



DGTEC

Modelli ST/ 2ST/ ST-R











DECLARATION OF CONFORMITY

Company:	AQUA S.p.A.
Address:	Via T. Crotti, 1 - 42018 - San Martino in Rio (RE)

Hereby declares that the products named:

• DGTEC

Responds to the principal features of the following European Directives:

- **2014/30/CE of 26/02/2014 - Harmonization of the laws of the Member States relating to electromagnetic compatibility – EMC Directive**
- **2014/35/CE of 26/02/2014 - Harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits – Low Voltage Directive**
- **2011/65/UE of 08/06/2011 with subsequent update 2015/863 of 31/03/2015 – ROHS III Directives**
- **2012/19/UE of 04/07/2012 - WEEE Directives for electrical and electronic waste**

This declaration is issued under the responsibility of Aqua S.p.A.

San Martino in Rio (RE) - 08 settembre 2020

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1.0 INTRODUCTION

The range of “**Dgttec**”, programmable digital peristaltic pumps is designed to manage dishwashers and/or washing machines and consists of the following models:

- *ST Model: digital programmable single-electrovalve pump to dose the detergent*
- *ST-R Model: digital programmable single-electrovalve pump to dose the brightener*
- *2ST Model: double solenoid valve programmable digital pump*
- *CD Model: adjustable digital pump with conductivity reading*
- *OPL Model: programmable digital pump for washing machine*
- *Timer Model: for weekly or daily programmable timed dosage*

ST and 2ST models allow the easy, flexible and precise dosing of detergent or brightener for dishwashers.

The ST pump is powered by the load/rinse electrovalve of the dishwasher, while the 2ST pump is powered by the load and rinse electrovalves of the dishwasher, but it may be powered by a single load/rinse electrovalve. Both models can be programmed in 3 different modes:

- **TIME AND SPEED**
- **G/L OF PRODUCT**
- **G/L OF ACTIVE PRINCIPLE OF THE PRODUCT**

1.1 WARNINGS



Before starting assembly, carefully read these instructions and follow them during installation.



Failure to follow the instructions of this manual may cause personal harm and damages to the device and/or the system.

We recommend reading the label reported on the pump and following the directions below:

- ✓ ***The pressure of the injection point must be lower or equal to the pump rated value!***
- ✓ ***When you receive the product, check the integrity of the pump and all of its parts. Should there be any anomalies, promptly notify qualified personnel before performing any operations.***
- ✓ ***This manual must be kept in a safe place for future references.***
- ✓ ***Before installing the pump make sure that the details provided on the adhesive plate attached to the pump correspond to those of the electrical system.***
- ✓ ***Do not use the device with wet hands or feet!***
- ✓ ***Do not leave the device exposed to the weather!***
- ✓ ***Make sure the peristaltic tube is compatible with the liquid to be dosed!***
- ✓ ***The device must be used by trained personnel!***
- ✓ ***If any irregularities are experienced during pump operation, cut off the power supply and contact one of our customer care centres for any repairs!***
- ✓ ***In order for the pump to operate correctly it is necessary to use original spare parts or accessories. The producer will not be held responsible for any fault or damaged provoked by tampering or non-original spare parts and accessories***
- ✓ ***The electrical system must be complying with the standards of the Country it is installed in.***
- ✓ ***The operating ambient temperature must not exceed 40°C with a relative humidity of 90% at 90°C.***

1.2 REFERENCE STANDARDS

Our pumps are manufactured according to General Standards in force and in compliance with the following European Directives:

n° 2014/30/CE “ E.M.C.

n° 2014/35/CE “DBT Low Voltage Directive”

n° 2011/65/UE , 2012/19/UE “direttive RoHs e WEEE”

1.3 TECHNICAL FEATURES

1.3.1 ELECTRICAL FEATURES



For the power supply value we recommend reading the label on the pump!

1.3.2 PERFORMANCES

- Maximum height of the suction tube: 1.5 m
- Flow rate and back-pressure: see Tab. 1, read the label on the pump to identify the corresponding model.

ST Model Codes	Power supply	Motor Type	Flow rate (l/h)	Backpressure (bar)	Dosing	Peristaltic Tube
ADD5004010000000	230 VAC	24 VDC	4	1	Detergent	Santoprene
ADD5006010000000	230 VAC	24 VDC	6	1	Detergent	Santoprene
2ST Model Codes						
ADD6004010000000	230 VAC	24 VDC	4	1	Detergent	Santoprene
ADD6006010000000	230 VAC	24 VDC	6	1	Detergent	Santoprene
ST-R Model Codes						
ADD5001030B00000	230 VAC	24 VDC	1	3	Brightener	Silicone

Tab. 1

- Temperature of the environment: 0 ÷ 45°C
- Packaging and transport temperature: -10 ÷ 50 °C
- Protection degree: IP65

2.0 INSTALLATION

2.1 GENERAL RULES

Pump installation must be carried out as follows:

- Away from sources of heat in dry locations, at a maximum temperature of 40°C and a minimum of 0°C.
- In a ventilated location that can be easily accessed for periodical maintenance.
- Above the level of the liquid that needs to be dosed, at a maximum height of 1.5 metres.
- Do not install the pump above the tank when using liquids that emit fumes, unless it is sealed shut.

2.2 INSTALLATION KIT

The pump is supplied with all items required for correct installation. The complete kit will vary for the ST or 2ST models chosen to dose the detergent, (*KIT-DET PERISTALTIC DUTRAL* - code ADSP6000042N- Fig. 1), or for the ST model chosen to dose the brightener (*KIT- BRI-PERISTALTIC VITON BLACK*- code ADSP6000151- Fig. 2).

- Fixing bracket (cod. ADSP8000025);
 - Wall plugs and screws (cod. ADSP6000041);
- Model for the detergent (Fig. 1) (ST- Detergent / 2ST)**
- 90° PP Complete cleaning injection fitting 4X6 D10 (cod. ADSP6000068N);
 - Counterweight of the foot strainer (cylinder) (cod. DA3040);
 - Short PP foot strainer without valve (cod. ADSP6000075);
 - Crystal PVC Ø 4x6 suction and delivery tubes (cod. ADSP6000546);

ST-R Model for the brightener (Fig. 2)

- Counterweight of the foot strainer (cylinder) (cod. DA3040);
- Short PP foot strainer without valve (cod. ADSP6000075);
- Injection fitting PP 1/8" – HOSE-END PIPE INT. DIAM. 6-8 MM (cod. ADSP6000063);

- f) Injection Valve 1/8" SS-VT 4x6 (cod. ADSP6500051);
- g) Crystal PVC suction pipe $\varnothing$ 4x6 (cod. ADSP6000546);
- h) PE Suction pipe (cod. ADSP6000078);

The pump can be connected to a level probe that is not supplied as standard:
-Level probe with BNC (cod. ADSLG4) in Fig. 3 ;



Fig.1 - Installation kit for the dosing of the detergent (ST / 2ST)



Fig.2- Installation kit for the dosing of the brightener (ST-R)



Fig. 3 - Level probe (Optional)

2.3 ASSEMBLY



We always recommend wearing protective masks, gloves, goggles and any other PPE during all installation steps and when handling chemical products.

WALL MOUNTING

To fix the pump to the wall:

- Fix the bracket to the wall using the wall plugs and screws supplied.
- Place the pump on the bracket.
- Ensure the fixing is stable.

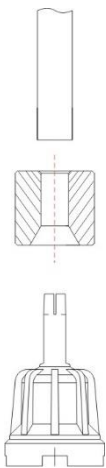


It is also recommended to install the pump in a dry environment, away from heat sources and exhaust vapours.

2.3.1 ASSEMBLY OF THE ACCESSORIES

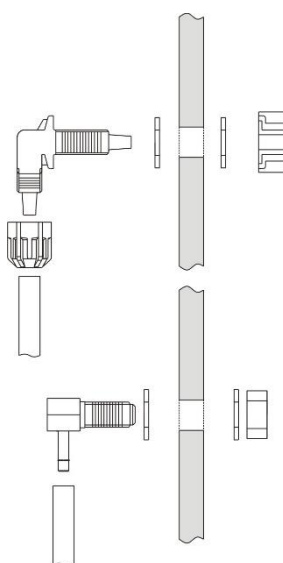
For the assembly, please follow the indications in Figures 4/a, 4/b and 4/c.

Foot strainer



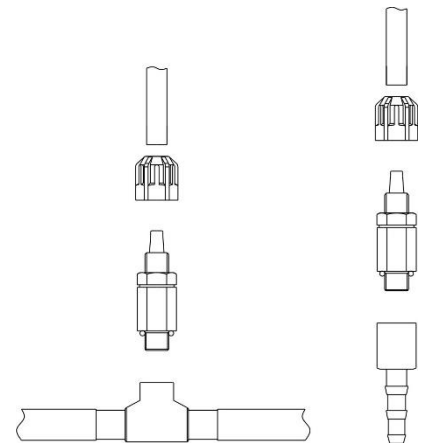
(a)

Tank inlet fitting



(b)

Non-return valve



(c)

Fig. 4 – Assembly of the Accessories

2.4 ELECTRICAL CONNECTIONS



Before performing any intervention on the pump, disconnect the power supply voltage of the machine!

Connect the pump cable to a voltage that is compatible with the one on the label.
For the connections refer to Fig. 5.

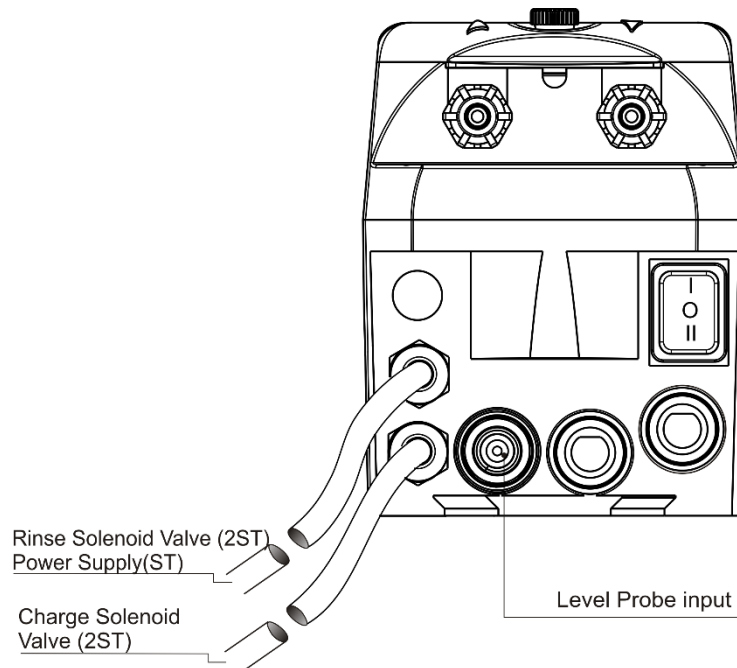


Fig. 5- View from below

2.5 HYDRAULIC CONNECTIONS

- Make sure the suction tube is placed in the product container and then connected to the pump suction fitting (marked with the ▲ symbol on the cover) and tightened with the correct ring nut.
- Make sure the delivery tube is inserted in the pump delivery fitting (marked with the ▼ symbol on the cover) and tightened with the correct ring nut. It must then be connected to the inlet fitting of the tank or to the injection valve.

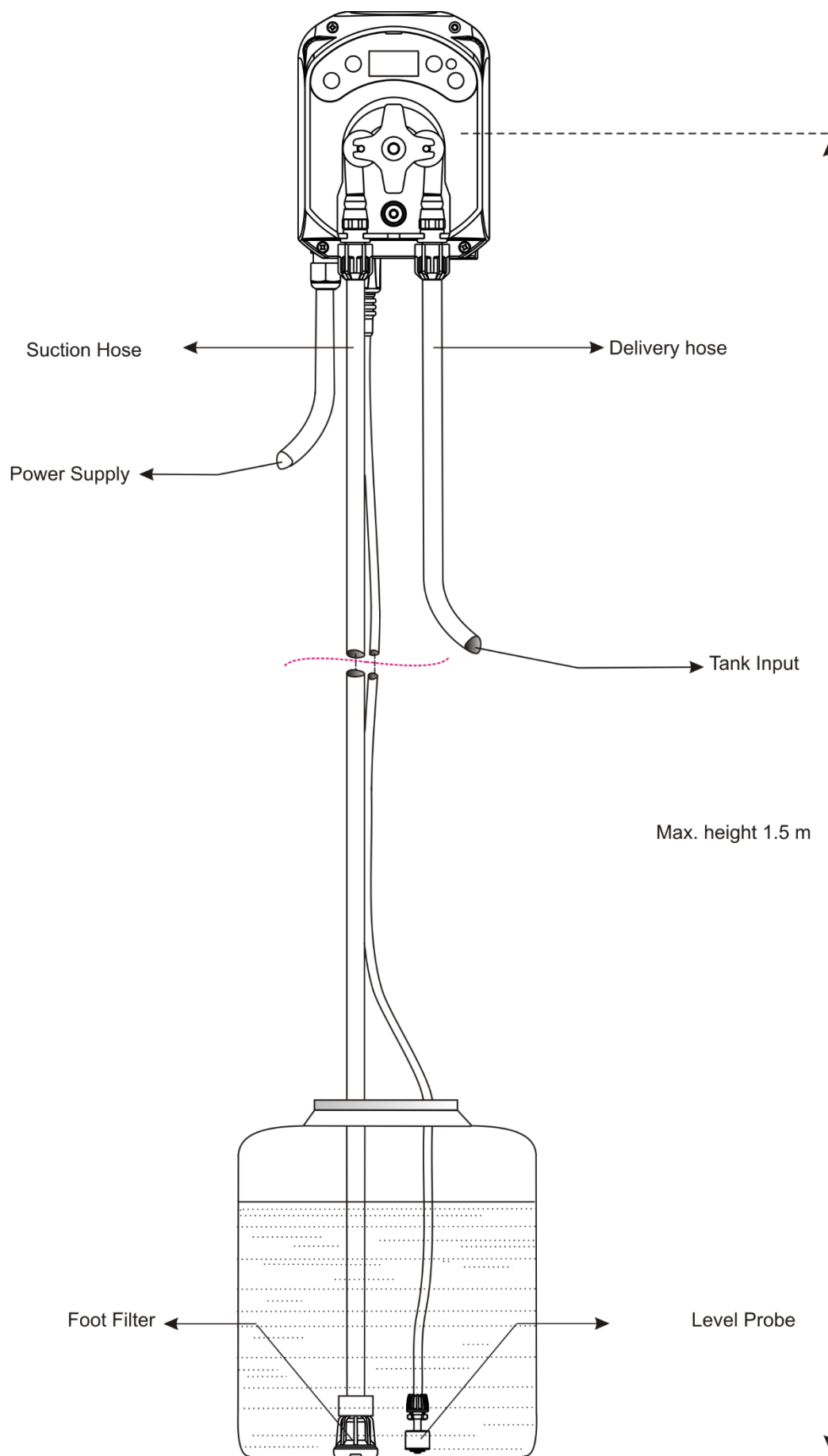
INLET MOUNTING OF THE TANK TO DOSE THE DETERGENT

Make a 10 mm hole and insert the inlet fitting of the tank;

ASSEMBLY OF THE INJECTION VALVE TO DOSE THE BRIGHTENER

Connect the injection valve between the electrovalve and the boiler of the dishwasher.

It is possible to use the injection fitting provided to connect the valve to the tube of the hydraulic doser directly.

**Fig. 6 -Installation**

3.0 PROGRAMMING

Every time the pump is powered, it starts operating at the set speed for the selected period, if set on **time-speed (t.S)** mode, or at the maximum speed for the time calculated depending on the quantity of product or active principle to be dosed if set respectively on **g/l of Product (G.L.P)** or **g/l of Active Principle (G.L.A)**.

1.1 MAIN FEATURES

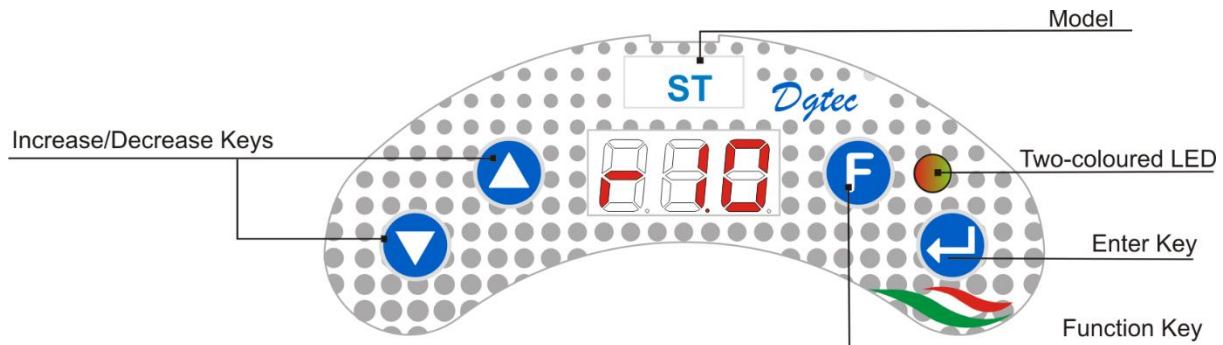


Fig. 7 - USER INTERFACE



The Increase/Decrease keys allow to change the numerical values and scroll through the lists of options for all the available menu entries.



The Enter key allows to access and exit from the various entries of the submenus. Pressing the key for 3 seconds allows, from the Initial Menu, to access the Programming Menu and to go back to the Menu one level up from the main entries on a Menu;



The Function key allows to browse through the Menu entries.
By pressing the key for 3 seconds from the initial page, you can access the User Menu;

TWO-COLOURED LED

The two-coloured LED displays the following conditions:

- **Steady green:** the pump is active;
- **Flashing green:** the pump is dosing;
- **Steady red:** the pump is not active;
- **Flashing red:** there is an alarm;
- **Steady Orange:** if you are browsing the Programming Menu;
- **Flashing orange:** Pump priming in progress;



The switch has three positions:

— : the pump is active (ON)

O : the pump is off (OFF)

≡ : the pump is priming (MOM)

The MOM position is monostable, therefore after setting the switch to MOM, when it is released the switch automatically goes back to OFF.

The pump doses for 60 seconds at the maximum speed; if the MOM key is pressed again before the 60 seconds elapse, the priming is interrupted.

OPERATION

The ST pump allows to dose the chemical detergent or brightener (ST-R version), while the 2ST model only doses the detergent to adjust the washing of the dishwasher.

The dosing of the product will activate when the pump is powered through the load/rinse electrovalve (ST/ ST-R), or through the load or rinse electrovalve (2ST) when the switch is set to ON.

For both models, the flow rate of the pump can be adjusted by calibration, and the dosing times are calculated depending on the actual flow rate of the pump. In case calibration is not carried out, the dosing times will be calculated on the basis of the nominal flow rate of the pump (see values on the label).

The dosing times for load and rinse, both on ST/ ST-R and 2ST models, may be:

- set by the user directly, in seconds, in case the operating mode is **TIME/SPEED**;
- calculated depending on the desired quantity of product, expressed in g/l, if the operating mode is **g/l PRODUCT**;
- calculated depending on the desired quantity of active principle, expressed in g/l, if the operating mode is **g/l ACTIVE PRINCIPLE**;

ST/ST-R Model

TIME/ SPEED Mode

The pump will dose for the set amount of time, from 0 to 999 seconds, or with the continuous mode "**ILL**", to the speed set, expressed as a percentage value depending on the flow rate of the pump, from 5% to 100%.

g/l PRODUCT Mode

The pump will continue dosing for a period that will be calculated depending on the quantity of product, grams per litre, and the quantity of water the product will be dosed into, in litres.

The total litres refer to the capacity of the dishwasher's tank, in case detergent is being dosed. The value expresses the backfilling litres (capacity of the rinse boiler of the dishwasher) in case brightener is being dosed.

The density of the product is assumed equal to 1000 g/l.

The dosing time will be calculated depending on [3.1].

$$T \text{ dosaggio (sec)} = \frac{\text{g/l prodotto} * \text{Litri totali}}{\text{densità (g/l)}} \times \frac{3600}{\text{Portata (l/h)}} \quad [3.1]$$

Speed will be equal to 100% of the flow rate.

Example:

- g/l Product = 0.5 g/l
 - Total Litres = 20 l (dosing of the detergent in the tank)
 - Flow rate = 4 l/h
- $$t.do = \frac{0,5 \text{ g/l} * 20 \text{ l}}{1000 \text{ g/l}} \times \frac{3600}{4 \text{ l/h}} = \frac{0,01 \text{ l} * 3600}{4 \text{ l/h}} = 9 \text{ sec}$$

g/l ACTIVE PRINCIPLE Mode

The pump will continue dosing for a period of time that will be calculated on the basis of the quantity of active principle present in the product, of its concentration expressed in percentage, of the density in g/l of the product itself, and of the quantity of water the product will be dosed in, expressed in litres.

The dosing time will be calculated depending on [3.2].

$$T \text{ dosaggio (sec)} = \frac{\text{g/l pr. attivo} * \text{Litri totali}}{\text{densità (g/l)} * \% \text{ concentr.}} \times \frac{3600}{\text{Portata (l/h)}} \quad [3.2]$$

Speed will be equal to 100% of the flow rate.

Example:

- g/l Active Principle = 1 g/l
 - Concentration = 30 %
 - Density = 1150 g/l
 - Total Litres = 50 l (dosing of the detergent in the tank)
 - Flow rate = 6.1 l/h
- $$t.do = \frac{1 \text{ g/l} * 50 \text{ l}}{1150 \text{ g/l} * 0,3 (\%)} \times \frac{3600}{6,1 \text{ l/h}} = \frac{0,145 \text{ l} * 3600}{6,1 \text{ l/h}} = 85 \text{ sec}$$

2ST Model

Bypassing the activation electrovalve, the 2ST model will dose for the period of time set or calculated for the load or rinse phase.

Operation with a double electrovalve

At every activation of the load electrovalve, in case the switch is set to ON, the pump starts dosing after waiting an adjustable period of time called *First Load Delay* for the load time and for the load speed in two possible modes. At every activation of the rinse electrovalve, the pump starts dosing for the rinse period, at the rinse speed: the rinse detection must start after a filtering time on the signal, which is also programmable.

The load signal comes before the rinse one: therefore, if the load dosing is ongoing and the rinse signal is activated, this last one will be ignored, and the load signal will be activated. The rinse will be immediately ended, and the load cycle will start.

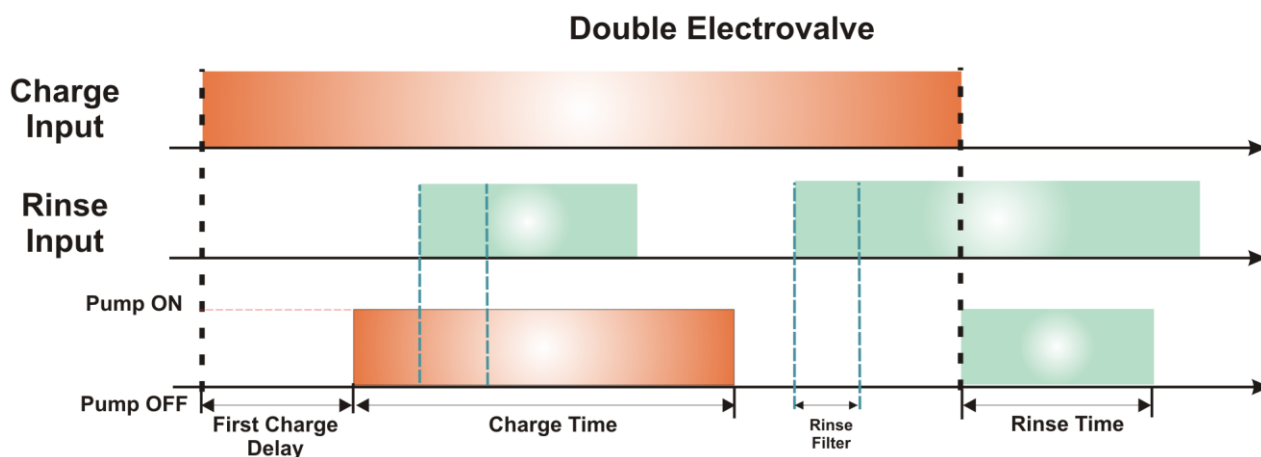


Fig. 8 Example of operation with a double electrovalve

Operation with a single electrovalve

In case a single load/ rinse electrovalve is available for the washing machine, it must be connected to the input of the pump rinse.

The distinction between load phase and rinse phase will be possible by setting the "*First load waiting time*".

The succession between rinse and load will take place as follows: at the activation of the electrovalve, after detecting the rinse signal, the pump will start the rinse dosing for the set or calculated time or the time set for the rinse cycle, and it will activate the "*First load waiting time*" meter.

Shall the First load waiting time set be inferior to the rinse time, the rinse cycle will be interrupted at the end of the Waiting time, and the load cycle (first load delay + load dosing time) will start. Otherwise, the rinse dosing will start, and it will be necessary to wait for the load cycle for a period that is equal to the difference between the two time values (First load waiting time - rinse time).

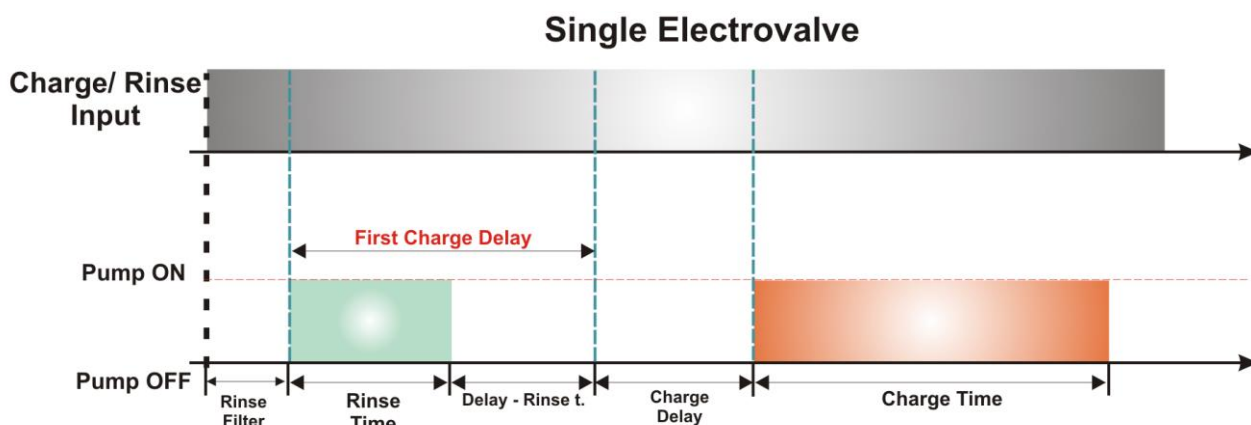


Fig. 9 Example of operation with a single electrovalve

TIME/ SPEED Mode

The dosing is based on the set time and speed: rinse time, load time, rinse speed, load speed.

The pump will dose, both in the load and rinse phase, for the set period of time, from 0 to 999 continuously "ILL" to the set speed, expressed with a value that is proportional to the flow rate of the pump, from 5% to 100%.

By setting the load time to "ILL" (unlimited), during the load phase the dosing will be continuous, and the activations of the rinse electrovalve will be ignored (in case of double supply). By setting the rinse time to unlimited, the dosing will be continuous until the load signal is detected (in case of double electrovalve or single electrovalve, with disabled First load waiting time), or for the whole duration of the First load Waiting Time (single-electrovalve case).

g/l PRODUCT Mode

The dosing time will be calculated depending on the quantity of product, grams per litre, and the quantity of water the product will be dosed into, in litres.

The total litres refer to the capacity of the dishwasher's tank for the load phase. The value expresses the backfilling litres (capacity of the rinse boiler of the dishwasher) for the rinse phase.

The density of the product is assumed equal to 1000 g/l.

The dosing time will be calculated depending on [3.1-2].

$$T \text{ Carico (sec)} = \frac{\text{g/l prodotto} * \text{Litri Carico}}{\text{densità (g/l)}} \times \frac{3600}{\text{Portata (l/h)}} \quad [3.1]$$

$$T \text{ Risciacquo (sec)} = \frac{\text{g/l prodotto} * \text{Litri Risc.}}{\text{densità (g/l)}} \times \frac{3600}{\text{Portata (l/h)}} \quad [3.2]$$

Speed will be equal to 100% of the flow rate.

Example:

- g/l Products = 0.5 g/l
- Load litres = 50 l
- Rinse litres = 8 l
- Flow rate = 1 l/h

$$t. \text{ carico} = \frac{0,5 \text{ g/l} * 50 \text{ l}}{1000 \text{ g/l}} \times \frac{3600}{1 \text{ l/h}} = \frac{0,025 \text{ l} * 3600}{1 \text{ l/h}} = 90 \text{ sec}$$

$$t. \text{ risc.} = \frac{0,5 \text{ g/l} * 8 \text{ l}}{1000 \text{ g/l}} \times \frac{3600}{1 \text{ l/h}} = \frac{0,004 * 3600}{1 \text{ l/h}} = 14 \text{ sec}$$

g/l ACTIVE PRINCIPLE Mode

The dosing time will be calculated depending on the quantity of active principle of the product, of its concentration expressed in percentage, of the density in grams per litre of the product itself, and of the quantity of water the product will be dosed into, in litres.

The dosing time will be calculated depending on [3.3-4].

$$t. \text{ carico (sec)} = \frac{\text{g/l pr. attivo} * \text{Litri Carico}}{\text{densità (g/l)} * \% \text{ concentr.}} \times \frac{3600}{\text{Portata (l/h)}} \quad [3.3]$$

$$t. \text{ risc. (sec)} = \frac{\text{g/l pr. attivo} * \text{Litri Risc.}}{\text{densità (g/l)} * \% \text{ concentr.}} \times \frac{3600}{\text{Portata (l/h)}} \quad [3.4]$$

Speed will be equal to 100% of the flow rate.

Example:

- g/l Active Principle = 1 g/l
- Concentration = 30 %
- Density = 1150 g/l
- Load litres = 50 l
- Rinse litres = 8 l
- Flow rate = 6.1 l/h

$$t. \text{ carico} = \frac{1 \text{ g/l} * 50 \text{ l}}{1150 \text{ g/l} * 0,3 (\%)} \times \frac{3600}{6,1 \text{ l/h}} = \frac{0,145 \text{ l} * 3600}{6,1 \text{ l/h}} = 85 \text{ sec}$$

$$t. \text{ risc.} = \frac{1 \text{ g/l} * 8 \text{ l}}{1150 \text{ g/l} * 0,3 (\%)} \times \frac{3600}{6,1 \text{ l/h}} = \frac{0,023 \text{ l} * 3600}{6,1 \text{ l/h}} = 13 \text{ sec}$$

MENU

When the pump is powered, regardless of the status of the switch, for a second the display shows the firmware version "r1.0". It then displays the first entry of the Initial Menu.

You can browse the whole Menu both when the switch is ON and when it is OFF.

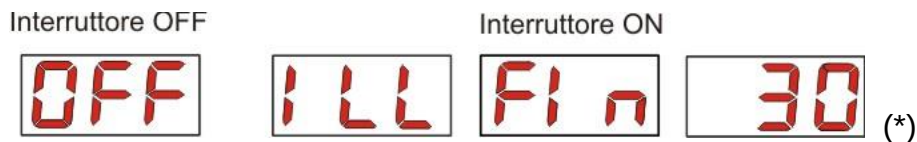
The Menu consists of the following submenus:

- **Initial Menu**, which allows to display the status of the pump;
- **User Menu**, which allows to change the main operating parameters;
- **Programming Menu**, which allows to set all the operating parameters and to display the statistics: this menu can be accessed only by entering a password;

To browse the Menus, please see [ANNEX H](#) and [ANNEX I](#).

ST/ST-R Initial Menu

The first entry of the Initial menu displays one of the following pages, depending on the status of the switch:



(*) example value expressed in seconds displayed in the countdown;

ILL (unlimited dosing time): displayed in case the time set is unlimited, i.e. the pump doses continuously for the whole time it is powered. Available only for Time/Speed mode;

End (Dosing finished): displayed in case the dosing time countdown is over, and the pump is stopped;

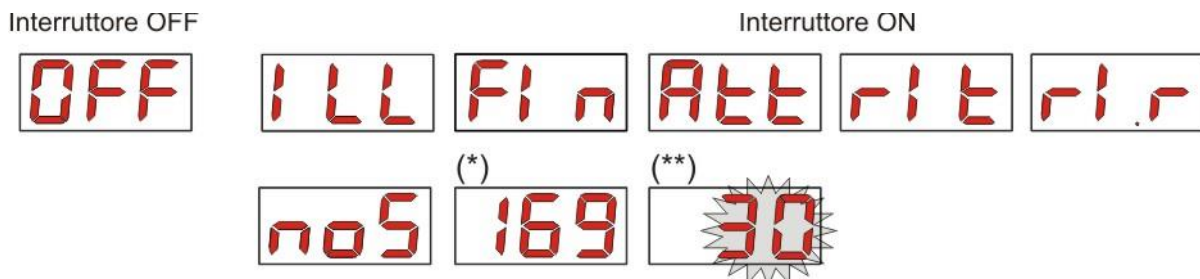
Seconds of dosing: in case the pump is dosing, the dosing countdown will be visualized; the value in seconds is calculated within a range of 0-999 seconds.

From the main page, with the **F** key, it is possible to display:

- **do.t:** calculated or set dosing time;

From the dosing time value, through the **F** key, you will be re-directed to the main entry, that will be identified with the label "**d.St**" (Dosing Status).

2ST Initial Menu



(*) example value in seconds, steady on the countdown for the load;

(**) example value in seconds, displayed blinking on the countdown for the rinse;

ILL (unlimited dosing time): displayed in case the time set is unlimited, i.e. the pump doses continuously for the whole time it is powered. (See *Time/Speed Mode*);

End (Dosing finished): displayed in case the dosing time countdown is over, and the pump is stopped;

First load Waiting time Displayed when the pump is working with a single load/ rinse electrovalve, between the rinse and the load start phase;

dEl (First load Delay): displayed when the pump is steady and waiting to perform the load (load Signal ON);

rl.r (Rinse signal filtering): displayed when the pump is stopped and waiting to perform the rinse (Rinse Signal ON);

noS (No Signal): displayed when the pump is powered, but the load and Rinse signals are detected as not active (see *Threshold Selection* of the signals in the *Settings Menu*);

Seconds of dosing: in case the pump is dosing, a countdown for the dosing time will be displayed; the value in seconds is calculated within a range of 0-999 seconds: for the load phase, the countdown will be steady, for the rinse phase, it will be blinking;

From the main page, with the **F** key, it is possible to display:

- **CH.t:** the dosing time set or calculated for the load phase;
- **t.rl:** the dosing time set or calculated for the rinse phase;

From the dosing time value, through the **F** key, you will be re-directed to the main entry, that will be identified with the label "**d. St**" (Dosing Status) if the switch is set to ON.

From any entry of the Initial Menu of the two models you can go to the:

- **Programming Menu** by pressing **Enter** for 3 seconds;
- **User Menu** by pressing the **F** key for 3 seconds;

User Menu

The User Menu allows to set the fundamental parameters for the dosing of the pump, and it will vary depending on the operation mode set, except for the main section (priming).

You can browse through the User Menu with the **F** key and display:

- **AdE:** allows to prime the pump without using the switch. You can start or stop the priming with the **Enter** key. The display shows a flashing "**AdE**" and the pump starts running at top speed.

Time-Speed Operating Mode - ST/ST-R

- **tl.n:** dosing time from 0-999 sec or unlimited (**ILL**);
- **PEr:** operation speed, that can be selected from 5 to 100% of the flow rate;

Time-Speed Operating Mode - 2ST

- **CH.t:** dosing time of the load from 0-999 sec or unlimited (**ILL**);
- **CH.P:** operation speed of the load, that can be selected from 5 to 100% of the flow rate;
- **dE.t:** dosing time of the rinse from 0-999 sec or unlimited (**ILL**);
- **rl.P:** operation speed of the rinse, to be selected from 5 to 100% of the flow rate;

g/l of Product operating mode – ST/ST-R and 2ST

- **G.L.P:** g/l of product from 0.00 to 99.9 g/l;

g/l of Active Principle Operating mode – ST/ST-R and 2ST

- **G.L.A:** g/l of active principle from 0.00 to 99.9 g/l;

It will be possible to modify the parameters only in case they have been enabled from the Settings Menu, i.e.:

- **OnL** (On-line change) enabled;

From the User Menu you can go back to the Initial Menu by pressing the **F** key for 3 seconds.



If there are one or several active alarms, every page of the Initial Menu and of the User Menu will be alternated to the entry that reports the alarm with the top priority. (See Alarm section)

Programming Menu

The Programming Menu allows to set all of the pump operating parameters and can be accessed only by entering the password.

The programming Menu can be accessed only using the Initial Menu: after pressing **Enter** for 3 seconds, the display shows "**PAS**", the LED turns orange and is steady. Then press **Enter** again and on the password selection menu the first digit of "000" starts flashing. With the **▲** and **▼** keys, you can increase/decrease the value displayed, with **Enter** you can scroll and select the desired digit. After setting the correct password, press **Enter** again for 3 seconds.

3.2 QUICK START-UP

This section features the steps to carry out to use the pump straight away. For further details on operation, refer to section 3.3 "Advanced Programming".

3.2.1 QUICK START-UP - Time/Speed Mode

In Time/Speed mode, the fundamental parameters to be set for the operation of the pump are:

ST/ST-R Model

Dosing Time - Flow Rate Percentage

From the Time/Speed User Menu you can proceed quickly with the steps below:

- Prime the pump;
- Set the dosing time;
- Set the flow rate percentage;

2ST Model

Load Dosing time – Percentage of the Load Flow Rate – Rinse Dosing Time – Percentage of the Rinse Flow Rate

From the Time/Speed User Menu you can proceed quickly with the steps below:

- Prime the pump;
- Dosing load time setting;
- Set the load flow rate percentage;
- Set the Rinse dosing time;
- Set the percentage of Rinse flow rate;

Here below are the pump default parameters:

- On-line Change of Menu values enabled;

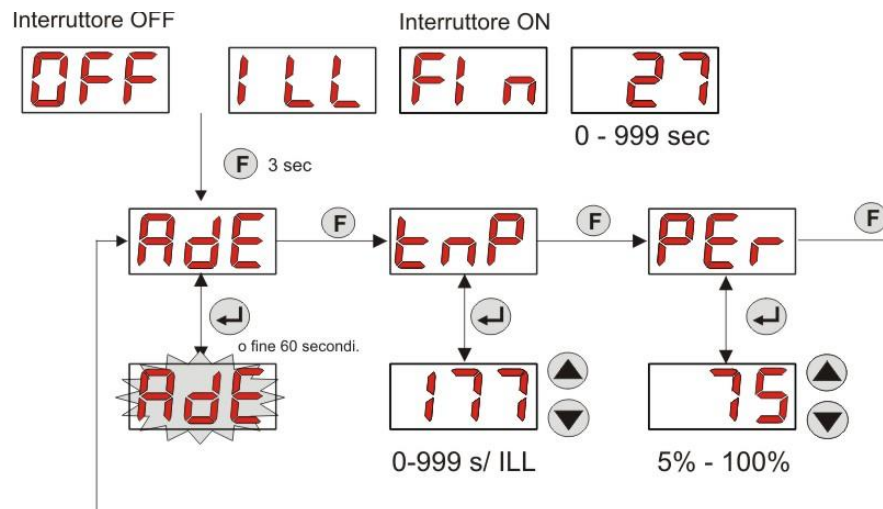
ST/ST-R USER MENU

Fig. 10 - Standard programming from ST/ST-R Time/ Speed User Menu

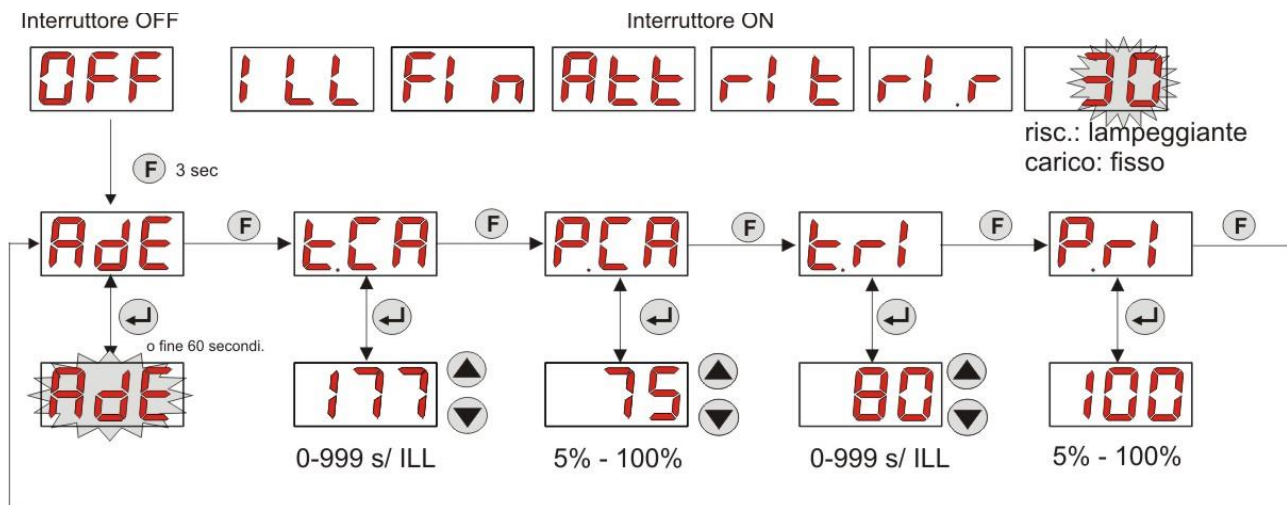
2ST USER MENU

Fig. 11 - Standard programming from 2ST Time/ Speed User Menu

3.2.2 QUICK START-UP - g/l of Product mode

In the g/l of Product mode, the fundamental parameters to be set for the operation of the pump are:

ST/ST-R Model

g/l of Product – Capacity in litres

2ST Model

g/l of Product – load capacity in Litres – Rinse Capacity in Litres

From the g/l of Product User Menu you can proceed quickly with the steps below:

- Prime the pump;
- Setting the product quantity;

Here below are the pump default parameters:

- On-line Change of Menu values enabled;
- Total capacity set on 10 litres; (for the 2ST models, both for load and for rinse)

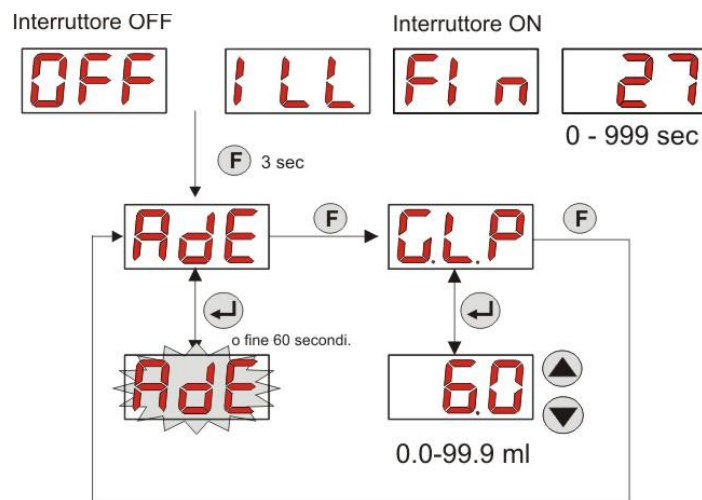
ST/2ST USER MENU

Fig. 12 - Standard programming from the User Menu g/l of Product- ST/2ST

3.2.3 QUICK START-UP - g/l of Active Principle Mode

In the g/l of Active Principle mode, the fundamental parameters to be set for the operation of the pump are:

ST/ST-R Model

g/l Active Principle – Concentration – Density of the Product – Capacity in Litres

2ST Model

g/l Active Principle – Concentration– Density of the Product – Load capacity in Litres – Rinse Capacity in Litres

From the g/l of Product User Menu you can proceed quickly with the steps below:

- Prime the pump;
- Setting the product quantity;

Here below are the pump default parameters:

- On-line Change of Menu values enabled;
- Concentration equal to 100%;
- Density equal to 1000 g/l;
- Total capacity set on 10 litres; (for the 2ST models, both for load and for rinse);

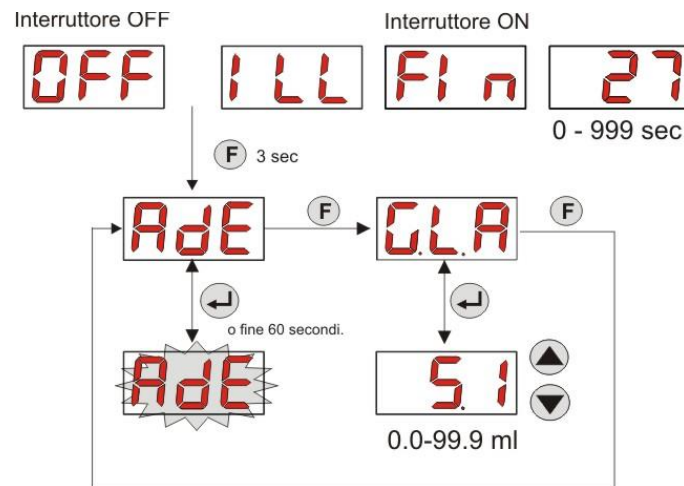
ST/2ST USER MENU

Fig. 13 - Standard programming from the User Menu g/l of Active Principle - ST/ST-R/2ST

3.3 ADVANCED PROGRAMMING

Below are the various features of the **Programming Menu** in greater detail.



Every parameter that is changed in the pump programming is saved when you go back to the initial display. If the pump power supply is disconnected before going to the stand-by display, programmed data is lost.

3.3.1 Setting the Language

From the **LAn** entry you can choose between Italian **It** and English **En** via the ▲ ▼ keys. Use **Enter** to enter and exit. (Fig. 14)

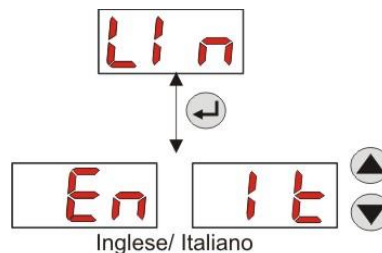


Fig. 14 - Setting the Language

3.3.2 Displaying and Resetting Statistics

From the **StA** section of the Programming Menu, you will access the dosing time statistics (from 0 to 999 hours); to reset the value, it will be necessary to access the numeric value at the reset entry **rSt** through the **F** key, and select **YES**, confirming with the **Enter** key. The corresponding reset value will be displayed. (Fig. 15)

The time format of statistics is expressed as follows:

- **h.mm** up to 9 h and 59 m
- **hh.m** up to 99 h and 59 m
- **hhh** up to 999 h

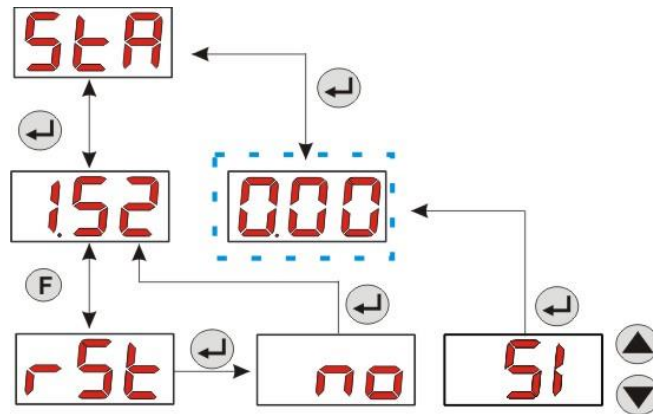


Fig. 15- Displaying and Resetting Statistics

3.3.3 Setting Time/Speed

ST/ST-R Model

From the **OPt** section of the Programming menu, by browsing with the **F** key in case the pump is operating with the Time/ Speed mode, it will be possible to set the following parameters:

- dosing time **tl:n**: to enter and exit the submenu, use the **Enter** key. The keys ▲ and ▼ increase/decrease the value from 0 to 999 seconds /ILL;
- flow rate percentage **PEr**: to enter and exit the submenu, use the **Enter** key. The keys ▲ and ▼ increase/decrease the value from 5% to 100% of the flow rate(*);

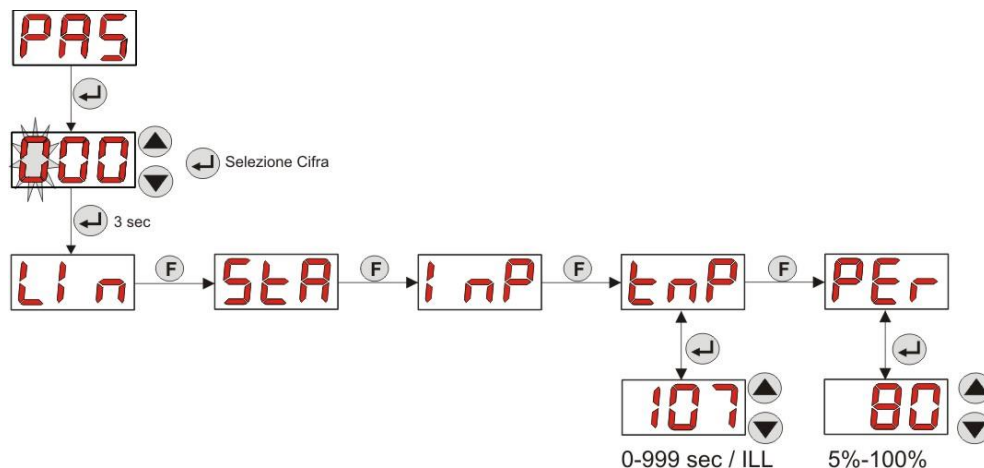


Fig. 16- ST Setting Time and Speed

2ST Model

From the **OPt** section of the Programming menu, by browsing with the **F** key in case the pump is operating with the Time/ Speed mode, it will be possible to set the following parameters:

- dosing time during load **CH.t**: to enter and exit the submenu, use the **Enter** key. The keys ▲ and ▼ increase/decrease the value from 0 to 999 seconds /ILL;
- percentage of the flow rate during load **CH.P**: to enter and exit the submenu, use the **Enter** key. The keys ▲ and ▼ will increase/decrease the value from 5% to 100% of the flow rate(*);
- dosing time during rinse **dE.t**: to enter and exit the submenu, use the **Enter** key. The keys ▲ and ▼ increase/decrease the value from 0 to 999 seconds /ILL;
- percentage of the flow rate during rinse **rl.P**: to enter and exit the submenu, use the **Enter** key. The keys ▲ and ▼ increase/decrease the value from 5% to 100% of the flow rate (*);

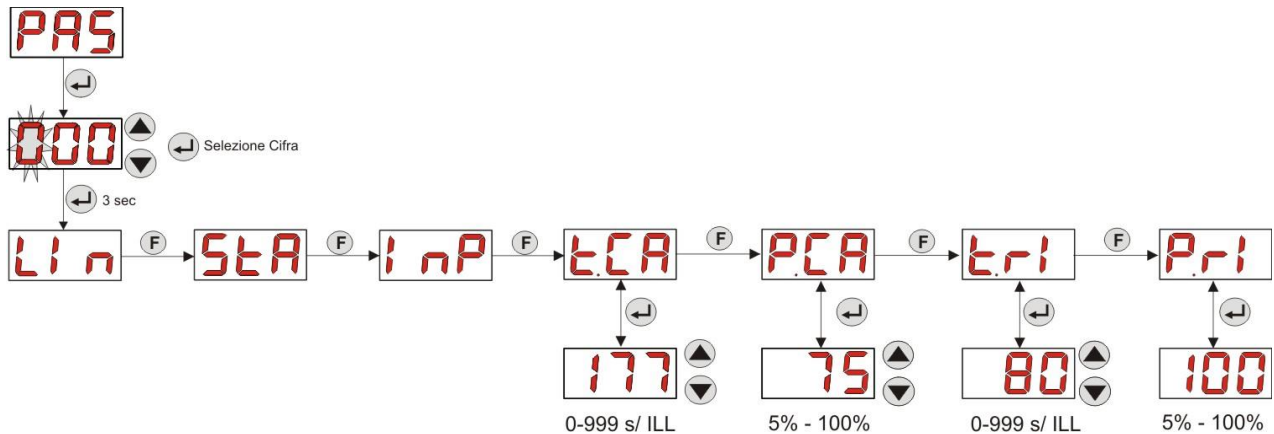


Fig. 17- 2ST Setting Time and Speed

3.3.4 Setting the g/l of Product

From the **OPt** section of the Programming menu, by browsing with the **F** key in case the pump is operating with the g/l of Product mode, it will be possible to set the following parameters:

- Quantity of product in g/l **G.L.P**: to enter and exit the submenu, use the **Enter** key. The keys **▲** and **▼** increase/decrease the value from 0 to 99.9 g/l;
- Total Litres **to.L**: to enter and exit the submenu, use the **Enter** key. The keys **▲** and **▼** increase/decrease the value from 0 to 99.9 litres with decimal precision, and from 100 to 150 litres;
- 2ST Model**: Backfilling Litres (rinse) **rl.L**: to enter and exit the submenu, use the **Enter** key. The keys **▲** and **▼** increase/decrease the value from 0 to 99.9 litres with decimal precision, and from 100 to 150 litres;

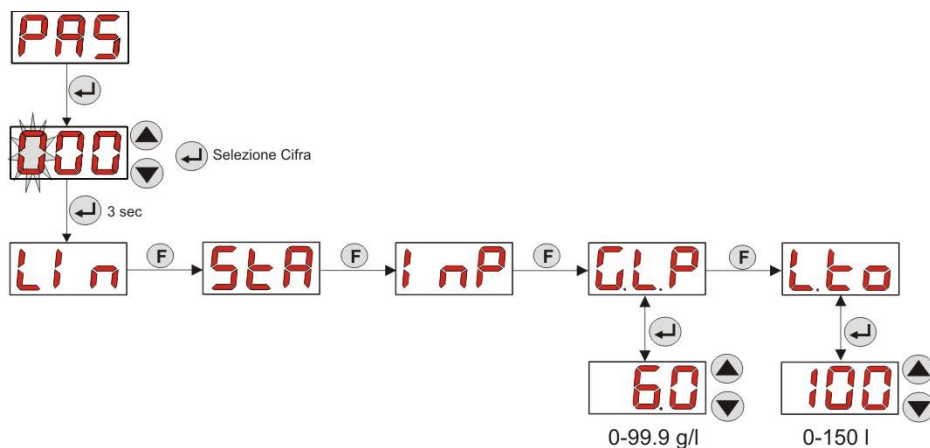


Fig. 18- Setting the Quantity of Product-ST/ST-R

(*)the flow rate will be equal to the actual one in case calibration has been carried out, otherwise, it will be equal to the nominal value on the label;

 For the ST/ST-R model, the Total Litres will refer to the capacity of the dishwasher's tank in case the detergent is being dosed. The value will refer to the rinse litres, i.e. to the capacity of the backfilling boiler, in case brightener is being dosed.

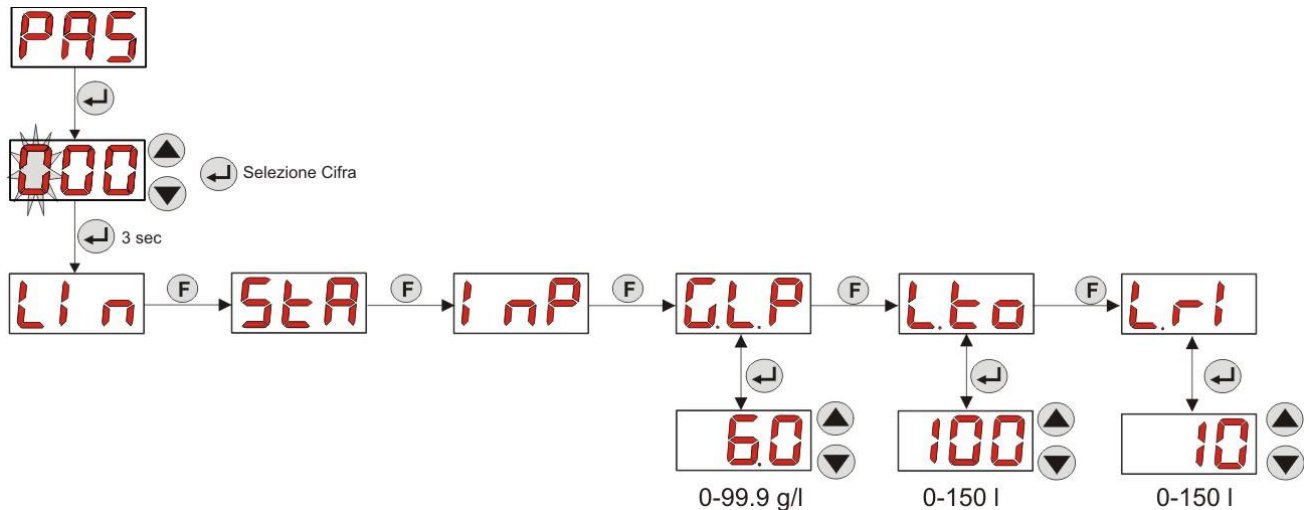


Fig. 19- Setting the Quantity of Product-2ST

3.3.5 Setting the g/l of Active Principle

From the **OPt** section of the Programming menu, by browsing with the **F** key in case the pump is operating with the g/l of Active Principle mode, it will be possible to set the following parameters:

- Quantity of Active Principle in g/l **G.L.A**: to enter and exit the submenu, use the **Enter** key. The keys **▲** and **▼** increase/decrease the value from 0 to 99.9 g/l;
- Concentration of Active Principle in the product **Con**: to enter and exit the submenu, use the **Enter** key. The keys **▲** and **▼** increase/decrease the value from 1% to 100%;
- Density of product to be dosed **dEn**: to enter and exit the submenu, use the **Enter** key. The keys **▲** and **▼** increase/decrease the value, that will be displayed as a difference from the value of 1000 g/l, from -50 to 500 g/l, i.e. in a density range from 950- 1500 g/l.
- Total Litres **to.L**: to enter and exit the submenu, use the **Enter** key. The keys **▲** and **▼** increase/decrease the value, from 0 to 99.9 litres with decimal precision, and from 100 to 150 litres (see section 3.3.4.);
- 2ST Model** Backfilling Litres (rinse) **rl.L**: to enter and exit the submenu, use the **Enter** key. The keys **▲** and **▼** increase/decrease the value, from 0 to 99.9 litres with decimal precision, and from 100 to 150 litres;

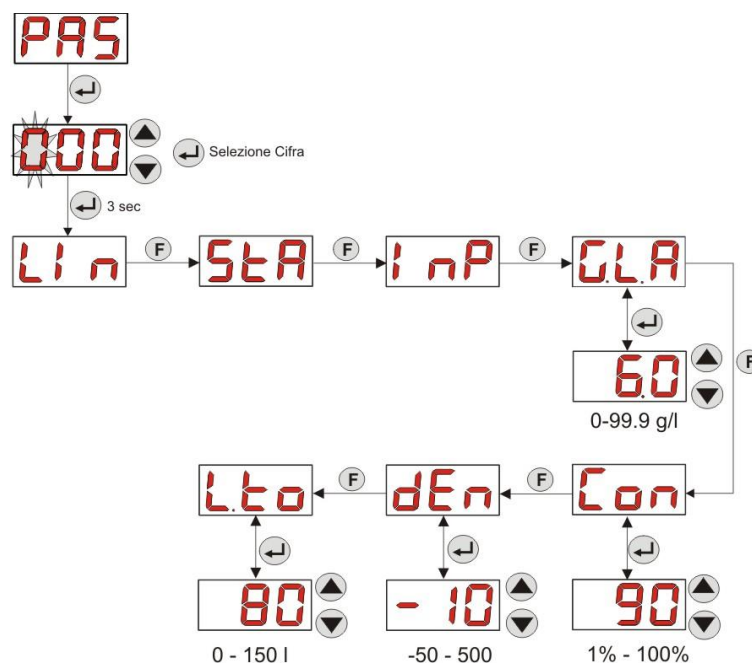


Fig. 20- Setting the Quantity of Active Principle –ST/ST-R

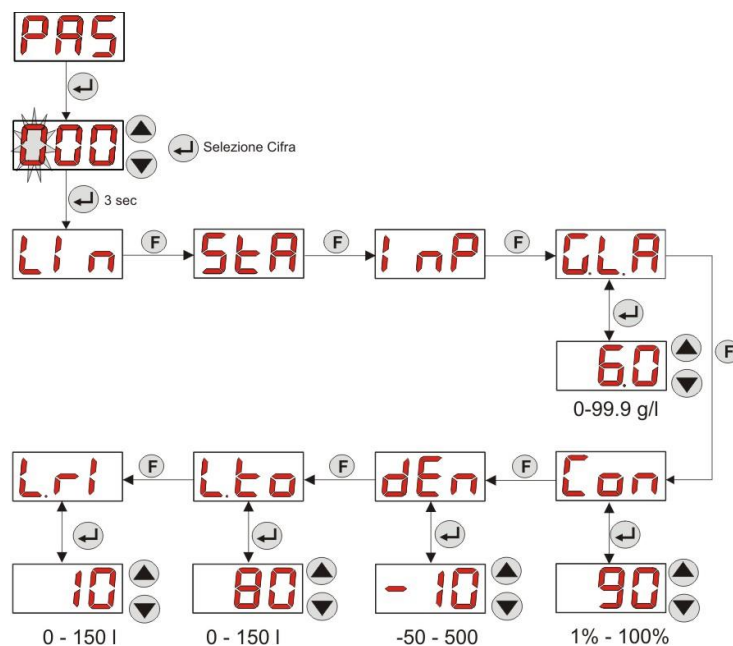


Fig. 21- Setting the Quantity of Active Principle –2ST

3.3.6 Calibrating the Pump

The calibration of the pump allows to achieve more accurate dosing for the 3 operating modes (Time/Speed, g/l of product, g/l of active principle): if the calibration is not carried out, dosing times would be calculated on the basis of the value of the pump rated flow rate value (read the value on the label).

From the **CAL** entry, you will be able to calibrate the pump for a fixed time of 60 seconds, thereby measuring the amount of liquid dosed via a graduated container used as a reference: from the start label “StA”, launch the count by pressing **Enter** and the pump will start dosing at top speed. Finally, just set the amount in ml (from 0 to 300).

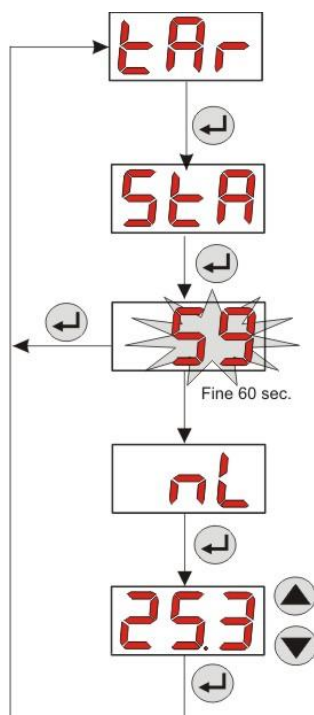


Fig. 22- Pump Calibration Menu

3.3.7 Resetting Default Parameters

From the **d.P.r** entry you will be able to reset the equipment default parameters (refer to the **Default Parameter Table**). If you choose to reset the initial values, you will go back to the initial display. See Fig. 23

Once you confirm with **YES**, you cannot go back.

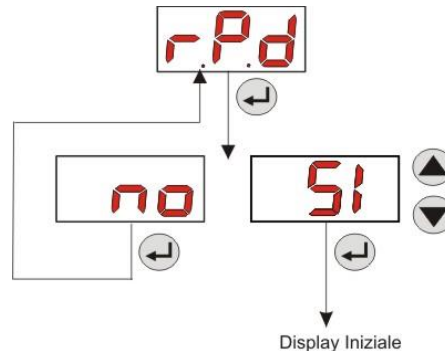


Fig. 23- Default parameter reset

3.3.8 Settings Menu

From the **OPt** entry of the Programming Menu, via the **Enter** key, you can access the **Settings Menu**

From the Settings Menu you can carry out the following operations (refer to **Figure 18**):

- Set the password to access the programming section **PAS**: with **Enter** you can go to the “000” selection page, with the ▲ and ▼ keys you can increase/decrease the value displayed and with **Enter** you can scroll to the figure you intend to set. After choosing the new password, press **Enter** for 3 seconds to go back to the **PAS** entry;
- Enable the pump stop in case of a **P.St** level alarm: to enter and exit the submenu, use the **Enter** key, use the ▲ and ▼ keys to choose “YES/no”;
- Defining the **d.l.n. operation mode**: to enter and exit the submenu, use the **Enter** key from the selection page. Use the keys ▲ and ▼, to visualize **A.P.L** (g/l of Active Principle)/ **Pr.L** (g/l of Product)/ **t.S** (Time/Speed);

Passing from a quantity mode to a Time/Speed mode, for the ST model the dosing time will be equal to **tIn=0** and speed will be **PEr=5**; for the 2ST model **CH.t=0** and **dE.t=0** and speed values will be **CH.P=5** and **rl.P=5**.

- Set the maintenance alarm time **O.F.d** from 0 (deactivated) to 999 h: to enter and exit the submenu, use the **Enter** key. The keys ▲ and ▼ increase/decrease the value, the time format of the maintenance alarm is expressed as follows:
 - **h.mm** up to 9 h and 59 m
 - **hh.m** up to 99 h and 59 m (minutes expressed in tens)
 - **hhh** up to 999 h
- Choose if you want to enable modification of the parameters' value, **OnL** from the User Menu: to enter and exit the submenu, use the **Enter** key, use the ▲ and ▼ keys to choose “YES/no”;
- Enable the **bu.E** buzzer when an alarm is activated: to enter and exit the submenu, use the **Enter** key, use the ▲ and ▼ keys to choose “YES/no”;
- **2ST Model**: Set the First load Waiting Time **HLd** from 5 to 999 seconds, or OFF (Waiting time deactivated): to enter and exit the submenu, use the **Enter** key. The keys ▲ and ▼ increase/decrease the value displayed;
- **2ST Model**: Set the First load Delay Time **CH.d** from 0 to 999 seconds: to enter and exit the submenu, use the **Enter** key. The keys ▲ and ▼ increase/decrease the value;
- **2ST Model**: Set the Filtering time on the rinse signal **rd.E** from 0 to 999 seconds: to enter and exit the submenu, use the **Enter** key. The keys ▲ and ▼ increase/decrease the value;

- 2ST Model:** Access the load signal recognition window: **CH.t:** to enter and exit the submenu use **Enter**. The display will show the status identified by the pump for the input signal:
Steady "HI": load signal identified as active;
Steady "Lo": load signal identified as not active;
Flashing "HI": load signal identified as active, but slightly above the identification voltage threshold;
Flashing "Lo": load signal identified as not active, but slightly below the identification voltage threshold;
 If the status displayed does not correspond to the actual status of the signal or if the status displayed is flashing, just scroll with the ▲ and ▼ keys to change the threshold, namely:
 Signal not active:
 → if the signal is identified as active (steady or flashing **HI**), or not active but near the threshold (flashing **Lo**), press ▼ to reduce the threshold voltage until a steady "**Lo**" is displayed;
 → if the signal is permanently identified as not active (steady **Lo**), conduct a check when the signal is activated;

 Signal active (activation of the dishwasher's load):
 → if the signal is identified as not active (**Lo** steady or flashing), or active but near the threshold (flashing **HI**), press ▲ to increase the threshold voltage until a steady "**HI**" is displayed;
 → if the signal is permanently identified as not active (steady **HI**), conduct a check when the signal is disabled;
- Access the rinse signal recognition window **S.rl:** to enter and exit the submenu use **Enter**. The display will show the status identified by the pump for the input signal:
Steady "HI": rinse signal identified as active;
Steady "Lo": rinse signal identified as not active;
Flashing "HI": rinse signal identified as active, but slightly above the identification voltage threshold;
Flashing "Lo": rinse signal identified as not active, but slightly below the identification voltage threshold;
 If the status displayed does not correspond to the actual status of the signal or if the status displayed is flashing, just scroll with the ▲ and ▼ keys to change the threshold, namely:
 Signal not active;
 → if the signal is identified as active (steady or flashing **HI**), or not active but near the threshold (flashing **Lo**), press ▼ to reduce the threshold voltage until a steady "**Lo**" is displayed;
 → if the signal is permanently identified as not active (steady **Lo**), conduct a check when the signal is activated;
 Signal active (activation of the dishwasher rinse):
 → if the signal is identified as not active (**Lo** steady or flashing), or active but near the threshold (flashing **HI**), press ▲ to increase the threshold voltage until a steady "**HI**" is displayed;
 → if the signal is permanently identified as not active (steady **HI**), conduct a check when the signal is disabled;

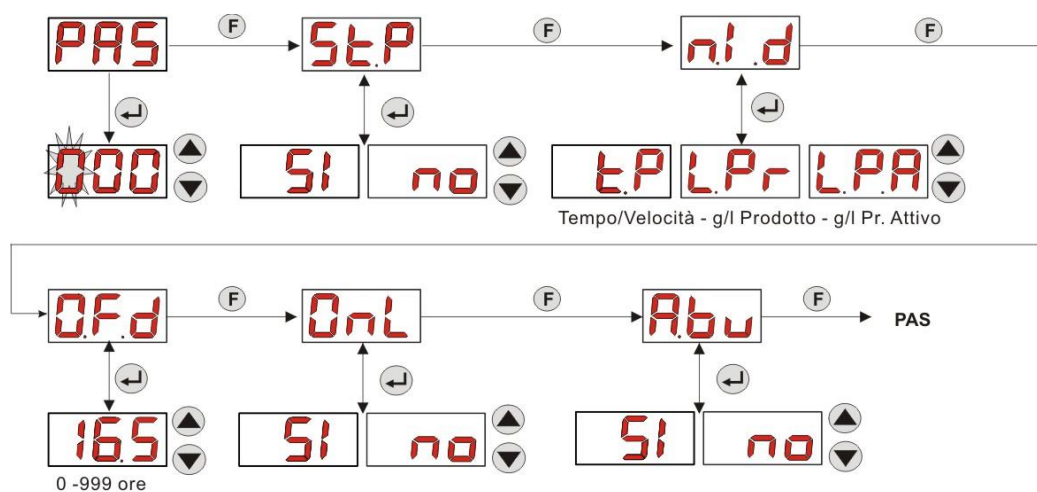


Fig. 24 - Settings Menu ST/ST-R Model

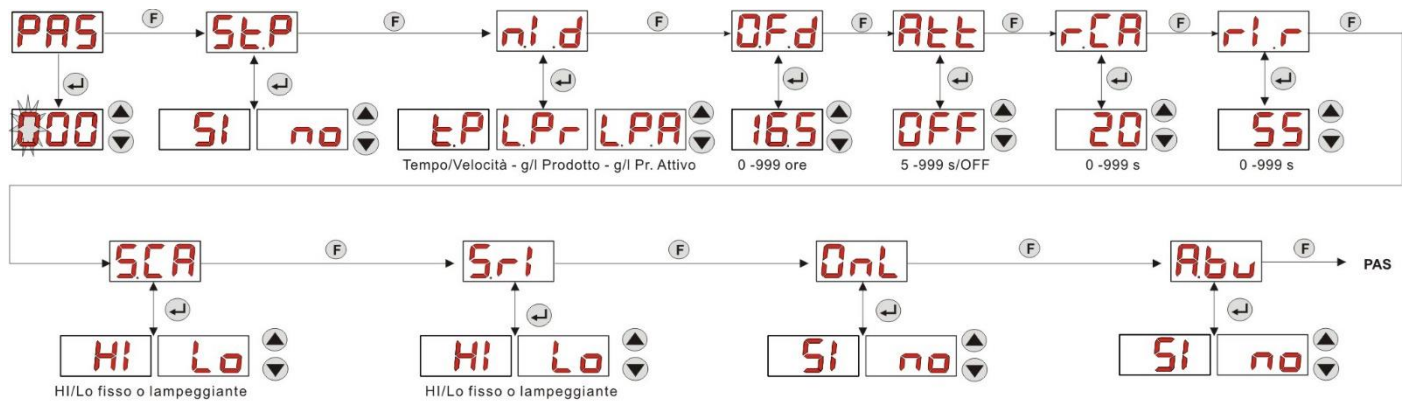


Fig. 25 - Settings Menu 2ST Model

4.0 ALARMS

4.1 MAINTENANCE ALARM

The maintenance alarm is activated when the pump has been running for longer than the time set in the relevant **O.F.d** submenu (see *Settings Menu*).

If you set 0.00 (h.mm) as a time value for the maintenance alarm, it will be disabled.

This is reported by the pump as follows:

- Audio signal via the buzzer (if there is one on the pump) with a frequency of 1 second on and 1 second off;
- flashing red LED;
- “**OFd**” flashing on the display;
- countdown of the blocked ongoing dosing

In this alarm status the motor is stationary. To disable the alarm, you need to access the pump operating time in the Statistics Menu and reset the value.

4.2 LEVEL ALARM (only for the model with the level probe)

A level probe can be connected to the pump to report the end of the product, which is indicated by the pump in the following way:

- Audio signal via the buzzer (if there is one on the pump) if enabled (see **Bu.E** in the “Settings Menu”) with a frequency of 1 second on and 1 second off;
- flashing red LED;
- “**uLo**” flashing on the display;

The inlet has a 3-second recognition filter to identify false contacts and unwanted level alarm signals.

This alarm may or may not imply the pump stop, depending on the option chosen in the “**P.St**” submenu (Settings Menu: **P.St**=YES→ the pump is stopped; **P.St**=no→ the pump keeps on dosing).

The alarm is automatically reset when the level of the chemical product to be dosed is restored.

i In priming mode, the level alarm is not indicated.

4.3 OFF STATUS ALARM

If the switch is left on the OFF position, after 20 minutes the switch alarm is activated and signalled by the pump in the following way:

- Audio signal via the buzzer (if there is one on the pump) with a frequency of 1 second on and 1 second off;
- flashing red LED;
- “**OFF**” flashing on the display;

5.0 MAINTENANCE

This section reports the general rules you need to follow to operate the pump correctly and the steps to carry out periodically to ensure optimal conditions are maintained over time.

5.1 GENERAL RULES

Maintenance operations must be conducted systematically and accurately by following the recommendations reported below to the letter.

It is difficult to define the standard times required for maintenance beforehand, as there are a number of factors that determine the wear of the pump and in particular the parts that are in contact with the liquid.

This also applies to the type of product used to clean the materials that are in contact with it (valves, etc.) as it depends on the compatibility of the material with the chemical product being dosed.

Having said this, we can take as an example a product, such as sodium hypochlorite, that develops crystals, which is often used with our pumps, and with which we have a great deal of experience, and identify the type of maintenance required.

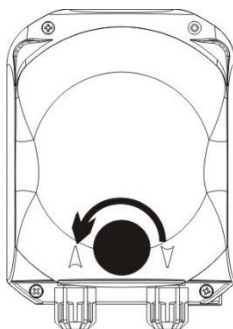
5.2 PERIODIC MAINTENANCE

- Check the foot strainer and clean it periodically from any residuals of crystallised product or dirt deposits;
- Ensure there are no impurities in the suction and delivery tubes, because they may damage the peristaltic tube and, at the same time, cause anomalies in the flow rate;
- **The pump materials that are in contact with the chemical product, such as the foot strainer and the injection valve, must be checked and cleaned at least every three months.** If the products are particularly aggressive increase the frequency of cleaning;
- Calibrate the pump periodically;

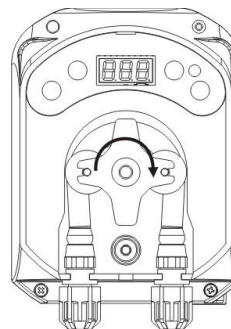
To remove and reassemble the peristaltic tube refer to the steps described respectively in Figures 26 and 27.

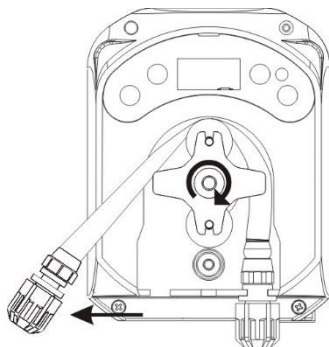
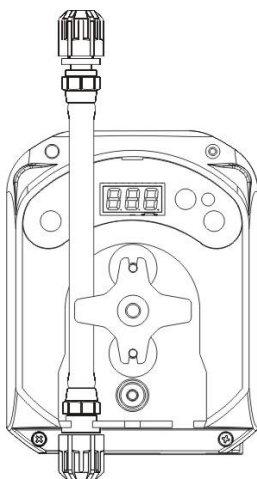
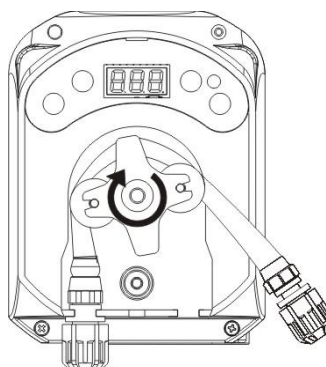
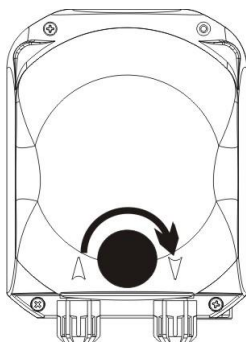
Removing the peristaltic tube

Step 1 - Open the front glass



Step 2 - Turn the roller clockwise and release the (left) suction ring nut



Step 3 - Remove the tube**Step 4** - Release the (right) delivery ring nut and remove it completely**Fig. 26 - Removal of the peristaltic tube****Reassembly of the peristaltic tube****Step 1** - Position the tube and secure it on the left-hand side**Step 2** - Insert it in the bell by turning the roller**Step 3** - Close the front glass**Fig. 27 - Reassembly of the peristaltic tube**

5.3 TROUBLESHOOTING

Problem: the pump does not turn on, the LED and display remain off

Solution:

1. Make sure the connection to the electrical network has been set up correctly in accordance with the information provided on the pump identification plate.
2. The electronic board may be damaged as well: call the support Service.

Problem: the pump works well but it doesn't inject the liquid in the dishwasher

Solution:

1. Check the product level in the tank.
2. Make sure the foot strainer is not clogged up.
3. Make sure the injection valve is not clogged up.
4. Check the status of the peristaltic tube. If evident malformations are detected, make sure that the material is compatible with the product being dosed by consulting the chemical compatibility table (see [ANNEX D](#)), and then go ahead with the replacement.

Problem: liquid leaking from the peristaltic tube

Solution:

1. Make sure the delivery and suction tubes are inserted properly and the ring nuts are well tightened.
2. Check the status of the peristaltic tube. If evident malformations are detected, make sure that the material is compatible with the product being dosed by consulting the chemical compatibility table (see [ANNEX D](#)), and then go ahead with the replacement.

Problem: no alarm has gone off, but the pump is not dosing

Solution:

2. Make sure the switch is not set to OFF.
3. Make sure that the values of the dosing time **tnP/CH.t/t.rl** (Time/Speed mode) or the g/l of Product **G.L.P** (Grams per Litre of Product mode) or the g/l of Active Principle **G.L.A** (Grams per Litre of Active Principle mode) or the litres set **to.L /L.rl** (g/l of Product or Active Principle mode) are not 0.
4. **2ST Model:** Please check that the voltage thresholds of the load and/or rinse signals are correctly set (*from CH.t and S.rl sections, Settings Menu*);

5.0 Returning material to the After-sales service

The material must be sent back in its packaging with all the original protections before the end of the guarantee period.

The system must be clean and the chemical product removed from the tubes.

In case these conditions are not observed, the producer will not be held responsible for possible damages occurred during transportation.

6.0 WARRANTY CERTIFICATE

The manufacturer provides warranty covered for pumps made by them for a period of 12 months, starting from the delivery date to the first user ().*

Within the above terms the producer agrees to provide spare parts for any parts that they, or their authorised representative, believe present factory or material defects free of charge; or to carry out the repair directly or through authorised workshops.

The producer is nevertheless excluded from any other responsibility and obligation regarding other expenses, direct or indirect damage and losses deriving from the use or from the impossibility, either total or partial, to use the pumps.

Repairs or spare parts will not extend nor renew the guarantee period.

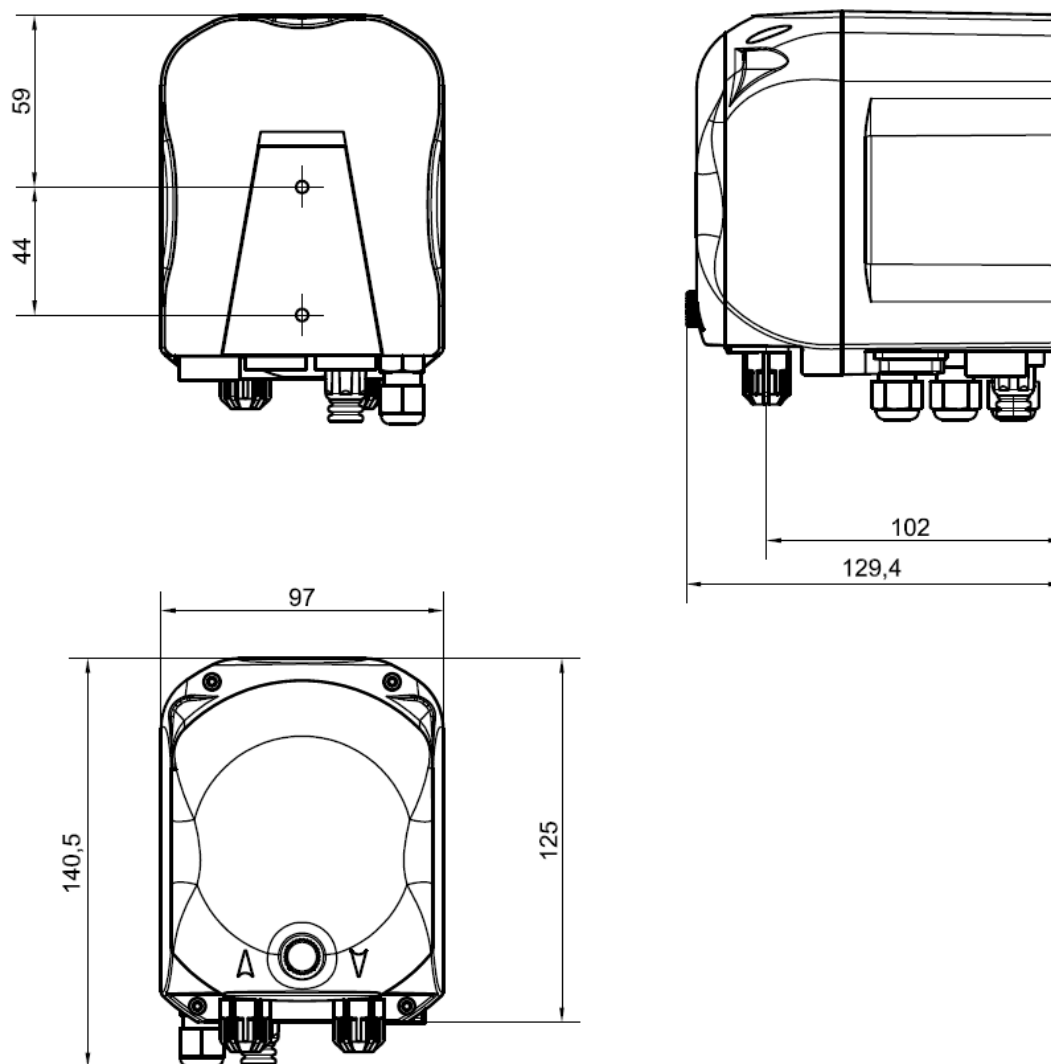
Costs to assemble and disassemble the pump from the system, shipping costs and consumables (filters, valves, etc.) are borne by the user.

The above-mentioned obligations for the producer will not be valid in case:

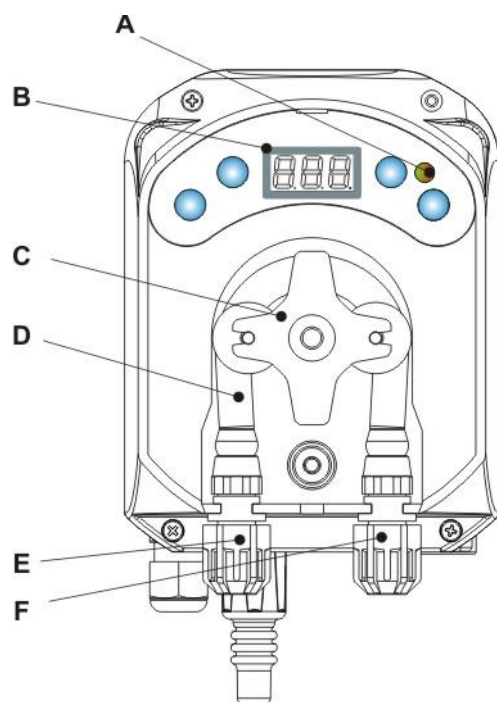
- *The pumps are not used in compliance with the instructions provided on the operating and maintenance booklet;*
- *The pumps are repaired, dismantled or modified by workshops that have not been authorised by the manufacturer;*
- *Non-original spare parts have been used;*
- *The injection systems have been damaged by non-compliant products;*
- *The electric systems are damaged due to external factors like over-voltage, electric discharges, etc.;*

When the warranty period expires, 12 months after delivery of the pump, the manufacturer is relieved of any responsibility and obligations described in the above paragraphs

() as attested by the serial code and the invoice issue date*

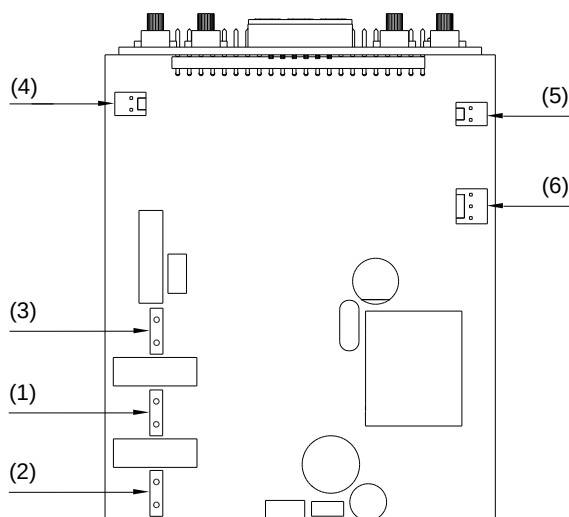
ANNEX A - Overall dimensions

ANNEX B - Reference Figures

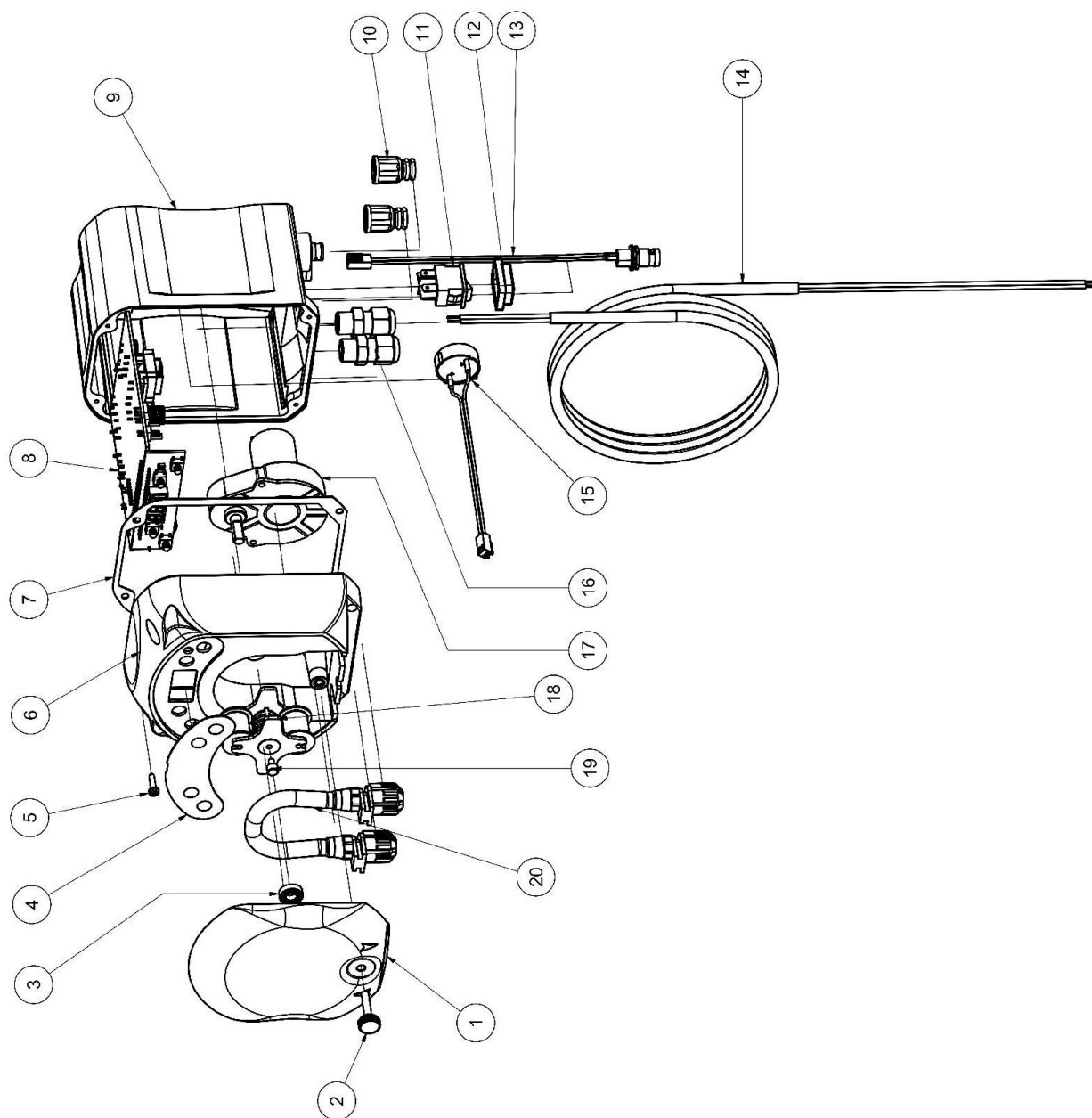


Ref.	Description
A	Two-coloured LED
B	3-digit display with 7 segments
C	Roll-holder
D	Peristaltic tube
E	Intake fitting
F	Delivery fitting

Electronic Board layout



Ref.	Description
1	Connector VAC1 (EV load/rinse ST/ST-R - EV load 2ST)
2	Connector VAC2 (not present in model ST/ EV rinse 2ST)
3	Motor connector
4	Level Connector
5	Buzzer Connector
6	Switch Connector

ANNEX C - Exploded views

No.	CODE	DESCRIPTION	QTY
1	ADSP8000195	PERISTALTIC NEUTRAL SMOKED FRONT COVER	1
2	ADSP8000029	KNOB TO SECURE CLEAR TEC COVER	1
3	ADSP4100207	SKF 618/6 BEARING FOR COVER PUMP 100LT	1
4	ADSP7000655	POLYCARBONATE PERISTALTIC LABEL DGTEC ST/ ST-R/2ST-AQUA	1
5	ADSP6000714	STAINLESS STEEL A2 M 2.9 X 13 SCREW UNI 6954 (slotted pan head)	4
6	ADSP9600005	DGTEC PERISTALTIC FRONT FRAME	1
7	ADSP6000059	PAPER GASKET FOR DIGITAL PERISTALTIC	1
8	ADSP6000969	SKD DGTEC ST 230 VAC	1
	ADSP6000970	SKD DGTEC 2ST 230 VAC	1
9	ADSP9600006	DGTEC PERISTALTIC BACK FRAME	1
10	ADSP6000948	FEMALE BNC PROTECTION FROM BLACK RUBBER PANEL	2
11	ADSP6000685	3A 250V ON/OFF/PAUSE FLIP SWITCH	1
12	ADSP6000686	CLEAR PROTECTIVE COVER FOR ON/OFF SWITCH	1
13	ADSP6000292	CRIMP. CONN.FEMALE BNC CONNECTOR 2.54 L160 R/N CABLED (Conn. Level)	1
14	ADSP6000419	THREE-POLE CABLE 3X0.75 1.5 METRES WITH SCHUKO PLUG - - H05VV-F 3G0.75 -	1/ 2(*)
15	ADSP6000627B	PIEZO. BUZZER ASSEMBLY CONN. HAND WHEEL 2 POLES P2.54 WIRES AWG24 L=120	1
16	ADSP6000424	PG7 PITCH CABLE GLAND - 1900.07 - B	3
17	ADSP8000254	RAP 225 24VDC PER-R MOTOR	1
18	ADSP8000009A	COMPLETE PER-R 4/6-1 ROLLER-HOLDER	1
19	ADSP8000028	ROLLER-HOLDER GUIDE PIN	1
20	ADSP8000109	COMPLETE SANTOPRENE TUBE	1
20**	ADSP8001128	INCOMPLETE SILICONE TUBE	

(*) one cable for the ST model / 2 cables for the 2ST model

(**) tube for the ST-R model

ANNEX D - Chemical Compatibility Table

Key: 1: excellent/good resistance

2: moderate resistance

3: non-resistant

Product	Formula	Ceram.	PVDF	PP	PVC	Hastel.	PTFE	FPM (Viton)	EPDM (Dutral)	NBR	PE
Acetic Acid, Max 75%	CH ₃ COOH	2	1	1	1	1	1	3	1	3	1
Concentrated Hydrochloric Acid	HCl	1	1	1	1	1	1	1	3	3	1
Hydrofluoric Acid, 40%	H ₂ F ₂	3	1	1	2	2	1	1	3	3	1
Phosphoric Acid, 50%	H ₃ PO ₄	1	1	1	1	1	1	1	1	3	1
Nitric Acid, 65%	HNO ₃	1	1	2	3	1	1	1	3	3	2
Sulphuric Acid, 85%	H ₂ SO ₄	1	1	1	1	1	1	1	3	3	1
Sulphuric Acid, 98.5%	H ₂ SO ₄	1	1	3	3	1	1	1	3	3	3
Amines	R-NH ₂	1	2	1	3	1	1	3	2	3	1
Sodium bisulphite	NaHSO ₃	1	1	1	1	1	1	1	1	1	1
Sodium Carbonate (soda)	Na ₂ CO ₃	2	1	1	1	1	1	2	1	1	1
Ferric chloride	FeCl ₃	1	1	1	1	1	1	1	1	1	1
Calcium Hydroxide	Ca(OH) ₂	1	1	1	1	1	1	1	1	1	1
Sodium Hydroxide (caustic soda)	NaOH	2	1	1	1	1	1	2	1	2	1
Calcium Hypochlorite	Ca(OH) ₂	1	1	1	1	1	1	1	1	3	1
Sodium Hypochlorite, 12.5%	NaOCl+NaCl	1	1	2	1	1	1	1	1	2	2
Potassium permanganate, 10%	KMnO ₄	1	1	1	1	1	1	1	1	3	1
Hydrogen Peroxide, 30%	H ₂ O ₂	1	1	1	1	1	1	1	2	3	1
Aluminium Sulphate	Al ₂ (SO ₄) ₃	1	1	1	1	1	1	1	1	1	1
Copper Sulphate	CuSO ₄	1	1	1	1	1	1	1	1	1	1

Key: 1: excellent/good resistance

2: moderate resistance

3: non-resistant

Product	Formula	PharMed	Tygon LFL	Santoprene
Acetic acid 50%- 60%	CH ₃ COOH	1	1	2
Hydrochloric acid 37%	HCl	1	1	2
Hydrofluoric Acid 40-48%	H ₂ F ₂	3	2	3
Phosphoric acid	H ₃ PO ₄	1	1	1
Nitric Acid 68%-71%	HNO ₃	3	3	3
Sulphuric Acid 30%	H ₂ SO ₄	1	1	1
Sulphuric Acid 95%-98%	H ₂ SO ₄	3	3	2
Amines	R-NH ₂	2	3	1
Sodium sulphates	NaHSO ₃	1	1	1
Sodium Carbonate (soda)	Na ₂ CO ₃	1	1	1
Ferric chloride 43%	FeCl ₃	1	1	1
Calcium Hydroxide	Ca(OH) ₂	1	1	1
Sodium Hydroxide (caustic soda) 30-40%	NaOH	1	2	1
Calcium Hypochlorite 20%	Ca(OH) ₂	1	1	1
Sodium Hypochlorite, 12.2%	NaOCl+NaCl	1	1	1
Potassium permanganate, 6%	KMnO ₄	1	1	1
Hydrogen Peroxide, 30%	H ₂ O ₂	1	1	1
Aluminium Sulphate 50%	Al ₂ (SO ₄) ₃	1	1	1
Copper Sulphate 13%	CuSO ₄	1	1	1

ANNEX E - Tubes' features Table

The technical features of the tubes guarantee the accurate dosing and the safety throughout the useful life of the pump.

It is important to stress the fact that, depending on the product to be dosed in the dishwasher, different delivery tubes may be assembled:

to dose the detergent, the same tube is normally used for delivery and suction. It is a normal, non-rigid PVC tube. To dose the detergent, it will be necessary to use a rigid PE delivery tube, while for suction a PVC one will be used.

Suction Tube
4 x 6 mm PVC (clear)

 The following table is based on the information collected from the tube manufacturer, and therefore shall be considered as a general guide. Please remember that the materials' behaviour can be influenced by many factors. The producer will not be held responsible for the data of this table.

Delivery Tube	Operating pressure	Burst pressure
4 x 6 mm PE (opaque)	20°C - 12 bar	20°C - 36 bar
	30°C - 10.5 bar	30°C - 31.5 bar
	40°C - 8.5 bar	40°C - 25.5 bar
	50°C - 6.2 bar	50°C - 18.5 bar

ANNEX F - Default Parameters**Default Parameters Table**

IT parameter	EN Parameter	Meaning	Value
A.bu	Bu.E	Buzzer Enabling	SI
Att	HLd	2ST First Charge Waiting time	OFF
Con	Con	Concentration (Active Principle)	100
dEn	dEn	Density (Active Principle)	0
G.L.A	G.L.A	Active principle g/l	1.0
G.L.P	G.L.P	Product g/l	1.0
LIn	LAn	Language	En
L.rl	rl.L	Backfilling Litres (2ST)	10
L.to	to.L	Total Litres	10
n.I.d	n.I.d	Data Input Mode	t.S
O.F.d	O.F.d	Maintenance Time	0.00 (Deactivated)
OnL	OnL	On Line	SI
PEr/ P.CA	PEr/ CH.P	2ST % Speed/ % Load Speed	5
P.rl	rl.P	2ST % Rinse Speed	5
r.CA	CH.d	2ST First Load Delay	0 sec
rl.r	rl.r	2ST Rinse Signal Filtering	0 sec
S.CA	CH.t	Charge Signal Threshold	2 V
S.rl	rl.t	Rinse Signal Threshold	2 V
St.P	P.St	Pump Stop (due to Level Alarm)	no
tnP/t.CA	tIn/ CH.t	2ST Dosing Time/Load Time	ILL
t.rl	rl.t	2ST Rinse Time	ILL

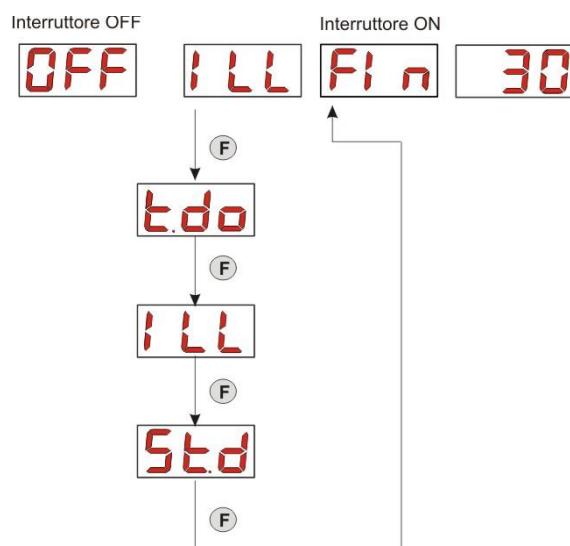
ANNEX G- Acronym Table

IT acronym	En acronym	Meaning
A.bu	bu.E	Buzzer Enabling
AdE	Pri	Priming
Att	HLd	First Load Waiting time
Con	Con	Concentration (Active Principle)
dEn	dEn	Density (Active Principle)
Err	Err	Error
Fin	End	Fine
G.L.A	G.L.A	g/l of Active principle
G.L.P	G.L.P	g/l of Product
ILL	ILL	Unlimited Dosing
InP	Opt	Settings
LIn	LAn	Language
L.P.A	A.P.L	Active principle g/l Mode
L.Pr	Pr.L	Product g/l Mode
L.rl	rl.L	Rinse Litres
L.to	to.L	Total Litres
n.I.d	d.I.n	Data Input Mode
nL	nL	ml
noS	noS	No Signal
O.F.d	O.F.d	Maintenance Time
OnL	OnL	On Line
PAS	PAS	Password
P.CA	CH.P	Load Speed Percentage
P.d.t	n.F.r	Nominal Flow Rate
PEr	PEr	Speed Percentage
P.UO	r.F.r	Desired Flow Rate
P.rl	rl.P	Rinse Speed Percentage
r.CA	CH.d	First Load Delay
rl.r	r.dE	Delay (filtering) of the rinse signal
rlt	dEL	Delay (load)
r.P.d	d.P.r	Default Parameters Reset
rSt	rSt	Reset
S.CA	CH.t	Load signal threshold
SI / no	YES/ no	SI/ NO
StA	StA	Statistics/ Start
St.d	d.St	Dosing Status
St.P	P.St	Pump Stop (due to Level Alarm)
tAr	CAL	Pump Calibration
t.CA	CH.t	Loading Dosing Time

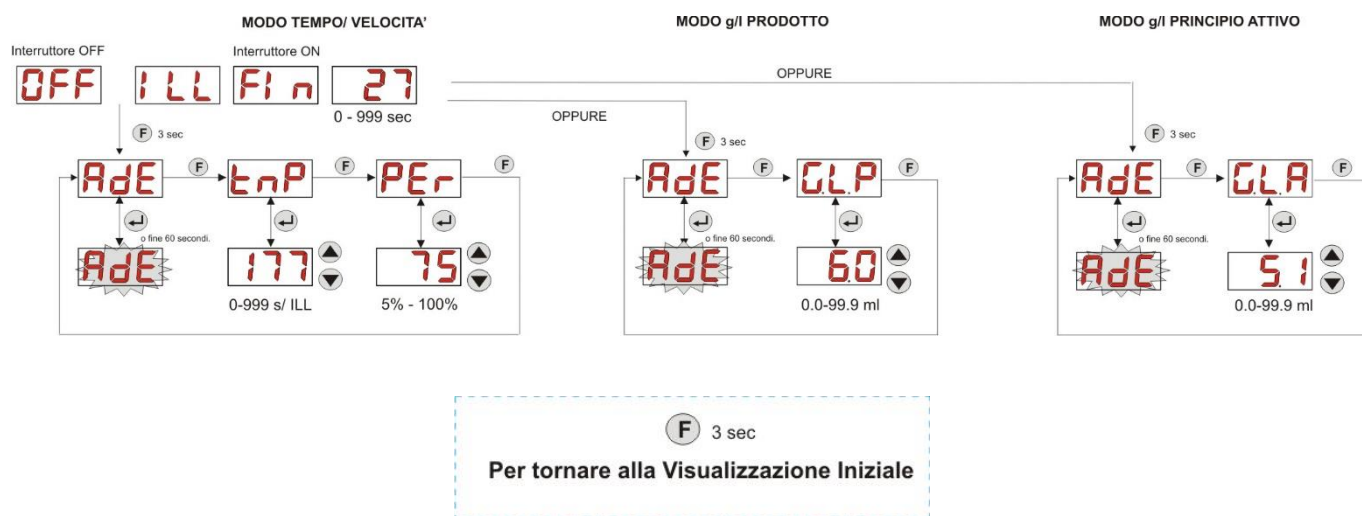
t.do	do.t	Dosing Time (Initial Menu)
tnP	tIn	Dosing Time (Programming)
t.P	t.S	Time/ Speed Mode
t.rl	rl.t	Rinse Dosing Time

ANNEX H - Map of the ST Menu

Initial Menu

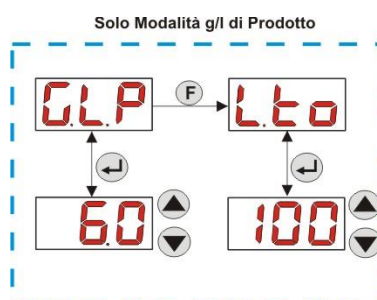
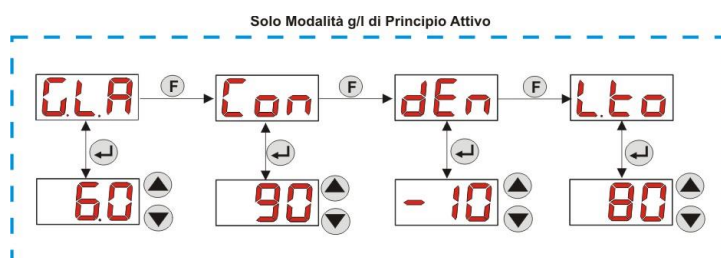
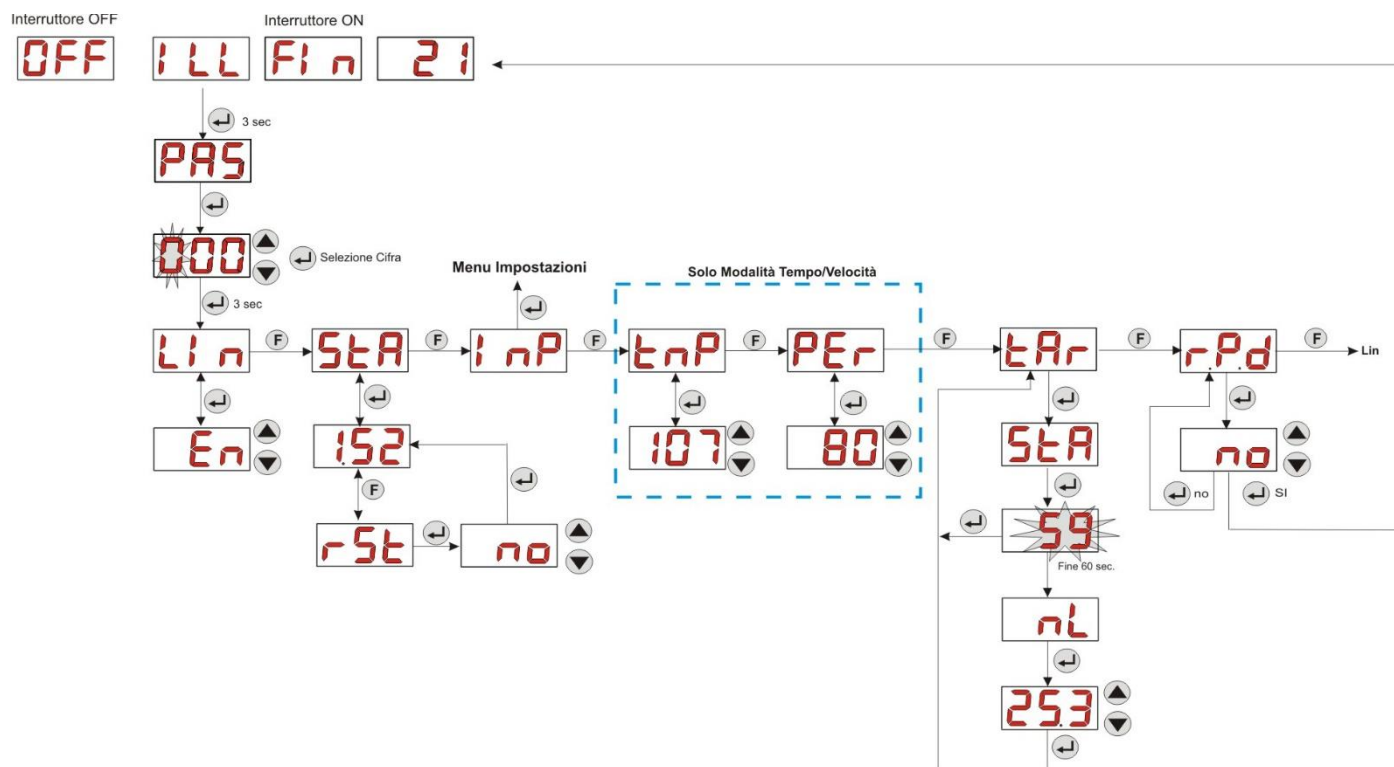


User Menu

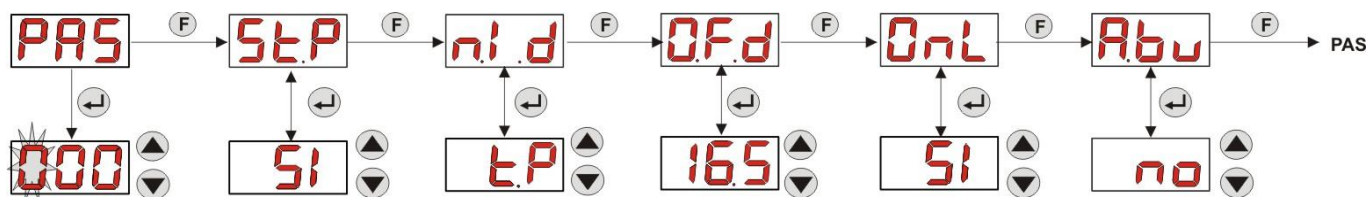


Programming Menu

The dotted part is different depending on the Operating Mode of the Pump



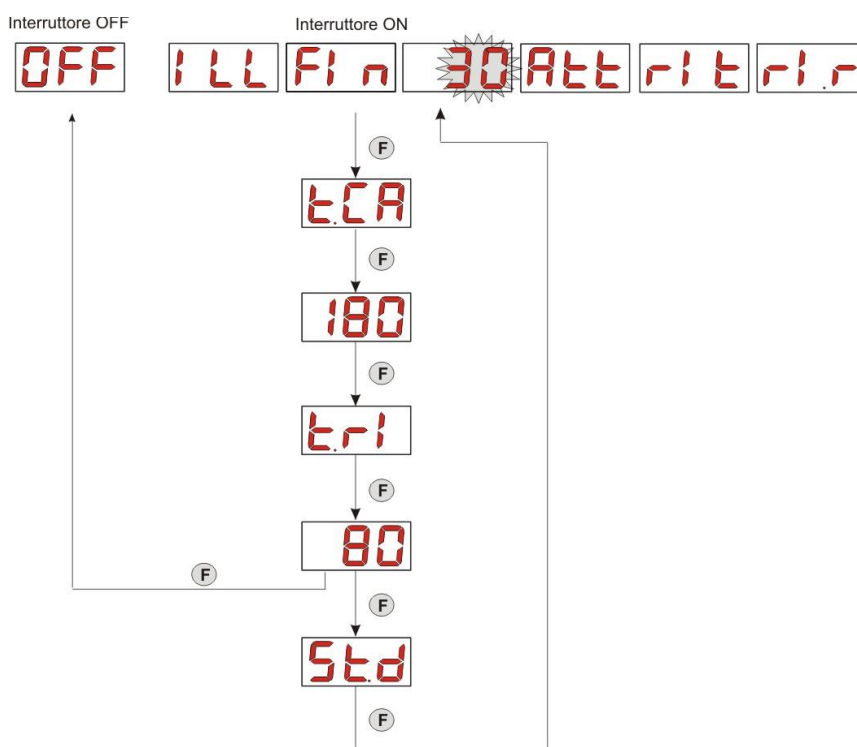
Settings Menu



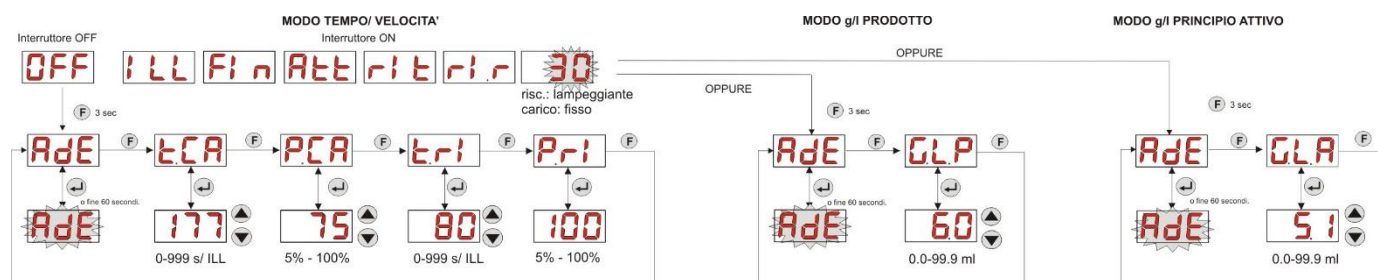
 3 sec
Per tornare al Menu Programmazione

ANNEX I - Map of the 2ST Menu

Initial Menu



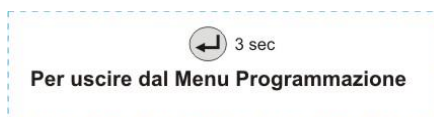
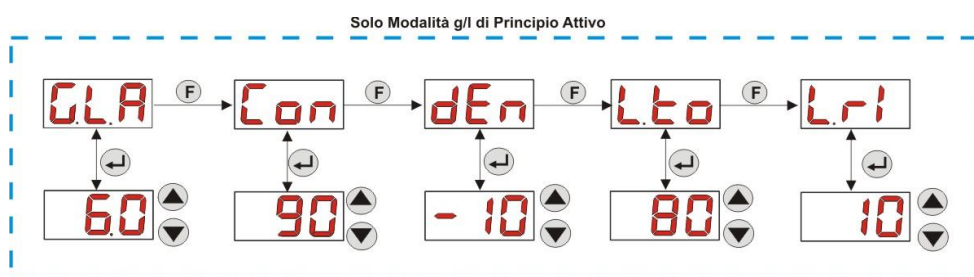
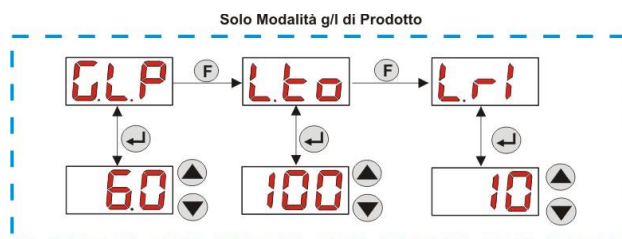
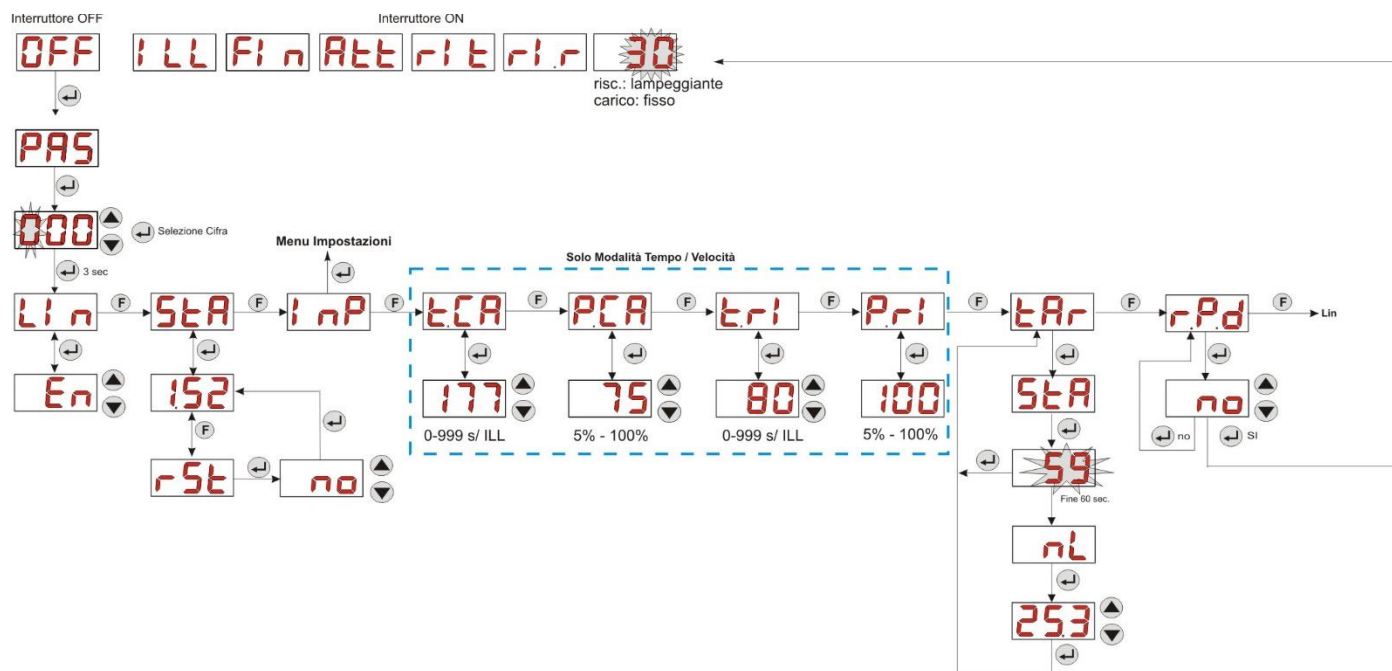
User Menu



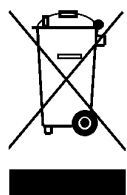
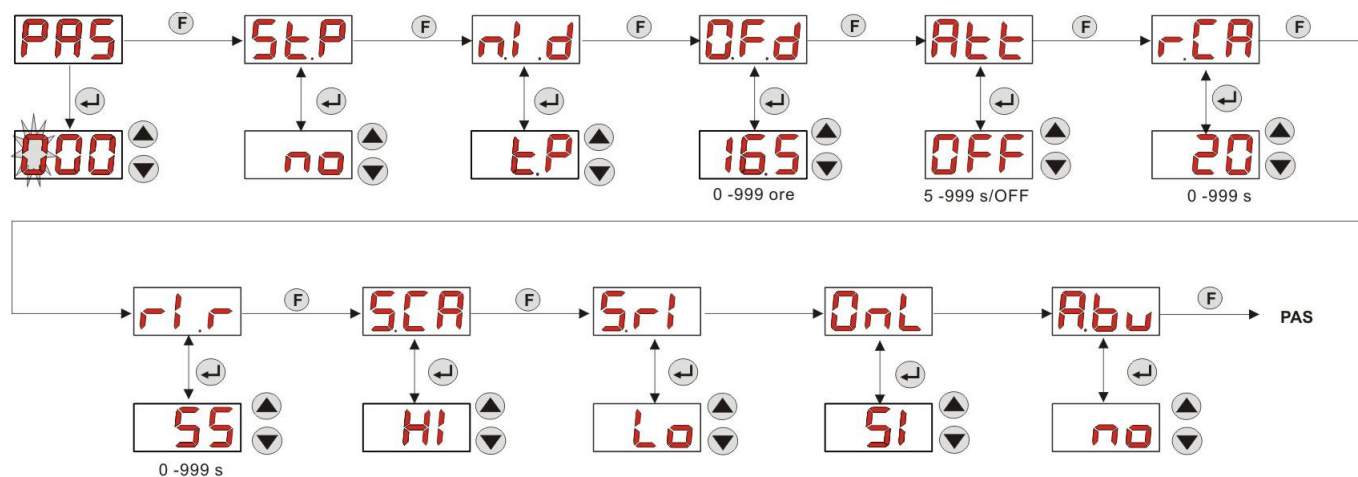
F 3 sec
Per tornare alla Visualizzazione Iniziale

Programming Menu

The dotted part is different depending on the Operating Mode of the Pump



Settings Menu



Notice is hereby given that, in compliance with art. 13 of the Italian DL no. 151, 25/07/2005 (implementation of 2002/95/EC, 2002/96/EC and 2003/108/EC):

Electrical and electronic devices shall not be considered domestic waste.

Consumers are obliged by law to return to the specific collection and recycling centres the electrical and electronic devices at the end of their useful life. Products labelled with the crossed-out wheeled bin or having this symbol placed on the instruction manual or on the packaging must be disposed of according to the regulations in force. Illegal disposal of the product involves the application of administrative sanctions provided by Italian DL no 151, 25/07/2005. Recycling, recovery and re-utilisation of waste devices are an important contribution to environmental protection.



DGTEC-ST-R

