

Logic Board HVM24A GPE Vendors

Update 26-09-2008

General Characteristics

Sales of products

The logic board is predisposed for the management of **6 single powder mixer groups** with the possibility to add to each of these one or more powders up to a total of **3 supplementary containers**, whilst for the sugar dispensing there is a separate container. The dispensing of the water of the mixer groups can be selected separately for each product choosing from **hot and cold** allowing the dispensing of hot and cold drinks.

For the coffee dispensing there is available an **espresso group** with grinder or alternatively an automatic **capsule group**.

Up to a maximum of **20 products** can be configured to dispense in an arbitrary mode any combination of the mixer groups and the espresso/capsule group, and also the dispensing of particular products such as hot/cold water, cup only, sugar only or stirrer only.

The logic board is predisposed for the sale of an additional **24 auxiliary products** on a second machine connected in a master/slave configuration.

The **graphic display** allows a simple and efficient use of the machine. The ample dimensions of the display lend to a clear and detailed visualization of all texts with the possibility of contemporaneous translations in a **second language** of your choice.

It is possible to personalize the operations on the display including the visualization of the status information, time and date and a maximum of **8 publicity Spots** designed and downloaded onto the machine by PC.

Accounts and registration

Each of the possible 44 products is equipped with a specific **sales counter**.

The **takings counters** allow the specific registration for each type of coin and also the direct visualization in **real currency**.

The prices programming is also expressed in real currency with relative decimals and currency symbol for an immediate understanding of the values of all the totals.

The **data-logger** system allows the automatic registration of any machine operation. Up to more than 1700 records in text format allow the memorizing for each vend of the time and date, the number of the selection, actual takings etc. A progressive reading system of these records by PC allows the archiving on file, in unique mode, of the detailed information of each vend for the whole life of the machine.

Clock functions

The clock/calendar of the logic board allows not only the eventual visualization of the current time and date on the display and the registration of events using the data-logger, but permits the management of turning on and **off the boilers** and the display depending on opportune programs.

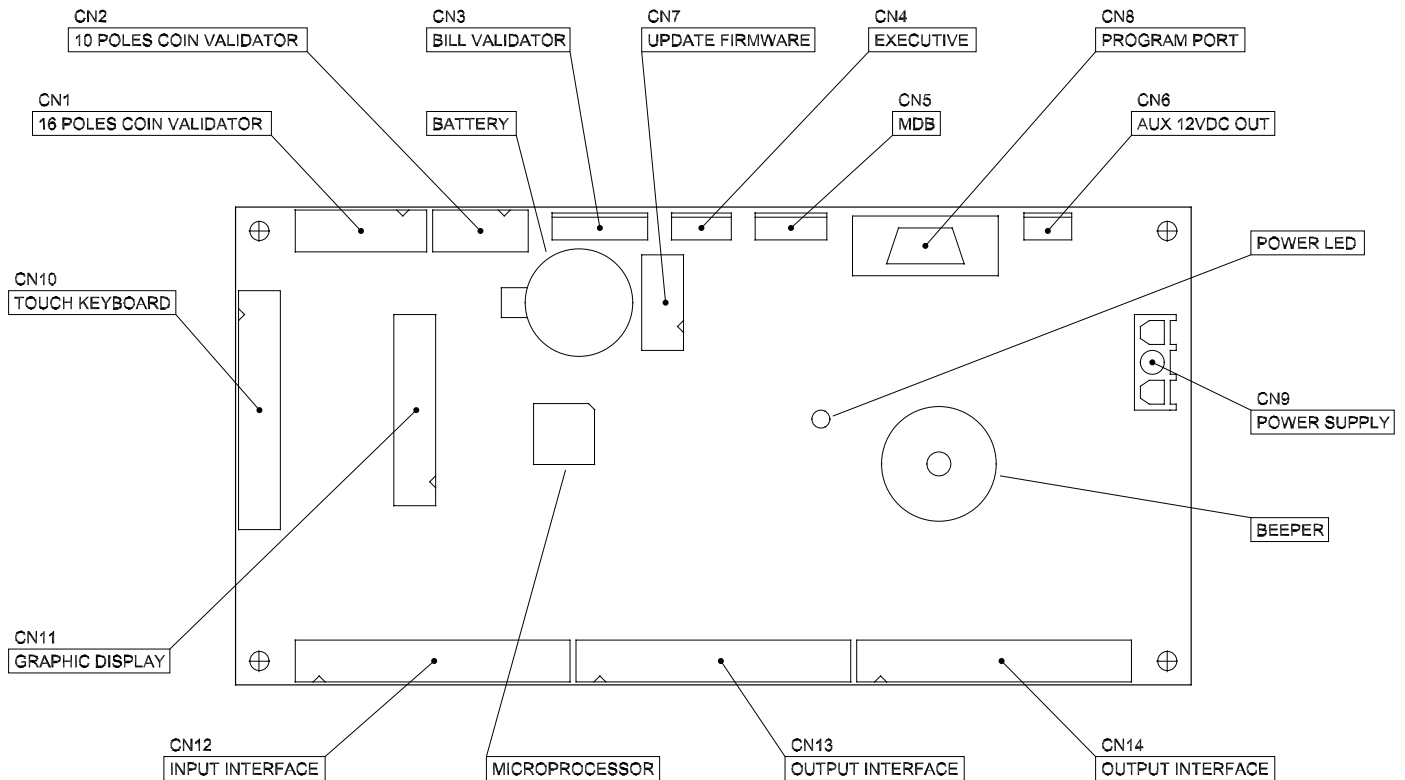
A maximum of **16 programs** describe the operations of turning on and off by correspondence masks which manage the value from seconds to those annual.

Elevated programming and personalization

The HVM24A is the only electronic board where it is possible by PC to **modify as required** all the texts in all the languages, the graphic fonts, the graphic icons and the Spots.

A computer software allows the reading, writing and archiving on file of all current working parameters of the machine in alternative to the manual programming with keypad and display. By PC it is also possible to **update the software** of the microprocessor directly onto the board.

General information on the logic board



Connection of the payment systems

A parallel coin mechanism can be connected to the 10 pin connector CN2 or to the 16 pin connector CN1. These connectors supply, respectively, a power supply of 12V and 24V to the coin mechanism.

A parallel banknote validator can be connected to the connector CN3 which can also supply a power supply of 12V.

A serial coin mechanism with Executive protocol can be connected to connector CN4 or with MDB protocol to connector CN5. The coin mechanism and the parallel banknote reader can be used contemporaneously with the Executive/MDB serial system.

The keypad of the machine

All of the sales and service functions of the machine are activated using the 24 key "touch sensor" type keypad.

In particular for the **sales functions** the first two keys (indicated by "-" and "+") allow the selection of the quantity of sugar, whilst the keys from 1 to 20 select the relative product. The key indicated by F1 carries out the special function (when activated in the menu) of the dispensing without cup, that is using the cup supplied by the user. The key F2 is not actually used.

For the **service functions** one must press for circa 1" the service key present inside the machine to the back of the keypad. The usable keys are "-" and "+" to select the menu voice and for modifying a value, the key F1 has the Escape function and the key F2 is OK (confirm).

Instead some of the 20 selection keys can carry out specific functions. Pressing one of these non used keys one can visualize a help context keypad.

In the following diagrams all of the specific functions of the keypad are explained.

SALES FUNCTIONS OF THE KEYPAD				
LESS SUGAR		-	+	MORE SUGAR
SELECTION 1	1			SELECTION 2
SELECTION 3	3			SELECTION 4
SELECTION 5	5			SELECTION 6
SELECTION 7	7			SELECTION 8
SELECTION 9	9			SELECTION 10
SELECTION 11	11			SELECTION 12
SELECTION 13	13			SELECTION 14
SELECTION 15	15			SELECTION 16
SELECTION 17	17			SELECTION 18
SELEZIONE 19	19			SELECTION 20
NO CUP	F1			F2

SERVICE FUNCTIONS OF THE KEYPAD				
PRECEDENT MENU LINE DESCENDING VALUE		-	+	SUCCESSIVE MENU LINE ASCENDING VALUE
FIRST LINE MENU (HOME) SETS VALUE TO ZERO	1			LAST LINE MENU (END) SETS VALUE TO DEFAULT
	3			
	5			
	7			
	9			
	11			
	13			
	15			
	17			
	19			
ANNUL MENU ANNULS MODIFY VALUE	F1	ESC	OK	F2
				CONFIRM MENU LINE CONFIRMS MODIFY VALUE

Set up of default parameters

The board, for its functioning, avails of more than 900 different working parameters. Normally it is necessary to modify only a few depending on specific needs. However, it is possible to automatically re-install these parameters with the values contained in distinct default tables for each type of machine.

To set-up a default table you must turn the machine on whilst pushing down the service key until the emission of a prolonged beep. From this moment one can release the service key and there are 5" available to select with the frontal keypad the default required according to the following illustration:

DEFAULT PARAMETER FUNTIIONS OF THE KEYPAD					
		-	+		
COMPLETE DEFAULT NO.1	1			2	COMPLETE DEFAULT NO.2
	3			4	
	5			6	
	7			8	
	9			10	
PARTIAL DEFAULT NO.1 (PRODUCTION PAR. ONLY)	11			12	PARTIAL DEFAULT NO.2 (PRODUCTION PAR. ONLY)
	13			14	
	15			16	
	17			18	
	19			20	
	F1			F2	

NOTE: there is actually available only one default table (No.1) distinct for each of the 5 different versions of machine available (DBX400I- DBX400E- DBX400C- DBX800I- DBX800E).

The complete default includes all working parameters of the machine such as the set up of the payment systems, the general set up of sales, the sales counters and takings, the product recipes and the general production configurations.

Partial default intends the whole of parameters relative only to the realizing of the product such as recipes and the general set up of production.

The service menu

“Takings counters” menu

All of the information regarding the takings of the machine are grouped under this voice menu. The counters are separate for every possible coin and banknote both for the parallel systems and for the MDB systems whilst for the Executive systems and MDB cashless there is a relative counter. The specific counters for each font of acceptance and dispensing (in the case of MDB moneychanger and MDB cashless recharge) are all partial (can be zeroed) and the total partial counter is by consequence taken from the single counters.

The remaining credit value is made up of the total effectively taken by the machine but still not used. There are various functions of the machine that can manage this remainder, apart from the normal sale of the product, such as the function of automatic cancellation after a certain time or the dispensing of credit by the MDB moneychanger.

The absolute counter (can't be zeroed) is instead updated at each operation of takings, coin dispensing or cashless reload.

“Vend counters” menu

For each possible number of selection there is available a partial (can be zeroed) type sales counter. In the menu there is also indicated the value of the total partial counter taken by consequence from the single partial counters.

The absolute counter (can't be zeroed) is increased with every sale of product.

“Info counters” menu

During the functioning of the machine there can be anomalous situations. For this reason there is a visualization of the anomalies by a specific signal on the display of the machine. These signals, after being visualized, can be cancelled by pressing the OK key. The particular anomalous situation is also counted in the errors counter and registered in the data-logger incorporated in the logic board.

“Product prices” menu

This menu allows the set up of prices in real currency of all 44 possible products (20 drinks + 24 auxiliary products on a slave machine). It should be noted that the values can be varied by quantity equal to the base coin making it important to select in the correct mode this unit.

There are two special price values indicated by “Free” and “No” included in the list between maximum price and minimum price. In particular the “Free” price allows the selling of that product even in the absence of credit, whilst the “No” price disables the sale of that specific product.

“Products config.” menu

In this menu all set ups relative to the production of the drink are gathered.

There is a specific recipe of production available for each of the 20 products with which there is a maximum flexibility in realizing drinks using an espresso/capsule group in combination with the 6 mixer groups (up to 9 powders), and also the possibility to dispense hot or cold water.

It is also possible to completely deactivate the sugar dispensing and the powders to achieve a cup of only hot or cold water.

Also, programming to zero all the values of the mixers and espresso water, it is possible to dispense in any combination the stirrer or the cup.

Other than the recipes in this menu, all other general production set up parameters are present. The logic board can manage up to 3 supplementary powders which can be joined in arbitrary mode to the 6 mixer groups. In the case of joining to a mixer group, the values of the supplementary powders must be programmed in the recipes in the powder positions 7-8-9. In analogue mode it is possible to join also the sugar container to any of the 6 mixer groups. In this case the currently selected sugar is dispensed by the mixer group chosen as if a supplementary powder.

For the sugar, which can be selected during the sale using keys “-” and “+”, it is possible to set the quantity corresponding to the central position (2) of the 5 position selector and the default position of the same cursor automatically presented at each new sale.

Setting the option “No cup” activates the possibility to exclude, for a current sale, the dispensing of the cup through the “F1” key of the keypad.

“Payment config.” menu

There are present in this menu some general set up parameters of the payment system whilst those specific to different systems are gathered in the relevant submenu.

“**Parallel sys.**” is the amalgamation of values, in real currency, relative to the 6 coin channels of the parallel coin mechanism and the 4 channels of the parallel banknote reader.

“**Executive**” allows the activation of the money back option in the case of a failed vend and the “Price Holding” option of the Executive payment systems. There is also available the programming of the 44 “price lines” relative to all the possible products. Remember that the value of the “price lines” is a value relayed to the Executive system (to identify the product) in alternative to the effective value of the price only when the “Price Holding” option is activated. In this way the coin mechanism, noting the requested product, determines the real price of sale through its price table. It is necessary to set up the same prices on the logic board of the machine as set up on the coin mechanism just for the correct visualization and management of the sale.

“**MDB systems**” allows the activation of the acceptance of the single coin/banknote and the dispensing of the single coin as change. The change parameter allows the automatic dispensing of the change after a sale (**single vend**), the dispensing of the change only after one or more sales with the activation of the relevant call up or the expiry of the programmed timeout (**multi vend**) or the dispensing of the available credit independently of the sale and with the activation of the call up (**coin changer**). Configuring the activation of the single coin accepted and dispensed it is possible to use the machine to change certain coins into coins of inferior value or superior to the same. The maximum dispensing parameter allows the limitation of the amount dispensed whilst the parameter of the minimum level of the coins constitutes an ulterior margin in respect to that set up in the coin mechanism just to signal on the display the lack of change.

The security option of the banknote channels set up raises the level of verification of same.

Attention: in the presence of any service menu, the coins inserted in the MDB coin mechanism do not accumulate credit. In this way it is possible to load coins for those coin mechanisms that don't avail of a load menu.

For the cashless systems there is available the parameter of maximum value of the reload. Consider that an analogue parameter is present in the cashless system for which the maximum reload corresponds to the minimum of the two values. A credit already acquired is automatically transferred in the key as soon as it is inserted in the system whilst the credit inserted by presented key are transferred contemporaneously. It is possible to acquire products and/or reload the key using also the parallel validators and those MDB.

“General config.” menu

This menu unites different parameters of configuration of the functioning of the machine.

It is possible to program the **principal language** of the display and activate an eventual **second language** of choice to visualize the contemporaneous translation of all texts present during a sale.

It is also possible to personalize the visualizations of the graphic display during the sale.

In particular you can deactivate the **credit visualization** in the sales scheme and activate the **date/time visualization**. All of these visualizations and other eventual warning signs that can appear in particular situations (for example in the case of no change left), appear in sequence and with a time programmable from the "Time status".

A characteristic of the board is that to alternate the previous sequence of the status scheme with a certain number of "**Spots**". These are completely arbitrary full screen graphic images which can be designed using any graphic program on a PC. You will need to create a BITMAP file for each Spot. Up to 8 Spots can be downloaded to the board and kept at disposition for activation on particular occasions.

The **operator code** permits a number to be programmed to be used as a password for access to part of the machine menu. A code equal to 0 deactivates the request for the password whilst it is possible to insert a number from 1 to 99999 directly using the keys from 1 to 10 (to digit the number 0 one must use the key of selection 10).

Entering the principal service menu with the appropriate key when a password has been programmed, the introduction of the code is requested.

Available in this menu are other parameters such as **machine number** and a **machine address** for the programming port (for management of diverse machines with the same PC or other external supervision device).

The **machine model** must be programmed in conformity with the particular machine so that the logic board can manage in the appropriate way all specific functions.

"Watch settings" menu

"**Date/time setting**" allows the regulation of the date and current time on the machine clock. This clock is used for various machine functions. Apart from visualizing in the pause between vends, the clock is used to manage the turning on and off of some parts of the machine according to certain programs and to provide the data-logger records of the time/date information on particular events.

"**Timer programs**" contains a list of 16 maximum programs used to turn on and off the boilers and the illumination of the display. If the illumination of the display has been turned off by a program, it is possible to momentarily turn it back on again pressing any key on the keypad and thus allowing a vend.

Each on/off program consists of a total of 8 fields of which the first 7 identify a particular condition of time/date whilst the last is of the on/off status desired departing from that time/date. The programs are constantly verified departing from program 1 up to program 16. All programs in which the time/date is verified (The current time/date is the same or more than that of the program excepting the field "Day of the week" which requires the program only of equality) define as valid their on/off status. Consequentially, if more programs see their condition of time/date verified, the valid on/off status will be that of the last verified program and so the priority is more as much as the number of programs is more.

In defining the time/date condition of a program the use of the value "***" is very important to specify that that field is not important for that condition. Programming the field "Year" to 2099 makes the relevant program un-influential in that, independent of other fields, the condition will not be verified until 2099.

Some examples of programs:

Example 1. Needs a weekly program the same for all the weeks of all the years:

Monday-Friday from 8:30 to 18:30 all on
 Saturday-Sunday all off

Prog.	Day of the month	Month	Year	Hour	Minute	Sec.	Day of the week	Status on/off
1	**	**	**	8	30	**	**	ON-ON
2	**	**	**	18	30	**	**	OFF-OFF
3	**	**	**	**	**	**	Saturday	OFF-OFF
4	**	**	**	**	**	**	Sunday	OFF-OFF
5	**	**	2099	**	**	**	**	
6	**	**	2099	**	**	**	**	
7	**	**	2099	**	**	**	**	
8	**	**	2099	**	**	**	**	
9	**	**	2099	**	**	**	**	
10	**	**	2099	**	**	**	**	
11	**	**	2099	**	**	**	**	
12	**	**	2099	**	**	**	**	
13	**	**	2099	**	**	**	**	
14	**	**	2099	**	**	**	**	
15	**	**	2099	**	**	**	**	
16	**	**	2099	**	**	**	**	

Example 2. Needs a weekly programming the same for every week of every year:

Monday-Friday from 8:30 to 18:30 all on
 Saturday from 9:30 to 13:30 all on
 Sunday all off

Prog.	Day of the month	Month	Year	Hour	Minute	Sec.	Day of the week	Status on/off
1	**	**	**	8	30	**	**	ON-ON
2	**	**	**	18	30	**	**	OFF-OFF
3	**	**	**	**	**	**	Saturday	OFF-OFF
4	**	**	**	9	30	**	Saturday	ON-ON
5	**	**	**	13	30	**	Saturday	OFF-OFF
6	**	**	**	**	**	**	Sunday	OFF-OFF
7	**	**	2099	**	**	**	**	
8	**	**	2099	**	**	**	**	
9	**	**	2099	**	**	**	**	
10	**	**	2099	**	**	**	**	
11	**	**	2099	**	**	**	**	
12	**	**	2099	**	**	**	**	
13	**	**	2099	**	**	**	**	
14	**	**	2099	**	**	**	**	
15	**	**	2099	**	**	**	**	
16	**	**	2099	**	**	**	**	

Example 3. Needs a weekly programming the same for every week of every year:

Monday	from 8:00	to 16:00	all on
Tuesday	from 8:15	to 16:15	all on
Wednesday	from 8:30	to 16:30	all on
Thursday	from 8:45	to 16:45	all on
Friday	from 9:00	to 17:00	all on
Saturday	from 9:15	to 17:15	boilers ON, display OFF
Sunday	from 9:30	to 17:30	boilers ON, display OFF

Prog.	Day of the month	Month	Year	Hour	Minute	Sec.	Day of the week	Status on/off
1	**	**	**	8	0	**	Monday	ON-ON
2	**	**	**	16	0	**	Monday	OFF-OFF
3	**	**	**	8	15	**	Tuesday	ON-ON
4	**	**	**	16	15	**	Tuesday	OFF-OFF
5	**	**	**	8	30	**	Wednesday	ON-ON
6	**	**	**	16	30	**	Wednesday	OFF-OFF
7	**	**	**	8	45	**	Thursday	ON-ON
8	**	**	**	16	45	**	Thursday	OFF-OFF
9	**	**	**	9	0	**	Friday	ON-ON
10	**	**	**	17	0	**	Friday	OFF-OFF
11	**	**	**	9	15	**	Saturday	ON-OFF
12	**	**	**	17	15	**	Saturday	OFF-OFF
13	**	**	**	9	30	**	Sunday	ON-OFF
14	**	**	**	17	30	**	Sunday	OFF-OFF
15	**	**	2099	**	**	**	**	
16	**	**	2099	**	**	**	**	

Consider that the on/off status associated with a program is represented by 2 icons (one for the boilers and one for the illumination of the display). The on/off status of the program corresponds to one of the 4 possible combinations of on/off of all 2. For example:

  indicates respectively: boilers ON, display ON

 - indicates respectively: boilers ON, display OFF

“Machine test” menu

All the test operations of every single part of the machine and the electronic board are possible with this menu.

For the test functions of the groups of the machine it is possible to activate an automatic cyclical test by pressing key “1”. To deactivate the test, continue to press key “1”.

For the testing of the board it is possible to have the current status of all the digital inputs and the temperatures read by the probes. It is also possible to change the status of the single outputs positioning the cursor on the output and pressing the OK key (at each pressure on the OK key the status of the output is changed).

In the following figure all the specific functions of the keypad relative to the direct test of the IO of the board are reassumed.

FUNCTIONS OF THE KEYPAD BOARD TEST					
		-	+		
MOVE INPUT CURSOR LEFT	1			2	MOVE INPUT CURSOR RIGHT
MOVE OUTPUT CURSOR LEFT	3			4	MOVE OUTPUT CURSOR RIGHT
	5			6	
	7			8	
	9			10	
	11			12	
	13			14	
	15			16	
	17			18	
	19			20	
ANNUL MENU	F1	ESC	OK	F2	CHANGE OUTPUT STATUS

Reassuring table of the error menus

In the following 2 tables all voices of the available menu are listed in the service menu organized in the same structure in which presented on the display.

Indicated to the right of each voice is a brief description of the functions carried out.

A list of all the possible error signals of the machine and the possible solutions is illustrated in the following table.

Main menu	Submenu level 1	Submenu level 2	Submenu level 3	Description	
Taking counters	Partial	100.00€		Current total of all partial takings counters	
	Reset counter			Zeroing of all partial takings counters	

	Parallel sys.	Coin 1 - 6	20.00€	Single coin partial takings of the parallel systems	
		Bill 1 - 4	50.00€	Single banknote partial takings of the parallel systems	
	Executive	100.00€		Single partial takings of executive systems	
	MDB Systems	Coins taking	Coin 0 - 15	20.00€	Single coin partial takings of the MDB systems
		Coins payout	Coin 0 - 15	5.00€	Single coin partial dispensing of the MDB systems

		Bills taking	Bill 0 - 15	50.00€	Single banknote partial takings of the MDB systems

		Cashless	100.00€		Partial takings of the MDB cashless systems
		Revalue	20.00€		Dispensing in reload of the MDB cashless systems

	Residual	1.00€			Remaining credit taken but not used
	Deleted	3.00€			Remaining credit annulled time at expiry
	Absolute	300.00€			Absolute takings total (never zeroed)
Vend counters	Partial	100		Current total of all partial sales counters	
	Reset counter			Zeroing of all partial sales counters	

	Product vends	Select. 1 - 44	10		Partial sales of single selections

	Absolute				Absolute total (never zeroed) of sales
Info counters	Error counter	Number 1 - 24	3		Counter for each type of error
	Reset counter				Zeroing of all errors counters

	Run time				Absolute total (never zeroed) of working hours

Product prices	Select. 1 - 44	0.50€			Prices of single selections (free-No-Price)
Products config.	Product recipes	Recipes 1 - 20	Espresso	50	Water quantity for coffee dispensing (espresso group or capsuls)
			Water 1	50	Water quantity for mixer group 1 dispensing
			Water 2	50	Water quantity for mixer group 2 dispensing
			Water 3	50	Water quantity for mixer group 3 dispensing
			Water 4	50	Water quantity for mixer group 4 dispensing
			Water 5	50	Water quantity for mixer group 5 dispensing
			Water 6	50	Water quantity for mixer group 6 dispensing
			Powder 1	2,5	Powder quantity for mixer group 1 dispensing
			Powder 2	2,5	Powder quantity for mixer group 2 dispensing
			Powder 3	2,5	Powder quantity for mixer group 3 dispensing
			Powder 4	2,5	Powder quantity for mixer group 4 dispensing
			Powder 5	2,5	Powder quantity for mixer group 5 dispensing
			Powder 6	2,5	Powder quantity for mixer group 6 dispensing
			Cold water	Yes/No	Activation of cold water dispensing instead of hot
			Sugar	Yes/No	Activation of selected sugar dispensing
			Spoon	Yes/No	Activation of stirrer dispensing
	Mixer powder 7	1			Mixer number (No-1-2-3-4-5-6) associated with powder 7
	Mixer powder 8	2			Mixer number (No-1-2-3-4-5-6) associated with powder 8
	Mixer powder 9	3			Mixer number (No-1-2-3-4-5-6) associated with powder 9
	Mixer sugar	No			Mixer number (No-1-2-3-4-5-6) associated with the sugar

	Sugar medium	2,3			Sugar quantity corresponding to central selector (pos. 2)
	Sugar default	2			Default position of sugar selector (0-1-2-3-4)
	No cup option	Yes/No			Activation of with/without cup selection function
	Boiler 1	85°C			Setpoint temperature of boiler 1
	Boiler 2	96°C			Setpoint temperature of boiler 2 (No-temperature)
	Fast espresso	Yes/No			Activation of pregrinding of coffee for espresso group

Main menu	Submenu level 1	Submenu level 2	Submenu level 3	Description	
Payment config.	Free vend	Yes/no		Activation of free sale for all selections	
	Coin unit	0.05€		Base coin used by the payment systems	
	Decimals	2		Number of decimal points for the visualisation of the amounts	
	Currency	€		Currency symbol for the visualisation of the amounts	
	Credit delete	Yes/no		Activation of the annulment of remaining credit after time expiry	
	Delete time	00:30		Time for annulment of remaining credit (min:sec)	
	Protocol	MDB		Type of serial protocol used by payment systems	

	Parallel sys.	Coin 1 - 6	0.05€	Value of coin channels of parallel coinmechanisms	
		Bill 1 - 4	1 €	Value of banknote channels of parallel validators	
	Executive	Exe. Refund	Yes/No	Activation of refund selection function for Executive systems	
		Price holding	Yes/No	Activation of price holding function for Executive systems	
		Price lines	Select. 1 - 44	1	Number of price lines for price holding of the single selections
	MDB systems	Accepted coins	Coin 0 - 15	Yes/No	Activation of the single coin acceptance MDB coin mechanism
		Payout coins	Coin 0 - 15	Yes/No	Activation of single coin dispensing MDB coin mechanism
		Minimum level	3		Minimum number of coins in MDB coin mechanism tubes
		Payout mode	Single		Type of MDB coin mechanism dispensing (single...)
		Payout time	00:20		Timeout for automatic change dispensing MDB coin mechanism
		Max payout	10 €		

		Accepted bills	Bill 0 - 15	Yes/No	Activation of single banknote acceptance MDB validators
		Bills security	Bill 0 - 15	Yes/No	Activation of single banknote security MDB validators

		Max revalue	20 €		Maximum value of reload of MDB cashless systems
General config.	Language 1	ITA		Main language for display visualisation	
	Language 2	ENG		Second language for display visualisation	
	Double lang.	Yes/No		Activation of second language visualisation	
	Credit view	Yes/No		Activation of current credit in sale visualisation	
	Watch view	Yes/No		Activation of clock visualisation screen in sale waiting	
	Status time	00:30		Durance of visualisation screen in sale waiting (min:sec)	
	Spots time	Number 1 - 8	00:05	Durance of spots screen in sale waiting (min:sec)	

	Operat. Code	0		Operator code number for access to all service menus	
	Machine num.	1		Identity number of the machine (for data reading)	
	Mach. Address	1		Serial RS232 communication address for machine net	
	Model	DBX400E		Machine model for specific options installed	
Watch settings	Date/time setting	Month day	29	Current day of month value	
		Month	05	Current month value	
		Year	08	Current year value	
		Hour	12	Current hour value	
		Minutes	28	Current minute value	
		Seconds	34	Current second value	
		Week	Monday	Current day of week value	
	Timer programs	Program 1 - 16	Month day	**	Corresponding day of month for on/off status
			Month	**	Corresponding month for on/off status
			Year	**	Corresponding year for on/off status
			Hour	07	Corresponding hour for on/off status
			Minutes	**	Corresponding minute for on/off status
			Seconds	**	Corresponding second for on/off status
			Week	**	Corresponding day of week for on/off status
			ON/OFF state	ON/OFF	On/off status of the single elements
Machine test	Boiler filling				Hot water dispensing from first three mixers and flowmeter monitor
	Cooler filling				Cold water dispensing from first three mixers and flowmeter monitor
	Mixers washing				Water dispensing for sequential washing of all mixers
	Espresso group				Complete cycle of coffee production (espresso option)
	Capsule group				Complete cycle of coffee production (capsule group)
	Capsule I/O test				Direct test of capsule group outputs
	Cups group				Cup dispensing with eventual column reload
	Hand test				Step by step sequence of station hand movements
	Spoon test				Stirrer dispensing
	Fan test				Timed test of suction activation
	Light test				Timed test of delivery light activation
	Board test				Direct test of all boards inputs and outputs

ERROR CODE TABLE

CODE	DESCRIPTION	SOLUTION
1	Error in the operations relative to the serial payment system	Verify the serial connection and the set up of the payment systems
2	Over temperature of boiler 1	Turn the machine off to cool the the boiler. Verify probe 1 and eventual heater output short circuits.
3	Over temperature of boiler 2	Turn the machine off to cool the the boiler. Verify probe 2 and eventual heater output short circuits.
4	Timeout in boiler 1 heating	Verify eventual interruptions of probe 1 and of the heater output circuit.
5	Timeout in boiler 2 heating	Verify eventual interruptions of probe 2 and of the heater output circuit.
6	GA1 float malfunctioning (intervention of GA2 but not GA1)	Using the I/O test check the functioning of the GA1 and GA2 floats.
7	Timeout in water tank filling	Verify the hydro circuit on the tank and GA1 float.
8	Excessive filling of water tank	Verify eventual leaks in the tank.
9	Waste tank full.	Empty the waste tank or check the functioning of the GS waste float.
10	Cups finished	Load the cups column or verify the cup group using the appropriate test function of the machine.
11	Timeout in hand movement	Check eventual blocks in the movements and the functioning of the hand using the appropriate test function of the machine.
12	Flowmeter timeout	Verify the hydro circuits and the functioning of the probe using the machine test.
13	Timeout in the inferior dead point search of espresso group.	Check the espresso group levers movement and the correct functioning of the PMI micro.
14	Timeout in the superior dead point search of espresso group.	Check the espresso group levers movement and the correct functioning of the PMS micro.
15	Timeout during the rotation of the capsule group columns	Verify the functioning of the capsule group column rotation and the correct functioning of the SCL micro.
16	Coffee finished	Load coffee in the espresso group or the capsule group column.

Other functions of the logic board

Data-logger of events

The board avails of an automatic register of events. The events are memorized in the form of lines of text in the internal of which there is different useful information on the event itself. Connecting a Personal Computer to the CN8 connector for programming the board using a standard serial cable it is possible to read this information and save it to a text file.

Normally each event is a line of text in the file.

An example of 5 events follows:

```
1 30/05/2008 11:32:00 POWERON: Run_Time=3600s
2 30/05/2008 11:32:05 SERVICE: Enter
3 30/05/2008 11:32:28 SERVICE: Exit
4 30/05/2008 11:33:25 VEND: Product=1 Vends=1 Abs_Takings=10 Abs_Vends=1
5 30/05/2008 11:33:38 VEND: Product=2 Vends=1 Abs_Takings=20 Abs_Vends=2
```

Each record begins with a progressive number of identification of the event followed by the time and date of registration of said event.

The next column represents the type of event. In this example the event number 1 indicates the turning on of the machine, event 2 indicates the entrance into service of the logic board whilst event 3 relates to the exiting from the service menu.

Successively the machine has sold with success product 1. After this sale, the partial sales counter of the specific product is raised by 1 whilst the absolute takings counter has totaled 10 base coins and the absolute sales counter has totaled 1. It results obvious also the description of the following sale effected on product number 2.

The sale of a product is definitely the most recurrent event in the machine. However many other events are registered amongst which all the possible anomalies reported during functioning. Registration of events is autonomous and automatic and the board is capable of memorizing more than 1700 events (lines) in its permanent memory. The mechanism of registration is equivalent to that of a continuous tape so that, reaching the registration of the maximum number of events, new records will successively take the place of the older ones.

To keep track of all events for the entire life of the machine it is necessary to download periodically with a PC the contents of the memory of the data-logger. The software on the PC will save the current contents of the register on a text file, automatically assigning a name composed of an arbitrary text added to the machine number and the time/date of acquisition. In this way, every acquisition file will be unique, as will be the identity number of each event of the machine. In this way it is possible to archive on a PC the data-logger files and keep track of each single sale of each machine installed for the duration of said machine.

Programming by Personal Computer

The CN8 programming connector constitutes a serial portal RS232 of access to the board (and thus to the machine) with enormous potential.

This communication portal consents principally to read and write all the circa 900 work parameters of the machine. In this way it is possible to set up the functioning of the machine contemporaneously or alternatively to the use of the keypad and display. Having read the parameters of the machine it is possible to modify them and re-transfer to same. Also, the parameters taken can be saved to file and vice versa it is possible to recall from a file a certain batch of values of the parameters to then transfer to the machine. In this way the optimum parameters can be archived to a PC by file (for example using a different name for each machine) to be re-used to configure other machines.

By PC it is also possible to set-up the clock of the machine or read, save to file and visualize the contents of the data-logger.

An innovative characteristic of the board is the possibility to modify and personalize all the graphic images which appear on the display. In particular, amongst these images, there are 8 Spots which can be used for publicity, warnings and information of all types. The Spots are full screen graphic images which require the creation of such files as BITMAP monochrome with resolution 128x64. Programs of image elaboration can be used for their creation (from a simple PAINT to more sophisticated programs such as PhotoImpact). After an opportune operation of conversion, these files can be transferred to the board by a serial portal.

With an analogue procedure all texts (in the various languages) visualized on the display can be modified. This time it is necessary to modify a text file in standard Unicode format. The choice of the Unicode format is decided by the necessity to use a batch of possible characters belonging to Latin, Common Latin, Cyrillic and Greek.

For all precedent programming and personalization functions you will just need a PC with Windows operative system, the software equipped with HVM24A and a standard serial cable. For PC's with just a USB portal, standard commercial adaptor cables USB-RS232 can be used.

Also by PC, it is possible to update the Firmware of the microprocessor of the board, or more precisely the software for the functioning of same developed and periodically updated by GPE Vendors. Just for this update it is necessary to connect a PC to the CN7 connector of the board using the appropriate interface available as an optional.

Data reader on SD Card board (optional)

The interface for the reading of data on commercial SD card is available. The usable memory can be of different sizes such as 512MB, 1GB and 2GB.

The advantages derived from the use of a data memory support such as the SD card are:

- Very contained physical dimensions. The board can be easily transported.
- Practically unlimited memory capacity. With one card it is possible to memorize many readings of all installed machines.
- Direct use through a Personal Computer of files of data acquired.
- Easy access and low cost thanks to diffusion of the digital camera sector.

The data of the machine is saved contemporaneously in two different formats:

- **GPE-DATA** format. In a file for each machine (named ID_XXXXX.txt where XXXXX is the machine number programmed in same) all successive readings are saved in a text format already legible, which can be directly imported and analysed in an EXCEL type program.
- **EVA-DTS** format. In a file for each machine the current reading is saved in this standard format. For reading and interpretation the correct conversion programs are needed.

In prevision there are two operative modes for the collection of data from the machine:

- Insertion of the same SD card on different machines and reading at command using a switch.
- Automatic daily reading, at a specific time, on the SD card fixed in the machine.

These two modes can even co-exist in that on a memory card, on which the automatic saving is activated, it is possible in any moment to launch an eventual reading on command using a switch.

It is also possible to personalize the reading carried out selecting which value or group of values must be acquired and if to zero the partial counters at the end of the reading.

All of the operative modes are memorized in the configuration file HVM24A.CFG that must be present in the principal folder of the SD card. If this file is not available the reading will still be carried out in the two formats using all fields available (185 in total). It is however advisable to

select only the really necessary fields otherwise files with lots of information will be created which become more difficult to analyse.

To modify files in text format HVM24A.CFG one can use any text editor or simply recall it from the voice "Edit configuration" of the "SD card" menu, being careful to respect the positions of spacings and page layout of said file.

Before using a new SD memory card it is necessary to proceed to its formatting using the voice in the memory "Format SD card". This command can also copy the HVM24A.CFG file in the board. It is also possible to use the standard procedure of formatting of the disk offered by the operative system of the PC being careful to format the board following the system file FAT16 or generally FAT.

Once the board has been inserted into the interface of the machine the switch to the side of the board connector must be pushed if one wants to carry out a reading on command. If the automatic daily reading is pre-disposed in the configuration file, the green led will start to flash to indicate the activation of said type of reading. In any way, when a data reading is being carried out, the green led switches off and the red led comes on. When it returns to green it is possible to extract the board if not needed for the daily readings.

In the case of any anomaly the red led will start to flash following a set code of flashes corresponding to the particular anomaly:

- 1 flash: the SD card has not been inserted properly.
- 2 flashes: the SD card is protected from writing. Move the switch over to this.
- 3 flashes: reading and writing error of the board.
- 4 flashes: error relating to the management of the files.
- 5 flashes: serial communication error with the HVM24A board.

To re-set the alarm conditions one must press the switch again. If the anomaly is no longer encountered the green led will switch on and the red led will switch off.

Once the data has been acquired it is possible to insert the board in a Personal Computer. The disk window relative to the contents of the two folders (GPE-DATA and EVA-DTS) will open containing the read files in the two different formats. For the EVA-DTS format refer to said standard documentation. The GPE-DATA format is a text format already legible and composed of a heading with the principal characteristics of the machine and lines (one for each reading) with the date/time of the reading and the values of all activated fields.

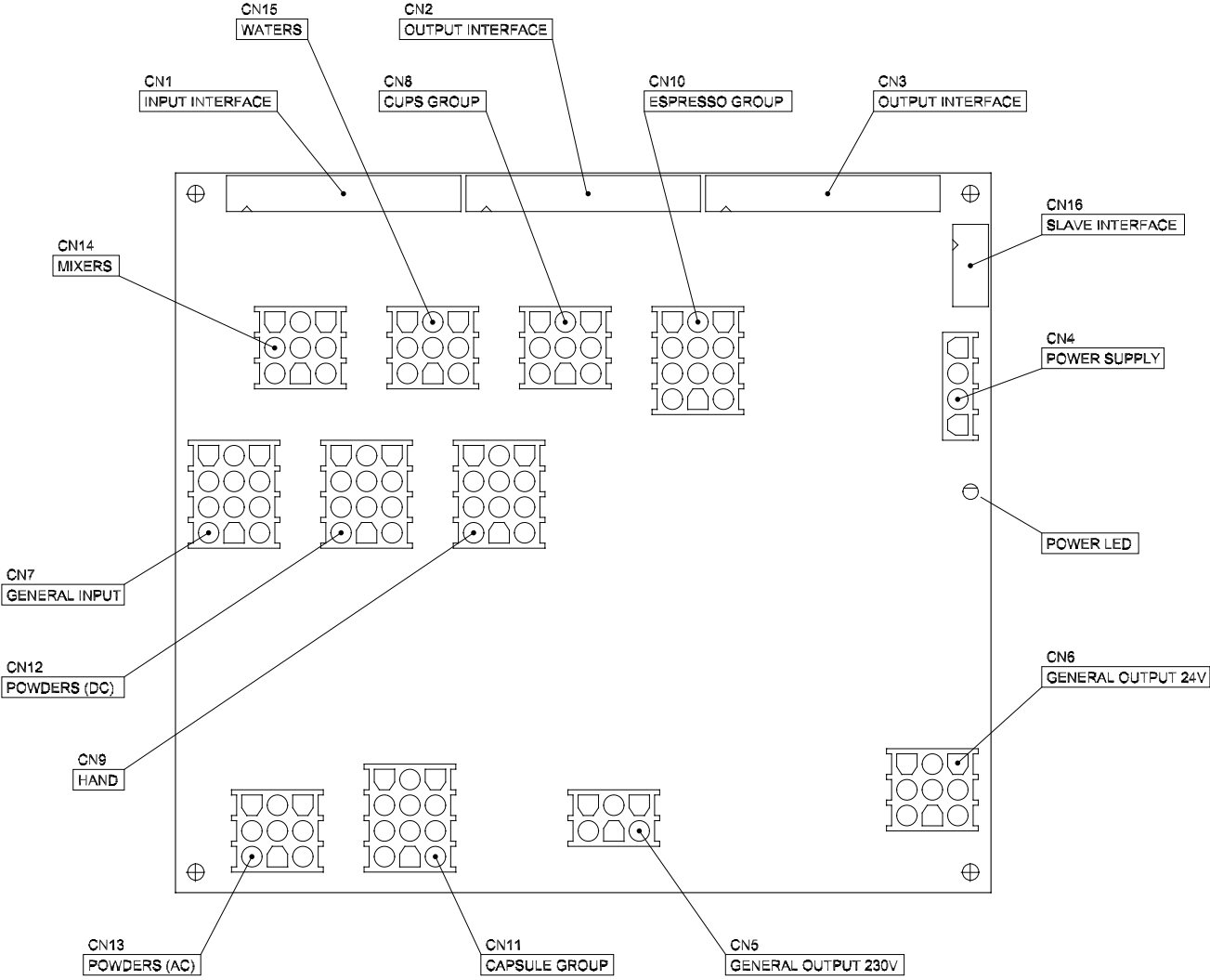
The various fields of each line are separated by the tabulating character (code ASCII = 9). In the case of direct reading with a text editor it is sufficient to set a number suitably high in spacings of the tabulation to easily read the file.

In the case of using a program like EXCEL it is possible to import data opening directly the file and following the guide procedure that is automatically activated.

As an example a model GPE-DATA.xlt file is supplied (in the folder C:\HVM24A\GPE-DATA) which contains the macro Auto_Open which is carried out automatically on opening and which allows to select the acquired file and to carry out some setting operations of the style and format of fields for a better reading. Even a graph is predisposed to allow analysis of one or more fields of value in function for example the date of reading.

To recall the EXCEL program with this model the voice "Excel import" can be used in the HVM24A software menu.

Extension board layout HVM_E01



I/O TABLE FOR THE EXTENSION BOARD HVM-E01

INPUT	GROUP	CON-PIN	CON-COM	NAME	DESCRIPTION
IN01	GENERAL	CN7-2	CN7-5 (GND)	GA1	Float 1 water tank (level)
IN02	GENERAL	CN7-3	CN7-5 (GND)	GA2	Float 2 water tank (level)
IN03	GENERAL	CN7-4	CN7-5 (GND)	GS	Waste float (security)
IN04	CUPS	CN8-1	CN8-4 (GND)	PB	Cups presence
IN05	CUPS	CN8-3	CN8-4 (GND)	xxx	Reserve
IN06	HAND	CN9-1	CN9-4 (GND)	SPM	Hand position switch
IN07	HAND	CN9-3	CN9-4 (GND)	SZM	Hand zero switch
IN08	ESPRESSO	CN10-1	CN10-5 (GND)	PMI	Inferiore dead point
IN09	ESPRESSO	CN10-2	CN10-5 (GND)	PMS	Superior dead point
IN10	ESPRESSO	CN10-4	CN10-5 (GND)	CMV	Grinder chamber empty
IN11	CAPSULE	CN11-1	CN11-4 (GND)	SCL	Column rotation switch
IN12	CAPSULE	CN11-2	CN11-4 (GND)	FPC	Capsule sensor not present
IN13	CAPSULE	CN11-3	CN11-4 (GND)	STP	Lid switch
HSC1	GENERAL	CN7-7	CN7-6(+), CN7-8(GND)	CL	Flowmeter
HSC2	HAND	CN9-6	CN9-5(+), CN9-4(GND)	MS	Door micro
TS1	GENERAL	CN7-9	CN7-10	SC1	Boiler 1 probe
TS2	GENERAL	CN7-11	CN7-12	SC2	Bolier 2 probe

OUTPUT	GROUP	CON-PIN	CON-COM	NAME	DESCRIPTION
OUT01	POWDERS	CN12-1 + CN13-1	CN12-12 (+M) + CN13-7	MZ	Sugar motor
OUT02	POWDERS	CN12-2 + CN13-2	CN12-12 (+M) + CN13-7	MP1	Powder motor 1
OUT03	POWDERS	CN12-3 + CN13-4	CN12-12 (+M) + CN13-7	MP2	Powder motor 2
OUT04	POWDERS	CN12-5 + CN13-5	CN12-12 (+M) + CN13-7	MP3	Powder motor 3
OUT05	POWDERS	CN12-6 + CN13-6	CN12-12 (+M) + CN13-7	MP4	Powder motor 4
OUT06	POWDERS	CN12-7	CN12-12 (+M)	MP5	Powder motor 5
OUT07	POWDERS	CN12-8	CN12-12 (+M)	MP6	Powder motor 6
OUT08	POWDERS	CN12-9	CN12-12 (+M)	MP7	Powder motor 7
OUT09	POWDERS	CN12-10	CN12-12 (+M)	MP8	Powder motor 8
OUT10	POWDERS	CN12-11	CN12-12 (+M)	MP9	Powder motor 9
OUT11	MIXERS	CN14-1	CN14-8 (+M)	MF1	Mixer motor 1
OUT12	MIXERS	CN14-2	CN14-8 (+M)	MF2	Mixer motor 2
OUT13	MIXERS	CN14-3	CN14-8 (+M)	MF3	Mixer motor 3
OUT14	MIXERS	CN14-5	CN14-8 (+M)	MF4	Mixer motor 4
OUT15	MIXERS	CN14-6	CN14-8 (+M)	MF5	Mixer motor 5
OUT16	MIXERS	CN14-7	CN14-8 (+M)	MF6	Mixer motor 6
OUT17	WATERS	CN15-1	CN15-8/9 (+EH/EC)	EA1	Water electrovalve 1
OUT18	WATERS	CN15-2	CN15-8/9 (+EH/EC)	EA2	Water electrovalve 2
OUT19	WATERS	CN15-3	CN15-8/9 (+EH/EC)	EA3	Water electrovalve 3
OUT20	WATERS	CN15-4	CN15-8/9 (+EH/EC)	EA4	Water electrovalve 4
OUT21	WATERS	CN15-6	CN15-8/9 (+EH/EC)	EA5	Water electrovalve 5
OUT22	WATERS	CN15-7	CN15-8/9 (+EH/EC)	EA6	Water electrovalve 6
OUT23	GENERAL	CN6-2	CN6-3 (+M)	E3V	3 way electrovalve
OUT24	CUPS	CN8-5	CN8-9 (+M)	MB	Cup release motor
OUT25	CUPS	CN8-6	CN8-9 (+M)	EB1	Cup 1 electromagnet
OUT26	CUPS	CN8-7	CN8-9 (+M)	EB2	Cup 2 electromagnet
OUT27	CUPS	CN8-8	CN8-9 (+M)	MCB	Cups columnmotor
OUT28	HAND	CN9-7	CN9-10 (+M)	BPZ	Sugar position reel
OUT29	HAND	CN9-8	CN9-10 (+M)	LC	Product delivery light
OUT30	HAND	CN9-9	CN9-10 (+M)	EP	Stirrer expulsion
OUT31	ESPRESSO	CN10-6	CN10-9 (+M)	MLV	Levers motor
OUT32	ESPRESSO	CN10-7	CN10-9 (+M)	RSE	Espresso heater
OUT33	ESPRESSO	CN10-8	CN10-9 (+M)	EM	Grinder electromagnet
OUT34	CAPSULE	CN11-5	CN11-6 (+M)	MCL	Column motor
OUT35	HAND	-	-	-	MM abilitation
OUT36	ESPRESSO	CN10-10	CN10-11 (+M)	MC	Grinder motor
OUT37	HAND	CN9-11	-	MM+	Hand motor +
OUT38	HAND	CN9-12	-	MM-	Hand motor -
OUT39	CAPSULE	CN11-7	-	MCM+	Rack motor +
OUT40	CAPSULE	CN11-8	-	MCM-	Rack motor-
OUT41	CAPSULE	CN11-9	-	MPS+	Press motor +
OUT42	CAPSULE	CN11-10	-	MPS-	Press motor -
OUT43	CAPSULE	CN11-11	-	MTP+	Lid motor +
OUT44	CAPSULE	CN11-12	-	MTP-	Lid motor -
OUT45	WATERS	CN15-8/9 (+EH/EC)		ECF	Hot/cold water electrovalve selection
OUT46	GENERAL	CN5-1	CN5-2	RC1	Boiler resistance 1
OUT47	GENERAL	CN5-3	CN5-4	RC2	Boiler resistance 2
OUT48	GENERAL	CN5-5	CN5-6	MA	Suction motor
OUT49	GENERAL	CN6-4	CN6-5	ER	Hydro net electrovalve
OUT50	GENERAL	CN6-6	CN6-7	PPA	Water pressure pump
OUT60	SPIRALS	CN16-1	CN16-6 (GND)	SB0	Spiral abilitation BIT0
OUT61	SPIRALS	CN16-2	CN16-6 (GND)	SB1	Spiral abilitation BIT1
OUT62	SPIRALS	CN16-3	CN16-6 (GND)	SB2	Spiral abilitation BIT2
OUT63	SPIRALS	CN16-4	CN16-6 (GND)	SB3	Spiral abilitation BIT3
OUT64	SPIRALS	CN16-5	CN16-6 (GND)	SB4	Spiral abilitation BIT4