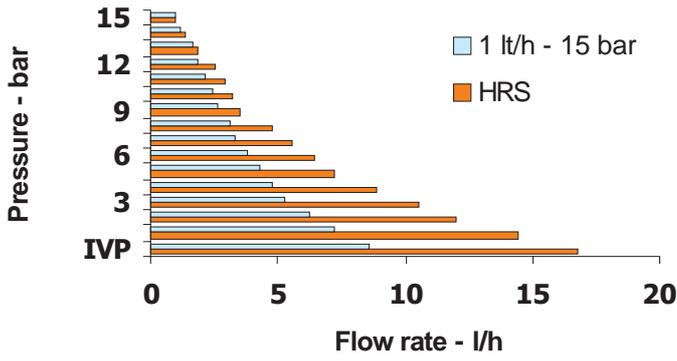
For example, if a 15 l/h at 4 bar pump, with pressure set at 5 bar, will show 15.1 l/h.

Changing the flow rate from 15.1 to 14.3, it means a decreasing of 5% not only of the default setting of 5 bar, but also of every pressures of the HRS mode.

P	Default l/h	Calibration l/h
0	35,0	33,1
1	29,6	28,0
2	23,2	22,0
3	20,7	19,6
4	17,3	16,4
5	15,1	14,3
6	13,0	12,3
7	11,4	10,8

To RESET the correction and so come to the default setting, it will be enough to set any value of pressure and correcting the value of maximum flow rate as displayed on the table of reference displayed, with the procedure above explained.

2.6 - FLOW RATE-PRESSURE GRAPHS



Values showed was made with same operative in the following test conditions: 20°C water dosed, 1.5m suction lenght with injection valve and foot filter, 1m discharge line with sleeve injection valve, tollerance allowed ± 5%. Different results could be possible in different conditions with other liquids

### 3.0 - INSTALLATION

- a. - Install the pump in a dry place and well away from sources of heat and, in any case, at environmental temperatures not exceeding 40°C. The minimum operating temperature depends on the liquid to be pumped, bearing in mind that it must always remain in a liquid state.
- b. - Carefully observe the regulations in force in the various countries as regards electrical installations (Fig.4). **When the supply cable is devoid of a plug, the equipment should be connected to the supply mains by means of a single-pole circuit breaker having a minimum distance of 3 mm between the contacts. Before accessing any of the electrical parts, make sure that all the supply circuits are open.**

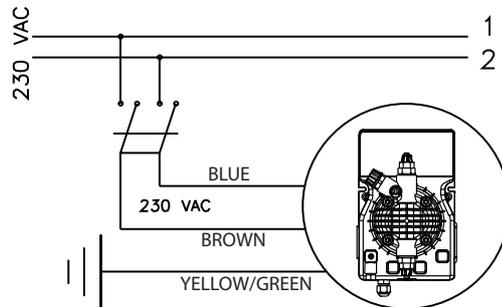


Fig. 4

- c.- Locate the pump as shown in fig. 5 bearing in mind that it may be installed either below or above the level of the liquid to be dosed, though the level difference should not exceed 2 meters. When the process plant in which the pump is installed is operating at atmospheric pressure (no back pressure) and the chemical tank is situated above the plant (Fig. 6), the condition of the injection valve should be checked at regular intervals, because excessive wear and tear could cause additive to drip into the plant even when the pump is shut down. If the problem persists, install a properly calibrate counter-pressure valve (C) between injection point and the valve. In the case of liquids that generate aggressive vapours, do not install the pump above the storage tank unless the latter is hermetically sealed.

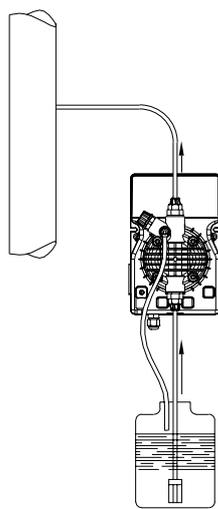


Fig. 5

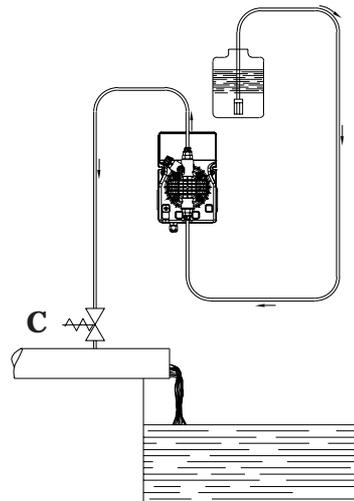


Fig. 6

- d.- The discharge nipple will always remain in the upper part of the pump. The suction nipple, which serves to attach the hose (with filter) leading into the chemical tank, will therefore always be situated in the lower part of the pump.

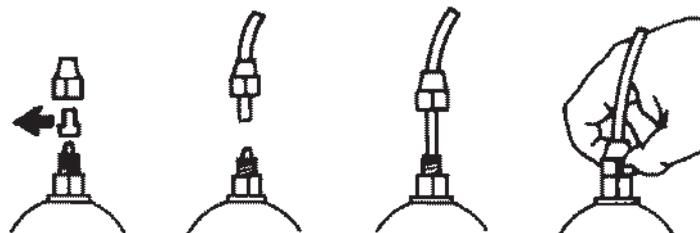


Fig. 7

- e.- Remove the protection caps from the two nipples, slide the hoses over the connectors, pushing them right home, and then fix them with appropriate tube nuts. (Fig. 7).

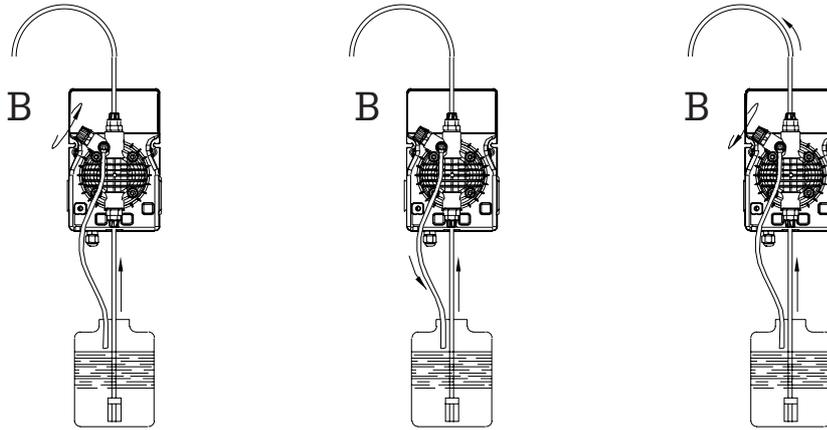


Fig. 8

Whenever the pump is dismantled from the pipework, you will be well advised to replace the caps on the connectors to avoid residual liquid being spilled. Before attaching the delivery hose to the plant, prime the metering pump by going through the sequence shown in Fig. 8. Before finalizing the installation of the discharge hose, make sure that the pump strokes will not cause it to move and bump into rigid bodies. In case of priming difficulties, use a normal syringe to suck liquid from the discharge nipple while the pump is in operation, continuing until you actually see the liquid rise in the syringe. Use a short length of suction hose to connect the syringe to the discharge nipple. In case of a pump equipped with an air bleed valve, unscrew the air relief valve B up to all the air in the pump head will be out.

- f. - Try to keep both the suction and discharge hose as straight as possible, avoiding all unnecessary bends.
  - g. - Select the most appropriate injection point on a pipe of the plant to be treated and there fit a 3/8" female steel gas thread connector (similar to BSPm). This connector is not supplied with the pump. Screw the injection valve to the gas connector, inserting a gasket as shown in Fig. 9. Then connect the discharge hose to the conical connector on the injection valve and fix it with the supplied tube nut G. The injection valve also acts as no return valve by means of a cylinder sleeve (elastomer, standard supplied in Viton).
- N.B. The sleeve D must not be removed.**

### 3.1 - INJECTION VALVE INSTALLATION

DIAGRAM Fig. 9

- A - Pipework
- C - Injection valve
- M - Conical connector for attaching the discharge hose
- N - 3/8" female steel gas thread connector
- G - Hose tube nut
- T - Polyethylene hose
- D - Cylinder sleeve (no return valve)

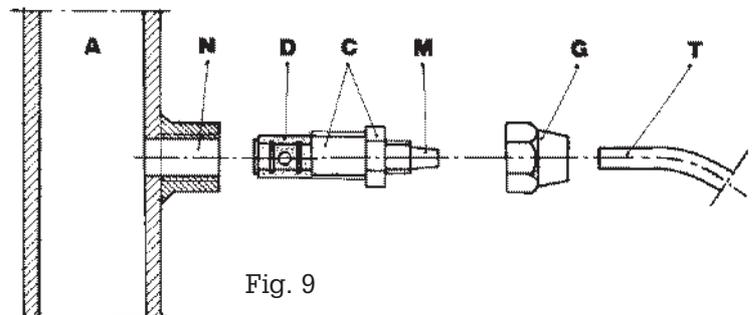


Fig. 9

### 3.2 - MANUAL STROKE LENGTH ADJUSTMENT - (upon request only for DLXB)

- press and turn the knob (1) up to the stroke length adjustment required.



## 4.0 - MAINTENANCE

1. Periodically check the chemical tank level to avoid the pump operating without liquid. This would not damage the pump, but may damage the process plant due to lack of chemicals.
2. Check the pump operating condition at least every 6 months, pump head position, screws, bolts and seals; check more frequently where aggressive chemicals are pumped, especially:
  - pulse and power L.E.D.;
  - the additive concentration in the pipework; a reduction of this concentration could be caused by the wearing of the valves, in which case they need to be replaced (Fig. 10) or by the clogging of the filter which then has to be cleaned as in point 3 here below.

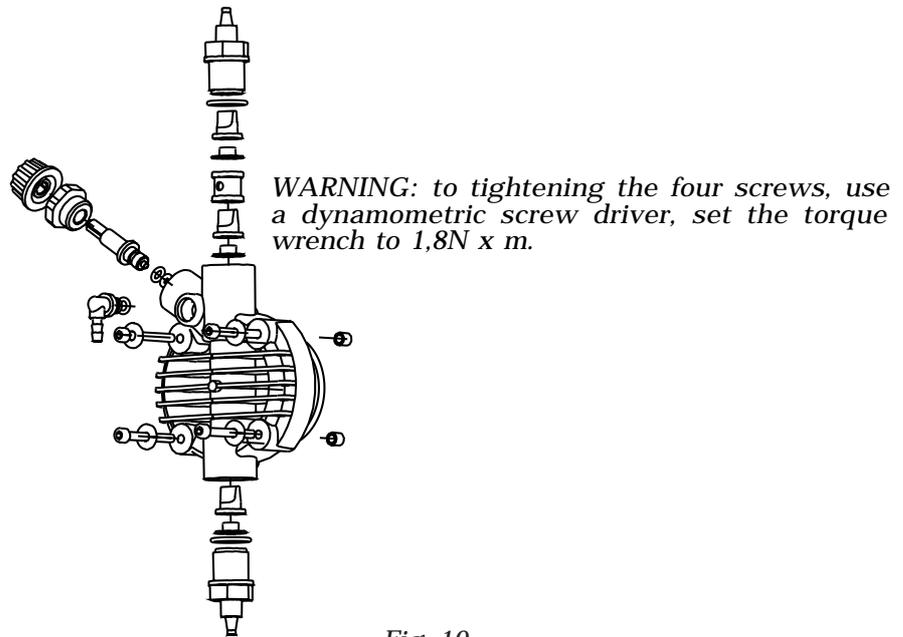


Fig. 10

3. The Company suggests periodically cleaning off the hydraulic parts (valves and filter). We cannot say how often this cleaning should be done as it depends on the type of application, we also cannot suggest what cleaning agent to use as this will depend on the additive used.

Operating suggestions when dosing sodium hypochlorite (most frequent case):

- a - disconnect the pins from the mains or by means of a onnipolar switch with 3 mm minimum distance between the contact.
- b - disconnect discharge hose from pipework;
- c - remove the suction hose (with filter) from the tank and dip it into clean water;
- d - switch on the metering pump and let it operate with water for 5 to 10 minutes;
- e - switch OFF the pump, dip the filter into a hydrochloric acid solution and wait until the acid finishes cleaning;
- f - switch ON the pump again and operate it with hydrochloric acid for 5 minutes in a closed-circuit, with suction and discharge hose dipped into the same tank;
- g - repeat the operation with water;
- h - re-connect the metering pump to the pipework.

## 5.0 - HOW TO OPERATE WHEN DOSING SULPHURIC ACID (MAX 50%)

In this case it is essential to bear in mind the following:

1. replace PVC crystal suction hose with polyethylene discharge hose;
2. empty any residual water from the pump head beforehand.

**Warning: if the water mixes with sulphuric acid it can produce a large quantity of gas with consequent overheating of the area causing damage to valves and pump head.**

This operation can also be done with the pump disconnected from the plant by turning the pump upside-down for 15 to 30 seconds and without connecting the hose to the nipples; if impossible, dismount and remount the pump head (Fig. 10) using the four mounting screws.

# DLX-MA/M • DLXB-MA/M

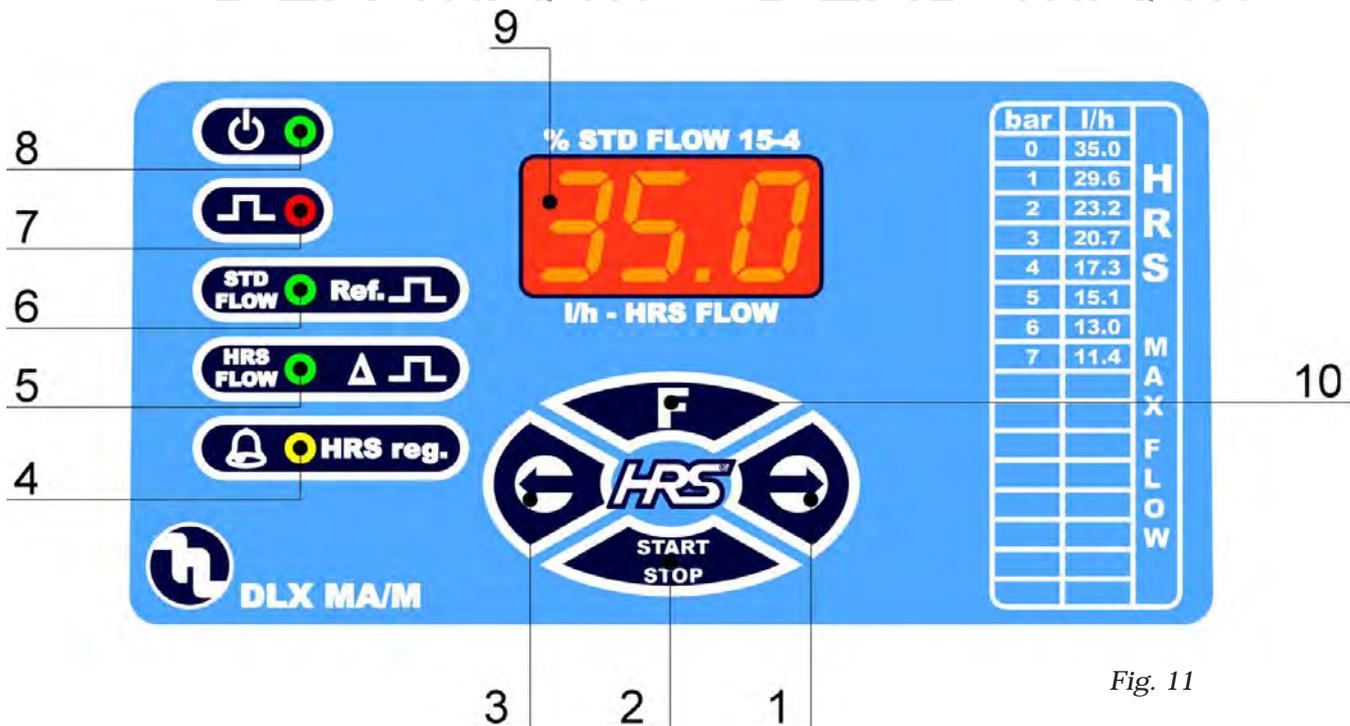


Fig. 11

## 6.0 - DLX MA/M AND DLXB-MA/M MICROCONTROLLER DOSING PUMPS

STD - Manual flow rate adjustment: constant flow at the present working mode. Operative range 1-100% flow rate  
 HRS - By setting working pressure it is possible to adjust the flow rate in l/h (liters/hours)

### 6.1 - PUMP CONTROLS (Fig. 11)

- 1 - Increasing values button
- 2 - ON/STAND BY button
- 3 - Decreasing values button
- 4 - "yellow" LED flow sensor alarm/HRS setting
- 5 - "green" LED HRS mode/max allowed pulse difference
- 6 - "green" LED Standard mode/reference pulses
- 7 - "red" LED injection pulse flashing
- 8 - "green/red" LED pump fed/stand by/level alarm
- 9 - 7 segment display
- 10 - Function selection button

### 6.2 - TYPICAL INSTALLATION (Fig.12)

- A Injection valve
- B Power supply
- C Filter
- H Cable gland
- I Chemical tank
- V Process tank

### 6.3 - ACCESSORIES

- 1 flexible PVC suction hose, transparent crystal type, length 2 m;
- 1 semirigid polyethylene hose, white, length 2 m;
- 1 injection valve 3/8 BSP m;
- 1 filter;
- 1 instructions/operating booklet.

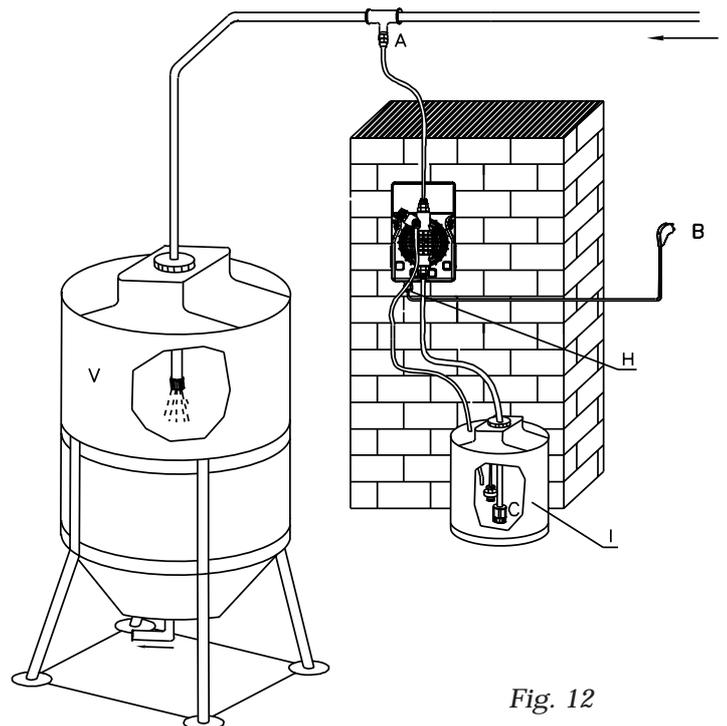


Fig. 12

# DLX-MA/MB • DLXB-MA/MB

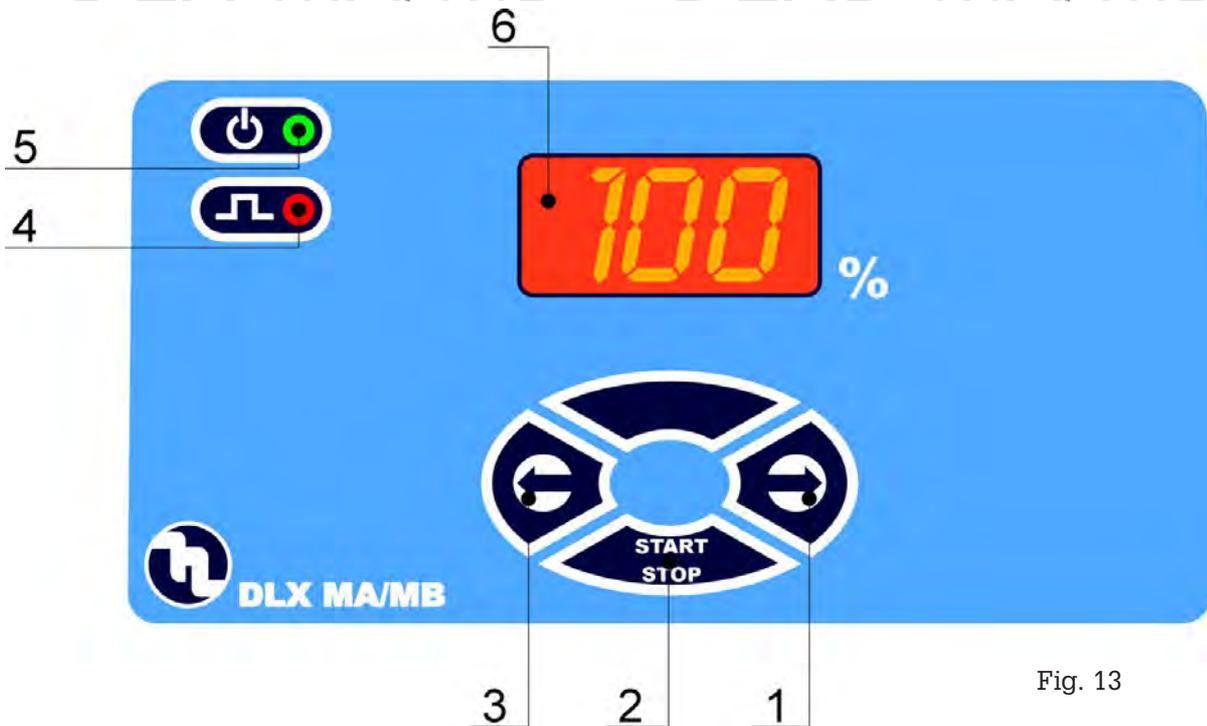


Fig. 13

## 7.0 - DLX MA/MB AND DLXB-MA/MB MICROCONTROLLER DOSING PUMPS

Manual flow rate adjustment: constant flow at the present working mode. Operative range 1-100% flow rate

### 7.1 - PUMP CONTROLS (Fig. 13)

- 1 - Increasing values button
- 2 - ON/STAND BY button
- 3 - Decreasing values button
- 4 - "red" LED injection pulse flashing
- 5 - "green/red" LED pump fed/stand by/ level alarm
- 6 - 7 segments display

### 7.2 - TYPICAL INSTALLATION (Fig.14)

- A Injection valve
- B Power supply
- C Filter
- H Cable gland
- I Chemical tank
- V Process tank

### 7.3 - ACCESSORIES

- 1 flexible PVC suction hose, transparent crystal type, length 2 m;
- 1 semirigid polyethylene hose, white, length 2 m;
- 1 injection valve 3/8 BSP m;
- 1 filter;
- 1 instructions/operating booklet.

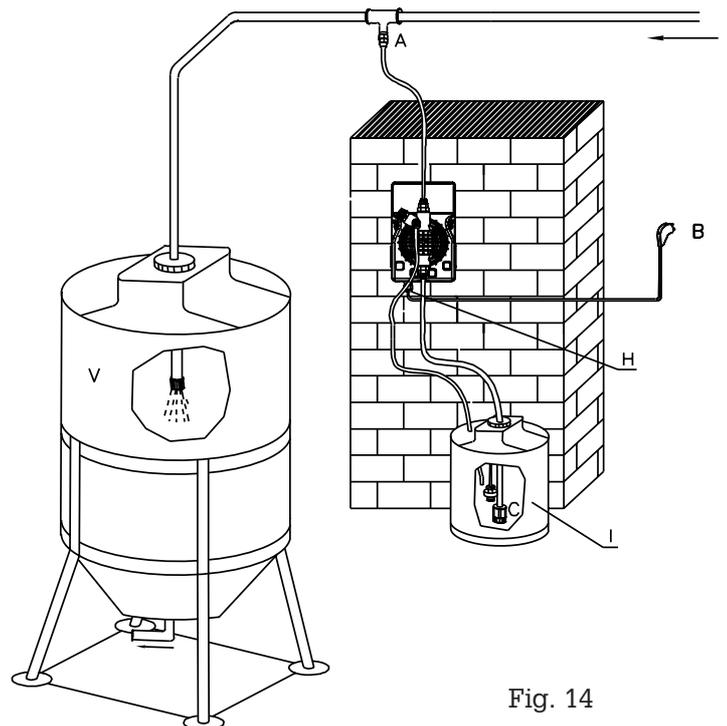
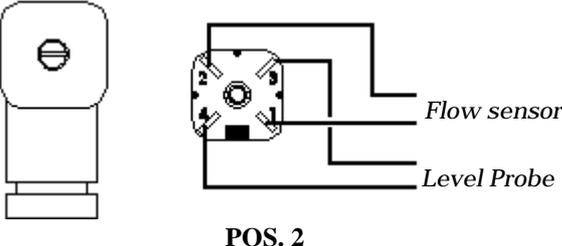


Fig. 14

## 8.0 - WIRING CONNECTION AND OUTPUT CONNECTOR FUNCTIONS

The output connector allows the wiring connection for the level control probe (3-4 pins) and flow sensor (1-2 pins) as shows in the below picture:



Wiring of the female connector	Technical info and functions
 <p style="text-align: center;">POS. 2</p>	<p>Level probe connection</p> <p>Configuration:</p> <p>Pin 1 = Flow sensor wire(MA/M series)</p> <p>“ 2 = Flow sensor wire(MA/M series)</p> <p>“ 3 = level probe wire</p> <p>“ 4 = level probe wire</p>

### 8.1 INPUT/OUTPUT EXTERNAL CONNECTIONS (FOR EXTERNAL ACCESSORY)

As shows on paragraph 7.0 the connector from position 2 is used for connecting the accessories. Namely the accessories are:

- Level control switch;
- Flow sensor;

It is very important to disconnect the power from the pump when connecting the accessories. It is also very important to protect the unutilized connectors with male connectors supplied with the pump.

Such operation will protect the internal circuitry from unwanted shorts and/or the power surge either from the operator or from different sources. **There will be no accessible contacts after installation is completed.** It is imperative that the accessories will be supplied by the factory to avoid unwanted mismatched situations and/or furthed possible damagee (wich in this this case will be no covered by the warranty). Further more cables and accessories must be idoneus and rated for the proper voltage and type of insulation.

#### SUMMARY OF TYPE OF CONNECTIONS

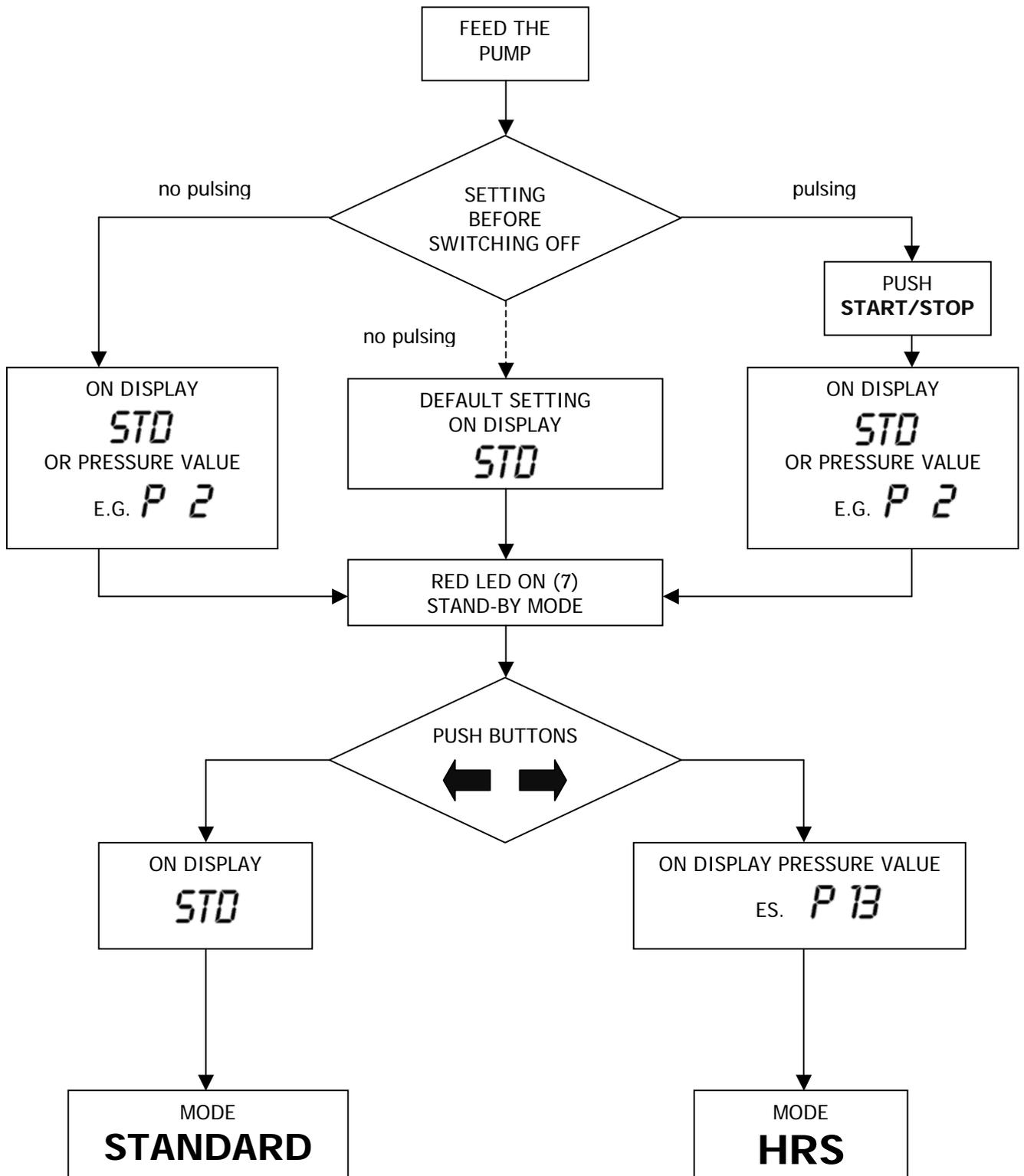
1. **INPUT LEVEL SWITCH:** as shown on paragraph 7.0 the pins #3-4 from position 2 are dedicated to the operation of the level sensor. Such operation is activated by a float containing one magnet if the liquid is below the position or completely absent the flow will slide down activating a reed switch.

2. **INPUT FLOW SENSOR:** as shown on paragraph 7.0 the pins #1-2 from position 2 are dedicated to the operation of the flow sensor.

# 9.0 - GRAPHIC SETTING REPRESENTATION MANUAL MICROCONTROLLER

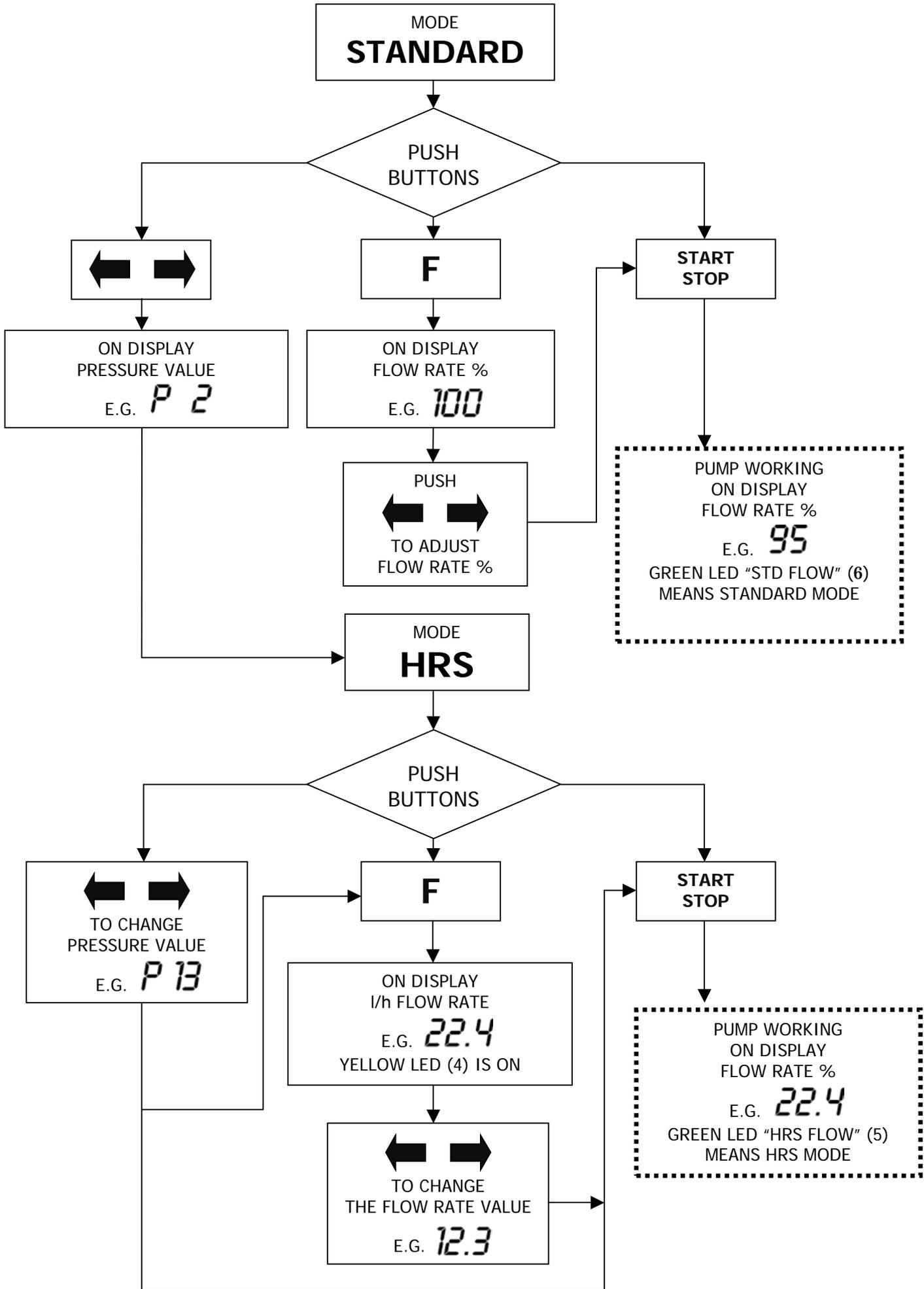
(only for MA/M series)

## STANDARD OR HRS MODES

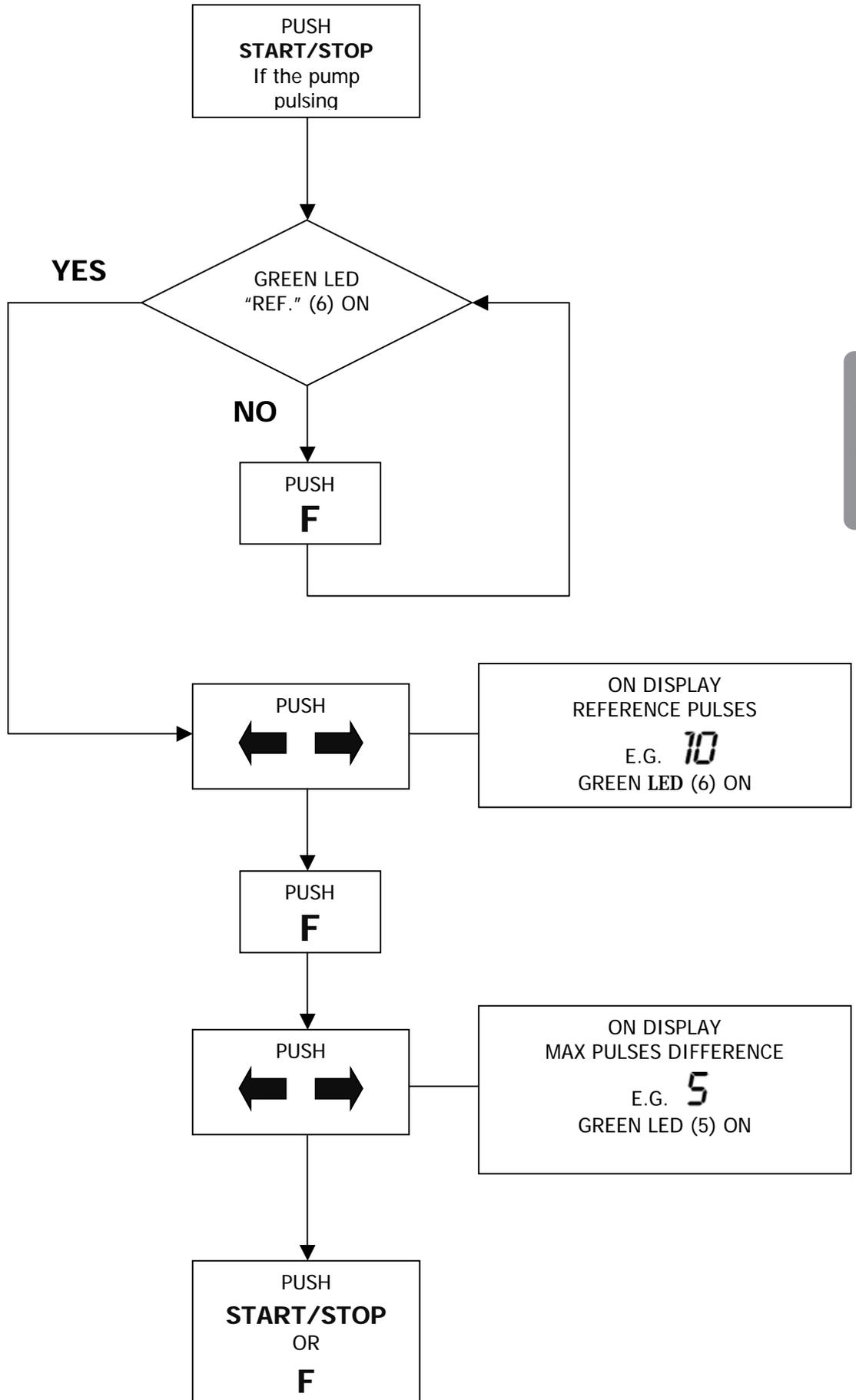


ENGLISH

**FLOW RATE ADJUSTING**



# FLOW SENSOR SETTING



## **10.0 - TROUBLE-SHOOTING COMMON TO DLX & DLXB SERIES PUMPS**

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### **10.1 - MECHANICAL FAULTS**

As the system is quite robust there are no apparent mechanical problems. Occasionally there might be a loss of liquid from the nipple because the tube nut has loosened, or more simply the discharge tubing has broken.

Very rarely there may be losses caused by the breakage of the membrane, or by the membrane seals in which case they have to be replaced by disassembling the four screws of the pump head (fig. 10), when re-mounting the pump head ensure that the screws are replaced properly, along with "O" ring.

After repair, the metering pump will need to be cleaned of additive residues which can damage the pump casing.

#### **① THE METERING PUMP GIVES PULSES BUT THE ADDITIVE IS NOT INJECTED**

a. Dismount the suction and discharge valves, clean them and replace, see position (fig. 10). Should the valves be swollen, check valves material against our chemical resistance compatibility chart and fit correct valves. Standard valves are Viton. Upon request ball check valve, can be supplied.

b. Check clogging of the filter.

**ATTENTION:** When removing the metering pump from the plant, be careful as there might be some residual additive in the discharge hose.

### **10.2 - ELECTRICAL FAULTS**

#### **① ALL LEDS OFF, THE PUMP DOES NOT PULSE**

Check power supply (socket, plug, power switch ON), if the pump doesn't work contact manufacturer Customer Service, Dealer or Distributor.

#### **② GREEN LED (POWER) ON, RED LED (PULSE) OFF, THE PUMP DOES NOT PULSE**

Press the START button. If the pump doesn't work contact manufacturer Customer Service, Dealer or Distributor

#### **③ PUMP PULSES ARE NOT CONSTANT**

Check that supply voltage is within +/- 10% of rated voltage.

#### **④ THE DOSING PUMP GIVES ONLY ONE PULSE**

Disconnect the equipment and contact manufacturer Customer Service, Dealer or Distributor.

#### **⑤ - IN CASE THE ADDITIVE LEVEL IS BELOW THE LEVEL PROBE AND THE LEVEL ALARM IS STILL OFF:**

Check the level switch connection, short circuit poles connector of the pump, in case the alarm is on, replace the switch;

if the alarm is off, contact manufacturer customer service, dealer or distributor.



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