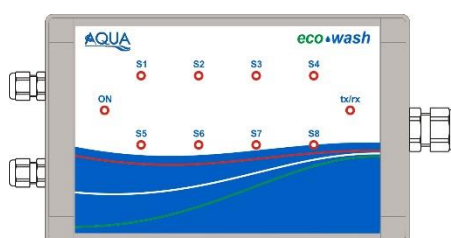
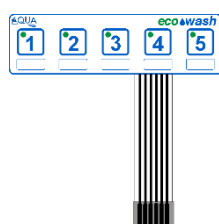




## *Instruction manual*

# **AQUA eco•wash**

*Dosing system for washing machines*





EL-DARS, EL-DEEB, JELIZOVEN &amp; HUSSEIN - POLY-EQUILIBRIUM



## 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:

- **ECOWASH**

**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) - 14 settembre 2020

Davide Vezzani  
 Certification Manager - Aqua S.p.A.

Daumid Vona

ADDA S.p.A.

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## 1.0 INTRODUCTION

The **eco•wash** has been designed for the automatic dosage of chemical products on any type of washing machine, from the smaller models to the large tunnel machines.

The **eco•wash** system is able to satisfy every requirement in fact, thanks to the full modularity, we can assemble up to a maximum of 10 pumps, choosing from the low flow rate (LF model, maximum flow rate of 20 L/H, adjustable from 0 to 100%) and the large flow rate (HF model, maximum flow rate of 100 L/H, adjustable from 0 to 100%). Simultaneous can work at maximum three pumps.

The feature making the **eco•wash** a state-of-the-art system, is the Bluetooth technology enabling easy and full system management; once the AQUAWARE software is installed on a PC, provided with the Bluetooth connection module, it is possible to remotely manage the system. To manage means: system configuration, definition of the dosing programs and control of the statistics relating to dosages.

### 1.1 STANDARDS OF REFERENCE

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

- n. 89/336/EEC “electro-magnetic compatibility” with relative amendments and integrations (92/31/EEC, 93/68/EEC, 93/97/EEC)
- n. 73/23/EEC “low voltage directive” with relative amendment n. 93/68/EEC
- n. 2002/95/EC, 2002/96/EC, 2003/108/EC “RoHs and WEEE Directives”



Pursuant to art. 13 of LD n. 151 dated 25/07/2005 (implementation of Directives 2002/95/EC, 2002/96/EC, 2003/108/EC) it is notified that:

The electric and electronic devices must not be considered as household waste.

The consumers must, by law, return the electric and electronic devices at the end of their useful life, to adequate differential collection centres. The crossed out rubbish mean symbol on the product, on the instructions manual or on the packaging indicates that the product is subject to the disposal rules envisioned by the Standard. Illegal disposal of the product leads to the enforcement of administrative penalties envisioned by LD n. 151 dated 25/07/2005. By recycling, reusing the material or other forms of utilising old devices, you are making an important contribution to protecting our environment.

### 1.2 TECHNICAL FEATURES

| Description              | Description             | Signals module | HF pump module | LF pump module | Relay module | Console standard | Levels module |
|--------------------------|-------------------------|----------------|----------------|----------------|--------------|------------------|---------------|
| Power supply             | 100 ÷ 240VAC<br>50/60Hz | 24VDC          | 24VDC          | 24VDC          | 24VDC        | 24VDC            | 24VDC         |
| Absorption (max)         | 130 W                   | -              | -              | -              | -            | -                | -             |
| Fuse                     | 4 A DEL<br>(5x20)       | -              | -              | -              | -            | -                | -             |
| Communications           | RS485                   | RS485          | RS485          | RS485          | RS485        | RS485            | RS485         |
|                          | Bluetooth               | -              | -              | -              | -            | -                | -             |
| Protection rating        | IP65                    | IP65           | IP65           | IP65           | IP65         | IP65             | IP65          |
| Dimensions in mm (LxHxD) | 138x230x138             | 190x120x60     | 138x230x138    | 138x230x138    | 138x230x138  | 110x85x35        | 138x230x138   |
| Weight (kg)              | 1                       | 0,5            | 2              | 1,5            | 1,5          | 0,25             | 1             |

### 1.3 PACKAGE CONTENT

- Instructions manual
- Central module
- Signals module with cable (7 m)
- Screws and wall plugs for wall fixing
- Modules retainer (2pc)
- Green connector for modules interconnection (1pc)

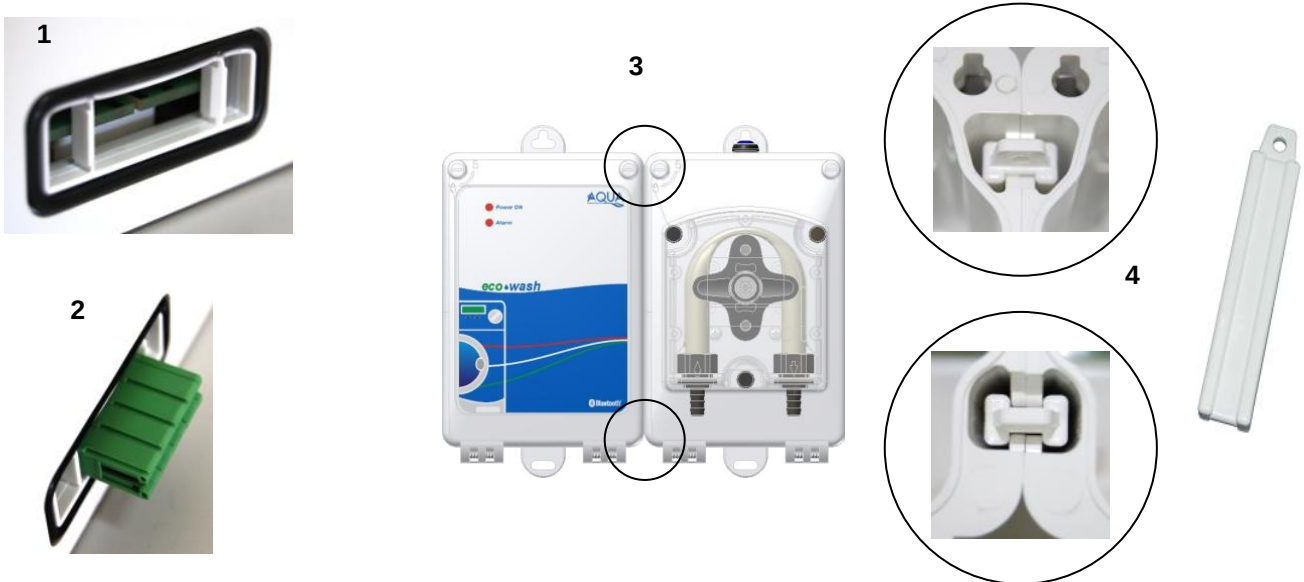
### 1.4 INSTALLATION MATERIAL

- Three-pole cable 3x1.75mm<sup>2</sup> for power supply connection on central module
- Multicore cable 16x0.25mm<sup>2</sup> for signals connection on signals module
- PVC 8x12 tube for hydraulic connections of the pumps
- Tube ø12mm for output connection of the flushing stub pipe

## 2.0 INSTALLATION

### 2.1 SYSTEM ASSEMBLY

1. Lift the lids of the modules composing the system (use a screwdriver to position the screws in opening position), so all circuits are uncovered.
2. Insert the green connectors (so the writing **TOP** is legible) on left side of the circuits. Align two modules and press to realise electric connection between them.
3. Insert the modules retainers in the internal part of the two boxes.



Example of an assembled system with four pumps and the levels module:



**i** Furthermore, it is also possible to mount the levels module (optional) next to the last pump of the system.

### 2.2 WALL MOUNTING

Position the **eco•wash** system on a wall near the washing machine and follow the instructions below:

- Install a wall plug and position the upper hole of the central module on it.
- Align the system and mark the other holes to be made on the wall (minimum four, two at top and two at bottom).
- Perforate the walls and install the other wall plugs.
- Position the system on the wall and fix it.



The maximum height between the **eco•wash** system and the chemical products tanks must not exceed 1.5 metres.

## 2.3 ELECTRIC CONNECTIONS



**ATTENTION:** Before carrying out maintenance on the appliance, always disconnect the power supply.

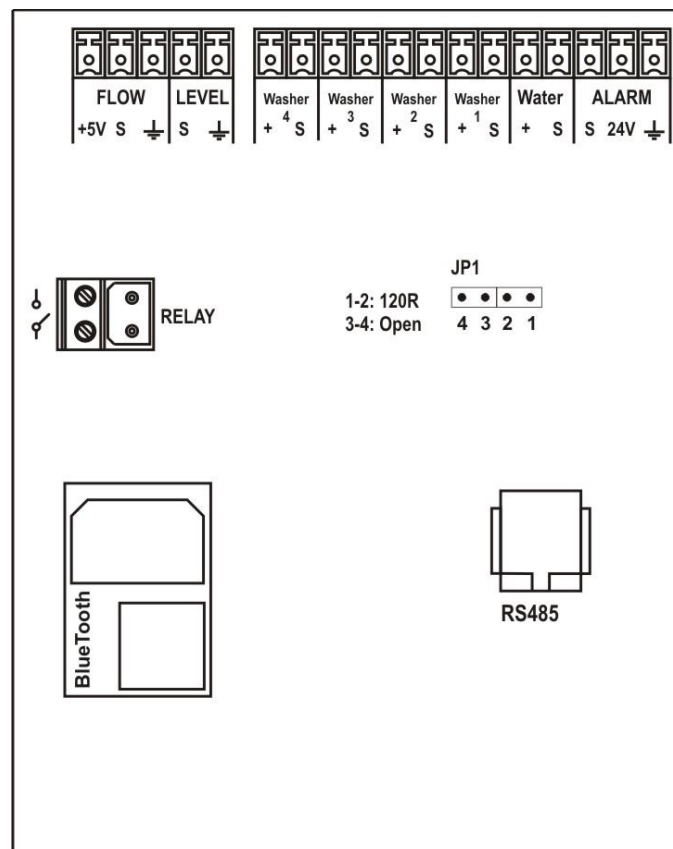


Using a multimeter, always check all electric connections of the *eco•wash* system. An incorrect voltage would cause a damage to the machine that is not covered by warranty. The following manual must always be kept as reference for any electric connection.

All electric connections must be made in compliance with the prescriptions of the local laws regarding electric system.

## 2.4 CENTRAL MODULE ELECTRIC CONNECTIONS

There are two electronic circuits inside the central module, separated by a protection plan. The power supply is in the low part of the module whereas, all other connections are on the lid.



### 2.4.1 Power supply

On the power supply boards, connect a voltage between 100 and 240VAC - 50/60Hz on clamp **F** **N**

### 2.4.2 Flushing kit solenoid valve – WATER clamps

Connect the flushing solenoid valve (24VDC voltage) on the **WATER** clamps.

### 2.4.3 Flow sensor – FLOW METER clamp

Connect the sensor found on the flushing to the **FLOW METER** clamp, respecting the colours:

- Clamp **S** connect the **BLU** wire
- Clamp **+5V** connect the **RED** wire
- Mass clamp, connect the **BLACK** wire

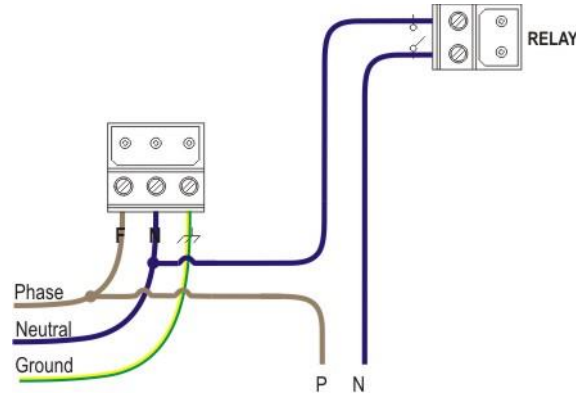
### 2.4.4 Signals module connection – RS485 clamp

Connect the telephone cable coming from the signals module to clamp **RS485**.

### 2.4.5 Relay output

The **RELAY** clamp from a dry contact (not powered); it is possible to program this output in NO (Normally Open) or NC (Normally Closed).

It is possible to use the **RELAY** clamp to obtain, for example, a voltage equal to the power supply voltage. The following figure shows a possible connection to realise such functionality.



### 2.4.6 Alarm output – OUT 24V Clamp

It is a repeat alarm output that supplies an impulsive voltage (1 second ON and 1 second OFF) at **30VDC with a maximum absorption of 500mA**.

To make the connection, connect the positive on clamp 24V and the negative on clamp S.

### 2.4.7 Level probe – connection **LEVEL** clamp

Input for level probe connection. It is also possible to connect more probes in parallel. (contact on/off, without voltage).



The level input has a programmable filter, 5 seconds by default.

### 2.4.8 Central module LEDs

The two red LED (**Power ON** e **Alarm**) that are on the module lid indicate:

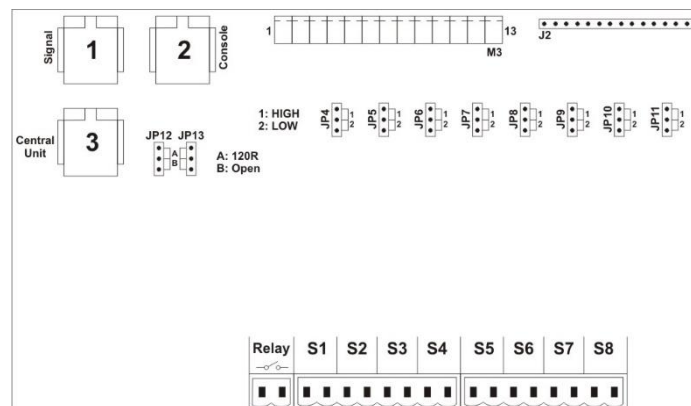
- **Power ON** continuously, it means that the system is powered.
- **Power ON** blinking, it indicates that the system is connected via bluetooth.
- **Alarm** blinking indicates an alarm situation.
- **Alarm** blinking along with **Power ON**, indicates that you are performing a reset of internal memory.

## 2.5 SIGNALS MODULE ELECTRIC CONNECTIONS

Open the signals module box; the four screws are behind the wall plugs, which can be easily removed using a screwdriver. Such operation is shown in the following figure:



**When removing the lid, pay attention to the flat LED cable that can disconnect from its connector (J2).**



### 2.5.1 Console

Connect the console standard cable to clamp 2 or the multipoles cable of the console basic on clamp M3. When connecting with the console standard, make sure the jumper on JP13 is in position A.

### 2.5.2 Central module

Connect the central module cable to clamp 3 (already assembled).

### 2.5.3 Washing machine signals – clamps from S1 to S8

Connect the signals coming from the washing machine to clamps **S1...8**.

The **eco•wash** system has 8 optocoupled inputs and compatible with any type of electric signal, alternate or direct. Also, the system is provided with a jumper for every input (JP4...JP11), that allows us to recognize the level of the input signal.

#### **HIGH jumper position**

This position allows to discriminate signals 110VAC or 230VAC.

#### **LOW jumper position**

This position allows to discriminate signals 12VDC or 24VAC.

The chosen position of the jumper must be in accordance with the selection made by the “AQUAware Configurator” program. This setting is the same for all inputs.



**There is no need to respect any polarity for signals in direct.**

### 2.5.4 Signals module LEDs

The signals module LEDs, S1, ..., S8 are blinking when the signal is active (voltage present) and are fixed when the signal lasts longer than the filter (see par. 5.5.1).

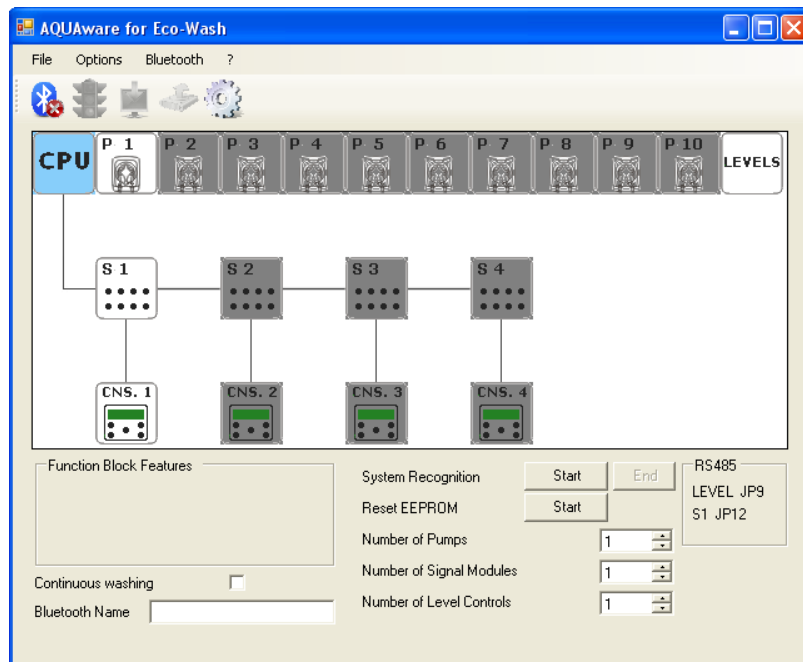
The LEDs (**ON** and **tx / rx**) indicate:

- **ON** continuously, it means that the module signals it receives power from the central module.
- **tx / rx** blinking indicates that the active communication between the modules (the flash must be constant)

### 3.0 AQUAWARE CONFIGURATOR PROGRAM

Install the "AQUAWARE Configurator" software.

Launch the program, clicking on icon  found on the desktop, the window shown below will appear.



The program allows configuring the assembled system, setting the following parameters:

- The number of pumps
- The type and flow rates of the pumps
- The number of the signals modules
- The number and type of console (standard, basic or absent)
- With or without the levels module

The system blocks appear coloured differently:

- White, the block is present in the system to be configured.
- Grey, the block is not present in the system to be configured.
- Blue, the block is selected and it is possible to read or vary the block features.
- Green, the block has been recognised, therefore resulting correctly configured (see par. 3.3).
- Red, the block has not been recognised (see par. 3.3).

#### 3.1 STEP 1 – BLUETOOTH CONNECTION

After having pressed icon , a new window will appear in which the following steps must be made:

- press **Actions** and select **Radio Bluetooth on**
- press **Actions** and select **Search devices**
- Select the name of the device to be connected ("AQUA Eco Wash 01" by default)
- press **Actions** and select **Services list**
- select **Serialport**
- press **Actions** and select **Connect**, then confirm connection and finally enter the password, it consists of 4 digits.



**The default password is 0000.**

It's possible to perform another Bluetooth connection, more quickly, following the next steps:

- press **Actions** and select **Radio Bluetooth on**
- press **Actions** and select **Search devices**
- Select the name of the device to be connected ("AQUA Eco Wash 01" by default)
- Double-click on the device and the system will be performed simultaneously the search of Services list and the connection request, so just enter the password (see above).

### 3.2 STEP 2 – SYSTEM CONFIGURATION

To perform changes, the system should be paused, the status's system is indicated by the "traffic light" icon:



- Green light: active system;
- Red light: the system is paused;

#### **To change the status of traffic lights, just click the icon.**

To configure the assembled system, set the number of the pumps, the number of the signals modules, the type of console used and the number of the levels modules.

Perform the upload (select Bluetooth → Upload).

### STEP 3 – SYSTEM SELF-RECOGNITION

Press the **Start** button next to *system recognition*, the pumps blocks will become green if they have been recognised, otherwise red.

The pumps now start to function one at a time and it is necessary to indicate to the system the number/position of the pump (pump 1 is that near the central module), by double clicking on the relative block, after which the pump stops.

When all pump blocks have been recognised, press the **End** button next to the *riconoscimento del sistema* (system recognition).



**Pressing "?" opens a window where there are versions of the firmware of all modules of the system and the software "AQUAWARE Configurator".**

### STEP 4 – MODULES CONFIGURATION

#### ***Pumps configuration***

Select the pump block (**P**), set the type of pump (LF or HF) and the flow rate expressed in percentage, in the features of the block.

- LF: maximum flow rate 20 l/h
- HF: maximum flow rate 100 l/h

#### ***Signals modules configuration***

Select the signal module block (**S**), in the block features it is possible to set the voltage of the electric signals coming from the washing machine. Its' possible select one of the following threshold:

- 12 Vdc;    ▪ 24 Vac;    ▪ 110 Vac;    ▪ 230 Vac;

#### ***Console configuration***

Select the console block (**CNS**), in the block features it is possible to set the type of console used: standard, basic or not connected (in the case the system functions in relay mode).



**To make the amendments effective, always perform upload (select *Bluetooth* and then *upload current page*).**

#### ***Levels module configuration***

Any parameter to set in this block.

#### ***RS485 Configuration***

The settings of the RS485 serial configuration are indicated in the bottom-right part of the Configurator program window.

The indications can be:

- S#            JP12, in the indicated signals module, set jumper JP12 in position 120 Ohm;
- P#            JP5, in the indicated pump/relay module, set jumper JP5 in position 120 Ohm;
- LEVEL      JP9, in the indicated levels module, set jumper JP9 in position 120 Ohm;



**We recommend performing these settings to avoid problems with communication between the various modules composing the system.**

### 3.4 STEP 4 – BLUETOOTH NAME SETTING

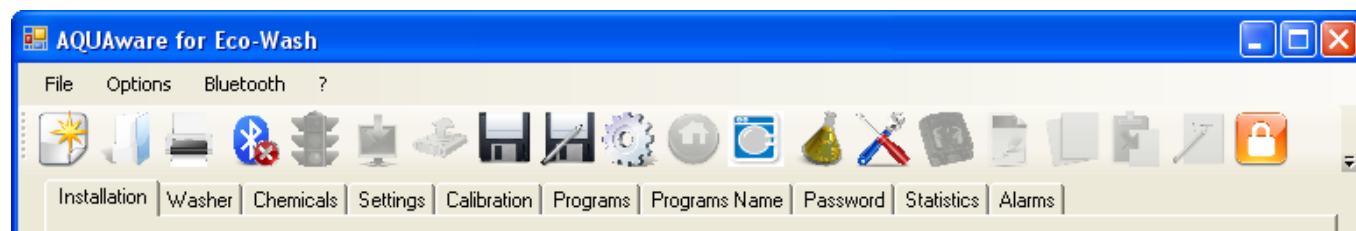
Set the bluetooth name so that the system is easily recognisable; we recommend entering the name of the washing machine in which it is installed.

Use names with maximum 16 characters.

## 4.0 AQUAWARE PROGRAM

Install the "AQUAWARE for Ecowash" software.

Launch the program, by clicking on the icon  on the desktop, the window below should appear, showing icons in the upper part and boards in the lower part.



The program allows carrying out all management operations of a project with the following icons:

| ICON                                                                                | DESCRIPTION                                                                                                               |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
|    | Open a new project with default settings (see Appendix 4)                                                                 |
|    | Opens a project previously saved on disc                                                                                  |
|   | Prints the statistics and alarms report                                                                                   |
|  | Indicates that the bluetooth connection is deactivated, clicking on the icon activates the bluetooth connection procedure |
|  | Indicates the bluetooth connection is active                                                                              |
|  | Indicates the <b>eco•wash</b> system is still, clicking on the icon reactivates it                                        |
|  | Indicates the <b>eco•wash</b> system is functioning, clicking on the icon stops it                                        |
|  | Save the project                                                                                                          |
|  | Save the project with name                                                                                                |
|  | Opens the board of the program configurations (choice of language and directory)                                          |

| ICON                                                                                | DESCRIPTION                                                                        |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|    | Opens the board relating to the installation data (name, address, telephone, etc.) |
|    | Opens the board relating to the washing machine data (brand, capacity, etc.)       |
|   | Opens the board relating to the chemical products data                             |
|  | Opens the board relating to the <b>eco•wash</b> system settings                    |
|  | Opens the board relating to the pumps calibration                                  |
|  | Deletes the open washing program                                                   |
|  | Copies the open washing program                                                    |
|  | Pastes on the open washing program                                                 |
|  | Opens the board relating to entering of the programs names                         |
|  | Opens the board relating to the system password                                    |
|  | Opens the board relating to the statistics                                         |
|  | Opens the board relating to the alarms settings                                    |

The two icons   will respectively download (from **eco•wash** to computer) and uploading (from the computer to **eco•wash**) of the total data.

**BOTH OPERATIONS CAN BE PERFORMED ONLY AFTER YOU PAUSE THE SYSTEM (RED LIGHT), AND THE ELABORATION'S STATUS WILL BE DISPLAYED BY A "PROGRESS BAR".**

## 5.0 PROGRAMMING

The "AQUAware for Ecowash" software enables full management of the **eco•wash** system. With reference to the figure below, it is evident how the sequence of the boards under the icons, respects the logic of a typical installation: *Installazione – Lavatrice – Prodotti Chimici – Impostazioni – Calibrazione – Programmi – Nomi Programmi – Password – Statistiche – Allarmi* (*Installation - Washing Machine - Chemical Products - Settings - Calibration - Programs - Programs Names - Password - Statistics - Alarms*).

Reported below are the system programming steps.

### 5.1 STEP 1 – BLUETOOTH CONNECTION

Connect Bluetooth by pressing the icon . A new window will now open in which the following operations must be performed:

- press **Actions** and select **Radio Bluetooth on**
- press **Actions** and select **Search devices**
- Select the name of the device to be connected ("AQUA Eco Wash 01" by default)
- press **Actions** and select **Services list**
- select **Serialport**
- press **Actions** and select **Connect**, then confirm connection and finally enter the password, it consists of 4 digits.

 **The default password is 0000.**

It's possible to perform another Bluetooth connection, more quickly, following the next steps:

- press **Actions** and select **Radio Bluetooth on**
- press **Actions** and select **Search devices**
- Select the name of the device to be connected ("AQUA Eco Wash 01" by default)
- Double-click on the device and the system will be performed simultaneously the search of Services list and the connection request, so just enter the password (see above).



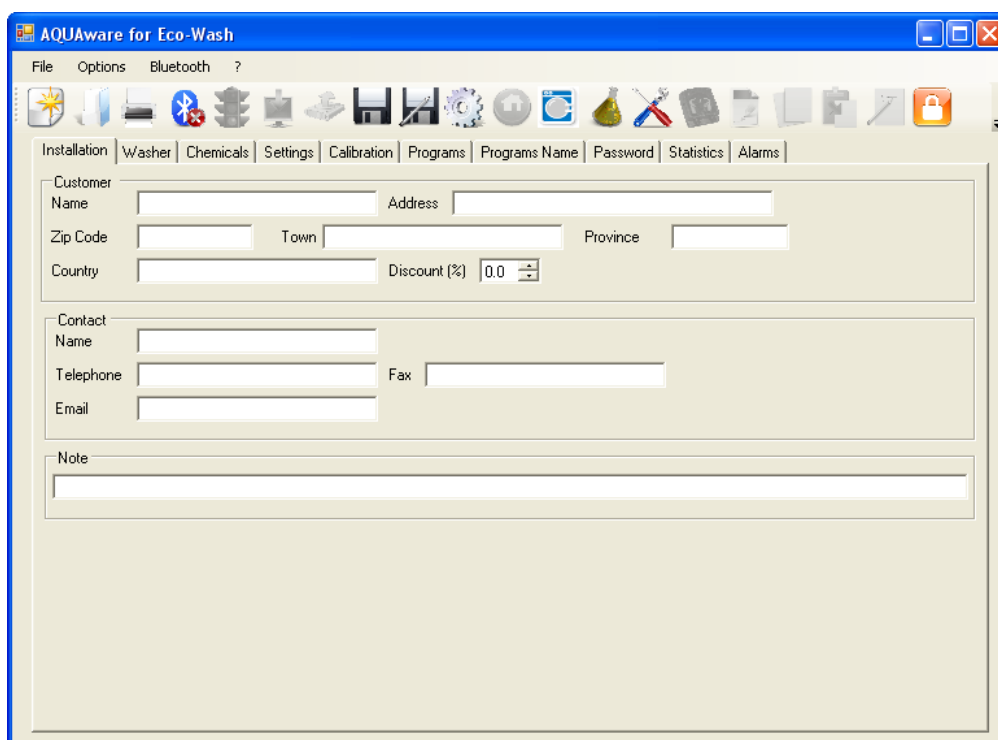
**To perform changes, the system should be paused, press the "traffic light" icon, once the system is paused the "traffic light" icon will be red.**



When a new system is started or after the internal memory has been reset, follow the procedure reported in annex 11 (Eco wash system initialization).

### 5.2 STEP 2 – INSTALLATION

It is possible to enter all customer information in the **Installation** board. Report the discount to ensure you have a correct report related to the statistics.



The screenshot shows the "AQUAware for Eco-Wash" software window. The "Installation" tab is selected in the top menu bar. The interface contains several input fields for customer information:

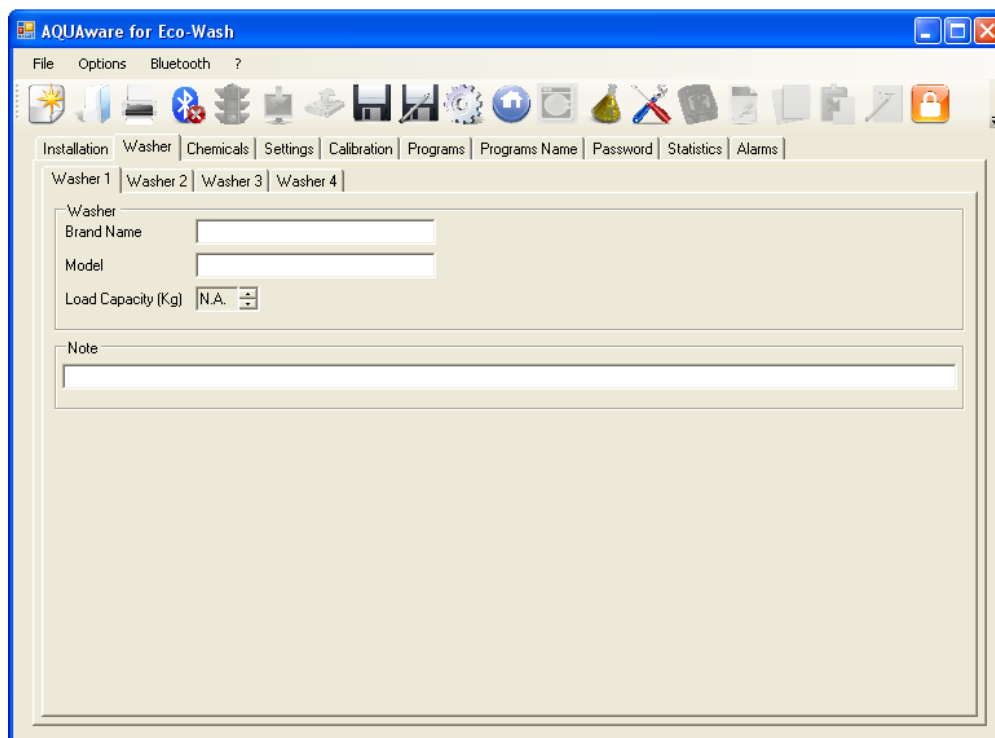
- Customer Information:**
  - Customer Name:
  - Address:
  - Zip Code:
  - Town:
  - Province:
  - Country:
  - Discount (%):
- Contact Information:**
  - Contact Name:
  - Telephone:
  - Fax:
  - Email:
- Note:**

Dosing system for washing machines

ENGLISH

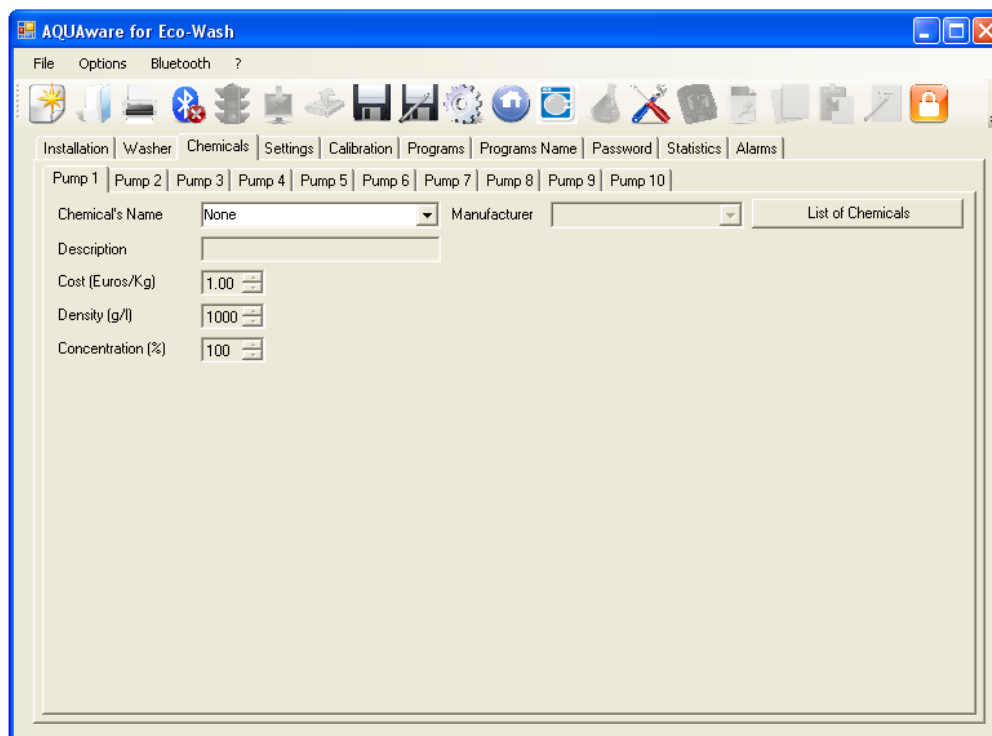
### 5.3 STEP 3 – WASHING MACHINE

Enter the information relating to the washing machine in the **Washer** board; capacity must be entered if wanting the direct reading of dosing of the pumps in g/Kg on the Programs tab.



### 5.4 STEP 4 – CHEMICAL PRODUCTS

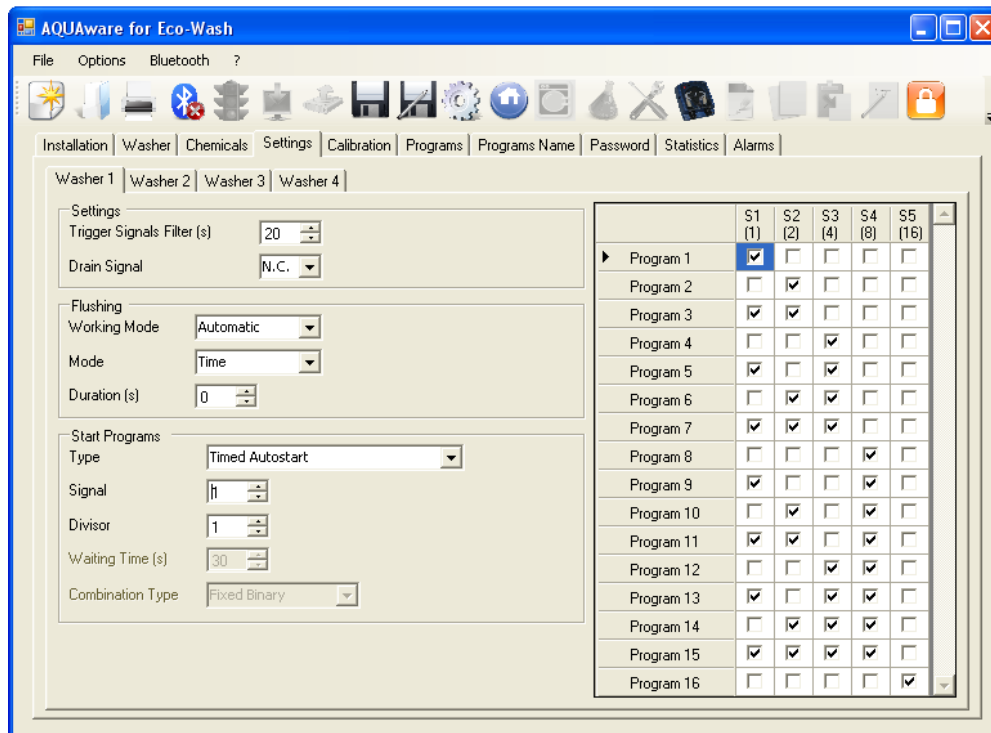
The chemical products are associated to the various pumps in the **Chemicals** board. It is also possible to add/amend/eliminate chemical products from a list.



**i** In the case of updating the AQUAware program, before to uninstall the old software, it is recommended to save the file “**Prodotti Chimici.TXT**”, and, then after installation, copy the saved file in the directory.

## 5.5 STEP 5 – SETTINGS

The following are programmed in the **Settings** board: the filtering duration on the input signals, the type of drain signal, the functioning mode of the solenoid valve of the flushing kit and the automatic start-up of the washing programs.



### 5.5.1 Input signals filter

Minimum time during which a signal must remain high, to be recognised as active.

This parameter prevents overdosing during water recalls from the machine and during the various washing phases. It is possible to set a time from 0 to 99 seconds; the default value is 10 seconds.

### 5.5.2 Drain signal

It is possible to set the type of drain signal of the washing machine in case of wanting to use this signal to synchronise the washing program phases.

The possible settings are N.O. (Normally Open) or N.C. (Normally Closed):

- **N.O.:** when the machine is on but is not performing a washing program, the signals module has the LED of the drain signal (#8) on.
- **N.C.:** when the machine is on but is not performing a washing program, the signals module has the LED of the drain signal (#8) off.

By default the drain signal is N.C.

### 5.5.3 Flushing

It is possible to set the opening functioning of the solenoid valve of the flushing kit in manual or in automatic.

#### **Manual**

In this case, consider the solenoid valve as a pump; to manage its opening, use the **WATER** instruction block in programming phase (see par. 5.7).

#### **Automatic**

The system automatically manages the opening of the solenoid valve, activating it at the same time in which the pump starts functioning and keeping it open for the whole dosing time + the programmed **Duration** time.

The **Duration** time of the solenoid valve depends from the following parameters:

#### **Mode**

Selecting **Time**, the **Duration** time depends on the seconds set in **Duration**. Selecting **Litres**, the **Duration** time depends on the litres set in **Duration** (system provided with flow meter). The default value is **Time**.

#### **Duration**

With this parameter it is possible to specify the opening seconds of the solenoid valve (settable from 0 to 99) or the litres of water that the solenoid valve must have pass, before closing (settable from 0 to 99). The default value is 20 seconds.

### **5.5.4 Program start**

This setting allows you to select the startup type of washing programs, if the mode of operation of the system is to "program". The three types of startup programs are: standard, combination Autostart and timed Autostart. The Autostart modes allow the system to automatically recognise the dosing program to perform, according to the washing cycle selected by the user on the washing machine. This mode can be used with washing machine provided with perforated board logic or electronic management machines.

It is possible to identify the washing program through a combination of signals or with the activation time of one of the input signals. With regard to what will be dealt with, refer to the figure of previous page

#### **Standard**

The selection of the washing program to execute is made by the operator through the console standard or basic.

#### **Fixed combination autostart**

Select Autostart of "Combination" type and, as combination type, "Fixed Binary".

Signal combinations are proposed, as a table, on the right side of the screen, that univocally identify a certain dosing program. When any signal activates, the system starts a timer for duration equal to the time specified in "Waiting Time". Upon expiring of the timer, the active signals identify the program to execution, depending of the correspondences in the above-said table. It must be noted that, upon expiring of the timer, the signals are considered active if they are for a greater or equal time to that specified in Input Signals Filter (see par. 5.5.1).

The input signals used are S1, S2, S3, S4 and S5.

#### **Programmable combination autostart**

Select Autostart of "Combination" type and, as combination type, "Programmable".

A table appears on the right side of the screen enabling to associate signals combinations to dosing programs. In this case, the table is initially empty and it is necessary to define, by ticking the boxes, the signals combinations activating a certain program.

The activation mechanism of a program is identical to that described in "Fixed combination autostart", reasons for which the "Waiting Time" parameter must be defined.

In case of same combinations formore program, the system will execute only the first program.

#### **Timed autostart**

Select "Time" type Autostart.

In this case, choose the input signal and a divisor number. Such parameters are used for discriminating the different programs.

For example: if signal 1 and divisor 3 are set, the system performs a particular washing program depending on the activation time of signal 1.

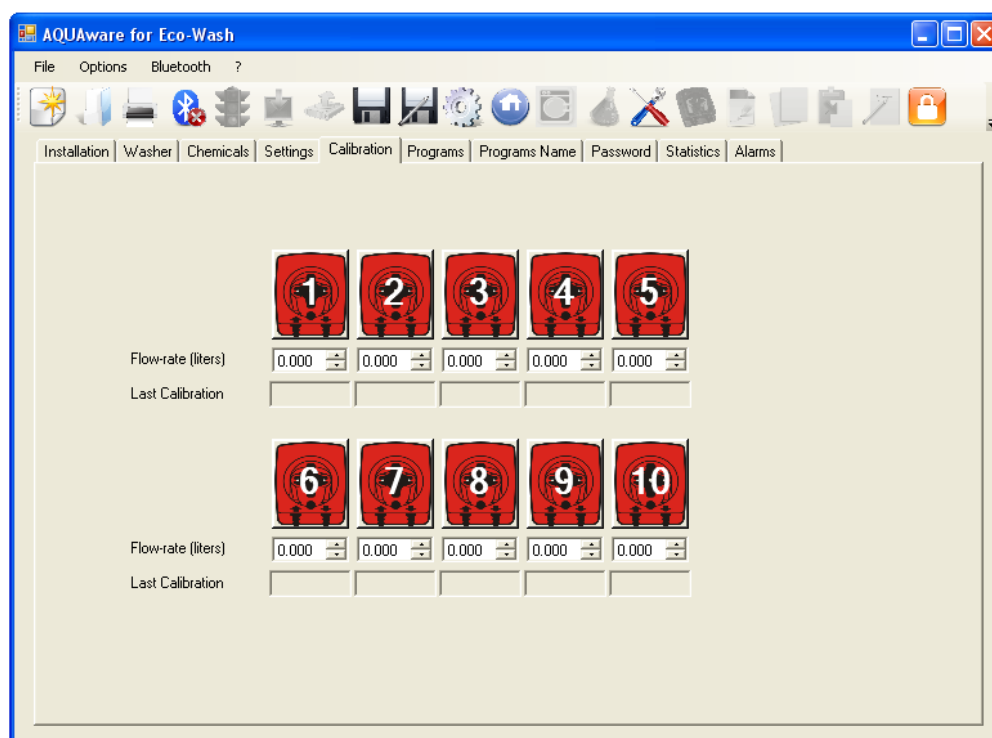
Signal 1 active for 15 seconds =>  $15:3 = 5$  => the system performs program 5.

Signal 1 active for 29 seconds =>  $29:3 = 9.6$  => the system performs program 10.

*We recommend using a divisor greater than 2.*

## 5.6 STEP 6 – CALIBRATION

The pumps flow rates must be set in the **Calibration** board; calibration, together with the chemical products data, enables displaying the g/Kg (see par 5.7.2) of dosed program and the statistics expressed in Kg of product. We recommend carrying out calibration using the product the specific pump must dose.

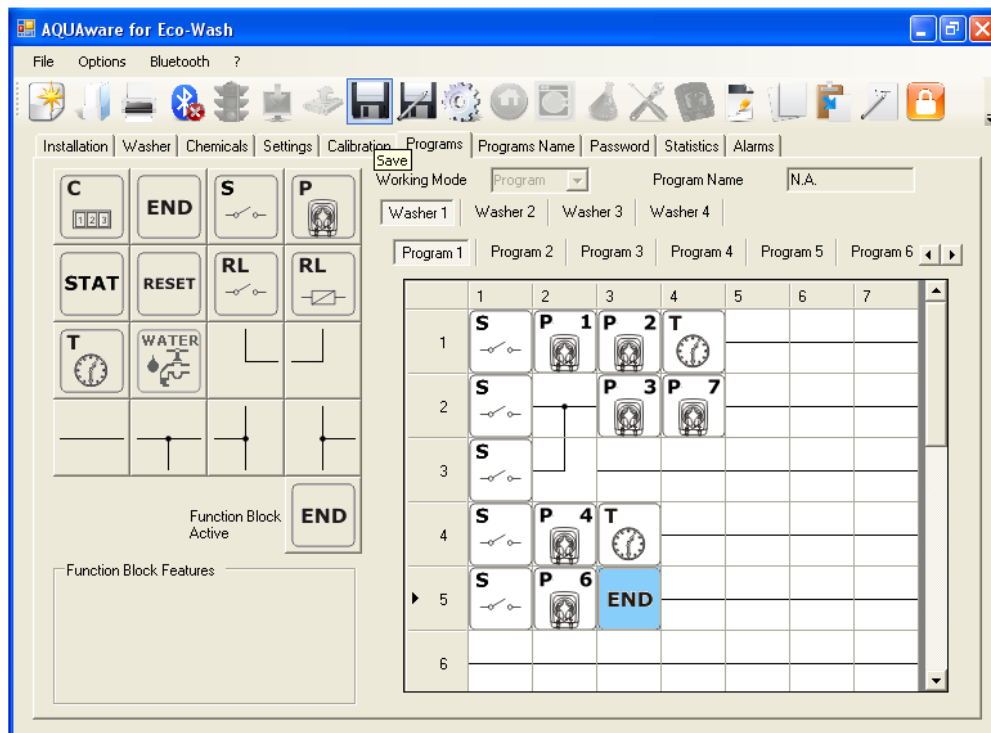


For correct calibration, follow the procedure below:

1. Prime the pump so that the chemical product comes out from the delivery fitting.
2. Position a container of at least 2 litres, on the pumps delivery.
3. Mouse click the icon of the wanted pump, a window will open. Relatively to the open window, click on the pump that will become green; the selected pump will start dosing for 60 seconds.
4. At the end of dosing, record the litres of product supplied by the pump.
5. Repeat sequence 1-4 for each pump.

## 5.7 STEP 7 – PROGRAMS

In the **Programs** tab, it is possible to configure the working mode of the system Relay or Program.



Firstly, choose the functioning mode of the system, that can be Relay or Program:

**Relay:** to every input signal coming from the washing machine, a pump is associated as follows: signal 1 -> pump 1, signal 2 -> pump 2 and so on (such association is not programmable). In this case, the dosing times of the pumps depend on the duration of the signals.

The dosing times of the pumps must be programmed by acting on the activation times of the signals of the washing machine.

**Program:** the washing programs must be configured in this mode, by positioning the instruction blocks (left side of the screen) in the editor window (right side of the screen).

For each machine you can configure up to a maximum of 20 washing programs.

The editor window is made of 15 rows and 7 columns, for a total of 105 cells; up to 7 blocks can be entered in each row.

To position a block on the editor window, mouse click on the wanted block and click on the chosen cell (the block will appear inside the cell).

To describe the washing program in program mode, the instructions blocks must be combined together with the connection blocks.



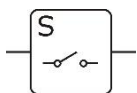
Also, it is possible to delete/copy and paste a program by means of the three icons

The **eco-wash** system analyses the content of the editor window, relating to the current program, analysing all rows in parallel.

The program cycle is terminated when the system meets the **END** instruction block in one of the rows.

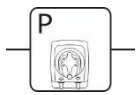
### 5.7.1 Input signal instruction block

This instruction indicates to the system to check the input signal associated to it.



If the signal is active (voltage present) for a time greater to that set in the input signals filter (see par. 5.5.1), the system performs the successive instruction block.

### 5.7.2 Pump instruction block

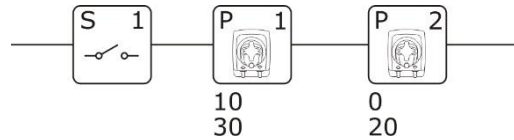


This instruction indicates to the system to activate a pump.

In this instruction set the number of the pump and the delay times (activation) and the dosing expressed in seconds. Also, in the *Pump dosing (g/Kg)* box it is possible to verify the grams of product per kilo of linen depending on the set times.

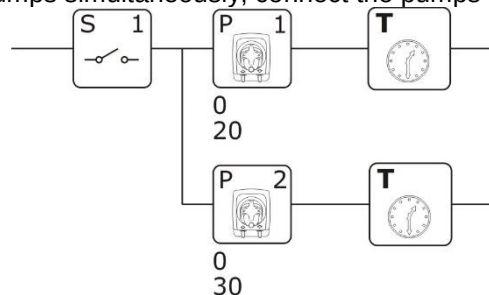
The program performs the successive instruction block at the end of the pump dosing.

We can now do a small exercise using the shown instructions:



Upon activation of signal #1, the system checks the activation time. Should the activation time be greater than the input signals filter, the program activates pump #1 with a delay of 10 seconds, for a dosing time of 30 seconds. At the end of dosing of pump #1, the program activates pump #2 for a dosing time of 20 seconds.

In case of wanting to function two pumps simultaneously, connect the pumps as follows:



Upon activation of signal #1, the system checks the activation time. Should the activation time be greater than the input signals filter, the program simultaneously activates pump #1 for a dosing time of 30 seconds and pump #2 for a dosing time of 20 seconds.

When the Timer expires, if the signal S1 is still active, will run the sequence again, it is necessary, however, that the timer on a 'line' ("Main Line") is greater than the Timer on "lines derived" (which can be omitted), to have an effective operation in parallel.

### 5.7.3 Water instruction block



When the system encounters this instruction block, it opens the solenoid valve (allows water passage) of the flushing kit for the seconds or litres set in "Dosing Time/Quantity".

"Dosing Time/Quantity" expresses the opening seconds if the Flushing is of Manual and Time type, whereas, in case we have set a Manual and Litres Flushing, it expresses the quantity (in litres) of liquid that the solenoid valve leaves to flow before interrupting the flow (see par. 5.5.3).

The program performs the successive instruction block at the end of the opening.

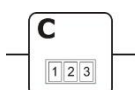
This instruction is active only if manual functioning of the solenoid valve has been set (see par. 5.5.3).

### 5.7.4 Timer instruction block



When the system meets this instruction block it waits for the time set within (expressed in minutes) and then passes to successive block.

### 5.7.5 Meter instruction block



The system increases a meter if the signal associated to the block has been activated (a signal must be associated to a meter instruction block). Upon reaching of the set threshold value (the signal has activated for a number of times equal to the threshold value), the program passes to successive block and resets meter.

### 5.7.6 END instruction block



When the system meets this instruction block, it ends the program in execution and returns in stand-by mode, updating all statistics.



***This instruction expects the solenoid valve closes when the flushing is set automatically, before ending the program running.***

**5.7.7 Conditional instruction block**

When the system meets this block, it poses the status associated to it in 1. Every block identified with a relay number and is characterised by its status (status 1, the program has encountered the block, status in 0, the program has not encountered the block). This type of block is useful to verify whether the system has performed a particular program row.

**5.7.8 Conditional instruction control block**

When the system meets this block, it controls the status of the conditional instruction block relating to it (relay number)

By setting the "active state" in 1, the system checks the status of the block associated conditional statement, if it is 1, the system pass to the next instrucion block.

By setting the "active state" in 0, the system checks the status of the block associated conditional statement, if it is 0, the system pass to the next instrucion block.

**5.7.9 RESET instruction block**

When the system meets this instruction block, it resets the status of all conditional instruction block present in the program, in case of using always one washing program.

**5.7.10 STAT instruction bock**

When the system meets this instruction block it updates the statistics, in case it uses always one washing program. Do not use this instruction if the END instruction is already in the program.

**5.7.11 Connection blocks**

Also, there are 6 connection blocks available for connecting the various instructions blocks.



You can not insert the connector block



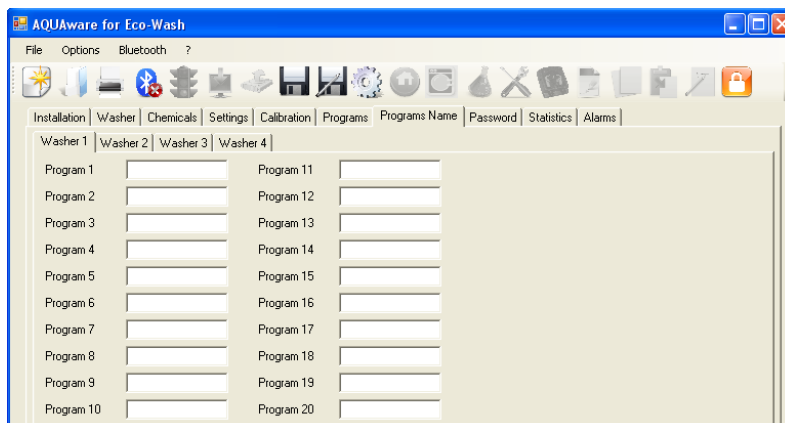
on the first column, otherwise the software will display a red exclamation mark.

Dosing system for washing machines

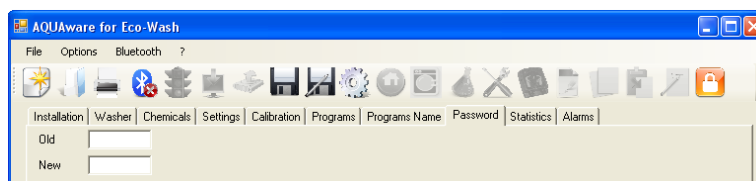
ENGLISH

**5.8 STEP 8 – PROGRAMS NAME**

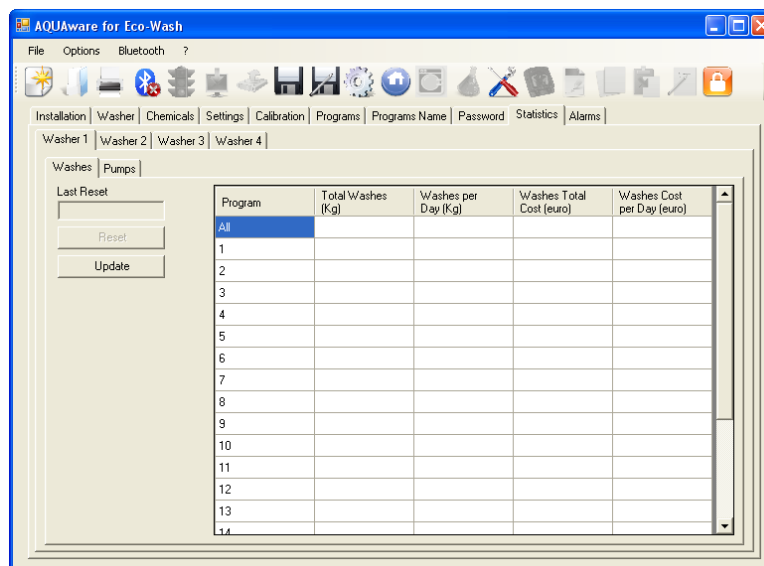
It is possible to set the names of the 20 programs in the **Programs Name** board. It is possible to use up to a maximum of 12 characters for each name.

**5.9 STEP 9 – PASSWORD**

It is possible to set a new access password (4 digits) in the **Password** board; by default "0000"

**5.10 STEP 10 – STATISTICS**

It is possible to read all statistic data of the pumps and of the executed programs in the **Statistics** board. Also, it is possible to save the data in a TXT format file, print a report or do a reset.

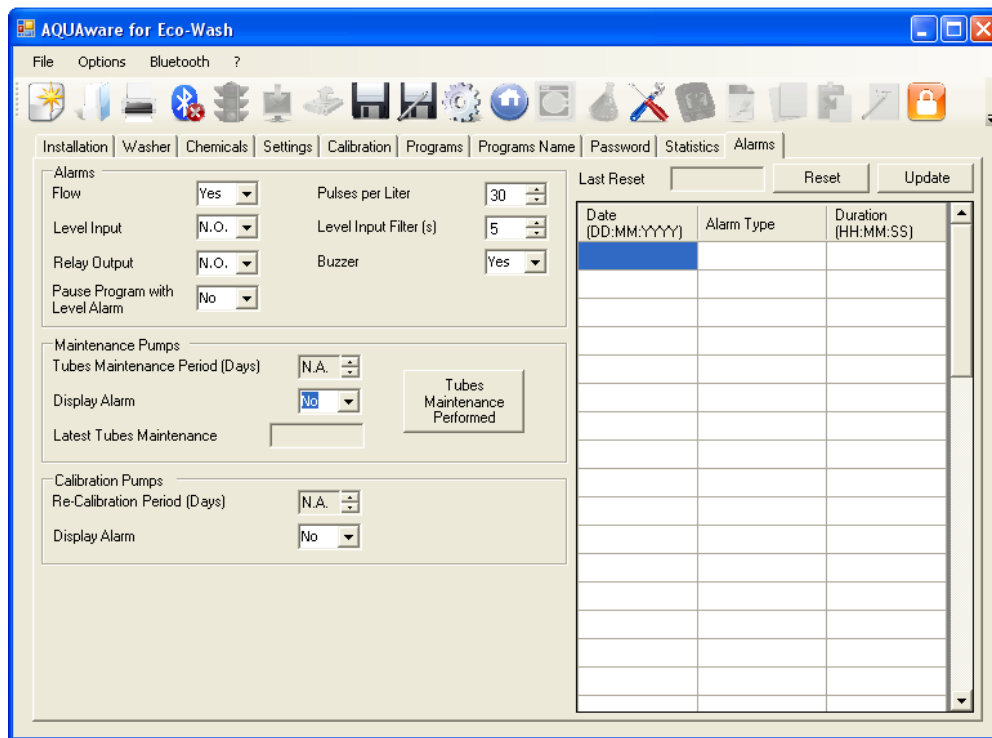


The **eco•wash** system can keep the last three months of functioning memorised.

### 5.11 STEP 11 – ALARMS

It is possible to manage the settings of the alarms in the **Alarms** board, as well as access the log of the alarms occurred on the system.

Also, it is possible to save the data in a TXT format file, print a report and do a reset.



#### 5.11.1 Alarms setting

It is possible to perform the following settings:

- Activate or deactivate the flow alarm. Such alarm verifies the water passage in the flushing kit.
- Specify if the probes of the level alarms are of NO type (when the product finishes the probe is in short circuit) or NC (when the product finishes the probe is open). Our probes are all of NO type.
- Set the alarm relay output as NO (when there is an alarm, the relay contact is at ON, creating a short circuit) or NC (when there is an alarm, the relay contact is at OFF, creating an open). It is NO by default.
- Set the impulses of the flow sensor, we recommend leaving the value set.
- Set the filter of the alarms signals, to avoid false contacts being recognised as alarm signals.
- Activate or deactivate the buzzer for the alarm signals. Such buzzer is on the standard console.
- Activate or deactivate the pump stop during the activation of the level alarm. By default, this is set to **No**.

#### 5.11.2 Pump maintenance alarm

It is possible to use this alarm as reminder to carry out pumps maintenance. To do this, set a time, after which the system goes in alarm. The displaying of this alarm, is possible only with the console standard, can be disabled. Once maintenance is carried out, communicate such event to the software by pressing the *Tubes Maintenance Performed* key.

#### 5.11.3 Calibration alarm

It is possible to use this alarm as reminder to carry out calibration out. In fact, it is possible to set the days during which the system does not require being calibrated. Upon expiring of this period, the system warns with an alarm, which displaying can be avoided.

*After calibration, switch the system off and on to reset the previous alarm situation; otherwise it remains active in the alarms list.*

The **eco•wash** system can maintain the last 50 alarms in memory.

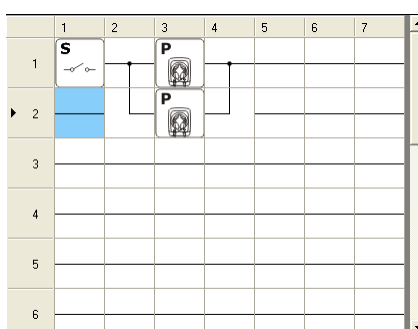
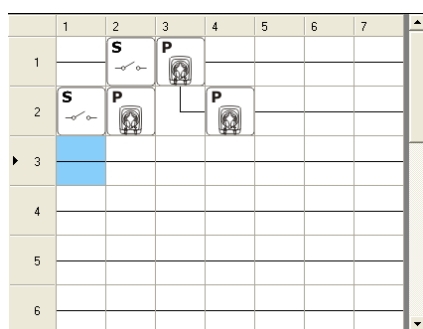
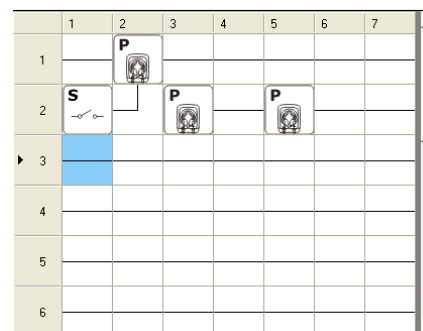
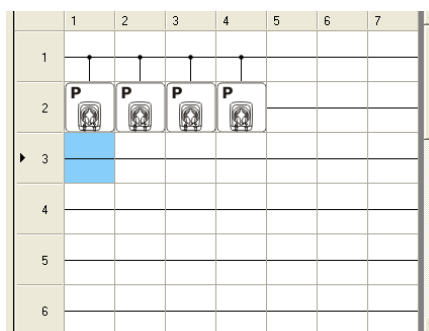
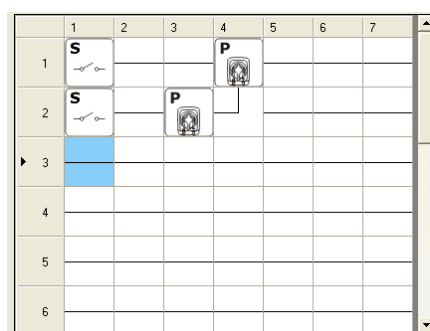
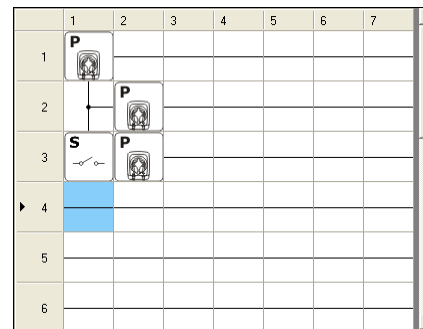
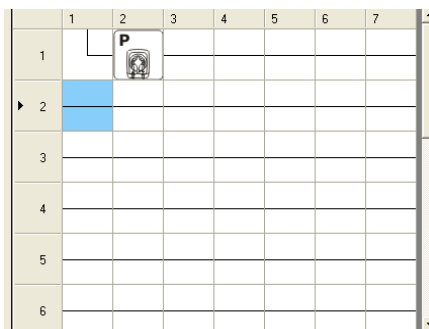
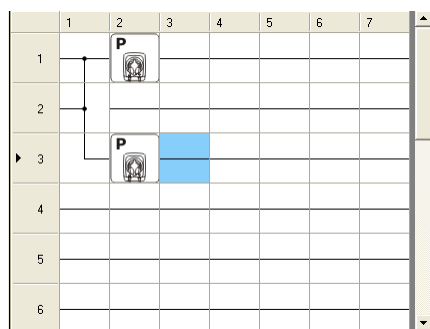
If the alarm is still active in the column "Duration", an asterisk appears next to the time.

## 6.0 TROUBLESHOOTING

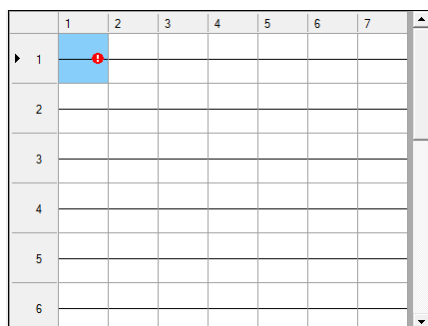
|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The system does not switch-on                    | <ul style="list-style-type: none"> <li>Check fuse on circuit.</li> <li>Verify that voltage on clamps <b>F-N</b> is between 100 and 240VAC 50/60Hz.</li> </ul>                                                                                                                                                                                                                                                          |
| The console does not switch-on                   | <ul style="list-style-type: none"> <li>Check the connection cable and the connection with signals module.</li> </ul>                                                                                                                                                                                                                                                                                                   |
| The signals module does not switch-on            | <ul style="list-style-type: none"> <li>Check the connection cable and the connection with central module.</li> </ul>                                                                                                                                                                                                                                                                                                   |
| The pump is not functioning                      | <ul style="list-style-type: none"> <li>On the circuit, verify there are no disconnected wires on the motor clamps of the pump.</li> <li>Verify the motor is not locked.</li> <li>Verify the activation signal is present on the signals module.</li> <li>Check the washing program.</li> <li>Verify the program on the console has been started.</li> <li>Verify at least one red LED on the circuit is on.</li> </ul> |
| The pump is slow                                 | <ul style="list-style-type: none"> <li>Verify the motor is not locked.</li> <li>Check integrity of the roller door.</li> <li>Check programmed speed.</li> <li>Check integrity of the check valve of the flushing kit.</li> </ul>                                                                                                                                                                                       |
| The pump is not priming                          | <ul style="list-style-type: none"> <li>Check integrity of the pump tube.</li> <li>Check integrity of the roller door.</li> <li>Check seal of the intake fitting.</li> <li>Check integrity of the check valve of the flushing kit.</li> </ul>                                                                                                                                                                           |
| Too much chemical product                        | <ul style="list-style-type: none"> <li>Check programmed time and speed.</li> </ul>                                                                                                                                                                                                                                                                                                                                     |
| Little chemical product                          | <ul style="list-style-type: none"> <li>Check programmed time and speed.</li> <li>Check any chemical product leaks in the delivery line.</li> <li>Check integrity of the check valve of the flushing kit.</li> </ul>                                                                                                                                                                                                    |
| Water is not passing through the flushing kit    | <ul style="list-style-type: none"> <li>Verify that the solenoid valve is correctly connected on the WATER clamp in the central module.</li> <li>Check programming of the solenoid valve functioning.</li> <li>Check fuse on CPU circuit (front panel of the central module).</li> <li>Verify the water cock is open.</li> </ul>                                                                                        |
| Impossible to perform the connection's Bluetooth | <ul style="list-style-type: none"> <li>The Bluetooth' driver on computer must be <i>Microsoft Bluetooth Enumerator</i></li> </ul>                                                                                                                                                                                                                                                                                      |

## 7.0 APPENDIX 1

### A few examples of invalid programs

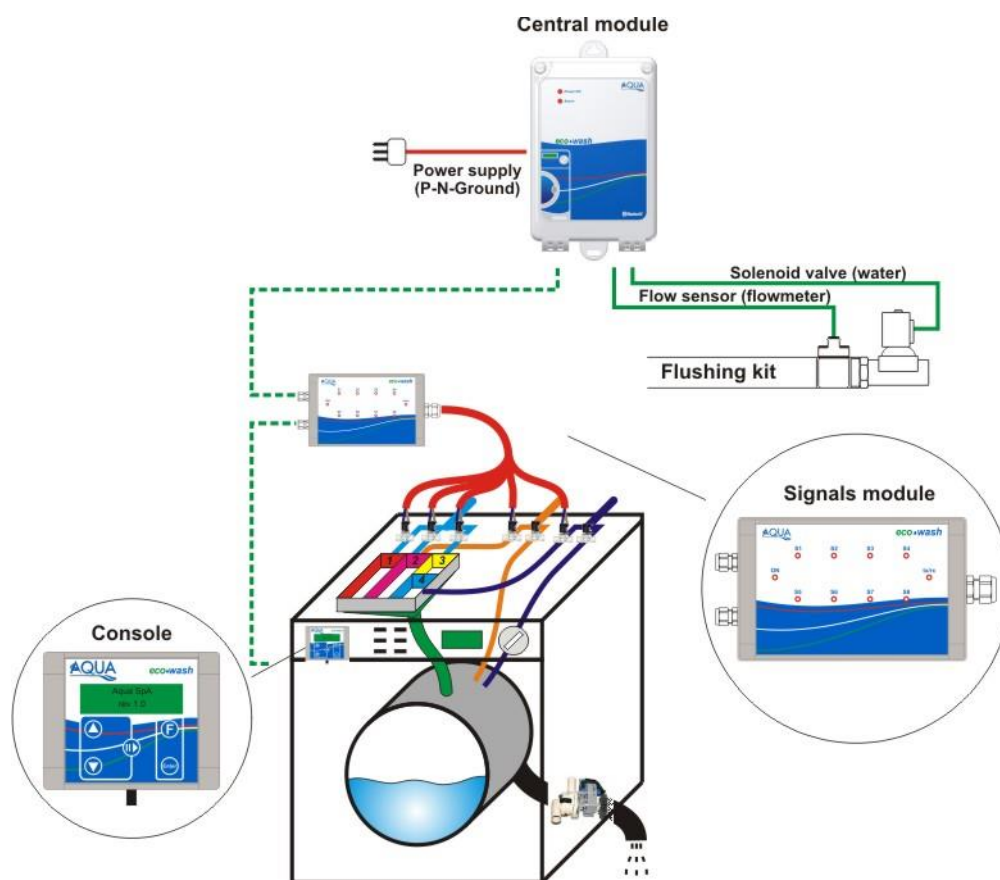


If you want to insert the block instruction  on the first column of the program's grid, the software AQUAWARE displays a red exclamation point because there is no such possibility. To remove, simply insert another block instruction.

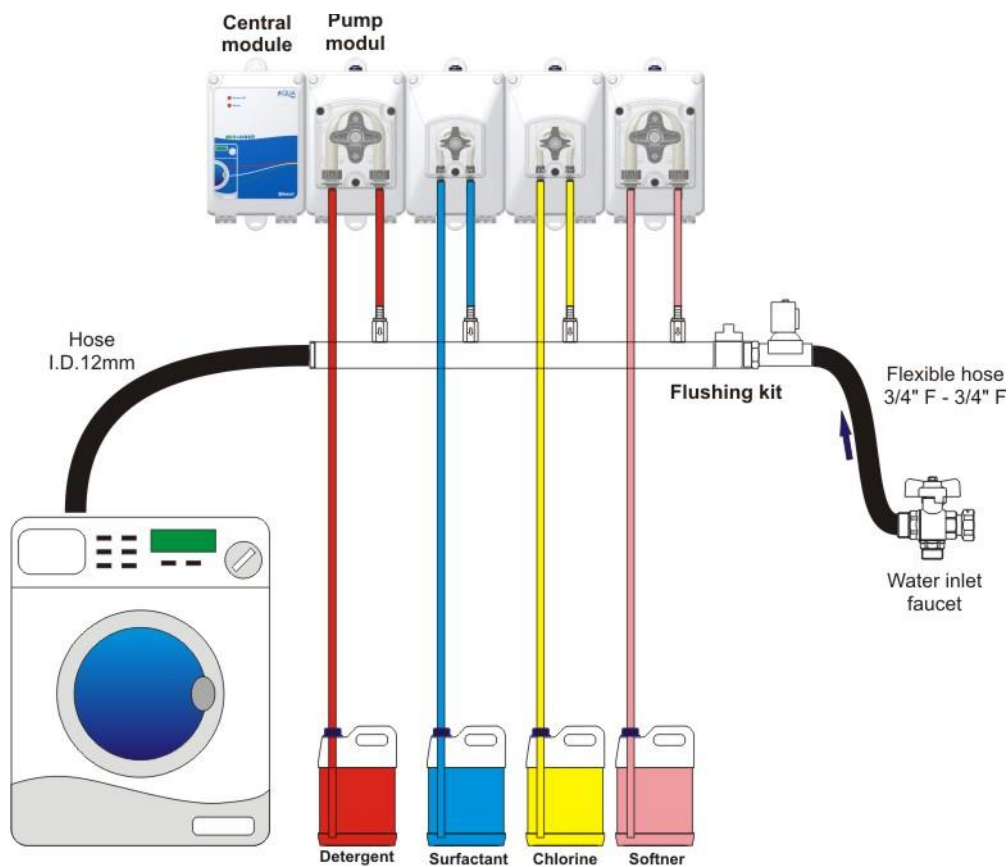


## 8.0 APPENDIX 2

### electric connections



## hydraulic connections



## 9.0 APPENDIX 3 – Programming examples

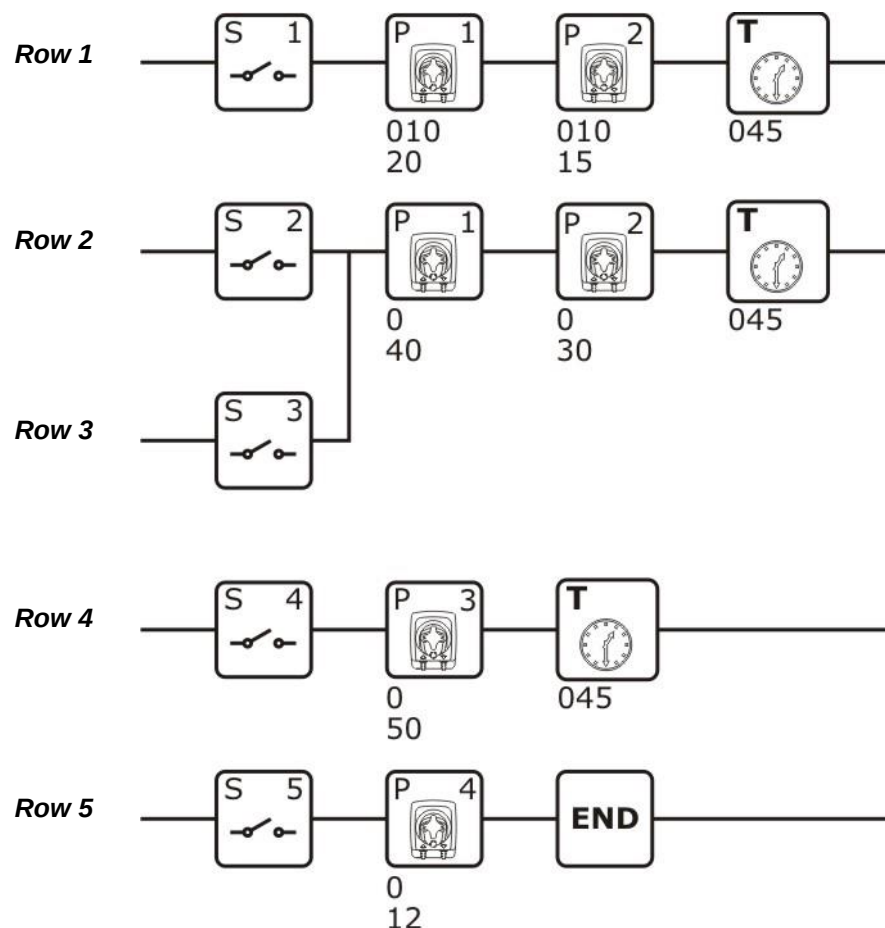
### 9.1 Example 1:

Washing machine with four signals coming from the solenoid valves of the dispensers: pre-washing, washing, chlorine and softener.

The washing program must perform the following operations:

| Phase       | Electric signal | Pumps                                                                                  |
|-------------|-----------------|----------------------------------------------------------------------------------------|
| Pre-washing | 1               | Pump 1 - 10 seconds of delay - 15 seconds<br>Pump 2 - 10 seconds of delay - 15 seconds |
| Washing     | 2 or 3          | Pump 1 - 0 seconds of delay - 40 seconds<br>Pump 2 - 0 seconds of delay - 30 seconds   |
| Chlorine    | 4               | Pump 3 - 0 seconds of delay - 50 seconds                                               |
| Softener    | 5               | Pump 4 - 0 seconds of delay - 12 seconds                                               |

Instructions blocks:



#### Explanation:

The first row performs the pre-washing phase activating pumps 1 and 2 after signal 1 has been recognised.

The second and third row perform the washing phase activating pumps 1 and 2 after signal 2 or signal 3 has been recognised.

The fourth row performs the chlorine phase activating pump 3 after signal 4 has been recognised.

The fifth row performs the softener phase activating pump 4 after signal 5 has been recognised. At the end of dosing, the system terminates the program with the END block.



The timer blocks on rows 1, 2 and 4 avoid that the rows are performed again in other phases of the same washing cycle.

*In this example it is not necessary that the signals arrive in the exact sequence.*

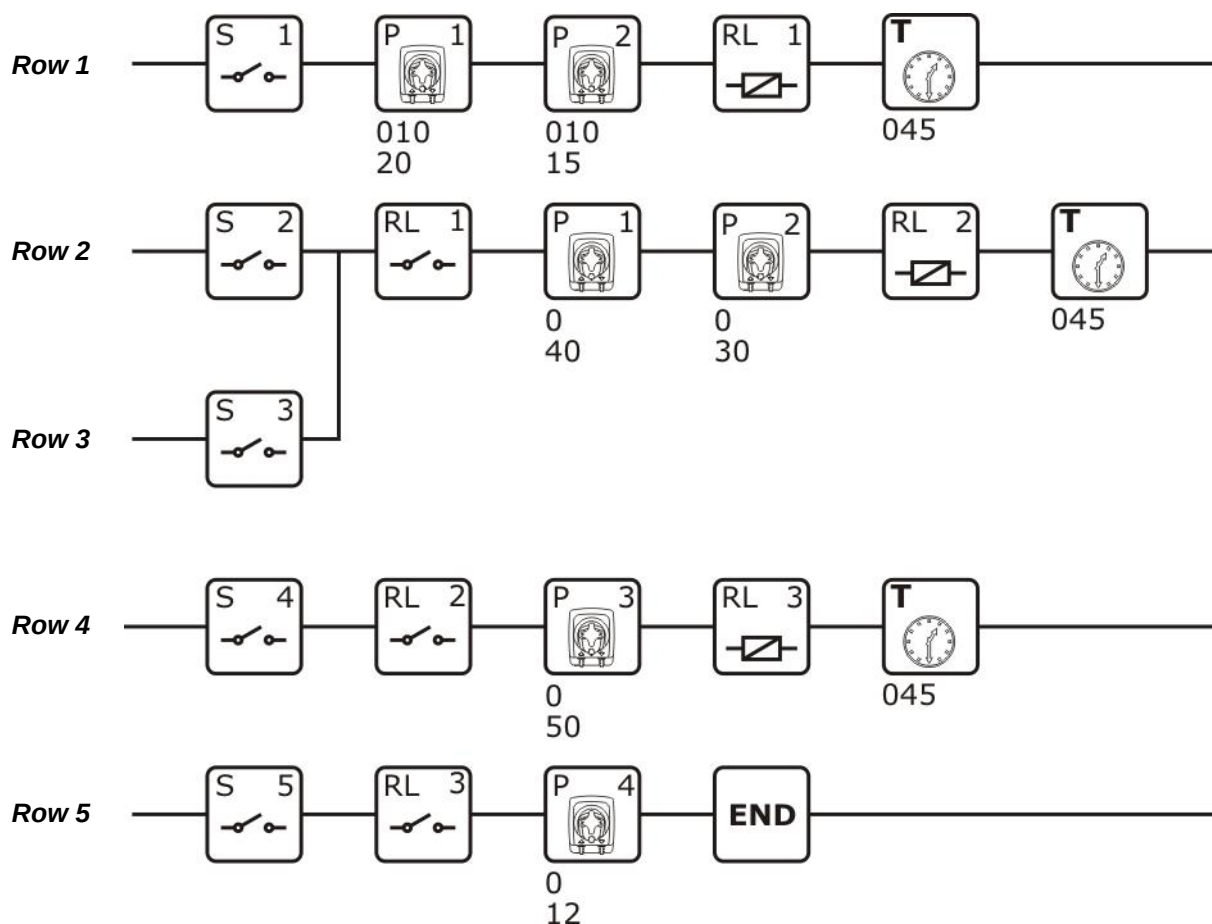
## 9.2 Example 2:

Washing machine with five signals coming from the solenoid valves of the dispensers, which are: pre-washing, washing, chlorine and softener.

The washing program must perform the following operations:

| Phase       | Electric signal | Pumps                                                                                  |
|-------------|-----------------|----------------------------------------------------------------------------------------|
| Pre-washing | 1               | Pump 1 - 10 seconds of delay - 20 seconds<br>Pump 2 - 10 seconds of delay - 15 seconds |
| Washing     | 2 or 3          | Pump 1 - 0 seconds of delay - 40 seconds<br>Pump 2 - 0 seconds of delay - 30 seconds   |
| Chlorine    | 4               | Pump 3 - 0 seconds of delay - 50 seconds                                               |
| Softener    | 5               | Pump 4 - 0 seconds of delay - 12 seconds                                               |

### Instructions blocks:



### Explanation:

The first row performs the pre-washing phase activating pumps 1 and 2 after signal 1 has been recognised.

The second and third row, if pre-washing has been performed (RL1 coil control), perform the washing phases activating pumps 1 and 2 after signal 2 or signal 3 has been recognised.

The fourth row, if washing has been performed (RL2 coil control), performs the chlorine phase activating pump 3 after signal 4 has been recognised.

The fifth row, if chlorine has been performed (RL3 coil control), performs the softener phase activating pump 4 after signal 5 has been recognised; then the system exits the program thanks to the END block.



The timer blocks on rows 1, 2 and 4 avoid that the rows are performed again in other phases of the same washing cycle.

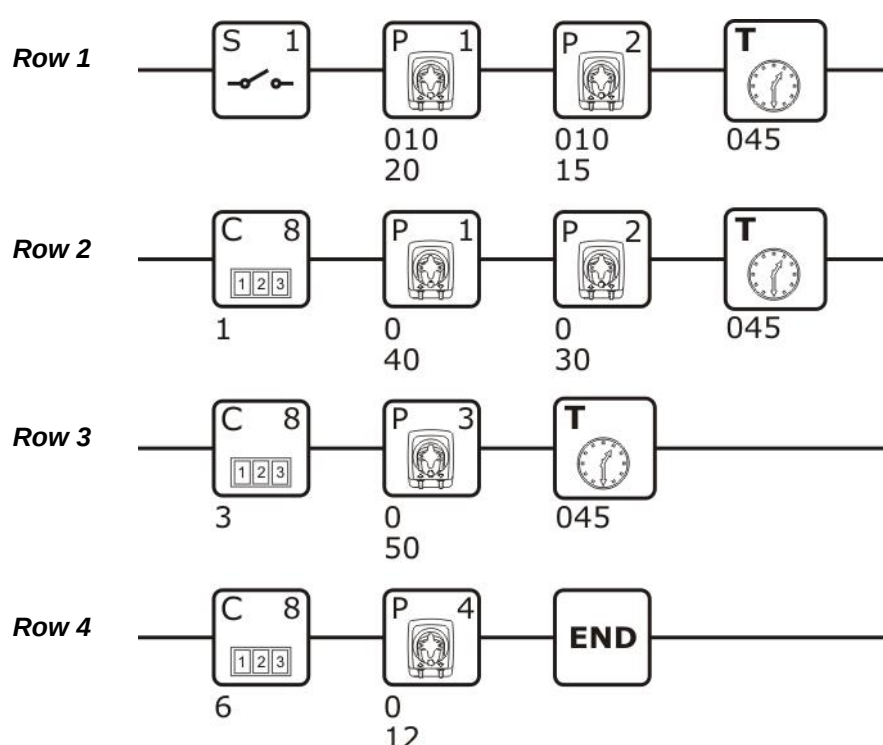
**In this example it is necessary that the signals arrive in the exact sequence.**

**9.3 Example 3:**

Washing machine with two signals, pre-washing and drain.

The washing program must perform the following operations:

| Phase       | Electric signal | Pumps                                                                                  |
|-------------|-----------------|----------------------------------------------------------------------------------------|
| Pre-washing | 1               | Pump 1 - 10 seconds of delay - 20 seconds<br>Pump 2 - 10 seconds of delay - 15 seconds |
| Washing     | 8               | Pump 1 - 0 seconds of delay - 40 seconds<br>Pump 2 - 0 seconds of delay - 30 seconds   |
| Chlorine    | 8               | Pump 3 - 0 seconds of delay - 50 seconds                                               |
| Softener    | 8               | Pump 4 - 0 seconds of delay - 12 seconds                                               |

**Instructions blocks:****Explanation:**

The first row performs the pre-washing phase activating pump 1 and, subsequently, 2 after signal 1 has been recognised.

The second row performs the washing phase activating pump 1 and, subsequently, 2 upon every activation of signal 8.

The third row performs the chlorine phase activating pump 3 every three activations of signal 8.

The fourth row performs the softener phase activating pump 4 upon the sixth activation of signal 8, then the system exits the program thanks to the END block.



The timer blocks on rows 1, 2 and 3 avoid that the rows are performed again in other phases of the same washing cycle.

## 10.0 APPENDIX 4 – Default settings

The software “AQUAWARE for Ecowash” (v. par. 5.0) when open a new project, by default it will load the following parameters:

### Settings tab

Filtro segnali ingresso (s):

- Trigger Signal Filter (s): **10**
- Drain Signal: **NC**

### Flushing

- Working mode: **Automatic**
- Mode: **Time**
- Duration: **20 s.**

### Programs tab

- Working Mode: **Relay**

### Alarms tab

- Flow: **No**
- Pulses per Litre: **30**
- Level Input: **NO**
- Level Input Filter (s): **5**
- Output Relay: **NA**
- Buzzer: **No**
- Program Pause on Level Alarms: **No**
- Display Alarm: **No**

## 11.0 APPENDIX 5 – Eco wash system initialization



The following procedure *must be applied* whenever you install a new system or after resetting the internal memory and2prom:

- Launch the **AQUAware for Eco-Wash** program.
- Connect the PC and the eco•wash system via bluetooth.
- Pause the system (red light).
- From the menu or the icon it is possible to create a new file or upload an existing one. In the first case, select **File->New** (choose the relevant no. of washing machines, see Fig. 11.a), while in the second case, select **File->Open** (see Fig. 11.b) and choose the backup file you intend to upload on the equipment.

The directory with the backup file is located in **Configurations->Data Folder**.

- Upload the whole **file**

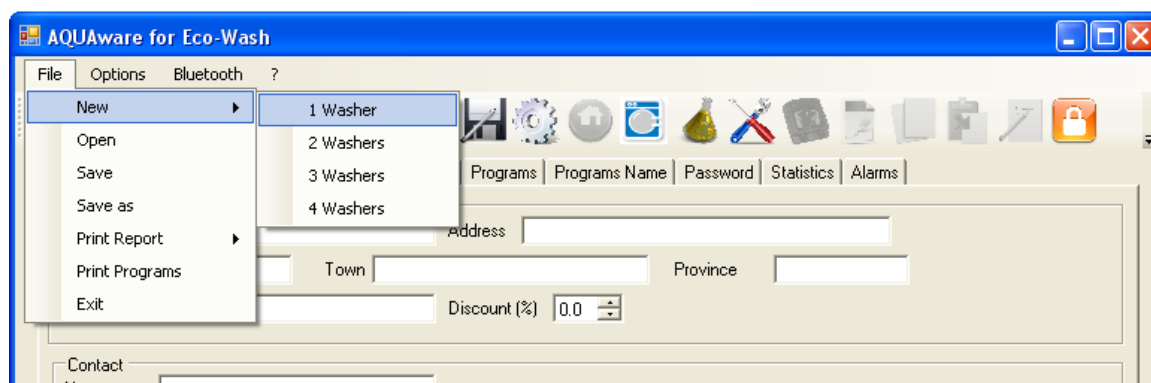


**Fig. 11.a**

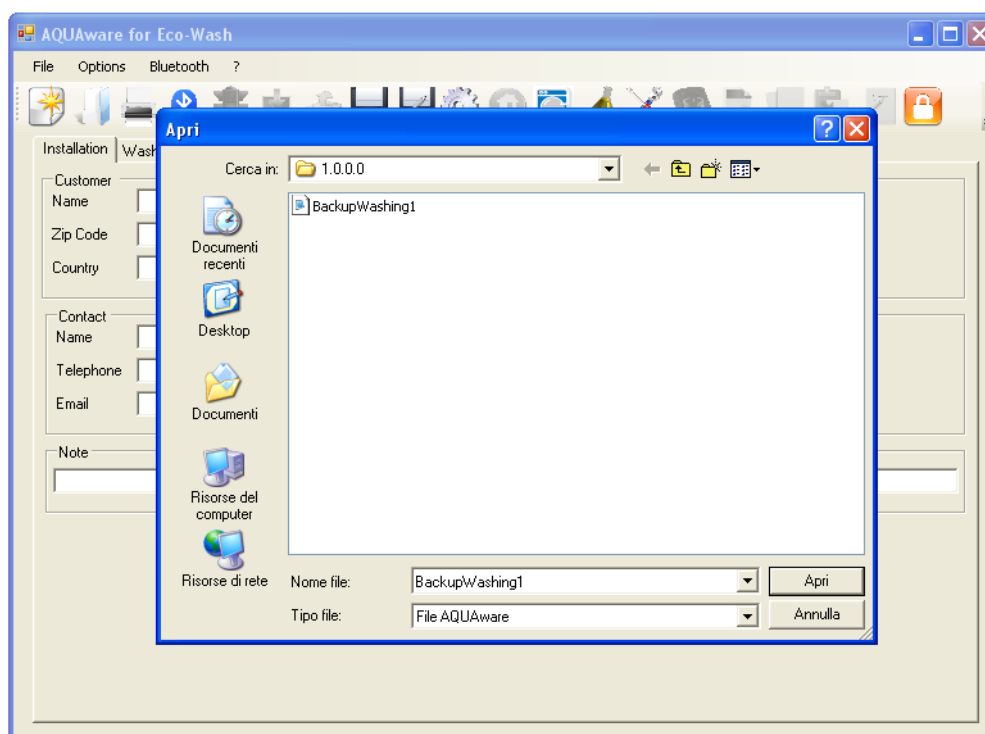


**Fig. 11.b**

## 12.0 APPENDIX 6 – Multi-machine System

The multi-machine system allows to manage up to four washing machines.

Each machine is associated with a Signal module to acquire the status of the relative solenoid valves. The pumps, which are always no more than ten, are connected to the product flushing kit. This is connected to the machine flushing kit, which allows to channel the product into the washing machine that required the dosing (see Figure 12.e).

The signal module is associated with the washing machine via jumpers JP1 and JP2 of the signal board (see Figure 12.a) as shown in table A12.

The Signal modules are connected together electrically by a serial link (see Figure 12.d): the input related to the return to the previous board (or the connection with the CPU) is on the connector marked as “*Central Unit*” (connector 3 in Fig. 12.a and 12.d). The output for the connection to the next board is conducted on the connector marked as “*Signal*” (connector 2 in Fig. 12.a and 12.d).

If there are simultaneous dosing requests from several washing machines, the multi-machine manages the requests based on a sequential order: in this case a relay contact in the signal module (see Figure 12.a) is activated for the washing machines that requested the dosage but that cannot (temporarily) be served. The relay contact must be used to set the corresponding washing machine in standby for the whole time during which the contact is active. The active status of the relay can be programmed as Normally Open (N.O.) or Normally Closed (N.C.) via the “**AQUAware Configurator**” configuration program (see Fig. 12.c).

The signal board is fitted with a normally open and a normally closed relay (see Fig. 12.a).

The central module (see Fig. 12.b and 12.d) manages the flushing solenoid valve at the inlet of the stub pipe and the 4 solenoid valves that control the flow of the washing machines.

| Washing Machine Number | Jumper 1 (JP1) | Jumper 2 (JP2) |
|------------------------|----------------|----------------|
| 1                      | Open           | Open           |
| 2                      | Open           | Closed         |
| 3                      | Closed         | Open           |
| 4                      | Closed         | Closed         |

**Table A12 – Addresses of the washing machines**

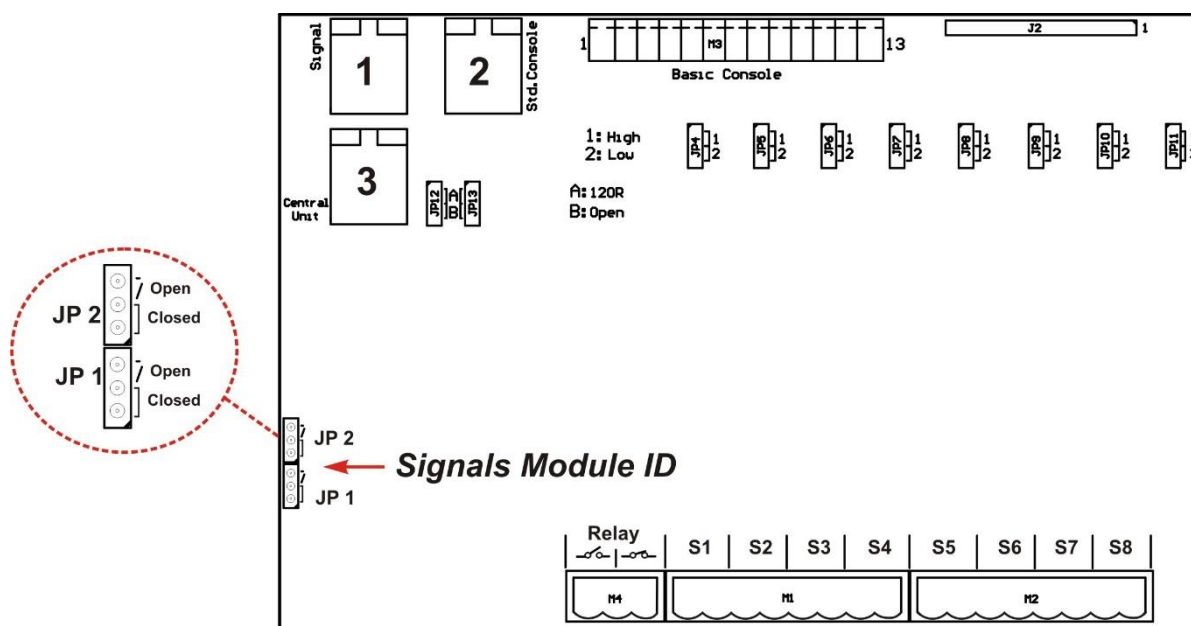


**Figure 12.a – Signal Board Layout**

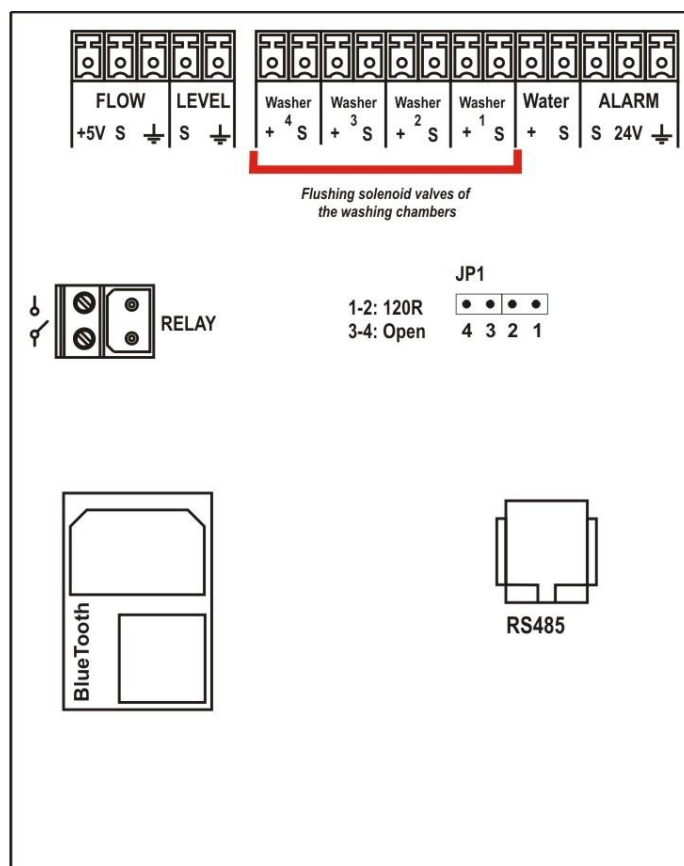


Figure 12.b – CPU Board Layout

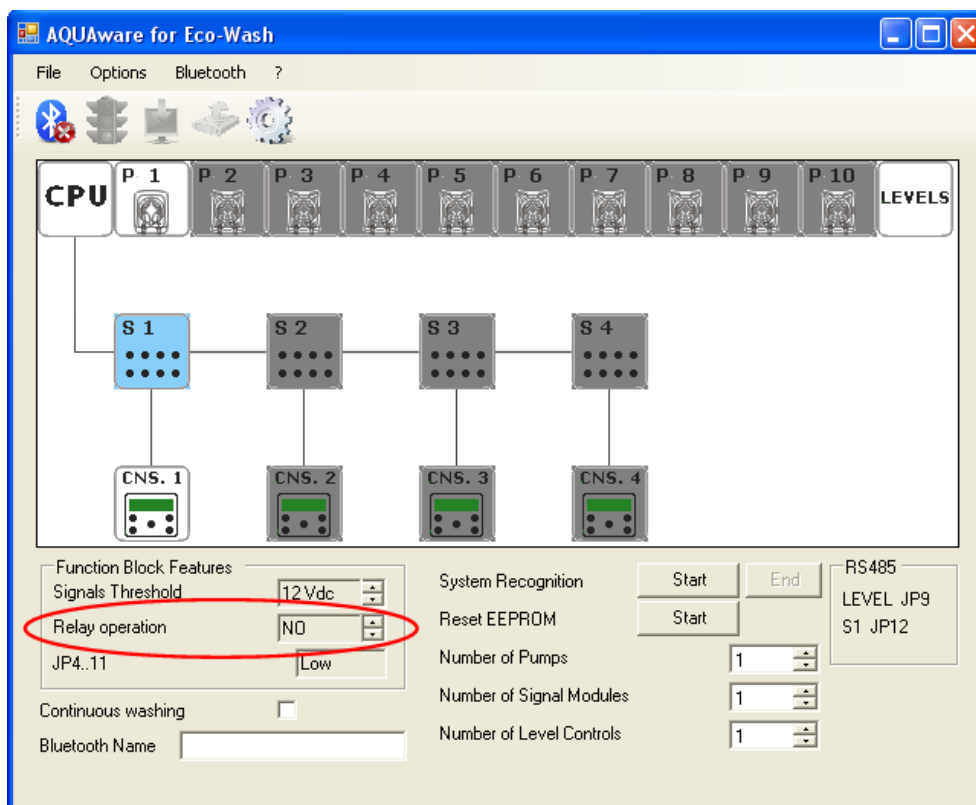


Figure 12.c – Configuration of the status of the signal module relay (washing machine standby)

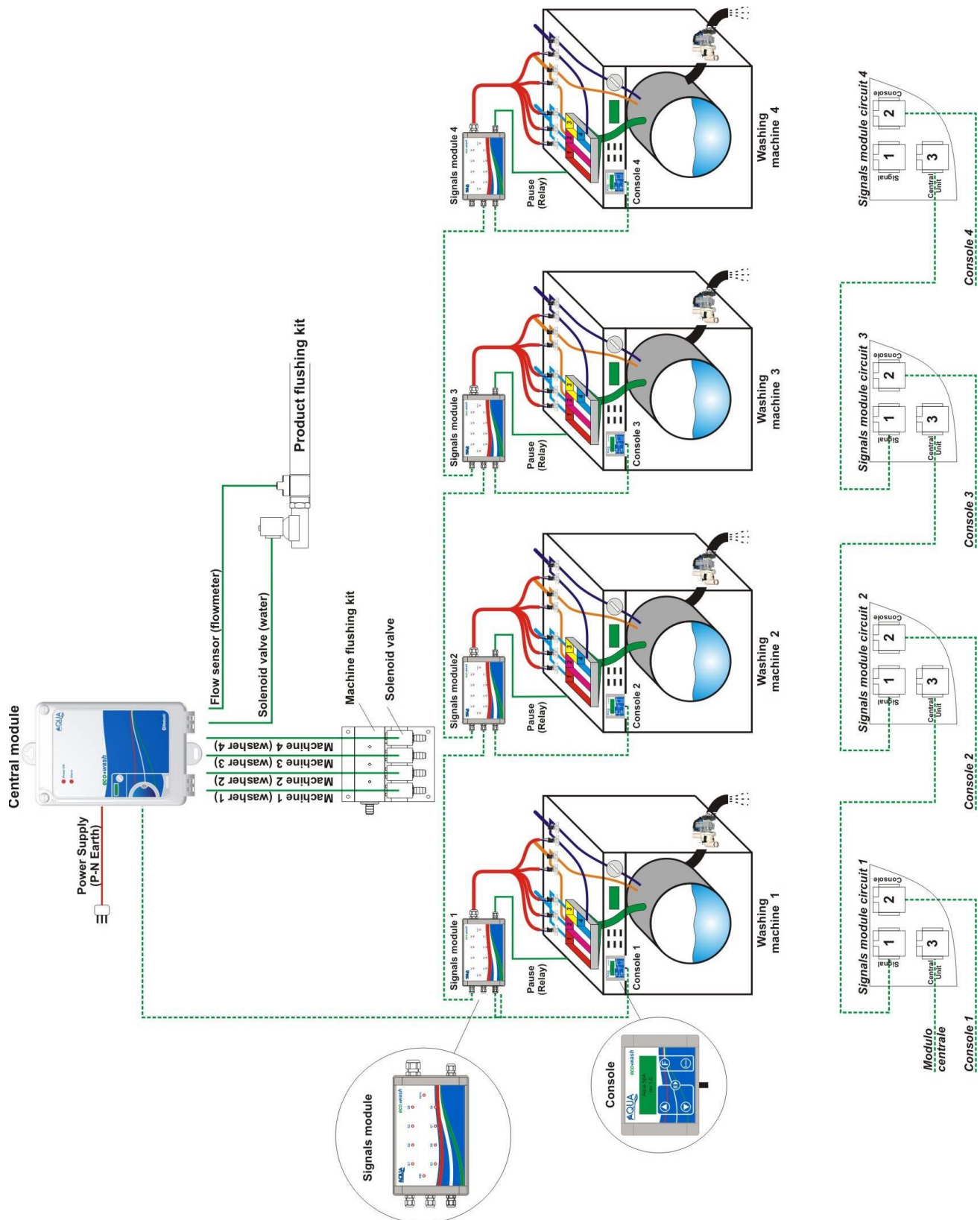


Figure 12.d – Electrical connections

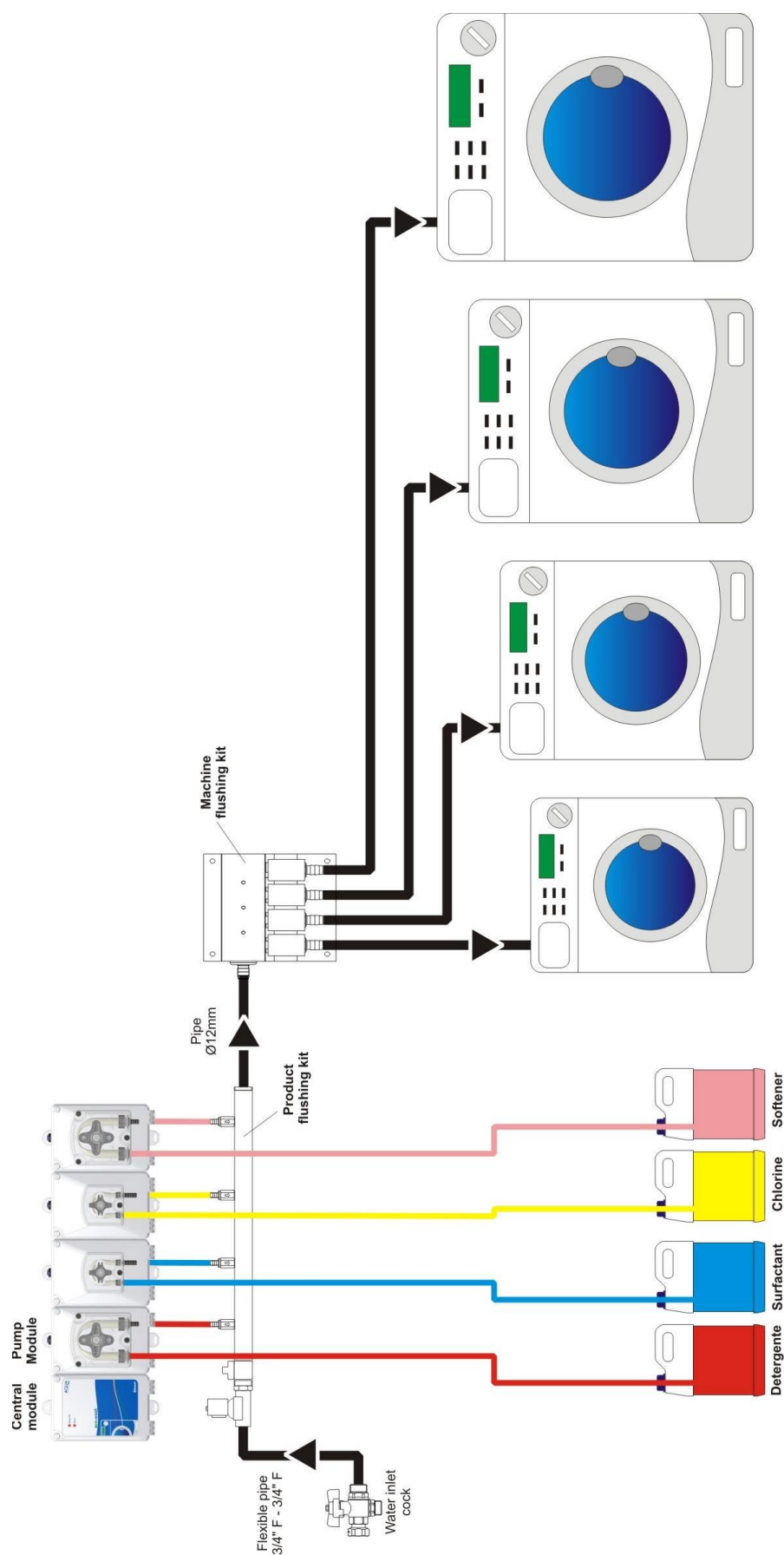


Figure 12.e – Hydraulic connections

### 13.0 APPENDIX 7– Continuous Washing Machine

The continuous washing machine allows to manage a tunnel washing machine with up to four washing chambers. The pumps are divided based on the washing chamber: each pump has a direct supply pipe on the flushing stub pipe related to the washing machine chamber it is associated with (see Figure 13.e).

There are always maximum ten pumps and each washing chamber is associated with a Signal module to acquire the status of the relative solenoid valves.

The signal module is associated with the washing chamber via jumpers JP1 and JP2 of the signal board (see Figure 13.a) as shown in table A3.

The Signal modules are connected together electrically by a serial link (see Figure 13.d): the input related to the return to the previous board (or the connection with the CPU) is on the connector marked as “*Central Unit*” (connector 3 in Fig. 13.a and 13.d). The output for the connection to the next board is conducted on the connector marked as “*Signal*” (connector 2 in Fig. 13.a and 13.d)

When there is an active dosage for one or more washing chambers, the corresponding solenoid valves are opened and the water is allowed to pass through the relative sector to carry the correct chemical product in the washing chamber: simultaneous dosages can be request for all the dosing chambers, which means all the system's pumps may be simultaneously active.

A continuous washing machine system is set via the program for the Configuration PC, “*AQUAware Configurator*”: just select the relative option on the main page by ticking the relative box. (Refer to Fig. 13.c)

The solenoid valves that form the flushing stub pipe of the washing chambers are managed by the central module (Fig. 13.b and 13.d)

| Washing Machine Number | Jumper 1 (JP1) | Jumper 2 (JP2) |
|------------------------|----------------|----------------|
| 1                      | Open           | Open           |
| 2                      | Open           | Closed         |
| 3                      | Closed         | Open           |
| 4                      | Closed         | Closed         |

**Table A13 – Addresses of the continuous washing machine's washing chambers**

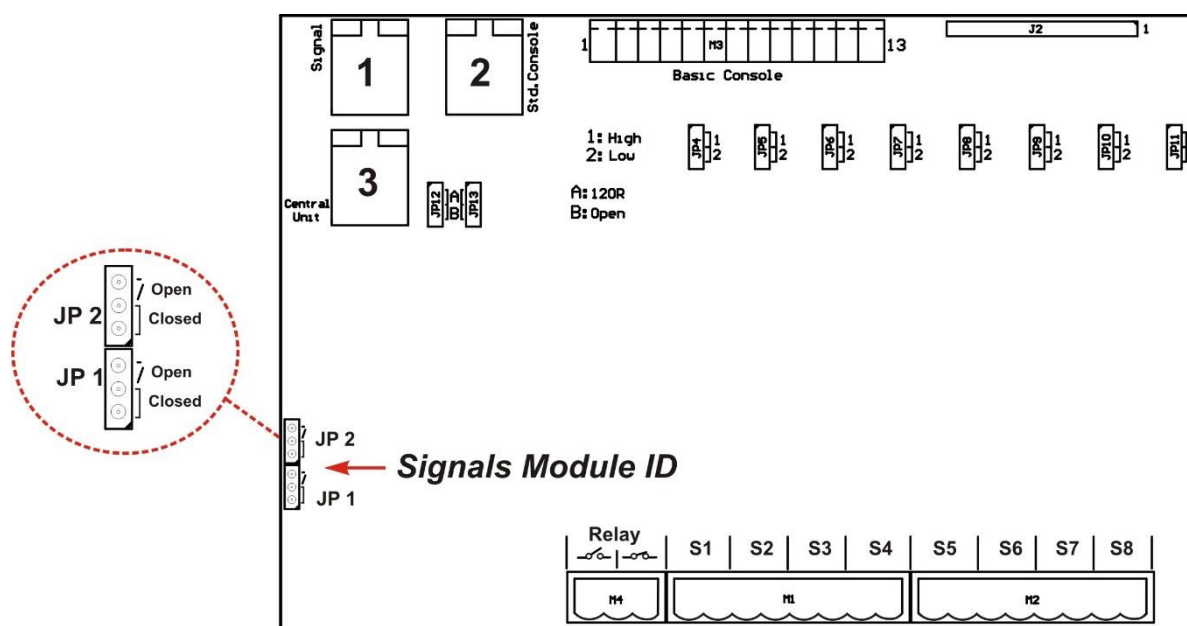


**Figure 13.a – Signal Board Layout**

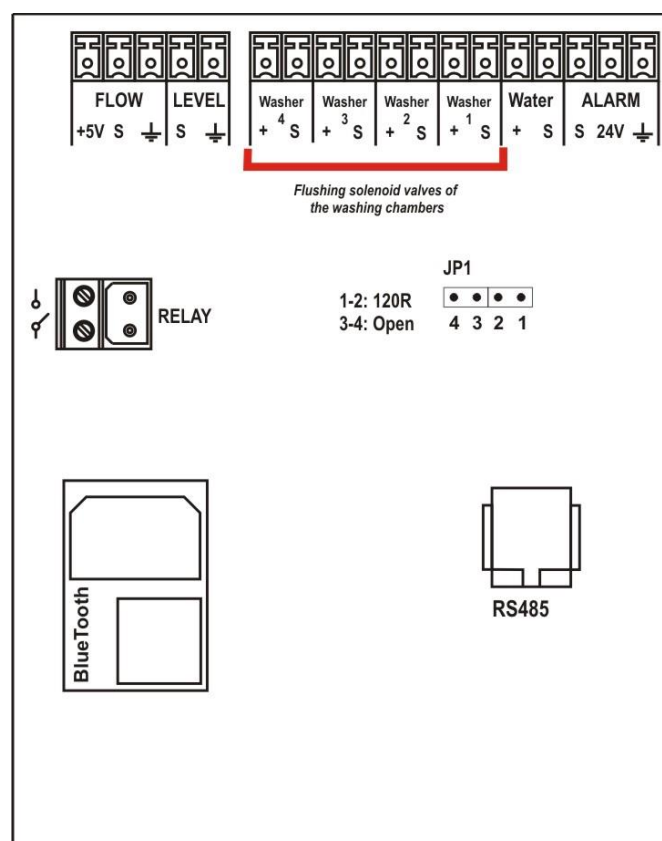


Figure 13.b – CPU Board Layout

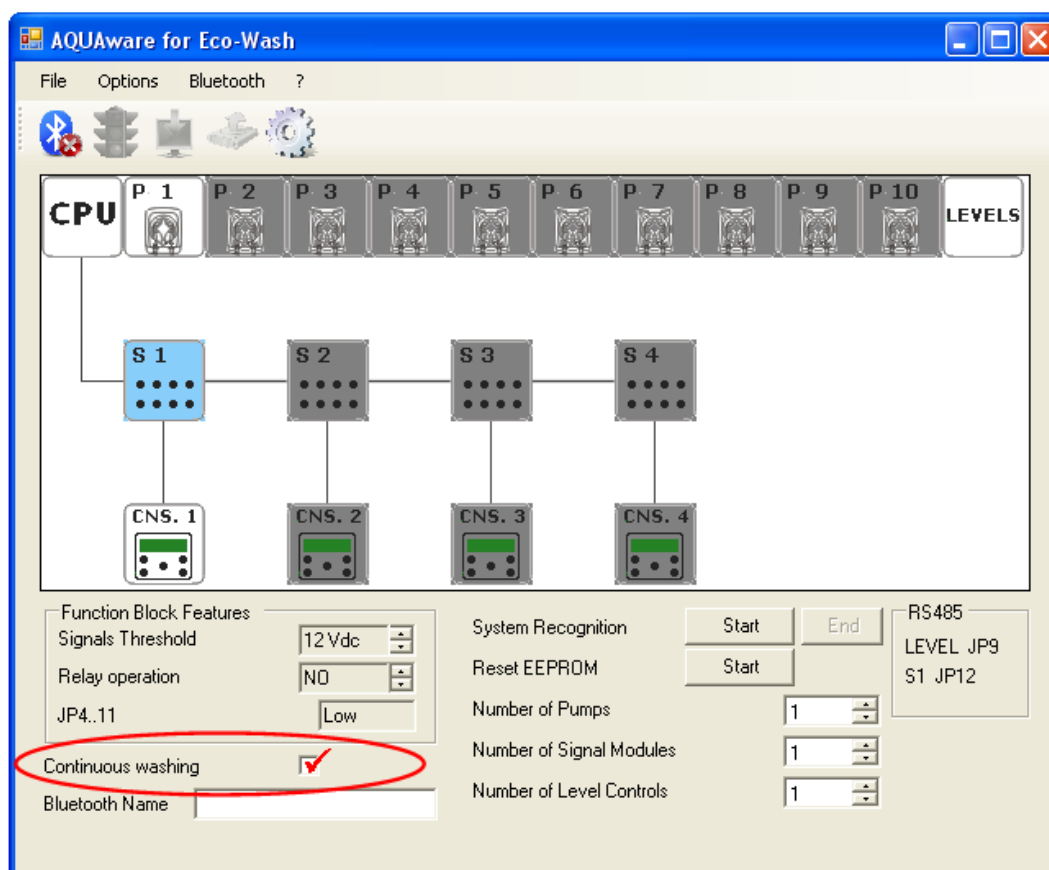


Figure 13.c – Continuous washing machine selection on the Configuration program

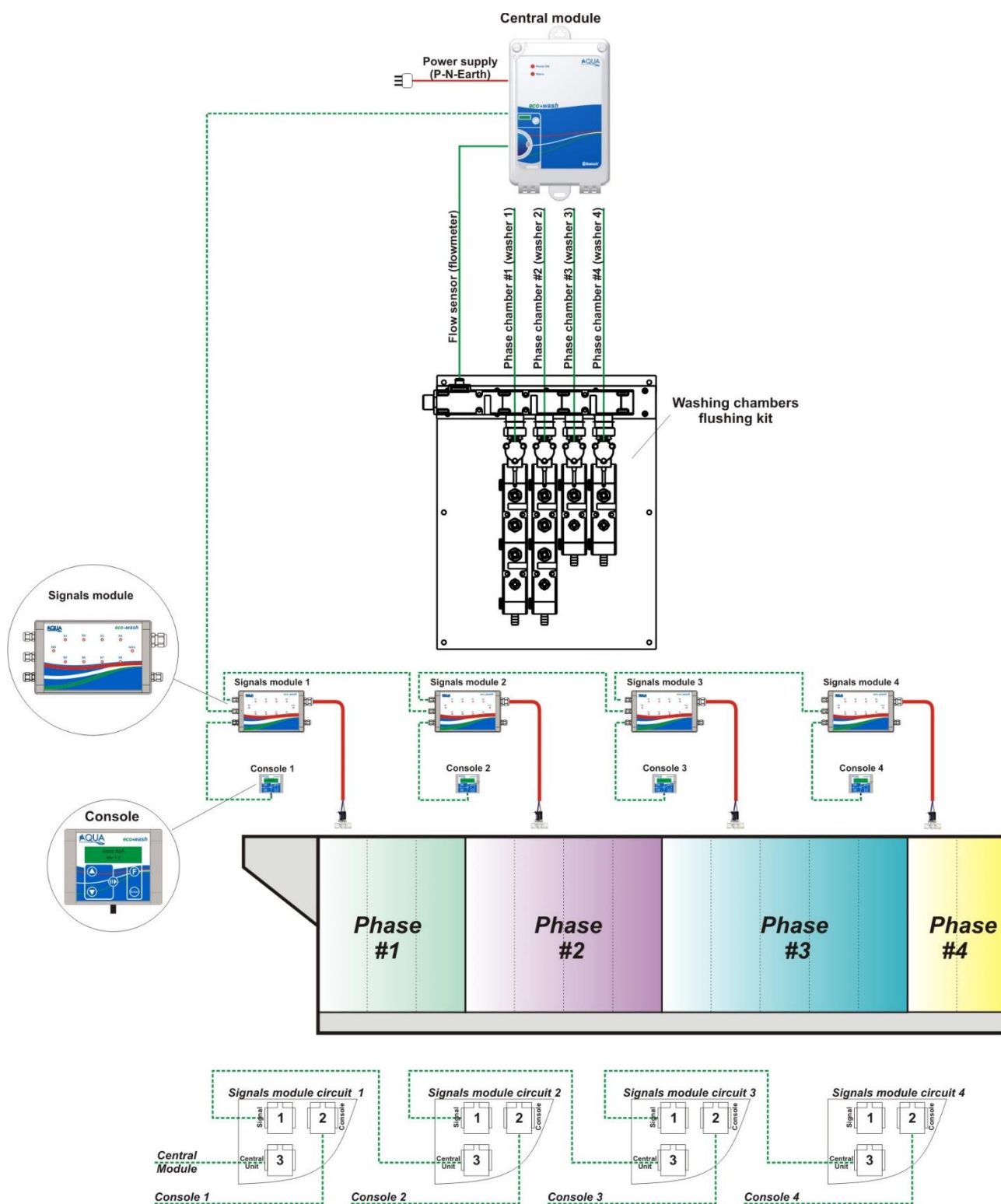
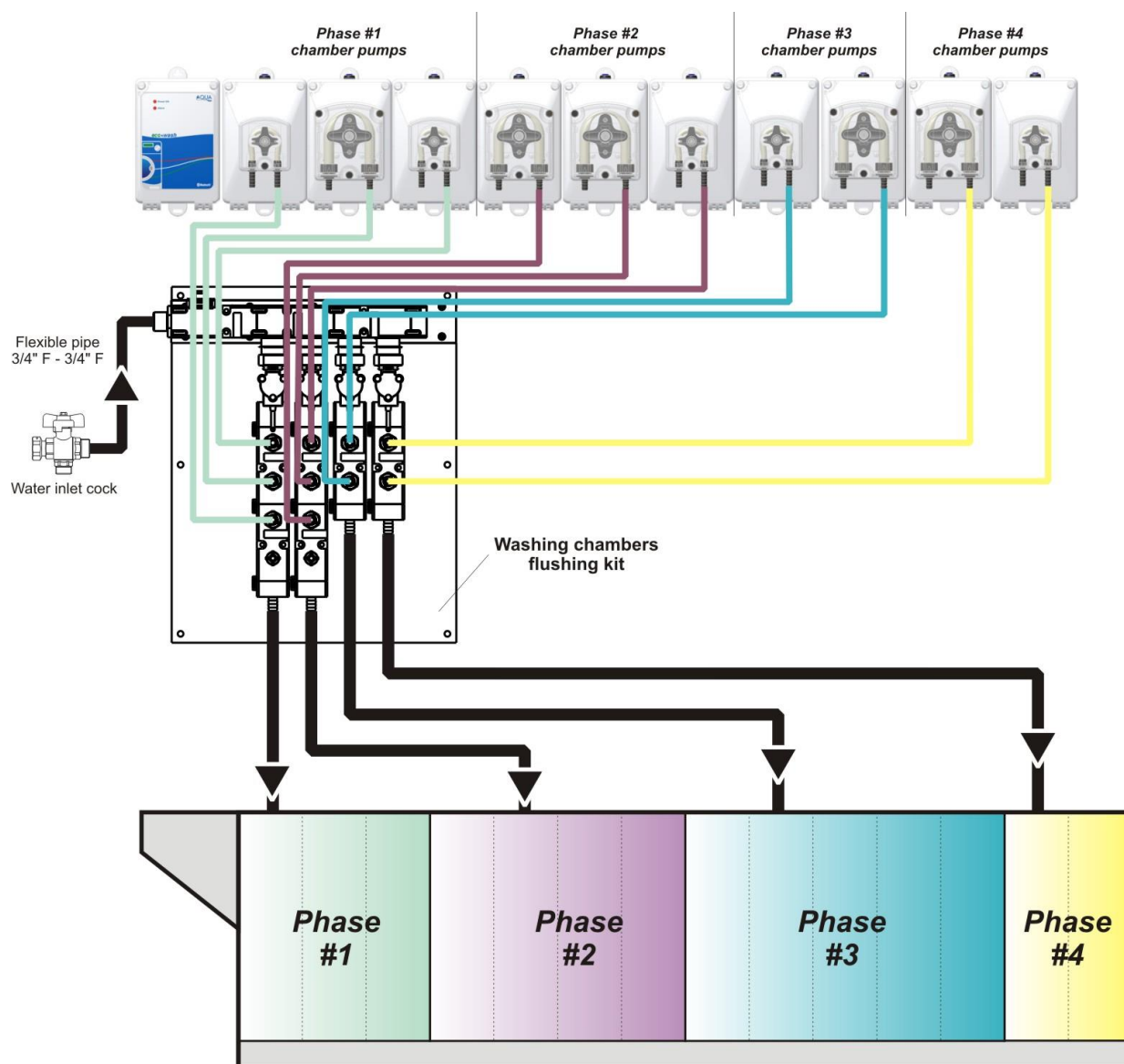


Figure 13.d – Electrical connections

**Figure 13.e – Hydraulic connections**



# AQUA eco•wash

