GPE *Vendors*

DBX20IE “Instant”
DBX20IE “Espresso”
INJECTOR

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technical handbook of
DB4A logic board

Update: 18-03-2004

Main features of DB4A logic board

DB4A logic board can be used in both versions: “Instant” and “Espresso” since the software manages all the optional groups.

DB4A logic board is located inside the machine, in an easily reachable position. On this logic board there are all the electronic parts of the machine, except the cable’s logic board named CAB5 (cables of the electric supply).

The main features of the DB4A logic board are:

- Dispensing of 24 products, with totally programmable recipes and all different prices
- Injector group with high pressure to be used with a maximum of 5 powders + 1 for sugar
- Mixer group with 1 powder. Possibility to manage a second powder (of the jet group too)
- Espresso group with optional of “pre-infusion” and coffee “quick production”
- Possibility of 6 more products to be programmed (hot water, cups,...)

- Manual test on single parts of machine and test on every I/O through keyboard and display
- Alarms by visible and acoustic signals and separated totalizers for each code

- Direct connection to parallel coin mechanisms (6 coin channels) both 10 and 16 poles
- Connection to banknotes validator (4 channels) with 12V/3A stabilized supply on board
- Serial interface for connecting Executive payment systems
- Partial totalizers (number of single coins, Executive) and total amount gained

- LCD alphanumeric display 1 x 16 characters in every language (max 32) on the same memory
- 9 keys (=selection buttons) keyboards + internal key for functions of managing and testing
- Thermo-regulation of boiler temperature and reading of ambient temperature for compensation

Description of sale's functions

Sales' operations are very simple and evident thanks to all information given to the user by the alphanumerical display and by the clearness of the keyboard.

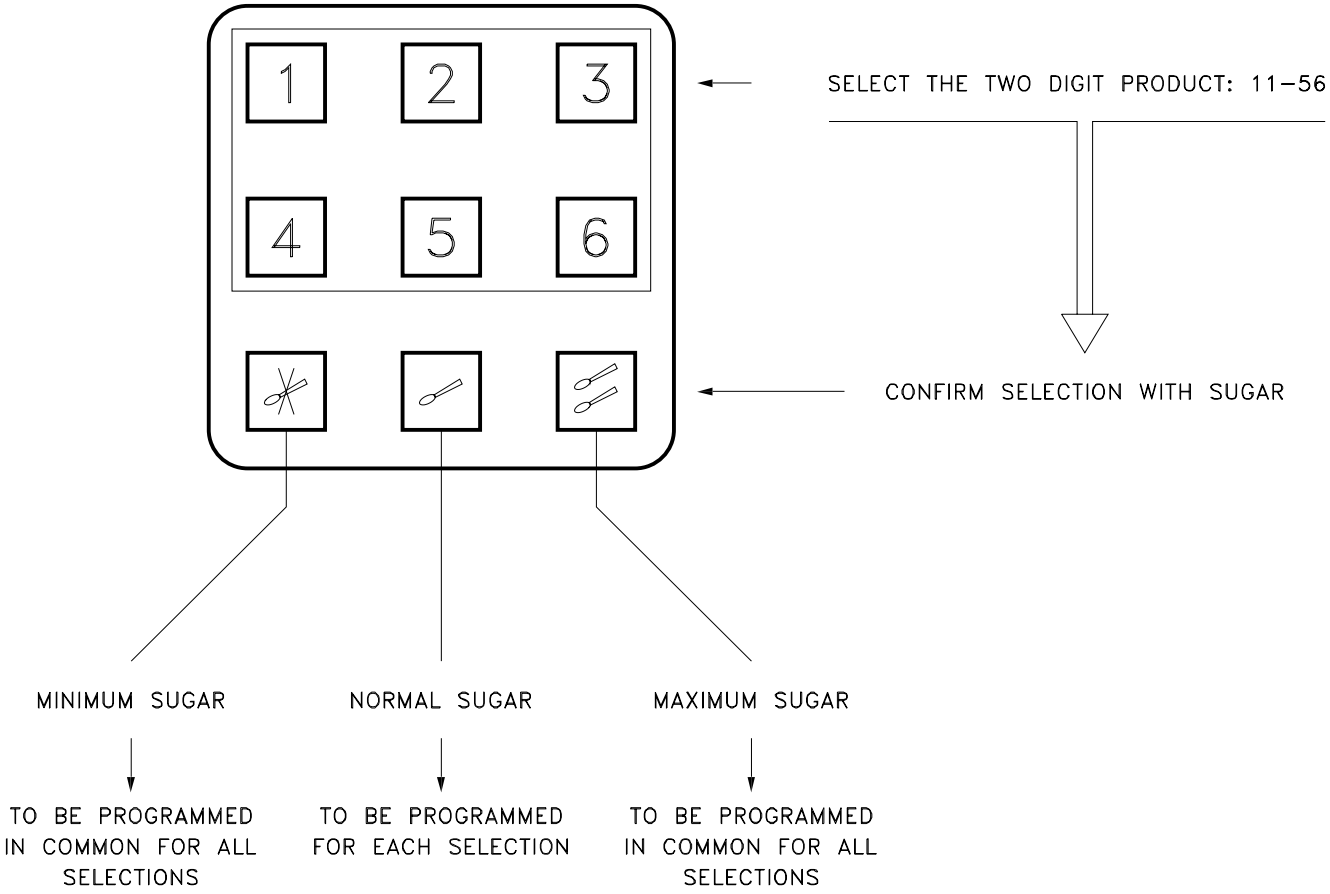
The machine can dispense up to 24 products, made using different recipes. These depend on the combination of water and powder from the 6 groups of production available. Moreover, there are 6 more products (hot water, chilled water, cups,...) of which only the quantity can be programmed.

The user can choose among many pre-defined recipes in the machine. Nevertheless the user can choose whether to modify the quantity of sugar by pressing one of the 3 keys of the keyboard representing 0,1 or 2 spoons:

• By pressing the central key (1 spoon) the product will have a normal quantity of sugar

• By pressing the key on the left (no spoon) the product will not have any sugar

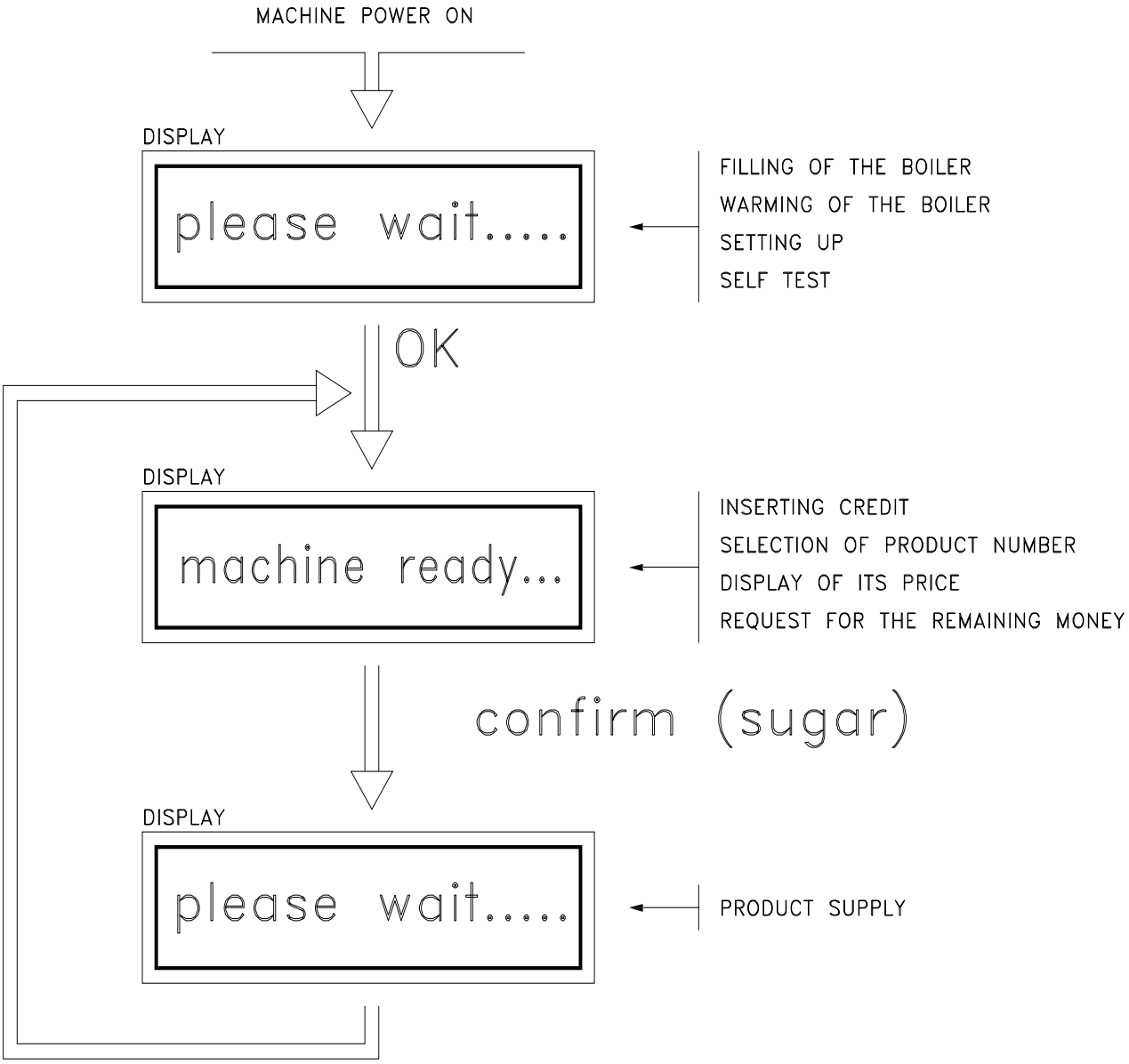
• By pressing the key on the right (2 spoons) the product will have more sugar



The user can insert credit in any phase of work of the machine, but selection can only be made in the stand-by phase (not during the programming, warming and supplying of the product).

By pressing the two numbers corresponding to the product, the price of same will be displayed and, eventually, the remaining money. Only when the right amount of money is reached, you are asked to confirm, by pressing one of the 3 sugar keys.

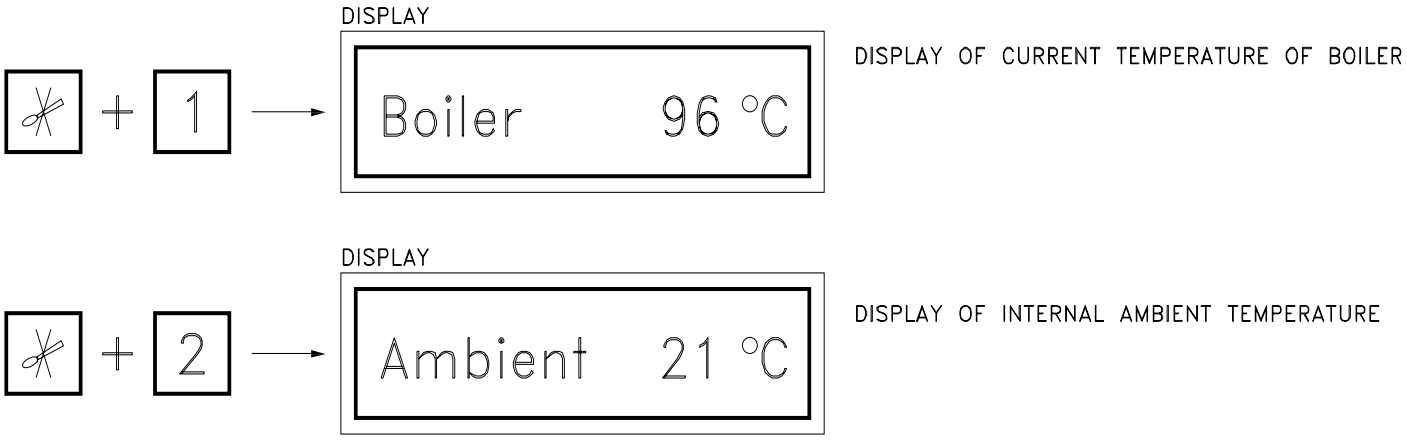
After the product is supplied, if there are residual credits on the machine they remain inside the machine unless there has been programmed the function of setting to zero the remaining credit within a max. time (menu: system configuration).



Display of current temperatures

DB4A logic board has 2 sensors of temperature, one of which is used for the thermo-regulation of the boiler; the other one is used to detect the temperature inside the machine. This last sensor allows to speed up the pre-warming operations of the machine, especially at low temperature of the machine (as example, at the beginning of the day of work).

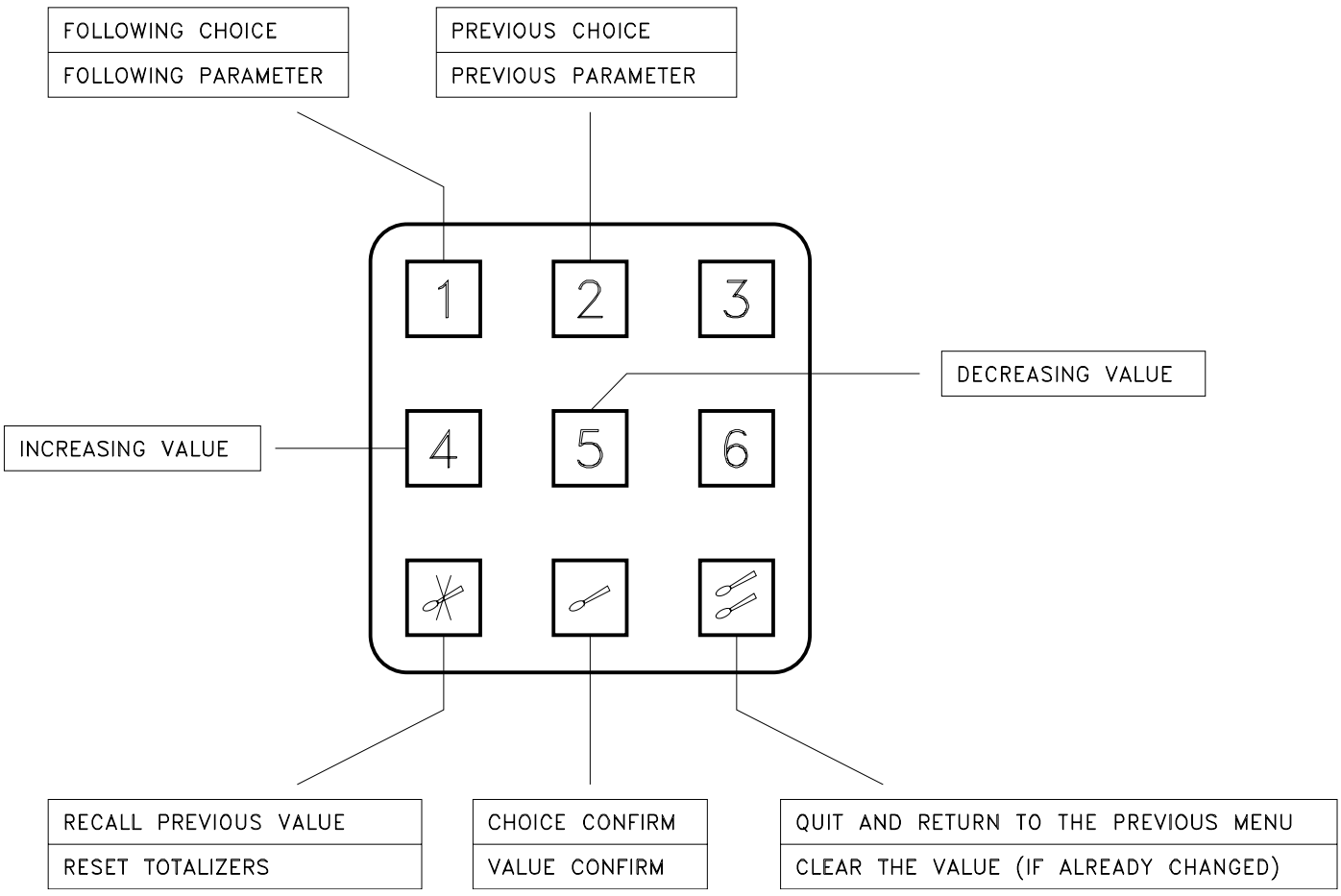
To verify temperature inside the machine during the pre-warming or the stand-by phase, press the key “no spoon” and an identifying key of the sensor, as explained in the following scheme:



Service and programming of the machine

DB4A logic board has many service functions and the possibility of programming the parameters of work. All these are inside the menu, following a logical order.

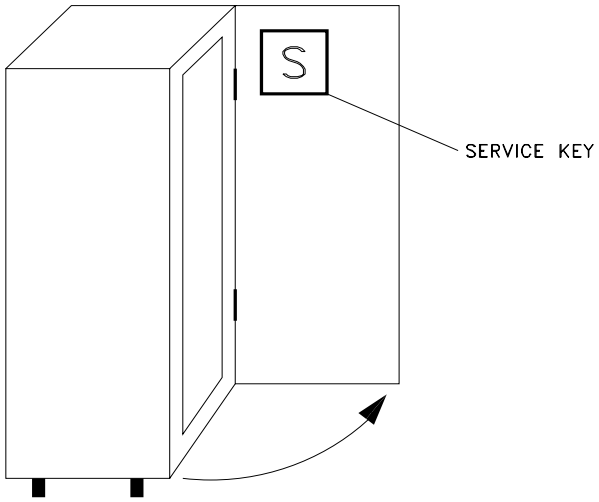
At first it is important to understand the alternative use of the keyboard (not the use of selecting products).
The keyboard is essential to move inside the service menu; to set up or modify every parameter and to test each part of the machine.
The meaning of the different keys on service is as follows:



- Key 1 and key 2 allow to select a voice or a parameter inside the menu;
- Key 4 and key 5 allow to modify the parameters' value;
- Key "one spoon" is to confirm the voice of the menu;
- Key "no spoon" is for specific functions of the menu;
- Key "two spoons" is for the clearing and cancellation of the operation.

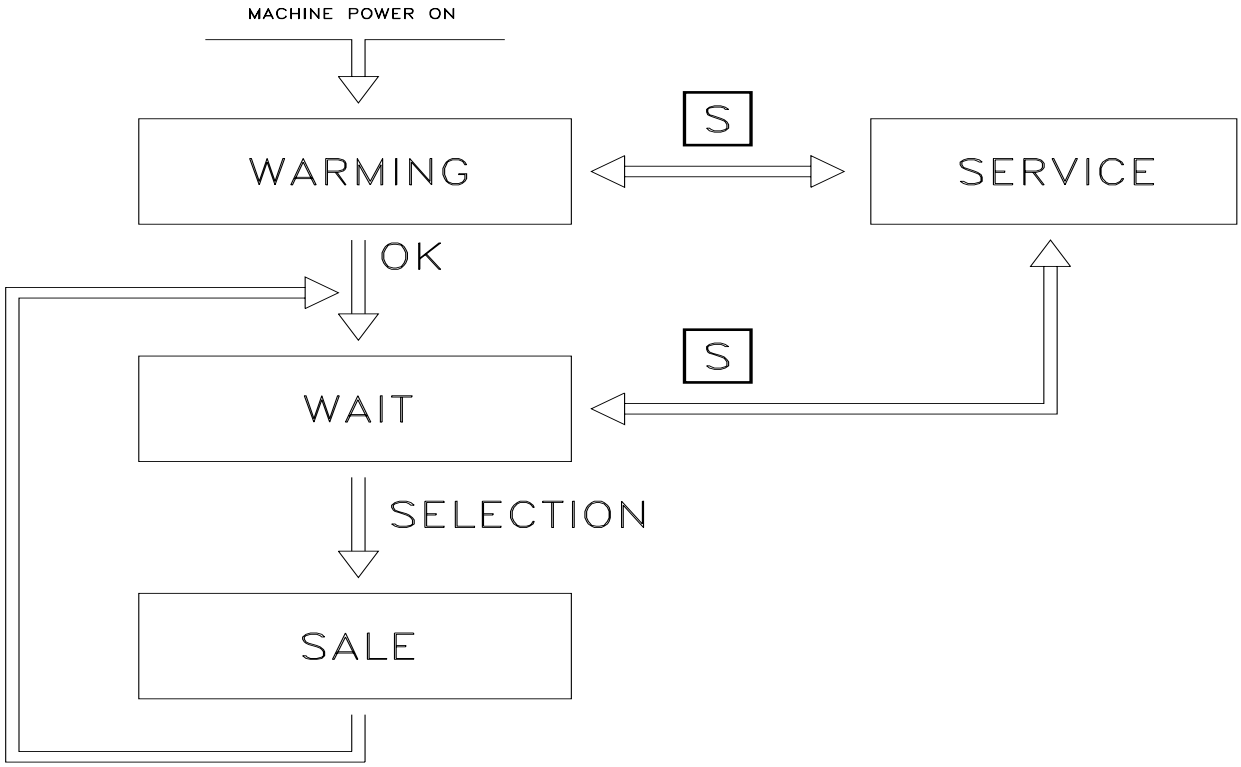
For a fast increase/decrease of some parameters hold the key at least 1 second.

For all service operations it is necessary a further selection button, called “service key”, which is on the back side of the keyboard. That’s why this kind of operation can be made only when the machine is open.



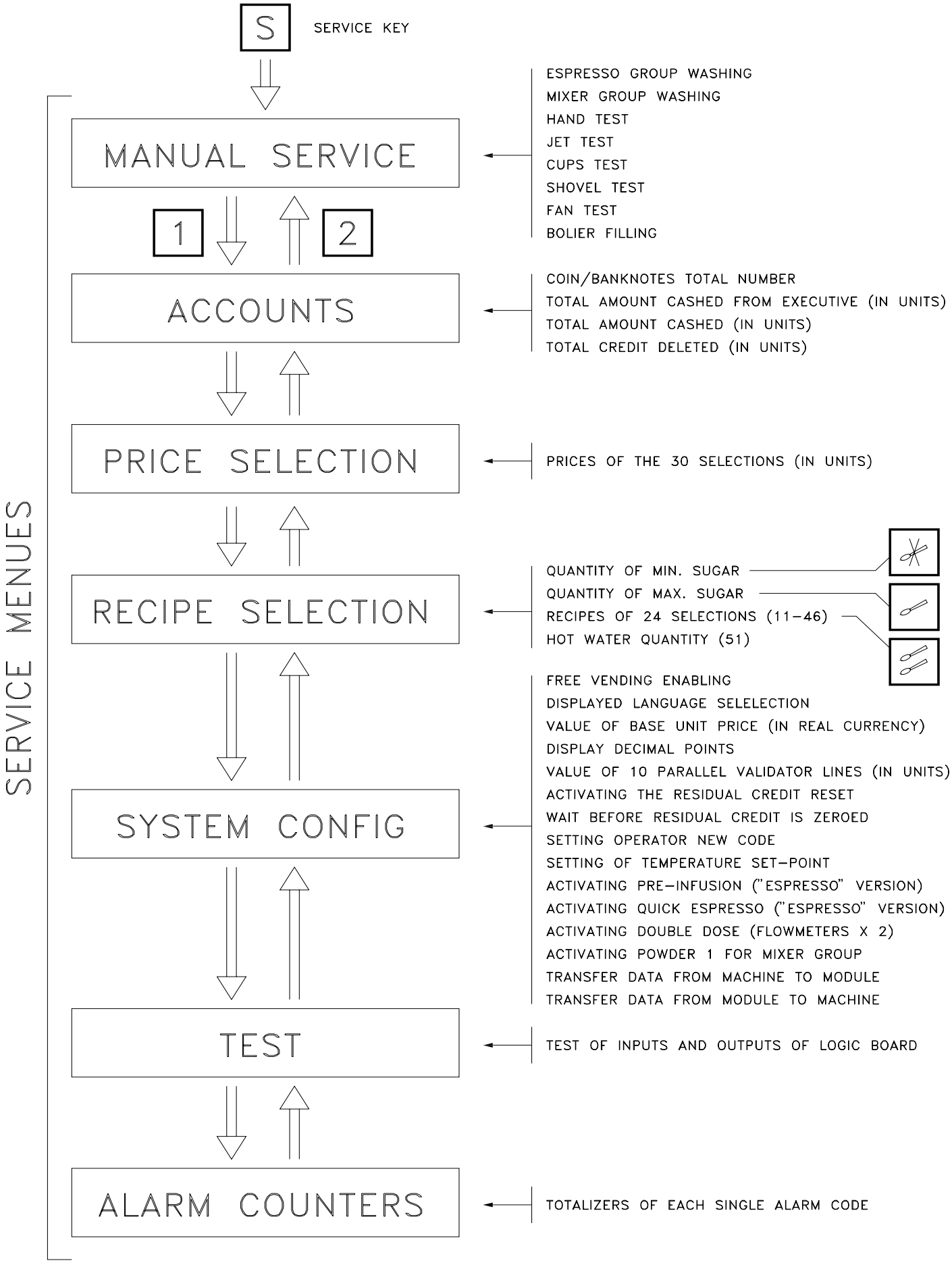
To enter some of the service menus, you have to dial a password, when required.
In case the machine has never been used before the default password is “0”; therefore, when password is asked, in this case you have only to press the key “one spoon”=confirm.
It is possible to change the value of the password (0-9999) through the service menu called “System configuration”. Once the password has been provided, this will not been asked for anymore until the switching off of the machine.

By pressing the service key, you can enter the service anytime, but during a sale.
In this way the several service menus will be displayed.
To exit the menus and the sub-menus it is necessary to press the service key or to switch off the machine. By exiting the service menus it is possible that the machine initiates some operations such as warming or setting up, since these depend on the manual managing of the machine parts.



Description of the service menu

Here is the table representing how the service and test operations, price and recipes programming and the totalizers and the alarms appear in the menu:



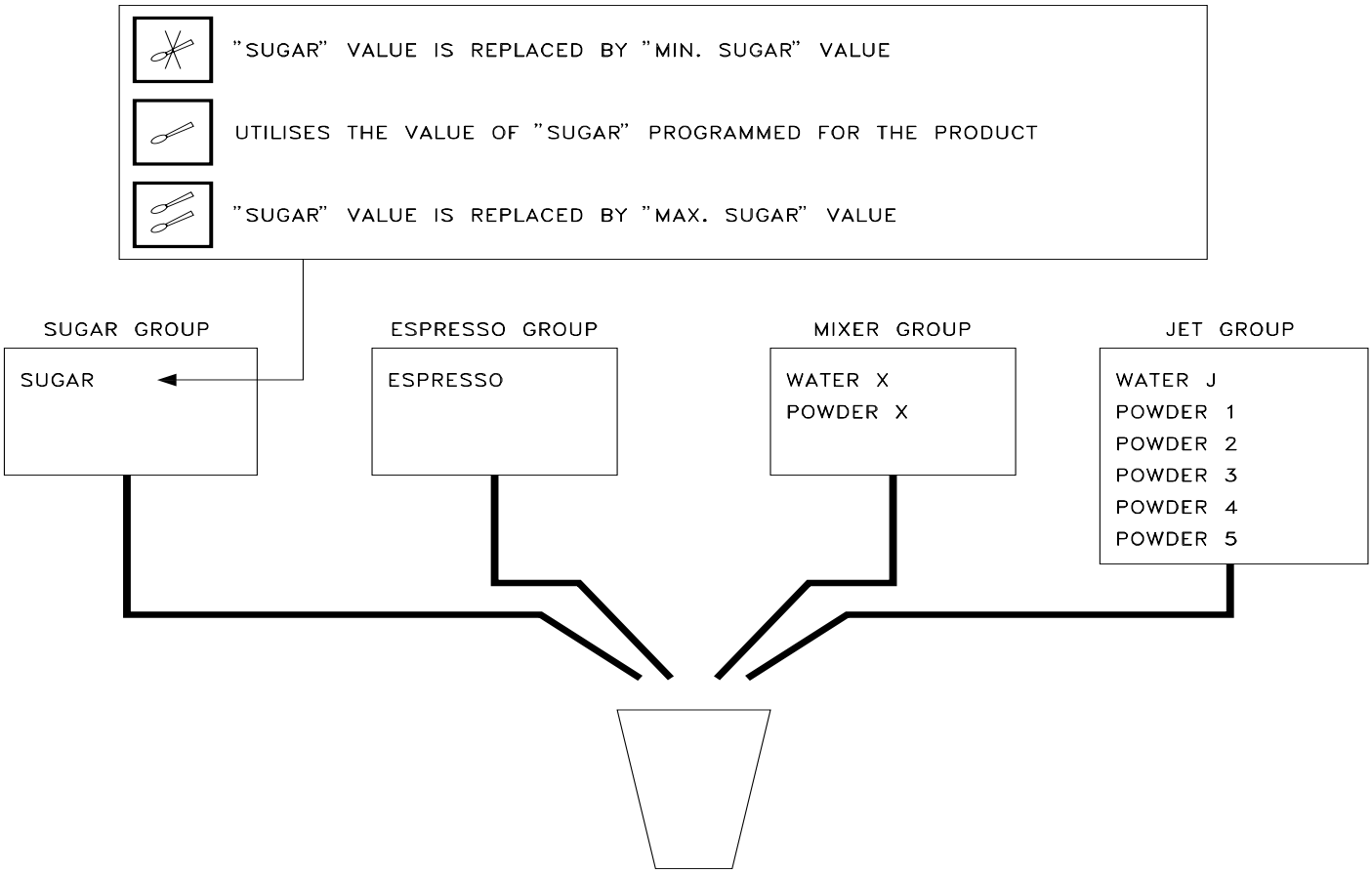
“MANUAL SERVICE” menu allows to proceed to the manual washing of machine, the test of some parts of the machine and the refilling of the boiler. To start these functions, at first enter the selected menu and press key “one spoon” (that has the start function).

The “ACCOUNTS” menu has in itself all the counters of the machine, that work for the inserting of credits. To be more precise, there are 10 counters (one for each channel) that sum up the number of pieces of each coin and banknote accepted by the parallel validators; while the counter of the Executive payment systems and the total amount cashed by the machine are expressed under the base unit value programmed.
To set to zero all these counters you need to press key “no spoon” and to confirm this by pressing key “one spoon”; if you press key “two spoons” you’ll cancel the data before confirming them.
It is possible to display two different totalizers (that cannot be set to zero): one is for the total amount gained by the machine and the other is for the total amount of products supplied. To display them you have to press at the same time the keys “3” and “4” for the amount cashed or the keys “3” and “5” for the products supplied.

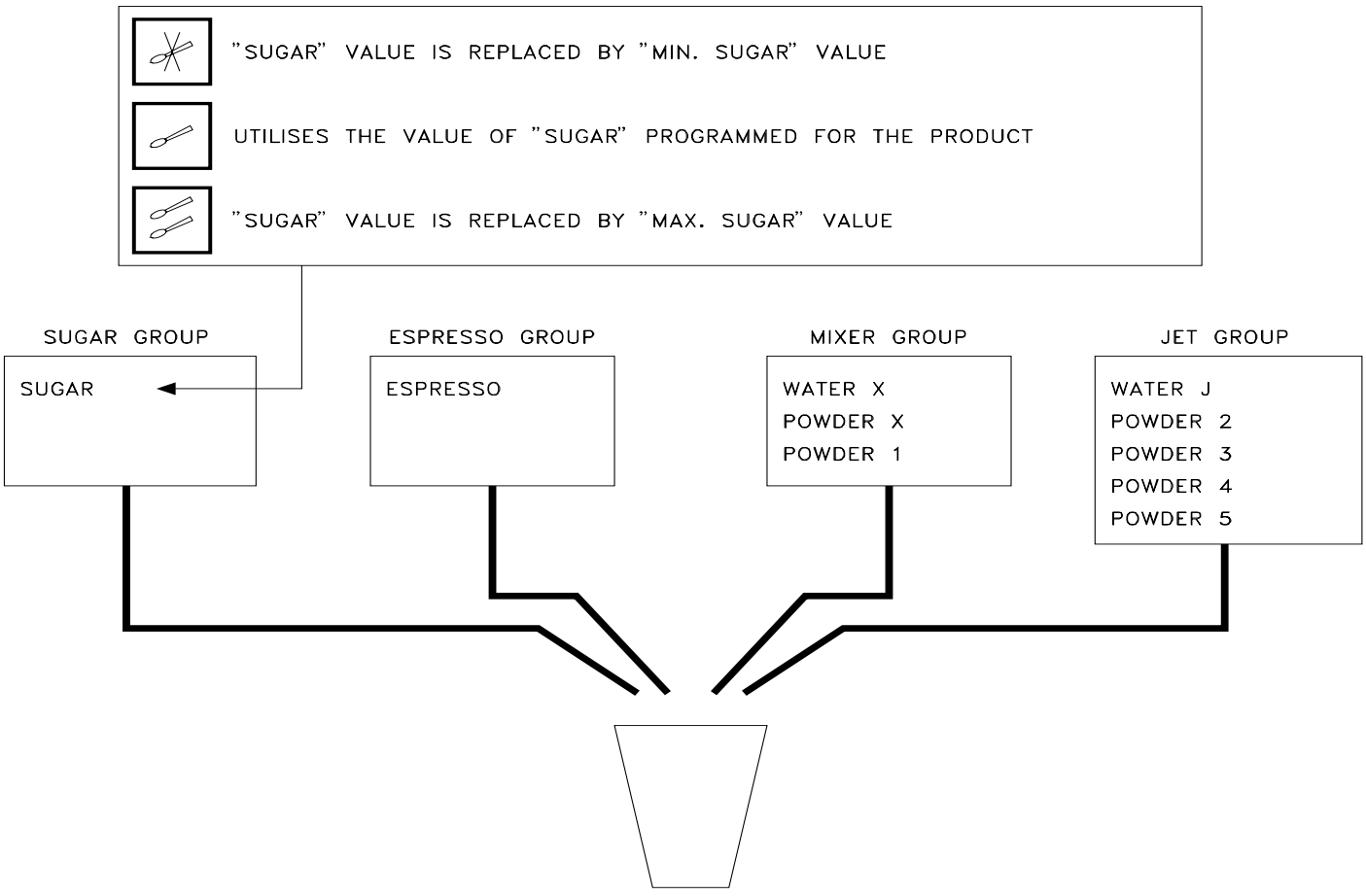
“PRICE SELECTION” menu is to set the price for the sale of products (for a max. of 30 selections).
Price must be programmed under the form of “base unit price”. The system can program a base unit price from 1 to 1000 and the value of price has a range from 0 to 5000.
If one product’s price is programmed with value 0 this means that no sale can be made of that product. If the user selects that product, on the display it will appear “nonexistent...”.

“RECIPE SELECTION” menu can change the recipes on all 24 programmable selections (11-46) and the quantities of the special selections (51-56).
The machine provides different configurations according to the options and the installed groups (jet group containers, espresso group and two powder mixer group). Nevertheless the DB4A board provides the parameters of recipe related to all the groups even if they are not installed.

Besides it is necessary to make a distinction related to the meaning of the parameter related to the powder 1.
If the installed mixer group has only one powder (powder X), the powder 1 is normally used by the jet group (until 5 powders, from 1 to 5 + sugar).
If the mixer group provides the second powder, it will be used not only the relative powder X but the powder 1 container too. In this case this powder cannot be provided anymore by the jet group; max 4 powders (from 2 to 5 + sugar) can be provided.
The option of the two powders mixer group has to be selected in the "configuration menu".
The following schemes represent the meaning of all parameters defining the recipe of a product in case of one or two powder mixer:



Production scheme with one powder mixer option



Production scheme with two powder mixer option

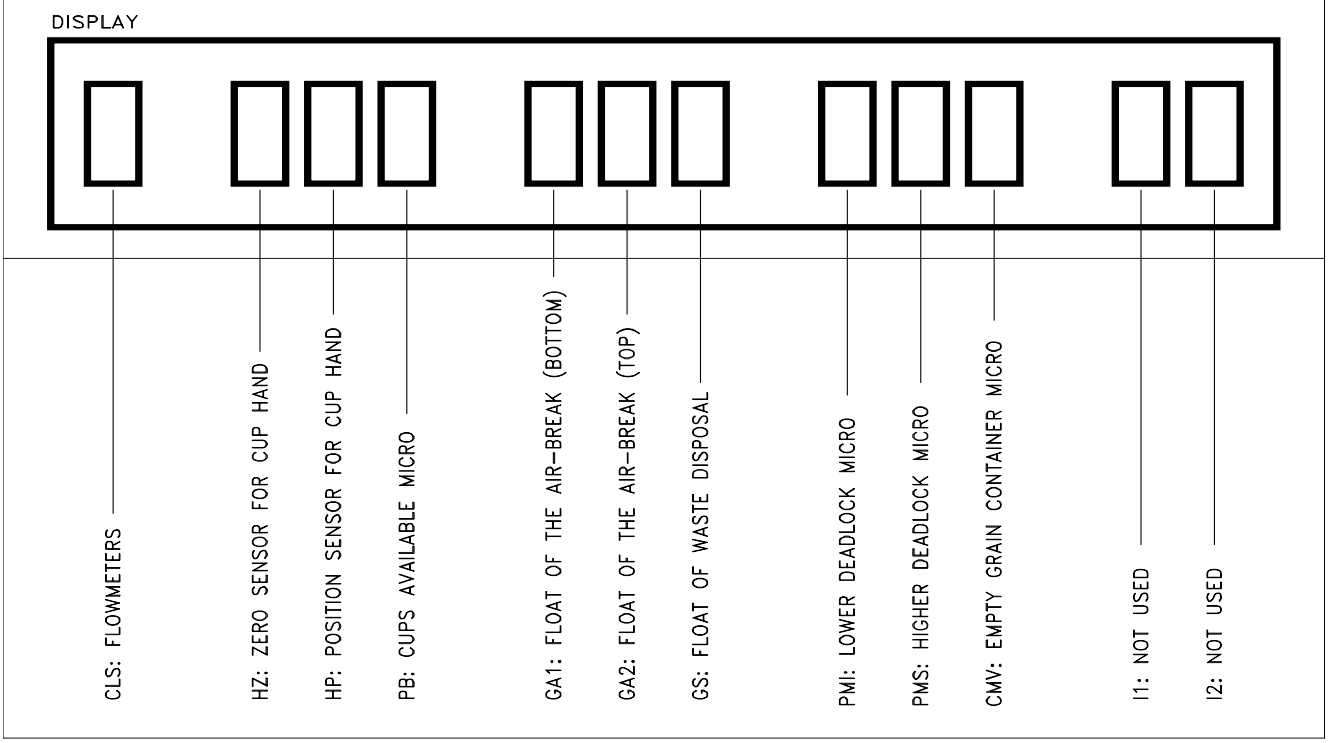
The selection recipes are made by combining different quantities of the various products inside the groups. All quantities of powders are expressed in seconds (with decimals) while quantities of water are expressed by the number of pulses of the flow-meters.
For the quantities of water, measured in impulses of the flow-meters, it is necessary to signal the presence of the "double dose" parameter in the "configuration menu".
Enabling this option all the quantities of water in all products are doubled according to the values planned in the recipes.

The first values to be programmed are those of the sugar: sugar minimum and sugar maximum are common for all recipes, while normal sugar is to be programmed in each single recipe.
Then there are the 24 programmable recipes. Each recipe is made of 10 values of all possible optional groups.
Any recipe of each selection corresponds to a number (that appears on the left in the display) and to see the other recipes it is necessary to press one of the two keys for the selection of parameters (the following = key1; the previous = key2).
The 5 way speed allows positioning on the value of a particular recipe notwithstanding the 240 (10x24) programmed values.

“SYSTEM CONFIGURATION” menu has all the general settings of the machine.
Payment systems: it is possible to set up the free sale, to choose the language for the messages of the display, to change the value of the base price unit (expressed in real currency), the number of the decimals, the value corresponding to the 10 channels of parallel validators, to set to zero the residual credit after a sale and the time before the credit will be cancelled.
Then there is the set up of the operator’s code (different from default 0), the set up of the set-point of the thermo-regulation, the “pre-infusion” set up and the quick production of coffee (coffee is ground during the supply of same and not before), the double dose option and the two powder mixer option.
Finally two commands can be used for reading and writing all data of the EEprom memory in the external module.

“TEST” menu allows to display the status of the 12 inputs ON/OFF of the machine, the values of the 4 inputs of the sensors of temperature and to start up the status of the 27 outputs.
To display the 4 temperatures it is necessary to press keys from 1 to 4.
The outputs can be activated only once. Therefore press key “no spoon” to see on the display the output properly selected and for moving use key 1 and 2; once you have chosen the proper output, you’ll have to confirm by pressing key “one spoon”.
In the following tables there are the associations between the inputs and the outputs and the different sensors of the machine:

ON/OFF INPUTS



ON/OFF OUTPUTS

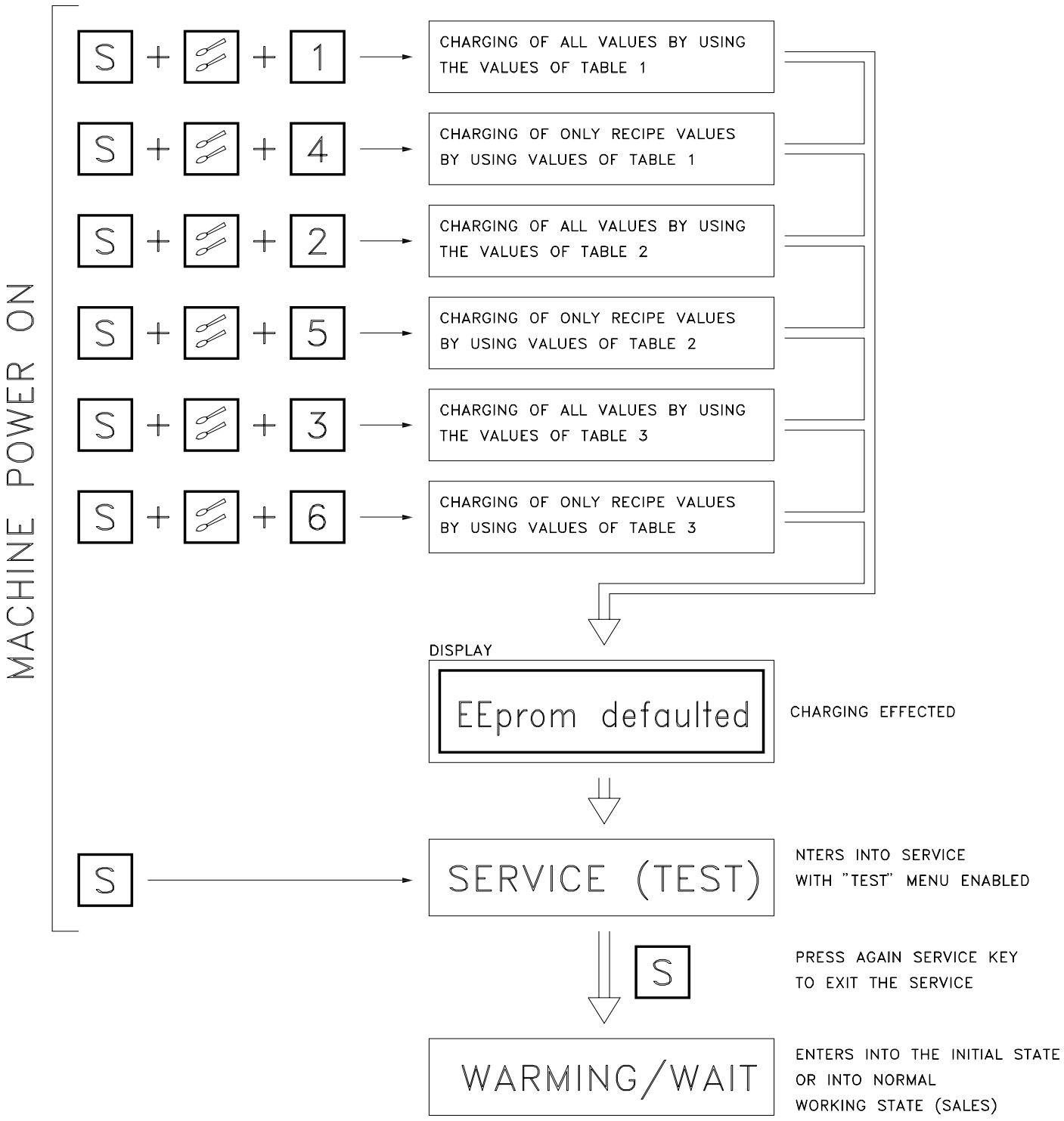
NUM	
1	RC: BOILER RESISTANCE
2	MA: ASPIRATOR'S MOTOR
3	PME: WATER PUMP
4	ER: WATER SUPPLY ELECTROVALVE / WATER MOTOR
5	MC: MOTOR OF ESPRESSO GROUP GRINDER
6	MLV: MOTOR OF ESPRESSO GROUP LEVERS
7	E3V: ESPRESSO GROUP 3 WAYS ELECTROVALVE
8	EAX: WATER ELECTROVALVE MIXER GROUP
9	EA1: WATER ELECTROVALVE JET GROUP
10	EA2: ELECTROVALVE CLEANING JET GROUP
11	EM: ESPRESSO GROUP ELECTRO-MAGNET
12	RSE: ESPRESSO GROUP HEATING RESISTANCE
13	MFX: MOTOR OF MIXING BOWL MIXER GROUP
14	MPX: MOTOR OF POWDER MIXER GROUP
15	MP5: MOTOR OF POWDER 5 JET GROUP
16	MP4: MOTOR OF POWDER 4 JET GROUP
17	MP3: MOTOR OF POWDER 3 JET GROUP
18	MP2: MOTOR OF POWDER 2 JET GROUP
19	MP1: MOTOR OF POWDER 1 JET GROUP / MIXER GROUP
20	MZ: MOTOR OF SUGAR GROUP
21	MB: CUPS GROUP MOTOR
22	EB1: CUPS GROUP ELECTRO-MAGNET 1
23	EB2: CUPS GROUP ELECTRO-MAGNET 2
24	EP: SHOVEL ELECTROVALVE
25	U1: NOT USED
26	U2: NOT USED
27	MH: CUP HAND MOTOR

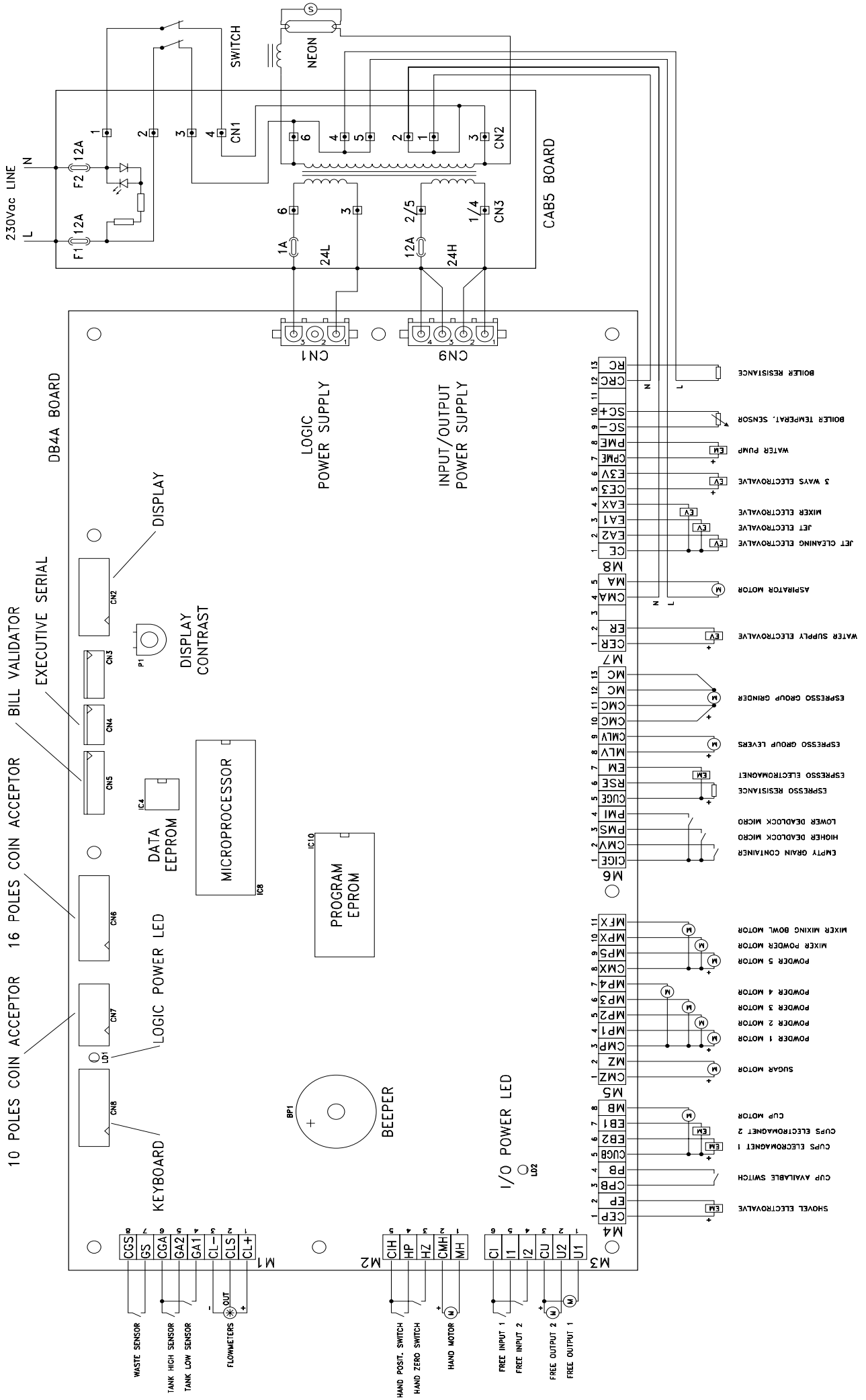
In the **“ALARM”** menu the counters are associated to single codes of alarm to indicate anomalies or “out of service”. These counters can register up to 225 alarms of the same kind.
To set to zero these counters you have to press key “no spoon” and to confirm this by pressing key “one spoon”; on the contrary to clear and cancel you have to press key “two spoons” before confirm.
All alarms lead to an “out of service” of the machine and show on the display the concerning code; only alarms like “no more cups” or “no more coffee” are clearly specified by words on the display.
Moreover a beep alarm will make clear the seriousness of the alarm, depending on the quantity of repeated beeps. To deactivate this beep you have to press for at least 1 second one key from 1 to 6.
Here follows a table with the possible alarms and their codes:

ALARM CODE	
1	NO CUPS (LOAD THE STACKS OF THE CUPS FEEDER OR CHECK THE CUPS DISPENSER)
2	NO WATER (CHECK THE WATER TANK AND THE FILLING SYSTEM: PUMP OR LINK TO WATER SUPPLY)
3	BOILER HEATING ALARM (CHECK THE HEATER AND THE TEMPERATURE SENSOR)
7	FULL LIQUID WASTE DISPOSAL (EMPTY THE WASTE DISPOSAL)
8	THE WATER TANK IS REFILLED TOO MANY TIMES (CHECK IF THERE IS A LOSS OF WATER IN THE WATER TANK OR IN THE ELECTROVALVES)
10	THE FLOAT GA1 IS BROKEN (CHECK IF BOTTOM FLOAT 1 IN WATER TANK IS WORKING)
11	BOILER IS OVERHEATED (CHECK THE HEATER AND TEMPERATURE SENSOR)
13	NO SERIAL CONNECTION WITH THE EXECUTIVE PAYMENT SYSTEM (CHECK THE SERIAL CONNECTION AND THE EXECUTIVE PAYMENT SYSTEM)
14	NO COFFEE (CHECK THE COFFEE QUANTITY AND IF GRINDER WORKS)
15	THE LEVER DOESN’T REACH THE HIGHEST DEADLOCK (CHECK LEVER SYSTEM OF ESPRESSO GROUP)
16	THE LEVER DOESN’T REACH THE LOWEST DEADLOCK (CHECK LEVER SYSTEM OF ESPRESSO GROUP)
17	TIMEOUT OF THE ESPRESSO FLOWMETER (CHECK WATER CIRCULATION AND IF COFFEE BLEND IS TOO FINE)
18	CUP HAND MOTOR TIMEOUT (CHECK HAND SENSORS AND MOTOR USING TEST MENU)

Setting default values in the EEprom memory

The EEprom memory is already programmed with values that normally allow the machine to be immediately used; anyway it is possible to change these parameters of working according to your own needs.
If you wish to reset the machine with the pre-programmed values, you have to follow the procedures for setting up the memory. Therefore, after having switched off the machine, you have to press the service key, the key “two spoons” and the key indicating the chosen program. Then you have to switch on the machine and wait until a confirmation text appears on the display. This procedure makes you enter the test function.
Here is a table representing these procedures:





DB4A board layout and external connections