

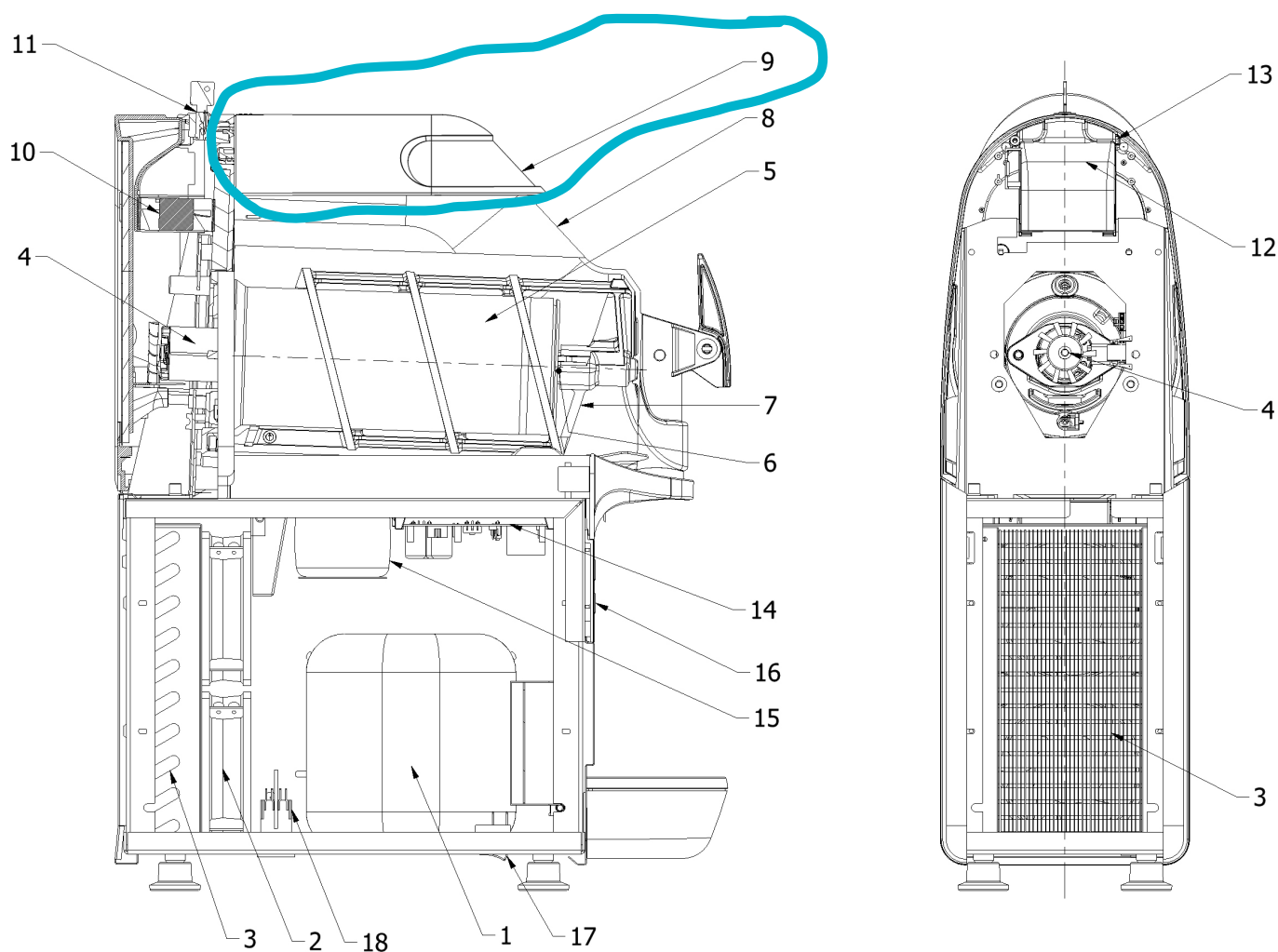
This Service Manual is intended solely for internal use by the manufacturer and his technical support team or other similarly qualified persons, in order to prevent any risks.

This manual describes the procedures for adjustment, maintenance and repair of the dispenser. For information regarding ordinary usage by the operator, please refer to the Instruction Manual provided with each dispenser.

## 1 APPLIANCE'S DESCRIPTION

This dispenser is designed for the production of iced or frozen drinks such as crushed ice drinks, ice creams and sorbets. The lower half of the dispenser contains the cooling system, which consists of a compressor (1), a condenser (3), the related fans (2) and a solenoid valve to open and close the cooling circuit. The lower half of the dispenser also contains the circuit boards designed to control operation (14) and (16) and the power supply transformer (15) for both the circuit boards and the geared motor to drive the mixers.

The upper half of the dispenser contains the transparent tank (8) designed for the food product, which in turn contains the mixer (7) and the evaporator cylinder (5) which is the unit that chills the product. In addition, the rear of the dispenser houses the electric motor (4) and the geared motor which drives the mixer, the tank defrosting fan (10) and any LED lamps.



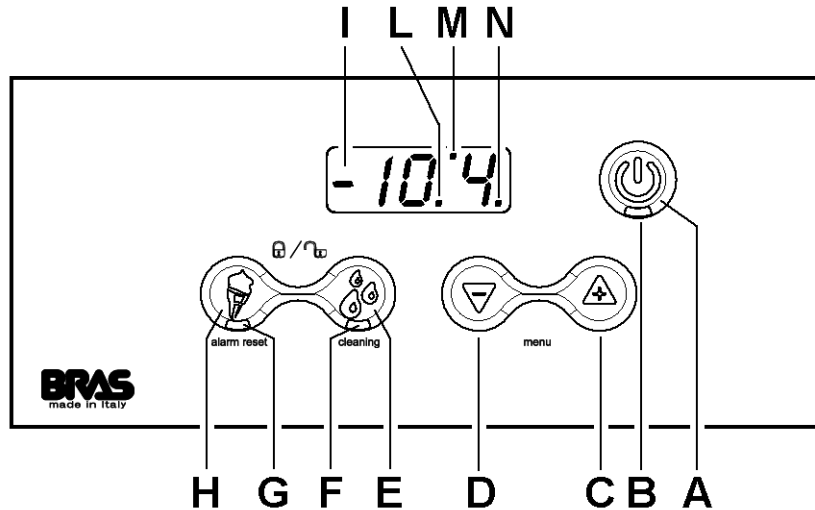
**figure 1**

The dispenser also features a main ON/OFF switch situated on the left-hand side of the frame underside. In addition, each tank is fitted with a control panel, situated under the dispenser tap, the functions of which are described below.

### BCREAM HD 1/2/3

The model BCream HD, in production starting from year 2014, has the following differences from the previous model:

- More powerful mixing system
- Cup sensor for ease of dispensing
- Graphic display showing a larger number of messages
- Improved software for better product handling
- Timer for operation programming



**figura 2**

- (A) ON / OFF key (on dispensers with more than one tank, this key is only present on the right-hand tank control panel): press it for one second to turn the dispenser on or off. When the appliance is in use, press it briefly to turn the lights on or off, where featured.
- (B) Status indicator light (on dispensers with more than one tank, this indicator light is only present on the right-hand tank control panel): if it is on, this means the main switch situated under the dispenser is turned on and the appliance is powered and ready for use.
- (C) Plus key: in ice cream production mode, this key increases the density of the product.
- (D) Minus key: in ice cream production mode, this key decreases the density of the product.
- (E) Conservation key: allows you to select the product conservation operating mode. On dispensers with more than one tank, if you hold this key down while the tank is in product conservation mode, the corresponding tank will be turned off. If you press it for two seconds, the dispenser switches to "Cleaning" mode: the mixer is on but the cooling is off.
- (F) Conservation indicator light: flashing light => product conservation mode selected, conservation temperature not reached. Indicator light permanently on => product conservation mode selected, temperature reached.
- (G) Ice cream production indicator light: flashing light => ice cream production mode selected, product not ready. Indicator light permanently on => ice cream production mode selected, product ready.
- (H) Ice cream production key: allows you to select the ice cream production operating mode. On dispensers with more than one tank, if you hold this key down while the tank is in ice cream production mode, the corresponding tank will be turned off.
- (I) Product temperature.
- (L) Decimal point.
- (M) Solenoid valve indicator light: indicator light on => solenoid valve open. Indicator light off => solenoid valve closed. Flashing indicator light => solenoid valve opening delay under way (factory set to 15 seconds).
- (N) Compressor indicator light: indicator light on => compressor on. Indicator light off => compressor off. Flashing indicator light => compressor start delay under way (factory set to 120 seconds).

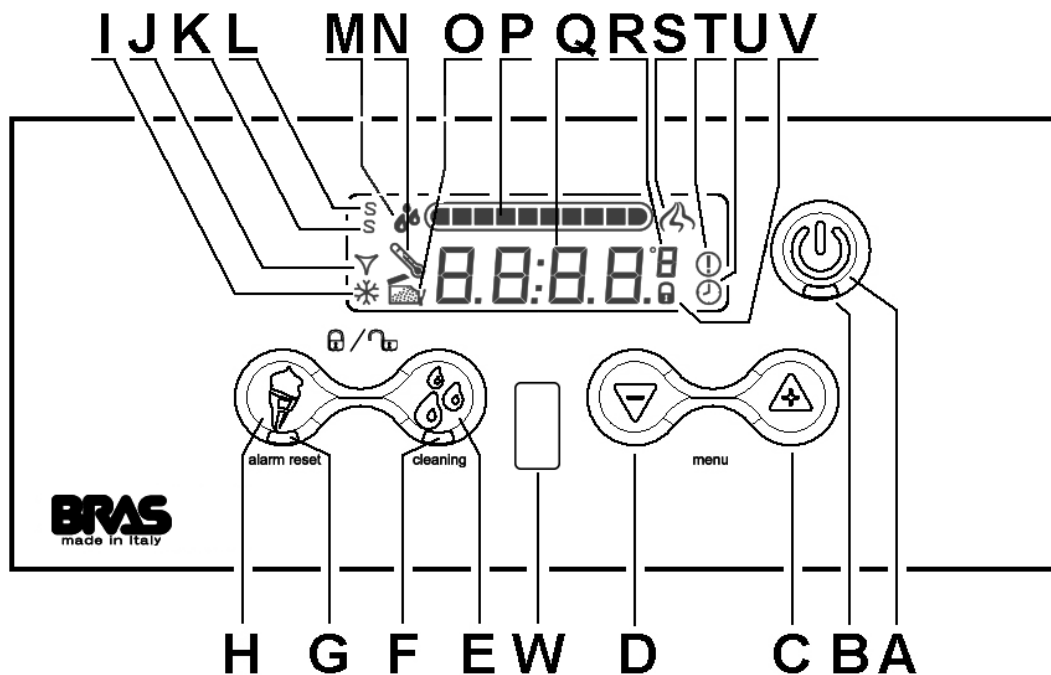


figura 3

- (A) ON / OFF key (on dispensers with more than one tank, this key is only present on the right-hand tank control panel): press it for one second to turn the dispenser on or off. When the appliance is in use, press it briefly to turn the lights on or off, where featured.
- (B) Status indicator light (on dispensers with more than one tank, this indicator light is only present on the right-hand tank control panel): if it is on, this means the main switch situated under the dispenser is turned on and the appliance is powered and ready for use.
- (C) Plus key: in ice cream production mode, this key increases the density of the product.
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- (F) Conservation indicator light: flashing light => product conservation mode selected, conservation temperature not reached. Indicator light permanently on => product conservation mode selected, temperature reached.
- (G) Ice cream production indicator light: flashing light => ice cream production mode selected, product not ready. Indicator light permanently on => ice cream production mode selected, product ready.
- (H) Ice cream production key: allows you to select the ice cream production operating mode. On dispensers with more than one tank, if you hold this key down while the tank is in ice cream production mode, the corresponding tank will be turned off.
- (I) Compressor icon: icon ON => compressor ON. Icon OFF => compressor OFF. Icon blinking => compressor OFF delay in progress (factory default PA14=180 seconds)
- (J) Solenoid valve icon: icon ON => solenoid valve open. Icon OFF => solenoid valve closed . Icon blinking => solenoid valve closed time in progress (factory default PA15=20 seconds)
- (K) Service Mode Icon: icon ON => the machine has been started in Service Mode (main switch + key A) and it is possible to set the working parameters.
- (L) Super Service Mode Icon: this icon and icon (K) ON => the machine has been started in Super Service Mode (main switch + key A) and it is possible to set the factory parameters.
- (M) Liquid product icon: actually not implemented
- (N) Temperature Alarm Icon: icon ON => the temperature of the product raised over the warning temperature (PA21= 4°C set as factory default)
- (O) Open top cover icon: icon ON => the top cover is open and the machine can't work (in case of machines with multiple containers, only the one with the open top cover is stopped).
- (P) Viscosity setting: graphical representation of the set value of the viscosity of the product
- (Q) Temperature of the product into the bowl
- (R) Temperature scale: temperature scale as set by parameter PA08
- (S) Dispensing Icon: icon ON => the cup sensor has detected the presence of a cup and the speed of rotation of the mixer is increased to the value of the parameter PA03
- (T) Alarm Icon: icon ON => an alarm is active

**B-Cream & B-cream HD**

- (U) Defrost timer Icon: icon ON => Defrost timer active, the switching between conservation and ice cream mode is operated automatically following the timer settings and can't be performed manually.
- (V) Locked Keyboard Icon: icon ON => keyboard is locked and it is impossible to adjust the machine unless the keyboard is unlocked (key E + key H pressed for 2 seconds)
- (W) Cup sensor: the cup sensor detects the presence of a cup up to a distance of approx 15 cm and increases the rotation speed of the mixer to the value of the parameter PA03



**IMPORTANT**

On dispensers with more than one tank, the ON/OFF key (A) and related indicator light (B) are only present on the control panel of the right-hand tank but their operation affects the entire appliance. Therefore pressing key (A) will turn all the tanks on or off and, where featured, it will also turn all the lights on or off.



**IMPORTANT**

On dispensers with more than one tank, should you wish to turn off a single tank, you will have to press the key for the operating mode currently in use on the related control panel. Both the cooling and the mixer will stop and the corresponding display will show the message: OFF.

**2 OPERATING PRINCIPLE**

The operating principle of this dispenser is based on cooling and concurrently mixing the product inside the transparent tank. When the product reaches negative temperatures, it begins to freeze, thereby increasing in density and therefore the effort required by the geared motor to mix it. Using the electricity consumption value, the electronic control system is able to determine this effort and when it reaches a set level, the solenoid valve is closed, thereby shutting off the supply of refrigerant gas to the evaporator cylinder. Since the product is no longer cooled, it tends to melt, thereby decreasing in density and therefore the effort required by the geared motor to mix it. When the effort drops below a set level, the solenoid valve re-opens, the refrigerant gas resumes its passage through the evaporator cylinder and the product cools down and increases in density again. This regulation system ensures the density of the product is kept at a set level.

Setting the density of the product to between 1 and 10 makes it possible to obtain a product with the required level of density. By default, the maximum setting, i.e. when the density is set to 10, corresponds to consumption of electrical power of 65 watts, which can be increased to 100 watts by starting up the machine in Service Mode and adjusting the PA02 parameter (see relative paragraph). Each density setting value corresponds to 1/10 of the value of the PA02 parameter. In addition to this, the machine checks that the product temperature does not drop below a minimum operating temperature defined by the PA03 parameter, whose default setting is -14 °C. This setting is useful to prevent the remaining product gradually reaching ever lower temperatures as the container is progressively drained.

Again starting up the machine in Service Mode, it is also possible to set the rotation speed of the mixer when the product is being prepared (PA03 parameter), when the product is ready (PA04 parameter) and when the machine is in product storage mode (PA05 parameter).



**IMPORTANT**

When the ice cream production operating mode is selected, the compressor is always on. When the dispenser is turned on, after the 120-second safety delay, the compressor starts up and always stays on. When the product conservation operating mode is selected, the compressor is only on if at least one of the solenoid valves is open and therefore if at least one of the tanks requires cooling. Every time the compressor is turned off, a safety time lapse of 120 seconds must pass before it can be restarted.

As well as the operating modes described in the Instruction Manual, the dispenser may be started up in other modes which can be used for technical support. These modes are summarised in the table below:


Mode	Description	Activation key
Operation Parameters Mode	In this mode, the machine functions normally but it is possible to modify the Operation Parameters.	Master switch + key A
Production Parameters Mode	In this mode, the machine functions normally but it is possible to modify all Parameters, concerning both Operation and Production.	Master switch + key A + key H

Test Mode	In this mode, the machine does not function and it is possible to manually activate individual components to check that they are functioning correctly.	Master switch + key E
Production Test Mode	In this mode, the machine does not function and it is possible to activate individual components in sequence to check that they are functioning correctly.	Master switch + key H

### 3 SERVICE MODE – ADJUSTING THE OPERATION PARAMETERS

By switching on the dispenser using the master switch and holding down key A simultaneously, the machine can be started up in service mode and make adjusting the Operation Parameters. The dispenser will function normally, but it will be possible to modify the operation parameters and any modifications carried out will be stored in the memory for the next time the dispenser is switched on in normal mode.

When the machine is in use, to adjust the operation parameters, hold down keys C and D simultaneously. The display will show the code PA01 to indicate the first parameter which may be modified. Pressing keys C and D enables the selection of the parameter to be modified. Pressing key A will then make it possible to activate the modification of the chosen parameter. The display will show the current value of the parameter. This value can be modified using keys C and D. Pressing key A once more or waiting three seconds without pressing any keys confirms the new value and the display will return to the list of parameters. To exit the parameter adjustment, hold down keys C and D simultaneously or do not press any key for three seconds.



**IMPORTANT**

**On dispensers with more than one tank, the operating parameters, from PA01 to PA10, must be set separately for each tank.**

#### LIST OF PRODUCTION PARAMETERS B-CREAM 1/2/3

NAME	DESCRIPTION	ADJUSTMENT INTERVAL	DEFAULT VALUE
PA01	Minimum temperature in Ice Cream Production Mode: This is the minimum possible temperature of the product when the density is adjusted to a value of 10.	0...-18 °C	-14
PA02	Maximum density in Ice Cream Production Mode: this is the absorption value of the motor corresponding to the adjustment of the density to a value of 10.	0...100 W	60
PA03	Motor rotation speed in Ice Cream Production Mode with an unfinished product.	500...6000 giri/min	3500
PA04	Motor rotation speed in Ice Cream Production Mode with a finished product.	500...6000 giri/min	3500
PA05	Motor rotation speed in Conservation Mode.	500...6000 giri/min	1000
PA06	Temperature produced in Conservation Mode.	- 25 ÷ + 10 °C	2 °C
PA07	Lock Keypad.	0 / 1 / 2	0
PA08	Scale representation of temperature.	C...F	C
PA09	Firmware version display circuit board.	Visualisation only	
PA10	Firmware version power circuit board.	Visualisation only	

#### LIST OF PRODUCTION PARAMETERS B-CREAM HD 1/2/3

NAME	DESCRIPTION	ADJUSTMENT INTERVAL	DEFAULT VALUE
PA01	Minimum temperature in Ice Cream Production Mode: This is the minimum possible temperature of the product when the density is adjusted to a value of 10.	0...-18 °C	-14
PA02	Maximum density in Ice Cream Production Mode: this is the absorption value of the motor corresponding to the adjustment of the density to a value of 10.	45...90 W	75
PA03	Motor rotation speed in Ice Cream Production Mode with an unfinished product.	2000...6000 giri/min	4000
PA04	Motor rotation speed in Ice Cream Production Mode with a finished product.	2000...6000 giri/min	2000
PA05	Motor rotation speed in Conservation Mode.	1000...6000 giri/min	1000
PA06	Temperature produced in Conservation Mode.	- 5 ÷ + 10 °C	2 °C

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PA07	Lock Keypad.	0 / 1 / 2	0
PA08	Scale representation of temperature.	C...F	C
PA09	Firmware version display circuit board. 2015 version : enabling defrost timer.	Visualisation only ON / OFF	OFF
PA10	Firmware version power circuit board. 2015 version : counter machine life	Visualisation only Days	0

### **4 SUPER SERVICE MODE – ADJUSTING THE MANUFACTORY PARAMETERS**

By switching on the dispenser using the master switch and holding down keys A and H simultaneously, the machine can be started up in Super Service Mode and make adjusting the manufactory parameters. The dispenser will function normally, but it will be possible to modify the production parameters and any modifications carried out will be stored in the memory for the next time the dispenser is switched on in normal mode.

For information on how to adjust the production parameters, please refer to the instructions for the operation parameters.



#### **IMPORTANT**

**Incorrect adjustment of the Production Parameters may compromise the operation of the machine.**



#### **IMPORTANT**

**Distributors in more containers from the factory parameters PA11 to PA 27 are common to all the distributor and therefore can only be adjusted by the control panel on the right container.**

#### **LIST OF PRODUCTION PARAMETERS B-CREAM 1/2/3**

<b>NAME</b>	<b>DESCRIPTION</b>	<b>ADJUSTMENT INTERVAL</b>	<b>DEFAULT VALUE</b>
PA11	Ice Cream Production Mode Density	1...10	8
PA12	Ice Cream Production Mode Density Hysteresis	0...4,0	0,2
PA13	Ice Cream Production Mode Temperature Hysteresis	0...5 °C	0,5
PA14	Compressor lockout time OFF	0...600 s	180
PA15	Electrovalve lockout time OFF	0...600 s	180
PA16	Time for which the density must remain above the reference value	0...60 s	1
PA17	Conservation Mode Temperature Hysteresis	0...5 °C	0,5
PA18	Maximum motor absorption	0...100 W	90
PA19	Motor cooling time	0...600 s	90
PA20	Motor protection intervention delay	0...60 s	5
PA21	Product conservation alarm temperature	0...10 °C	4
PA22	Tap sensor entry activation	ON...OFF	OFF
PA23	Temperature probe offset	?	0
PA24	Number of motor poles	0...1000	300
PA25	Motor control proportional P constant	0...1000	4
PA26	Motor control integral I constant	0...1000	0
PA27	Motor control derivative D constant	YES...NO	NO

#### **LIST OF PRODUCTION PARAMETERS B-CREAM HD 1/2/3**

<b>NAME</b>	<b>DESCRIPTION</b>	<b>ADJUSTMENT INTERVAL</b>	<b>DEFAULT VALUE</b>
PA11	Ice Cream Production Mode Density	1...10	8
PA12	Ice Cream Production Mode Density Hysteresis	0...4,0	0,2
PA13	Ice Cream Production Mode Temperature Hysteresis	0...5 °C	0,5
PA14	Compressor lockout time OFF	0...600 s	180

PA15	Electrovalve lockout time OFF	0...600 s	20
PA16	Time for which the density must remain above the reference value	0...60 s	1
PA17	Conservation Mode Temperature Hysteresis	0...5 °C	0,5
PA18	Maximum motor absorption	YES...NO	120
PA19	Motor cooling time	0...600 s	90
PA20	Motor protection intervention delay	0...60 s	5
PA21	Product conservation alarm temperature	0...10 °C	4
PA22	Tap sensor entry activation	ON / OFF	OFF
PA23	Available for future implementations 2015 version : locking density	0...25 YES / NO	0 NO
PA24	Mixer rotation inversion when in conservation mode	YES...NO	YES
PA25	Mixer rotation inversion delay	0...3600	900
PA26	Minimum time of rotation speed increasing when cup is detected	0...60	10
PA27	Reset of the parameters to default values	YES...NO	NO

## 5 PARAMETER RESET

To reset the parameters to the default values it is necessary to switch on the machine, using the main switch located under the unit, holding down keys C and D simultaneously, selecting YES value pressing key C and then confirming it, pressing key A. It is also possible to reset the parameters to the default values starting the machine in Super Service Mode, selecting parameters PA27, selecting YES value pressing key C and then confirming it, pressing key A.

## 6 FUNCTIONAL TEST OF THE MACHINE

The following procedure allows to test the complete functionality of the unit:

- 1 Switch On the machine.
  - 2 If in Standby set the machine in Working Mode.
  - 3 Set all the bowls in Ice Cream Mode: the gear motors must turn regularly. The icon J flashes on the right display. The icons I flash on all the displays.
  - 4 After 15 seconds, when the time set by parameter PA15 is expired (delay timer of the solenoid valves, factory default 15 sec.) the solenoid valves open (the sound "click" must be heard one time for each bowl in a short time). The icon J, on all the display, stop flashing becoming still.
  - 5 After 180 seconds, when the time set by parameter PA14 is expired (delay timer of the compressor, factory default 180 sec) the compressor and the fan motor start. Now the cooling system of the machine is working and after some ten of seconds the evaporators must begin to freeze in the front lower part. The icon I, on the right display, stops flashing becoming still.
  - 6 If it is possible to complete this procedure with success it means that the machine works properly.
- This test takes approx. 5 minutes and allows to verify the proper working of the gear motors, of the compressor, of the fan motor, of the solenoid valves and of the electronic boards all together.

The only thing that this procedure can't allow to verify is the efficiency of the cooling system which can be reduced for example due to a leak of refrigerant gas. In order to execute such a check, a test with product, 90 minutes long, is required.

## 7 PROTECTION AGAINST EXCESSIVE DENSITY

In the case of excessive product density, in order to avoid damage to the dispenser, both the freezer and the mixer will be stopped for three minutes and one of the following messages will appear on the display: "AL03", "AL06" or "AL08". After three minutes, both mixing and freezing will be reactivated and the previous density setting will be decreased by one level.

To reset the alarm message and return to the fixed display, hold down the B key for three seconds.

From serial number 1184, with the introduction of firmware versions 025 and 018, the alarm display has been replaced by the symbol ---- shown on the display.

The alarm display is possible in Service Mode or Super Service (see paragraph 3 and 4) or, during normal operation, by simultaneously pressing the + and -.

## 8 ALARMS

The table below summarises the machine's alarm codes:

Code	Title alarm	Note
COV	Cover opened	It warns the operator that the machine can not operate if the lid is not closed
AL02	Product temperature alarm	This alarm stops the operation of the machine

AL03	Excessive motor absorption	Alarm displayed when the machine is operating in Service Mode Service Mode or Super
AL04	Temperature probe damaged	This alarm stops the operation of the machine
AL05	Circuit board transmission error	This alarm stops the operation of the machine
AL06	Unplanned motor stop	Alarm displayed when the machine is operating in Service Mode Service Mode or Super
AL07	24V power supply missing	This alarm stops the operation of the machine
AL08	Excess current, hardware protection intervention	Alarm displayed when the machine is operating in Service Mode Service Mode or Super
AL09	Error Hall probes	This alarm stops the operation of the machine
AL10	Lack of communication between master and slave card 1	This alarm stops the operation of the machine
AL11	Lack of communication between master and slave card 2	This alarm stops the operation of the machine
AL12	Alarm low voltage motor	This alarm don't stops the operation of the machine
AL13	System clock out of order	System clock out of order. The machine can work but the defrost timer can't be used.
AL14	Clock battery out of order	Clock battery expired or out of order. The machine can work but current time is reset when the machine is powered off.

If one of these alarm codes appears on the display, please refer to Appendix 1: Possible Problems and their Solutions.

## **9 FIRMWARE VERSIONS CHRONOLOGY**

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### **Control display**

Version	Notes
0.22	First production version.
0.23	Updates 2013.
1.01	Updates 2014. First production version with LCD display.
1.08	Updates 2015.

### **Power board**

Version	Notes
0.06	First production version.
0.10	Updates 2013.
0.27	Updates 2014. Compatible version with new LCD display.
0.35	Updates 2015.



## 10 DISASSEMBLING THE DISPENSER

### 10.1 OPENING THE DISPENSER

**1** Remove the rear panel, prising it open with a screwdriver inserted in the purpose-designed slot, then remove the condenser filter.



**2** Loosen the fastening screws and remove the side panels.



#### **IMPORTANT**

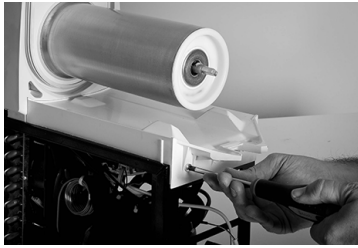
The side panels cannot be removed if the rear panel has not previously been disassembled.

**3** Loosen the screws and remove the front panel. Then remove the condensation water drain cover.



**4** Once you have removed the cover, the tank and mixer, loosen the fastening screws on the condensation water collection tray

and remove it by pulling it out from the front.

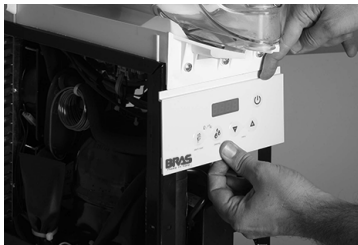


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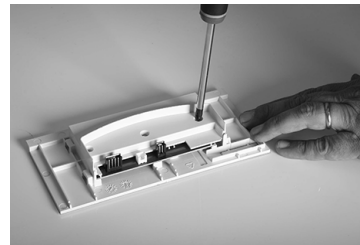
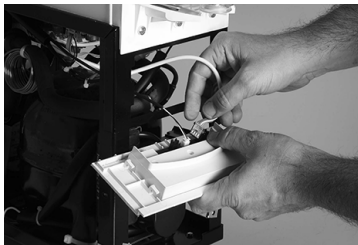
## **10.2 DISASSEMBLING THE CIRCUIT BOARDS**

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**1** Remove the control board housing by pushing it down.



**2** Disconnect all connectors at the rear of the board. Loosen all the housing securing screws and then remove the board itself.



**3** To remove the power board, you need to disconnect all the connectors then pull down the two side anchor tabs and pull out the board.



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## **10.3 DISASSEMBLING THE WATER COLLECTION TRAY**

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**1** Remove the advertising picture at the rear by prising it off with a screwdriver inserted in the purpose-provided slot. Loosen the

fastening screw and pull the water collection tray out.

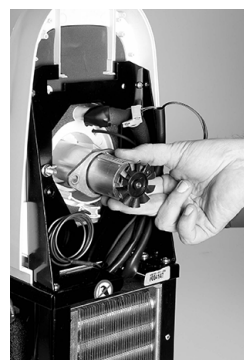
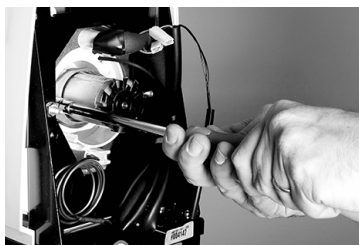


## 10.4 DISASSEMBLING THE GEARED MOTOR

1 Remove the rear cover after loosening its fastening screws.



2 Loosen the fastening nuts on the geared motor and remove the latter from its seat.



## 10.5 DISASSEMBLING THE DEFROSTING FAN AND THE LID PRESENCE SENSORS

1 Remove the air conveyor by pressing on either side. Pull the defrosting fan out of its seat in the conveyor. The lid presence detectors are situated at the rear of the conveyor and can be removed from their seat with the help of a small screwdriver.

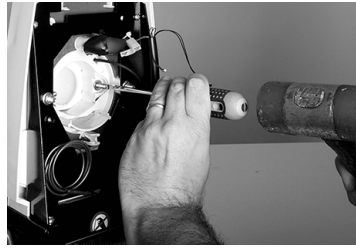
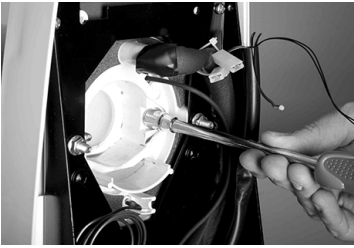


## 10.6 DISASSEMBLING THE TEMPERATURE SENSOR

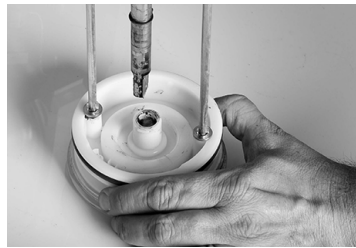
1 The temperature sensor is situated inside the front evaporator cylinder cap. To replace it, first loosen the fastening nuts, then,

## B-Cream & B-cream HD

with the help of a rubber hammer, push the tie rods and then pull the front cap out.



**2** Lastly, loosen the temperature sensor fastening screw situated inside the cap. If necessary, pull out the mixer drive shaft from its seat.



## 11 UPDATING THE FIRMWARE

The dispenser firmware can be updated by uploading the correct update files to the circuit board memory. Each board, control board, master power board and slave power board has its own firmware which can be updated individually. To do this, you need the special programmer supplied by the manufacturer shown in the figure below. This is supplied with an adapter which is used or not according to the connector on the circuit boards.



In addition to the programmer, the update files supplied by the manufacturer named as shown in the table below are required:

Brushless_Front_XXX.mot	Version XXX front board firmware
Brushless_M_S_MASTER_vXXX.mot	Version XXX master power board firmware
Brushless_M_S_SLAVE_vXXX.mot	Version XXX slave power board firmware

The files must be saved to a Personal Computer (PC) with a USB port.

### 11.1 UPDATING THE CONTROL BOARD FIRMWARE

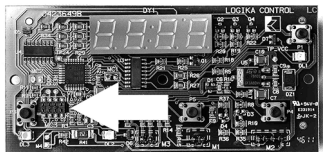
To update the control board firmware, perform the steps described below.

**1** Collect the programmer to the USB port on the PC where the firmware update files are stored. The programmer will be recognised by the PC as a normal USB storage device (memory stick). Delete any files on the programmer and copy the file Brushless\_Front\_XXX.mot onto it making sure that when you have finished, this is the only file on the programmer.

**2** While the machine is disconnected from the mains, access the control board following the steps described above without disconnecting the board from the connectors.

**3** Connect the programmer to the MC3 connector shown in the figure. Connect the machine to the mains and switch on the master switch. The green PROGRAMMING light on the programmer will come on to confirm that it is connected to the board correctly and that the board is powered. Press the programming button on the programmer. The green PROGRAMMING light will

flash for a few seconds; when it remains permanently lit, programming has been terminated correctly.



- 4 Switch off the master switch and disconnect the machine from the mains.
- 5 Disconnect the programmer and put the control board back into its housing.

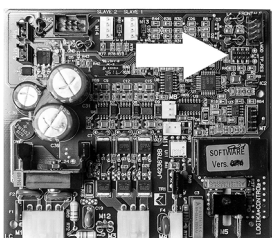
**IMPORTANT**

If updating has not been successful, the red **ERROR** light will come on. You will have to repeat the entire procedure making sure you do not make any mistakes.

## 11.2 UPDATING THE MASTER POWER BOARD FIRMWARE

To update the master power board firmware, perform the steps described below.

- 1 Collect the programmer to the USB port on the PC where the firmware update files are stored. The programmer will be recognised by the PC as a normal USB storage device (memory stick). Delete any files on the programmer and copy the file Brushless\_M\_S\_MASTER\_vXXX.mot onto it making sure that when you have finished, this is the only file on the programmer.
- 2 While the machine is disconnected from the mains, access the master power board following the steps described above without disconnecting the board from the connectors.
- 3 Connect the programmer to the MC1 connector shown in the figure. Connect the machine to the mains and switch on the master switch. The green PROGRAMMING light on the programmer will come on to confirm that it is connected to the board correctly and that the board is powered. Press the programming button on the programmer. The green PROGRAMMING light will flash for a few seconds and when it remains permanently lit, programming has been terminated correctly.



- 4 Switch off the master switch and disconnect the machine from the mains.
- 5 Disconnect the programmer.

**IMPORTANT**

If updating has not been successful, the red **ERROR** light will come on. You will have to repeat the entire procedure making sure you do not make any mistakes.

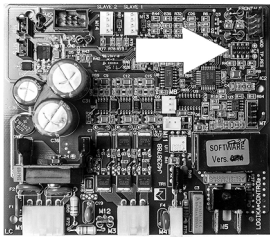
## 11.3 UPDATING THE SLAVE POWER BOARD FIRMWARE

To update the master power board firmware, perform the steps described below.

- 1 Collect the programmer to the USB port on the PC where the firmware update files are stored. The programmer will be recognised by the PC as a normal USB storage device (memory stick). Delete any files on the programmer and copy the file Brushless\_M\_S\_SLAVE\_vXXX.mot onto it making sure that when you have finished, this is the only file on the programmer.
- 2 While the machine is disconnected from the mains, access the master power board following the steps described above without disconnecting the board from the connectors.
- 3 Connect the programmer to the MC1 connector shown in the figure. Connect the machine to the mains and switch on the master switch. The green PROGRAMMING light on the programmer will come on to confirm that it is connected to the board

# B-Cream & B-cream HD

correctly and that the board is powered. Press the programming button on the programmer. The green PROGRAMMING light will flash for a few seconds and when it remains permanently lit, programming has been terminated correctly.



- 4 Switch off the master switch and disconnect the machine from the mains.
- 5 Disconnect the programmer.

## 12 REFRIGERATOR CIRCUIT MAINTENANCE

### 12.1 LOCATING GAS LEAKS

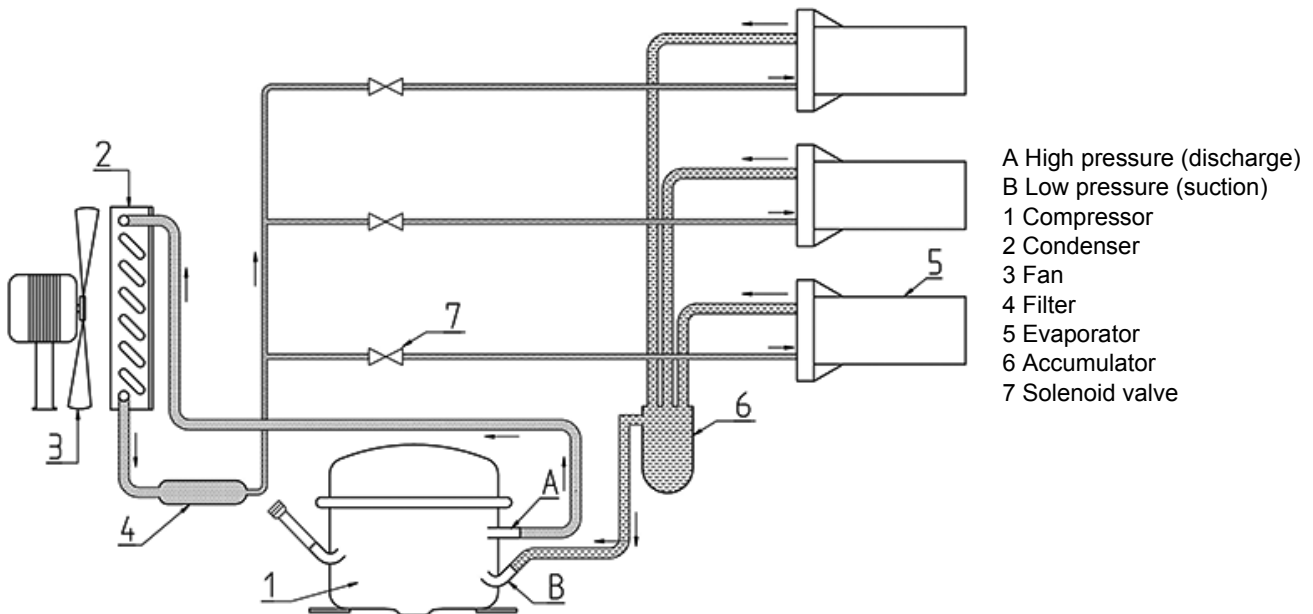
The following is the recommended method for the systematic inspection of the refrigerator circuit when trying to identify the source of a gas leak.

i

IMPORTANT

**When using the leak detector, always direct the sensor towards the bottom of the copper tubes. The refrigerant gas is heavier than air.**

Where the copper tube is protected by an insulation grip, the leak can be detected from both ends of each individual grip.



**figure 4**

Referring to figure 3, proceed as follows:

- 1 Begin the inspection at the "High Pressure" zone (discharge) of the compressor. Check around the seals.
- 2 Follow the copper pipes to the condenser and check the sealed connections at the condenser entrance and exit.
- 3 Also check the curves of the pipes on both sides of the condenser.
- 4 Follow the copper pipes to the evaporator, checking around the sealed connections on the dehydrator filter and the electrovalves.
- 5 Disassemble the geared motors and check the evaporator capillary tube entry and the suction line outlet.
- 6 Check the copper pipes up to the compressor.

- 7 Inspect the "Low Pressure" zone of the compressor, checking the connections on the suction and inlet pipes.



## IMPORTANT

Incorrect adjustment of the Production Parameters may compromise the operation of the machine.

- 8 Once the leak has been identified, seal it and charge with gas according to the instructions below.

## 12. 2 HOW TO EMPTY THE CIRCUIT

- 1 Remove all the machine's panels.
- 2 Remove the cap from the "Charge" pipe valve on the compressor.
- 3 Connect the compressor "Charge" tube to the "Low" filling unit on the "pressure Gauge" (see figure).
- 4 Connect the "VAC" filling unit on the pressure gauge to an appropriate and approved gas collection device.



## WARNING

The refrigerant gas may be highly acidic and toxic.

- 5 Open the "Low" and "VAC" valves and collect the gas.
- 6 Once the discharge operation is complete, close the "Low" and "VAC" valves and disconnect the collection equipment.

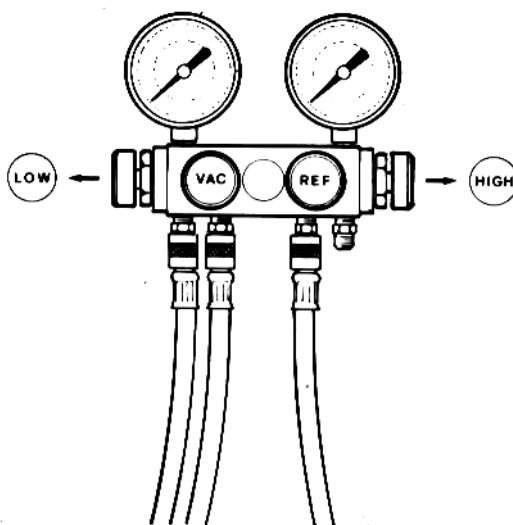


figure 5

## 12. 3 HOW TO EMPTY THE SYSTEM

Before emptying the system, always replace the dehydrator filter with a new one.

- 1 Connect the "REF" filling unit on the pressure gauge to the charging unit.
- 2 Connect the "VAC" filling unit to the vacuum pump and open the "VAC" valve.
- 3 Open the valve on the charging unit and, for a moment, also open the "REF" valve on the pressure gauge, to remove air from the "REF" pipe.
- 4 In machines with more containers, disconnect the electrovalves from the machine's internal cabling and supply power to them directly using an auxiliary power supply. This way, the electrovalves are open and the whole circuit is ready to be evacuated.
- 5 Open the "Low" valve on the pressure gauge and run the vacuum pump for approximately thirty minutes.
- 6 While the pump is operating, close the "VAC" valve on the pressure gauge once the preset level of emptying has been reached.
- 7 Switch off the vacuum pump.
- 8 Disconnect the electrovalves from the auxiliary power supply and reconnect the machine's original cabling.

**12.4 HOW TO CHARGE THE MACHINE WITH GAS**

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The "pressure gauge" shown in figure 5 is the type with 4 filling units (and 4 valves) because this type is most widely available on the market, and it allows charging with gas both through the "High" and "Low Pressure" zones of the refrigerator circuit.

The refrigerator circuit on our machines is built so that the charging of gas may only be carried out through the compressor charging tube ("Low Pressure" area): for this reason, the "HI" filling unit is not mentioned or used in our procedures and the "HI" valve should therefore remain closed at all times.

- 1** Verify how many grams of gas should be decanted. This data, along with the type of gas, is indicated on the machine's information plate.
- 2** Remove any containers and mixers from the machine.
- 3** Connect the machine's plug to a power supply and switch the master switch to the "I" position.
- 4** Switch all the "Mixer and Refrigeration" switches to the "I" position and wait until all electrovalves are open (only in multiple machines) and the compressor starts up.
- 5** Open the valve on the charging unit.
- 6** Open the "REF" valve on the pressure gauge slowly and gently, so that the refrigerant is pushed into the circuit in gas form.
- 7** When the quantity of gas indicated on the Information Plate has been decanted, the refrigerator circuit is charged. Close the "REF" valve and the valve on the charging unit, keeping the compressor running for a further few minutes.
- 8** Make sure that all the evaporator cylinders are covered with frost.
- 9** Close the "LOW" valve, disconnect the "LOW" pipe from the compressor charging pipe and screw the cap onto the bottom of the charging pipe.

As an indication, the temperatures and corresponding evaporation and condensation pressures at which the machines must operate are indicated below.

These temperatures and pressures must be verified under the following operating conditions:

Ambient temperature: 32 °C

Temperature produced in the tank: 0 °C

In these conditions, the evaporation temperature should be approximately -10 °C and the condensation temperature approximately 50°C.

These temperatures should correspond with the temperatures indicated in the table below, depending on the refrigerant gas used:

Refrigerant gas	Evaporation Pressure	Condensation Pressure
R134a	1,00 bar	12,00 bar
R404a	3,20 bar	22,00 bar

**13 COMPRESSOR FAULTS**

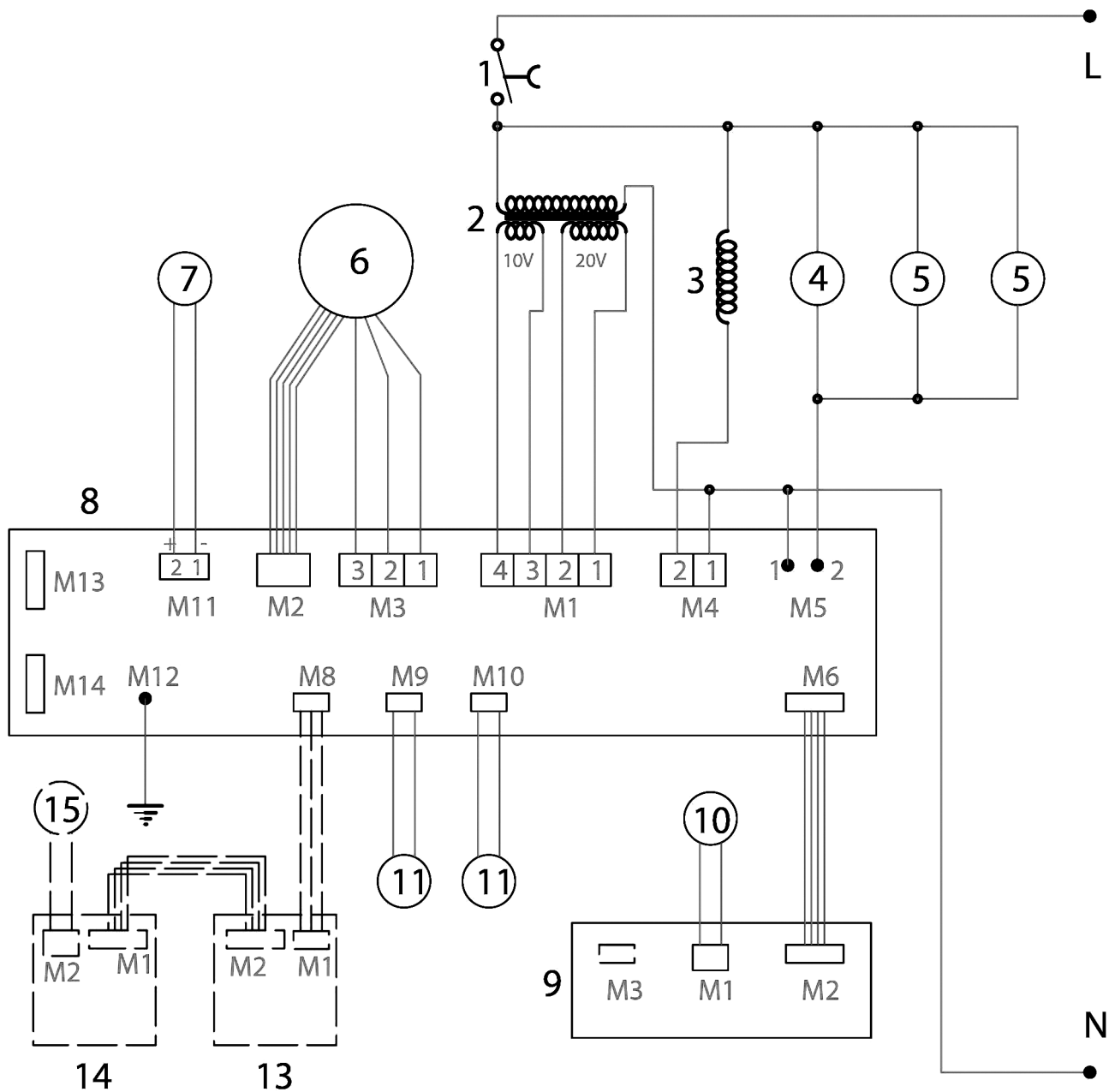
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To establish if a malfunction has occurred, proceed as follows:

- 1** Disconnect the machine's plug from the power supply.
- 2** Disconnect the conductors from the compressor terminals.
- 3** Using an ohmmeter, measure the isolation between the terminals and the compressor housing. If the instrument indicates continuity, the compressor has short-circuited.
- 4** In this situation, the compressor must be replaced using the following method:
- 5** Collect the gas as described in the paragraph "Discharging the gas".
- 6** Remove the faulty compressor.
- 7** Eliminate the cause of the compressor fault (check the conditions of the condenser both when the machine is started up and when it is operating, and also the condition of the starter relay as possible sources and causes of the fault).
- 8** Install a new compressor and a new dehydrator filter.
- 9** Empty and charge the circuit as described above.



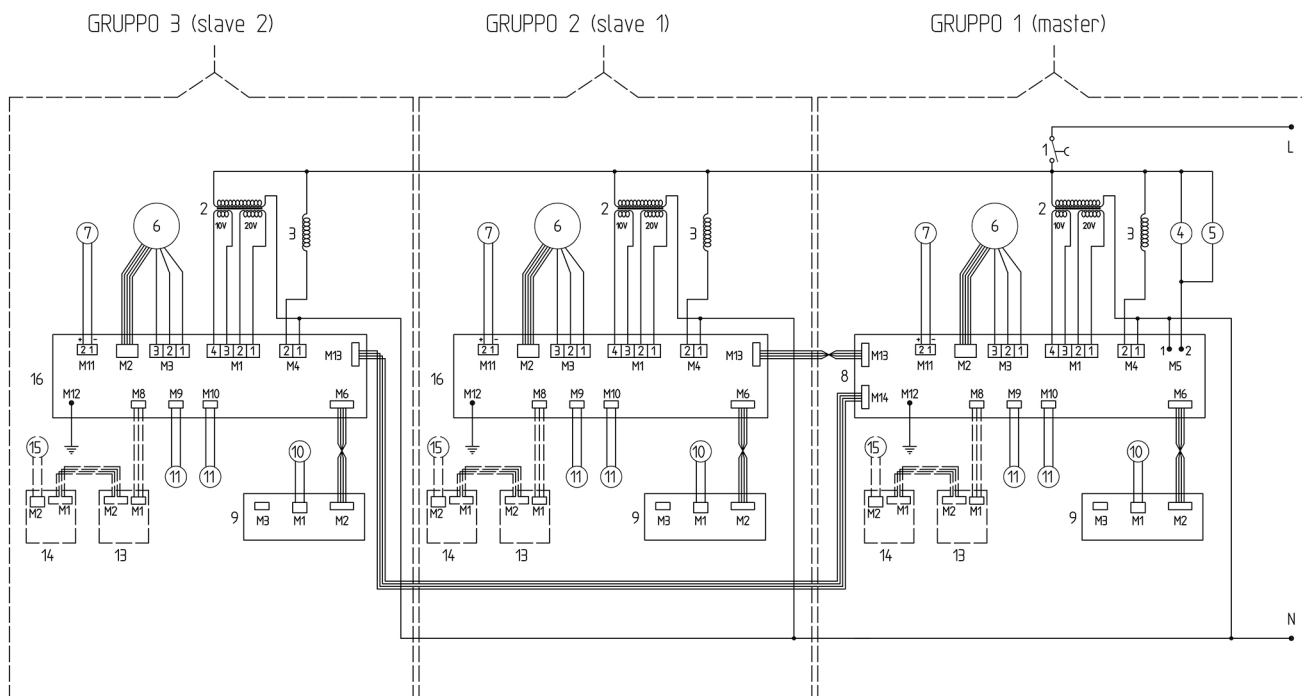
## 14 WIRING DIAGRAM (1 BOWL)



### KEY

- |   |               |    |                                    |
|---|---------------|----|------------------------------------|
| 1 | Master Switch | 8  | Power supply circuit board         |
| 2 | Transformer   | 9  | Display circuit board              |
| 3 | Electrovalve  | 10 | Temperature probe                  |
| 4 | Compressor    | 11 | Reed safety switches               |
| 5 | Fan           | 13 | LED board hat (optional)           |
| 6 | Geared motor  | 14 | LED Board cop. shoulder (optional) |
| 7 | Defrost fan   | 15 | LED Strip cop. shoulder (optional) |

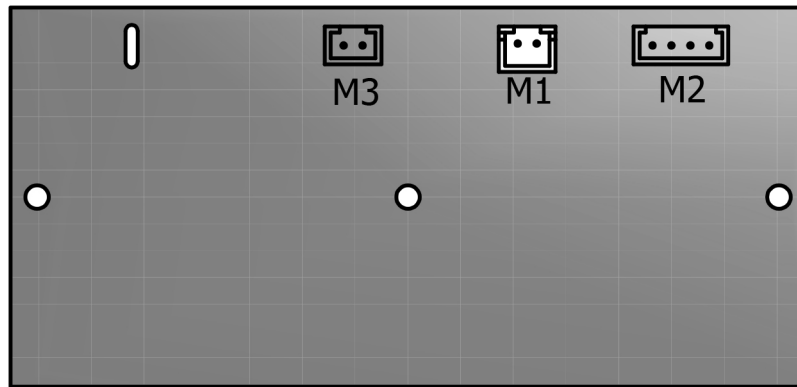
15 WIRING DIAGRAM (2 / 3 BOWLS)



KEY

- |   |                                   |    |                                    |
|---|-----------------------------------|----|------------------------------------|
| 1 | Master Switch                     | 9  | Display circuit board              |
| 2 | Transformer                       | 10 | Temperature probe                  |
| 3 | Electrovalve                      | 11 | Reed safety switches               |
| 4 | Compressor                        | 13 | LED board hat (optional)           |
| 5 | Fan                               | 14 | LED Board cop. shoulder (optional) |
| 6 | Geared motor                      | 15 | LED Strip cop. shoulder (optional) |
| 7 | Defrost fan                       | 16 | Slave power supply circuit board   |
| 8 | Master power supply circuit board |    |                                    |

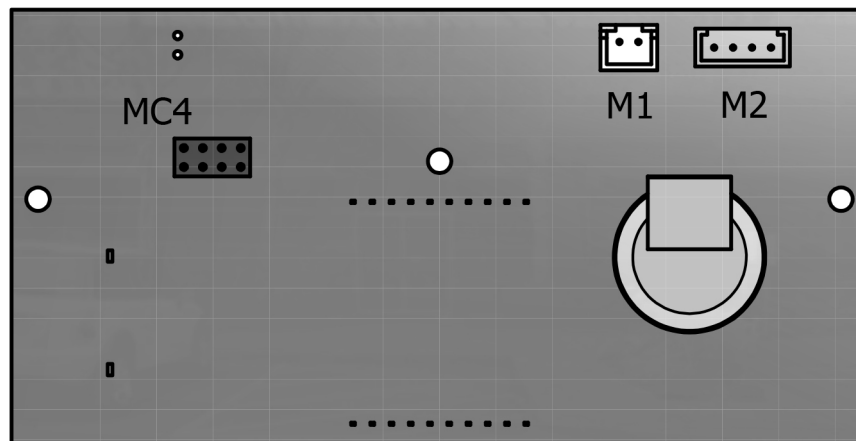
## 16 TOPOGRAFIC DIAGRAM POWER SUPPLY (DISPLAY MINIGEL)



### KEY

- M1** Temperature probe
- M2** MASTER board
- M3** Faucet Reed switch (opt)

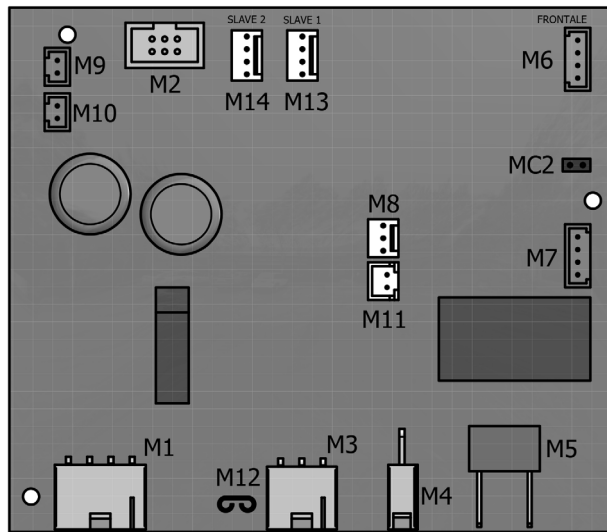
## 17 TOPOGRAFIC DIAGRAM POWER SUPPLY (DISPLAY MINIGEL PLUS)



### KEY

- M1** Temperature probe
- M2** MASTER board
- MC4** Programming

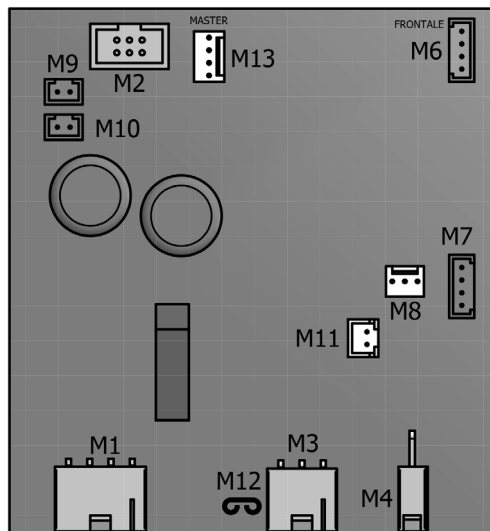
**18 TOPOGRAFIC DIAGRAM POWER BOARD (MASTER MINIGEL PLUS)**



**KEY**

- |   |  |
|---|--|
| <b>M1</b> Power supply 20 Vac pin1-2 / 10 Vac pin 3-4 | <b>M9</b> Safety Reed switch 1                     |
| <b>M2</b> Gearmotor Hall probe signals                | <b>M10</b> Safety Reed switch 2                    |
| <b>M3</b> Gearmotor power supply                      | <b>M11</b> Defrost fan                             |
| <b>M4</b> Solenoid valve                              | <b>M12</b> Earthing                                |
| <b>M5</b> Compressor                                  | <b>M13</b> Slave 1 board                           |
| <b>M6</b> Display board                               | <b>M14</b> Slave 2 board                           |
| <b>M7</b> Not connected                               | <b>M15</b> Closed : machine without solenoid valve |
| <b>M8</b> Top cover LED board                         | <b>M16</b> Open : machine with solenoid valve      |

**19 TOPOGRAFIC DIAGRAM POWER BOARD (SLAVE MINIGEL PLUS)**

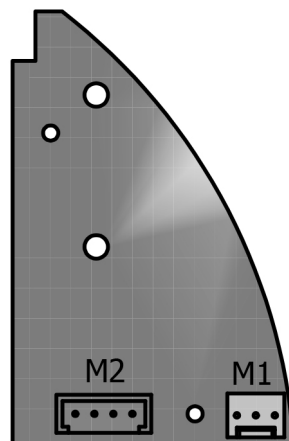


**KEY**

- |   |                                 |
|---|---------------------------------|
| <b>M1</b> Power supply 20 Vac pin1-2 / 10 Vac pin 3-4 | <b>M8</b> Top cover LED board   |
| <b>M2</b> Gearmotor Hall probe signals                | <b>M9</b> Safety Reed switch 1  |
| <b>M3</b> Gearmotor power supply                      | <b>M10</b> Safety Reed switch 2 |
| <b>M4</b> Solenoid valve                              | <b>M11</b> Defrost fan          |
| <b>M6</b> Display board                               | <b>M12</b> Earthing             |
| <b>M7</b> Not connected                               | <b>M13</b> Master board         |

**20 TOP COVER LED TOPOGRAPHY**

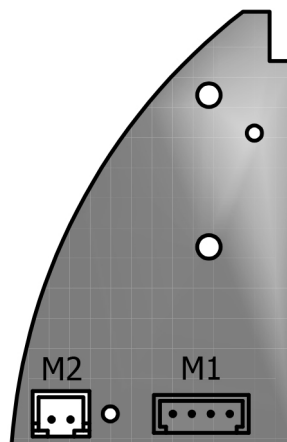
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**KEY**

- M1** Motherboard
- M2** LED strip power supply board

**21 REAR COVER LED TOPOGRAPHY**

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**KEY**

- M1** LED power supply board
- M2** Rear cover LED strip

**22 POSSIBLE PROBLEMS AND THEIR SOLUTIONS**

PROBLEM	CAUSE	SOLUTION
<ul style="list-style-type: none"> <li>• The machine does not start and the display does not light up.</li> <li>• On machines with multiple tanks, a container does not start and the corresponding display does not light up.</li> </ul>	<ul style="list-style-type: none"> <li>• Faulty display circuit board</li> <li>• Faulty transformer</li> </ul>	<ul style="list-style-type: none"> <li>• Replace the display circuit board.</li> <li>• Check that the connector is correctly connected to the power supply circuit board (M1).</li> </ul> <p>If the problem persists, check that the following voltage values are read at the transformer output (connector M1 on the circuit board):</p> <p>20 V between poles 1 and 2 10V between poles 3 and 4</p> <p>If this is not the case, replace the transformer.</p>
<ul style="list-style-type: none"> <li>• The mixer is not turning</li> <li>• Message “COV” is indicated on the display</li> <li>• Open top cover icon shown on display</li> </ul>	<ul style="list-style-type: none"> <li>• The cover is not correctly positioned on the container</li> </ul>	<ul style="list-style-type: none"> <li>• Position the cover correctly on the container.</li> </ul>
<ul style="list-style-type: none"> <li>• Message “AL02” is indicated on the display</li> </ul>	<ul style="list-style-type: none"> <li>• Product temperature alarm: the temperature of the product in the container has risen above the safe temperature of 4 °C.</li> </ul>	<ul style="list-style-type: none"> <li>• Check that the product has not become defective.</li> <li>• Hold down the H key for two seconds to clear the alarm message</li> </ul>
<ul style="list-style-type: none"> <li>• The mixer is not turning</li> <li>• Message “AL03” is indicated on the display</li> <li>• “----” message shown on the display from serial number 1084 onwards</li> </ul>	<ul style="list-style-type: none"> <li>• Software protection intervention due to excessive absorption in the geared motor.</li> </ul>	<ul style="list-style-type: none"> <li>• If the mixer has stopped, wait for it to start up again. The density adjustment will be automatically reduced by one unit.</li> <li>• Hold down the H key for two seconds to clear the alarm message.</li> </ul>
<ul style="list-style-type: none"> <li>• The machine does not start up</li> <li>• Message “AL04” is indicated on the display</li> </ul>	<ul style="list-style-type: none"> <li>• Temperature probe damaged.</li> </ul>	<ul style="list-style-type: none"> <li>• Switch off the dispenser and replace the temperature probe (see relative paragraph).</li> </ul>
<ul style="list-style-type: none"> <li>• The machine does not start up</li> <li>• Message “AL05” is indicated on the display</li> </ul>	<ul style="list-style-type: none"> <li>• Transmission error between display pcb and power pcb.</li> </ul>	<ul style="list-style-type: none"> <li>• Check that the connectors to the electronic components are correctly connected.</li> <li>• If the problem persists, replace the electronic circuit boards.</li> </ul>
<ul style="list-style-type: none"> <li>• The mixer is not turning</li> <li>• Message “AL06” is indicated on the display</li> <li>• “----” message shown on the display from serial number 1084 onwards</li> </ul>	<ul style="list-style-type: none"> <li>• Unplanned geared motor stop due to excessive product density.</li> <li>• Geared motor damaged.</li> <li>• Power transformer fault.</li> </ul>	<ul style="list-style-type: none"> <li>• If the mixer has stopped, wait for it to start up again. The density adjustment will be automatically reduced by one unit.</li> <li>• Hold down the H key for two seconds to clear the alarm message.</li> <li>• If the problem persists, check that the connectors between the motor and the power supply circuit board (M2 and M3) are correctly connected.</li> <li>• If the problem persists, check that the transformer leave the following voltage values (M1 connector of the PCB): 20 V between pins 1 and 2 10V between poles 3 and 4 Otherwise, replace the transformer.</li> <li>• If the problem persists, replace the geared motor.</li> </ul>
<ul style="list-style-type: none"> <li>• The machine does not start up</li> <li>• Message “AL07” is indicated on the display</li> </ul>	<ul style="list-style-type: none"> <li>• 24V power supply missing.</li> </ul>	<ul style="list-style-type: none"> <li>• Check that the connector to the power supply circuit board (M1) is correctly connected.</li> </ul> <p>If the problem persists, replace the transformer.</p>

PROBLEM	CAUSE	SOLUTION
<ul style="list-style-type: none"> <li>• The mixer is not turning</li> <li>• Message “AL08” is indicated on the display</li> <li>• “----” message shown on the display from serial number 1084 onwards</li> </ul>	<ul style="list-style-type: none"> <li>• Hardware protection intervention due to excessive absorption in the geared motor.</li> </ul>	<ul style="list-style-type: none"> <li>• If the mixer has stopped, wait for it to start up again. The density adjustment will be automatically reduced by one unit. Hold down the H key for two seconds to clear the alarm message.</li> </ul>
<ul style="list-style-type: none"> <li>• Mixer does not rotate</li> <li>• “AL09” message shown on the display</li> </ul>	<ul style="list-style-type: none"> <li>• Geared motor synchronism signal error (Hall probes).</li> </ul>	<ul style="list-style-type: none"> <li>• Check that the M2 connector is properly connected to the electronic power board.</li> <li>• If the problem persists, replace the geared motor.</li> <li>• If the problem persists, replace the relative electronic power board relating to the tank not in operation.</li> </ul>
<ul style="list-style-type: none"> <li>• Message “AL10” or “AL11” shown on the display</li> </ul>	<ul style="list-style-type: none"> <li>• Transmission error between master pcb and slave pcb (AL10 for slave pcb of second container, AL11 for slave pcb of third container)</li> </ul>	<ul style="list-style-type: none"> <li>• Check wirings; If necessary replace pcbs</li> </ul>
<ul style="list-style-type: none"> <li>• Message “AL12” shown on the display</li> </ul>	<ul style="list-style-type: none"> <li>• The main power voltage is not enough to guarantee the proper working of the machine</li> </ul>	<ul style="list-style-type: none"> <li>• Verify that extension cords or multiple sockets are not used to connect the machine to the power supply.</li> </ul>
<ul style="list-style-type: none"> <li>• Message “AL13” shown on the display</li> </ul>	<ul style="list-style-type: none"> <li>• System clock out of order. The machine can work but the defrost timer can't be used</li> </ul>	<ul style="list-style-type: none"> <li>• Replace display pcb</li> </ul>
<ul style="list-style-type: none"> <li>• Message “AL14” shown on the display</li> </ul>	<ul style="list-style-type: none"> <li>• Battery clock expired or out of order. The machine can work but current time is reset when the machine is powered off.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace display pcb</li> </ul>
<ul style="list-style-type: none"> <li>• Loss of beverage from the container</li> </ul>	<ul style="list-style-type: none"> <li>• The container is not correctly positioned on the drip tray</li> <li>• Container fittings are not correctly mounted</li> <li>• Container fittings are broken or worn</li> <li>• Tap piston is broken or worn</li> <li>• Tap piston is not in the closed position</li> </ul>	<ul style="list-style-type: none"> <li>• Position the container correctly on to the tray</li> <li>• Mount the fittings correctly around their own housing</li> <li>• Replace fittings</li> <li>• Replace tap piston</li> <li>• Check the tap lever or spring and replace the worn part</li> </ul>
<ul style="list-style-type: none"> <li>• The machine is cooling but is not producing ice cream</li> </ul>	<ul style="list-style-type: none"> <li>• Conservation Mode is selected instead of Ice Cream Production Mode</li> <li>• Condenser is clogged and dirty</li> <li>• Insufficient ventilation through the condenser around the machine</li> <li>• Product has not been correctly prepared</li> <li>• Gas low in the refrigerator circuit</li> </ul>	<ul style="list-style-type: none"> <li>• Select Ice Cream Production Mode by pressing the H key</li> <li>• Clean the condenser</li> <li>• Check that there is sufficient free space</li> <li>• Prepare the product in accordance with the manufacturer's instructions</li> <li>• Check for the presence of a gas leak. Once identified, seal the leak and recharge the gas (see chapters 9.3 and 9.4)</li> </ul>

**B-Cream & B-cream HD**

PROBLEM	CAUSE	SOLUTION
<p><b>•The machine is not cooling</b></p>	<ul style="list-style-type: none"> <li>• Fan motor is not functioning</li> <li>• The compressor overload cut-out has intervened</li> <li>• One or more of the compressor's electrical components are damaged (overload cut-out, relay, condensers)</li> <li>• Electronic circuit board is faulty</li> <li>• Compressor motor is not functioning (short circuit or mechanical blockage)</li> <li>• Electrovalve is not opening (coil)</li> <li>• Electrovalve is not opening (body)</li> </ul>	<ul style="list-style-type: none"> <li>• Check that the fan can turn freely. Remove any obstacles. If faulty, replace the fan motor</li> <li>• Check that the fan can turn freely. Remove any obstacles. If faulty, replace the fan motor</li> <li>• Replace the damaged electrical components</li> <li>• Replace the electronic circuit board</li> <li>• Replace the compressor (see chapter 10)</li> <li>• Replace electrovalve coil</li> <li>• Replace electrovalve body</li> </ul>
<p><b>• Only one container is not cooling (the others are functioning correctly)</b></p>	<ul style="list-style-type: none"> <li>• Electronic circuit board is faulty</li> <li>• Gas low in the refrigerator circuit</li> <li>• Electrovalve is not opening (coil)</li> <li>• Electrovalve is not opening (body)</li> </ul>	<ul style="list-style-type: none"> <li>• Replace the electronic circuit board</li> <li>• Check for the presence of a gas leak. Once identified, seal the leak and recharge the gas (see chapters 9.3. and 9.4.)</li> <li>• Replace electrovalve coil</li> <li>• Replace electrovalve body</li> </ul>
<p><b>• Only one container is cooling too much (the others are functioning correctly)</b></p>	<ul style="list-style-type: none"> <li>• The electrovalve is not closing</li> </ul>	<ul style="list-style-type: none"> <li>• Replace electrovalve body</li> </ul>