

Operating manual
CMC PRO



DIGIMESA⁺
CHOOSE THE ORIGINAL

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1. Safety instructions

- Read through this Operating manual very carefully before putting the CMC PRO into operation. Carry out all steps strictly according to the instructions.
- Take note of all instructions and displays.
- Always disconnect the power supply before opening the housing.
- The CMC PRO is protected according to Protection class IP 44. This means it has limited protection from splash water and foreign bodies can find their way into the machine.
- Make sure that the main voltage utilised matches the value specified on the type plate.

- In the following cases, the power supply must be disconnected immediately and a technician called in:
 - Water or other liquids have penetrated into the CMC PRO.
 - In spite of strict observance of all the instructions in this Operating manual, the CMC PRO is still not operating properly. Under no circumstances must you attempt to modify anything yourself or try to get things working by randomly pressing the input buttons.
 - If the housing of the CMC PRO is damaged.

2. General description

The CMC PRO controller is an electronic control and dosage system for automatic drinks and coffee machines. Up to 3 keypads (with a maximum of 6 buttons) and a 16 x 2 display can be connected. A dimmer allows you to adjust the brightness of the display. 7 x 230V AC outputs permit the connection of up to 6 electric valves and a pump. 5 inputs are provided for the connection of 3 flow sensors and 2 filling level sensors. The control unit is powered from the 230V AC mains network and is equipped with a fuse.

Interfaces: 3 x keypad connections, 1 x LCD connection, 1 x serial port, 1 x programming microcontroller.

3. Description of operation

3.1 Dispensing portions of coffee

If all the LEDs on the keypad are illuminated, the automatic coffee machine is on standby (i.e. nothing is being dispensed). On pressing one of the four portion buttons (Figure 1, buttons Nos. 1 - 4), both the output valve and the pump are energised. The LED corresponding to the portion selected is illuminated throughout the entire dispensing period. The portion selected is displayed on the LCD. Dispensing is automatically stopped once the pre-defined quantity has been supplied, or the process can be interrupted manually by pressing any of the portioning buttons (Figure 1) of the particular station.

In the case of automatic coffee machines with multiple dispensing stations, the simultaneous dispensing of coffee at all of the stations is possible.

➤ Please see Chapter 4.1 for setting the portion quantities

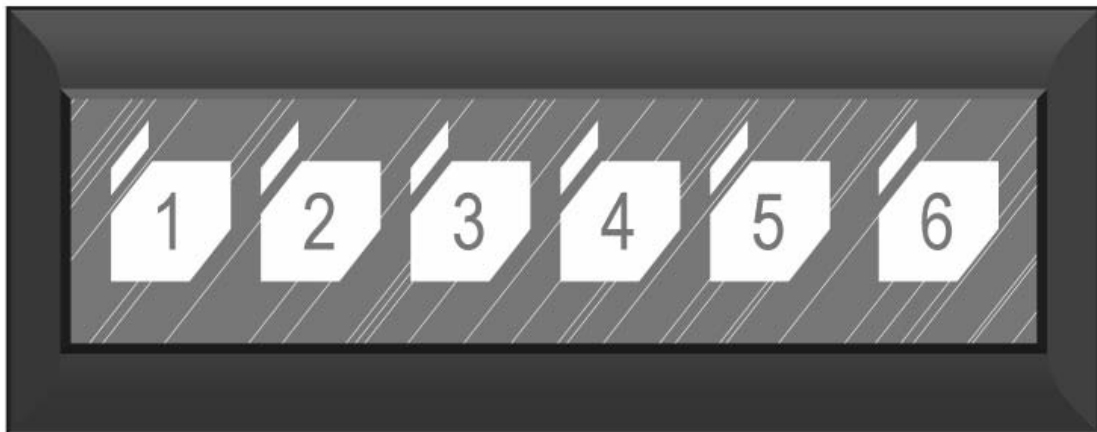


Figure 1

3.2 Dispensing unportioned coffee

If the automatic coffee machine is on standby, the unportioned dispensing of coffee can be started by pressing button No. 5 (Figure 1). The LED on the relevant button is illuminated for the entire dispensing period.

Dispensing can be interrupted by pressing any button or is automatically ended if the appropriate maximum product quantity has been reached. The same thing happens on reaching the dispensing time-out.

3.3 Pre-infusion

The CMC PRO coffee machine controller is equipped with a pre-infusion function.

On starting the portion, the electric valve belonging to the station switches off after a time period T1 and remains switched off for time period T2. Once time period T2 has elapsed, the electric valve is switched on again until dispensing is finished.

The pump remains switched on during the entire dispensing period, as well as for the entire duration of the pre-infusion process.

- Please see Chapter 4.2 for settings for the pre-infusion function

3.4 Dispensing TEA

Tea can be dispensed starting from standby mode or simultaneously with the dispensing of a portion of coffee. The time period over which the electric valve is active is programmable. Throughout the entire tea dispensing process, the LED of the relevant button is illuminated. Dispensing can be stopped at any time by pressing the Tea button (Figure 1, button No. 6) on the dispensing station. If the automatic machine has been programmed to have two tea dispensers, one dispensing device is controlled via the keypad of the first station and the other via the keypad of the second or third station.

On the other hand, if the automatic machine has been programmed so that only one dispensing device is used, it can be controlled using the keypads of all 3 stations.

- Please see Chapter 4.1 for setting the portion quantities
- Please see Chapter 4.2 for setting up the tea dispensing devices

3.5 Automatic cleaning of stations

You can clean the coffee stations by using the cleaning cycle. This can take place individually for all the stations on the machine. To switch on the cleaning cycle for one of the stations on the machine, all you need to do is press buttons Nos. 1 and 5 (Figure 1) simultaneously on the appropriate keypad whilst the station is in standby mode. The electric valve of the selected station and the pump will be switched on simultaneously and 5 cycles will be run (7 seconds on, 3 seconds off). Station cleaning can be interrupted at any time by pressing any button (Figure 1) of the station being cleaned.

Dispensing is still possible at the same time as cleaning one of the stations on the machine by activating one of the other stations. Tea can also be dispensed simultaneously with the cleaning of one or more stations.

3.6 Checking and topping up the water in the boiler

The water level in the boiler is checked automatically.

When you switch the machine on, the electronic control system determines the status of the filling level sensor with an initial delay of 6 seconds. If the water level is low, the electric filling valve and pump are energised until the correct water level, which is monitored by the filling level sensor, is reached in the boiler. Refilling is shown on the LCD display. Should the refilling process extend beyond the time-out set in Service mode, an alarm is activated to indicate that the boiler is completely full. This alarm is indicated on the LCD display and by flashing LEDs. Furthermore, the functionality of the keypad and output valves is blocked.

During normal operation of the machine, switching on and off takes place with a delay of 3 seconds after detection of the filling level.

- Please see Chapter 4.2 for setting the time-out for boiler filling

3.7 Displaying and resetting the quantity dispensed (only possible with display connected)

To call up the menu displaying quantity dispensed/litres, you must press button No. 5 (Figure 1) on the keypad of station 1 for at least 10 seconds. In the mode to display quantity dispensed/litres, the following functions are assigned to the buttons on station 1:

- Button No. 1: the parameter displayed is increased
- Button No. 2: the parameter displayed is decreased
- Button No. 3: the meter is reset to zero (in combination with button No. 4)
- Button No. 4: the meter is reset to zero (in combination with button No. 3)
- Button No. 5: quit the screen mask for displaying quantity dispensed/litres
- Button No. 6 (if available): button deactivated

The meters shown on the quantity dispensed display can be reset to zero. On the other hand, it is not possible to set the total of all dispensers or the sum of litres dispensed to zero.

To set meters to zero:

1. Call up the mode to display quantity dispensed/litres.
2. Simultaneously press buttons Nos. 3 and 4 (Figure 1) for station 1 and hold them down for at least 3 seconds.

3.8 Menu structure of quantity dispensed meter

LCD display	Full name/detailed description
General total	Grand total of all quantities dispensed [0 - 16777215]
Espresso Station 1	Total quantity dispensed Button No. 1 – Station 1 [0 - 16777215]
2 Espresso Station 1	Total quantity dispensed Button No. 2 – Station 1 [0 - 16777215]
Coffee Station 1	Total quantity dispensed Button No. 3 – Station 1 [0 - 16777215]
2 Coffee Station 1	Total quantity dispensed Button No. 4 – Station 1 [0 - 16777215]
Unportioned Station 1	Total quantity dispensed Button No. 5 – Station 1 [0 - 16777215]
Espresso Station 2	Total quantity dispensed Button No. 1 – Station 2 [0 - 16777215]
2 Espresso Station 2	Total quantity dispensed Button No. 2 – Station 2 [0 - 16777215]
Coffee Station 2	Total quantity dispensed Button No. 3 – Station 2 [0 - 16777215]
2 Coffee Station 2	Total quantity dispensed Button No. 4 – Station 2 [0 - 16777215]
Unportioned Station 2	Total quantity dispensed Button No. 5 – Station 2 [0 - 16777215]
Espresso Station 3	Total quantity dispensed Button No. 1 – Station 3 [0 - 16777215]
2 Espresso Station 3	Total quantity dispensed Button No. 2 – Station 3 [0 - 16777215]
Coffee Station 3	Total quantity dispensed Button No. 3 – Station 3 [0 - 16777215]
2 Coffee Station 3	Total quantity dispensed Button No. 4 – Station 3 [0 - 16777215]
Unportioned Station 3	Total quantity dispensed Button No. 5 – Station 3 [0 - 16777215]
Total tea	Total tea dispensed [0 - 16777215]
Grand total in litres	Total litres counted [0 - 16777215]

3.9 Filter monitoring with the CMC PRO

As soon as the value of litres counted has reached the maximum filter capacity, it is indicated on the LCD display that the water filter should be changed. To reset the litre counter of the filter monitoring device to zero, you must press buttons Nos. 3 and 4 (Figure 1) of station 1 simultaneously. You will see that the litre counter has been reset to zero on the LCD display. Then the machine switches to standby mode and the filter change display disappears.

- Please see Chapter 4.2 regarding adjustment of filter size

4. Programming

4.1 Programming portion size

Using Programming mode, you can save various quantities for coffee portions. In order to switch to Programming mode, button No. 5 (Figure 1) of one of the keypads on the machine must be held down for at least 5 seconds. The changeover to Programming mode is displayed by the lighting up of all LEDs on the keypad, by the message „Programming“ on the LCD display and the flashing of the LED (of all available keypads, if programming has been carried out using the keypad of station 1) of button No. 5 (Figure 1) on the station being programmed.

4.1.1 Sequence of events of portion programming

On pressing one of the buttons for the portioning to be programmed, the LED for the portion selected remains illuminated, as does the programming LED of button No. 5 (Figure 1). On programming the coffee quantities, the electric valve for the station and the pump are activated. On programming the tea quantity, only the electric valve for tea is activated. On reaching the required quantity, one of the „Coffee“ buttons of the station being programmed is pressed. Dispensing is discontinued, in that the pump and electric valve for the station are deactivated. The number of pulses of the volumetric meter is saved, the LED of the programmed quantity is extinguished and the other LEDs remain illuminated. When programming the tea quantity, on reaching the required quantity, the Tea button of the station being programmed is pressed, which means dispensing is discontinued and the electric valve is deactivated. The LED appropriate to the programmed tea quantity is extinguished and the remaining LEDs stay illuminated. The LEDs relevant to the quantities already programmed remain extinguished, in case you want to switch to Programming mode. In any event, reprogramming is possible. This is not the case if you have switched to Programming mode after dosing has been carried out.

4.1.2 Features of Programming mode

Every station can be programmed according to the instructions given above. To do this, you have to switch to Programming mode using the keypad belonging to the selected station. The quantities programmed for the first station also apply to the remaining stations.

As long as the „pre-infusion“ function is active, it is activated by the dosage just programmed, so you have to wait until this has finished before dispensing is stopped. To quit portion programming before the time-out expires, all you need to do is press button No. 5 (Figure 1) of the station on which programming is being performed.

Important: during the programming of a station, the functions of all other stations are blocked.

The programming instructions given above also apply for programming the tea quantity. The programming of tea and coffee quantities can take place simultaneously on the same station.

4.2 Service Programming (only possible with display connected)

In Service Programming mode, several parameters or special functions can be changed. It is only possible to call up Service Programming mode and its associated operations from the keypad of station 1. This mode is called up by simultaneously pressing buttons Nos. 1 and 5 (Figure 1) and holding them down for at least 3 seconds. The LEDs belonging to the buttons that can be used (LEDs of buttons Nos. 1, 2 and 5 [Figure 1]) are illuminated throughout the entire duration of programming, the LED of button 3 (Figure 1) only during modification of the „User name“.

In Service Programming mode, the buttons have the following functions:

- Button No. 1: Counting up alphanumeric values or jumping between options
- Button No. 2: Counting down alphanumeric values or jumping between options
- Button No. 3: Confirmation of alphanumeric value and jumping to next character during „User“ programming
- Button No. 4: Button deactivated
- Button No. 5: Jump to next parameter (during „User“ programming, the modified character is saved and you switch to the next parameter, „time-out“)
- Button No. 6 (if available): button deactivated

4.2.1 Menu structure of Service Programming

LCD display	Full name/detailed description	Permissible values	Factory settings
Language	Language set for words appearing on the LCD display	Italian/English/French/German/Polish/Spanish	Italian
User	User name	16 alphanumeric characters	“ ”
Tea/safety relay	Tea or safety relay	0000 – 0001	0000
Time-out	Time-out threshold: boiler filling time in seconds (into 10-sec. steps)	30 – 250	120
Filter	Number of litres that can be filtered by the machine (in 50-litre steps)	0 – 5000	0 = OFF
KeyB	Type of keypad used by the machine	esp-cof-2es-2cof / esp-2es-cof-2cof	esp-2es-cof-2cof
On – 1	Button No. 1 - time electric valve turned on at station during pre-infusion process (in 0.1-sec. steps)	0,0 - 5,5	0,0
On – 2	Button No. 2 - time electric valve turned on at station during pre-infusion process (in 0.1-sec. steps)	0,0 – 5,5	0,0
On – 3	Button No. 3 - time electric valve turned on at station during pre-infusion process (in 0.1-sec. steps)	0,0 – 5,5	0,0
On – 4	Button No. 4 - time electric valve turned on at station during pre-infusion process (in 0.1-sec. steps)	0,0 – 5,5	0,0
Off – 1	Button No. 1 - time electric valve turned off at station during pre-infusion process (in 0.1-sec. steps)	0,0 – 5,5	0,0
Off – 2	Button No. 2 - time electric valve turned off at station during pre-infusion process (in 0.1-sec. steps)	0,0 – 5,5	0,0
Off – 3	Button No. 3 - time electric valve turned off at station during pre-infusion process (in 0.1-sec. steps)	0,0 – 5,5	0,0
Off – 4	Button No. 4 - time electric valve turned off at station during pre-infusion process (in 0.1-sec. steps)	0,0 – 5,5	0,0
Pre-inf	Activated/deactivated pre-infusion function	0000 – 0001	0000

The output EV7 can be controlled differently with the parameter “tea/safety relay”. If the parameter is set to the „Safety relay” function, the output EV7 can be controlled using the water level measured by the safety sensor in the boiler as a basis, whilst the tea dispensing process is controlled by output EV6 in the case of all stations. If the parameter is set to the „Tea relay” function, output EV6 is controlled for dispensing tea from station 1, whilst output EV7 is controlled for dispensing tea from stations 2 and 3. The safety sensor is deactivated.

A change in the type of keypad used (esp-cof-2es-2cof/esp-2es-cof-2cof) only means a change to what is shown on the LCD display, but not to the programmed quantities.

Service Programming mode ends with the activation/deactivation option of the pre-infusion function. If you press button No. 5 (Figure 1) once more, the system goes into standby mode and closes Service Programming mode.

4.3 Factory settings

If you press buttons Nos. 4 and 5 (Figure 1) of station 1 during start-up of the control system, the saved parameters are reset (in other words, the parameters are put back to the original factory settings). By doing this, the factory settings for beverage quantities are reset and all the meters for quantities to be dispensed and water consumption are set to zero.

After pressing buttons Nos. 4 and 5 (Figure 1) of station 1, a message appears on the LCD display stating that the card parameters are being reset. Then the machine is put into "Off" status, which means the LEDs on all the keypads are extinguished (as long as an LCD display is provided, the status of the card is displayed as „Off“). To put the machine into normal operating mode, press button No. 5 (Figure 1) of station 1. This return to normal operating mode is shown both on the LCD display and by all the LEDs on the keypads lighting up.

5. Troubleshooting

Display	Name/Code	Meaning	Correction
<ul style="list-style-type: none"> - All LEDs are flashing - „Alarm Time-out H2O“ is shown on the LCD display 	Water level too low	The filling level sensor detects that the water level is too low, also after the time-out for boiler refilling has been reached	Turn the machine off and back on again
<ul style="list-style-type: none"> - The LED relevant to the selected portion is flashing - „Alarm Flowmeter“ appears on the LCD display 	No pulses from volumetric meter	During a coffee cycle, the microcontroller does not measure any pulses from the volumetric meter	After 1 minute without pulses, the current portioning is stopped and the machine put into standby mode
<ul style="list-style-type: none"> - A message shown on the LCD display indicates that the filter should be replaced 	Filter quantity exceeded	The litre meter exceeds the filter quantity set in the Service menu	Turn the machine off and back on again and reset the litre meter to zero
<ul style="list-style-type: none"> - All of the LEDs except for button No. 5 are flashing - „EEPROM Alarm“ appears on the LCD display 	EEPROM alarm	The software version installed varies from the data saved on the EEPROM	After switching on, press buttons Nos. 4 and 5 of station 1, wait for reset, turn the machine off and back on again

6. Technical specifications

6.1 Boundary conditions for correct functioning of card

Symbol	Parameter	Value	Unit
T _A	Ambient operating temperature	+0 / +50	°C
T _S	Storage temperature	-20 / +60	°C
U _R	Relative air humidity (non-condensing)	90	(%)
V _A	Supply voltage of card	230 ± 10%	V _{AC}

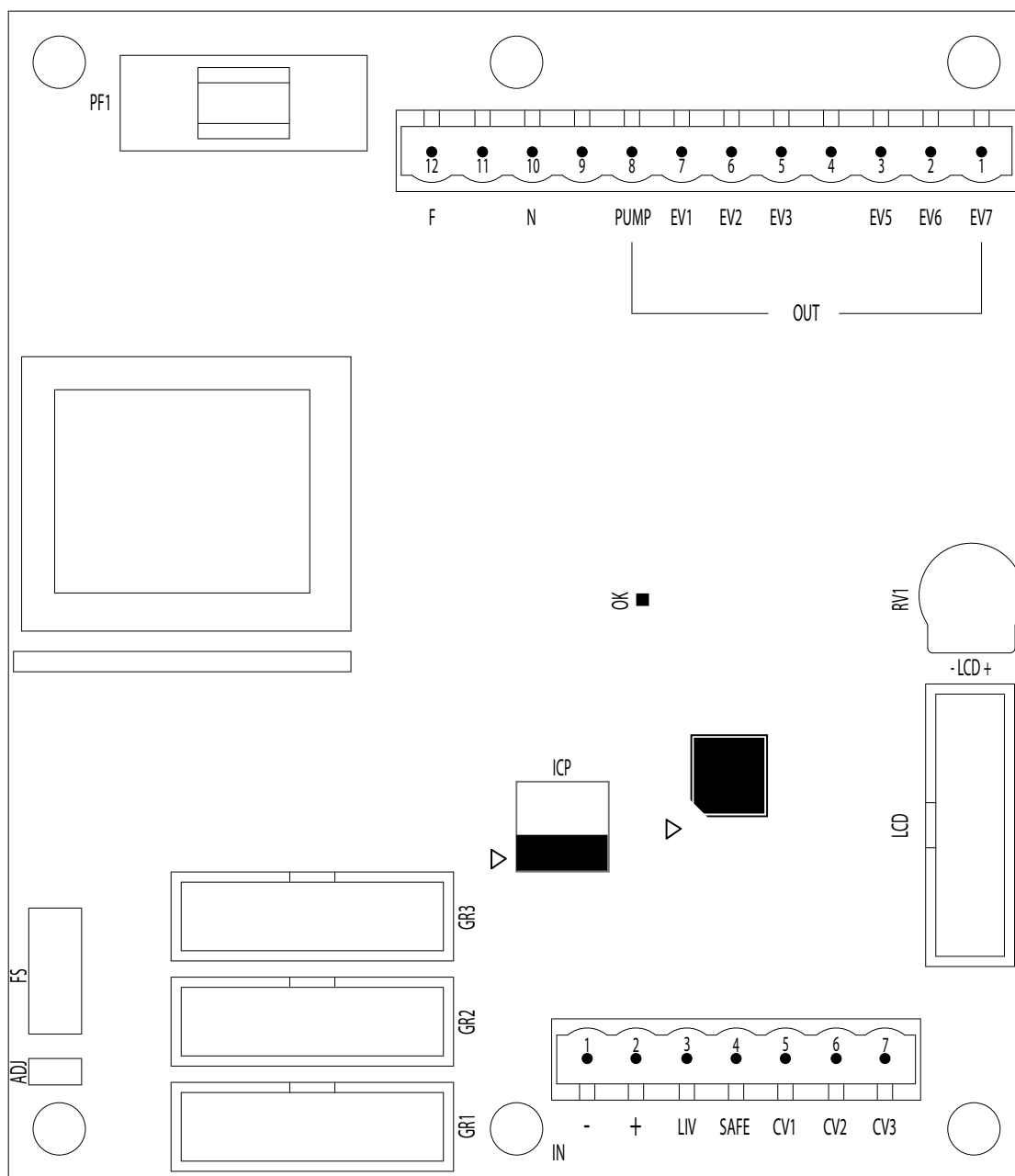
Plug **OUT**: Limit values for outputs (T_A = 25°C)

Plug	Pin	Parameter	Value	Unit	Remarks
OUT	PIN 1	Max. current	0.1	A	Pins 1, 2, 3, 5, 6 and 7 (max. current at individual pins: 0.1 A) supply the electric valves. Pin 8 (max. current: 1 A) supplies the pump.
		Nominal voltage	230	V _{AC}	
	PIN 2	Max. current	0.1	A	
		Nominal voltage	230	V _{AC}	
	PIN 3	Max. current	0.1	A	
		Nominal voltage	230	V _{AC}	
	PIN 5	Max. current	0.1	A	
		Nominal voltage	230	V _{AC}	
	PIN 6	Max. current	0.1	A	
		Nominal voltage	230	V _{AC}	
	PIN 7	Max. current	0.1	A	
		Nominal voltage	230	V _{AC}	
	PIN 8	Max. current	1	A	
		Nominal voltage	230	V _{AC}	

Plug	Pin	Parameter	Value	Unit	Remarks
OUT	PIN 4	Max. current	N.C.	A	Pins 12 and 9/10 (max. current: 4 A) correspond to the phase and neutral conductor of the supply from the 230 V AC mains network. The supply current is also limited by the fuse: if using a 3.15 A fuse, the max. current at Pins 12 and 9/10 is reduced from 4 to 3.15 A.
		Nominal voltage	N.C.	V _{AC}	
	PIN 9	Max. current	4	A	
		Nominal voltage	230	V _{AC}	
	PIN 10	Max. current	4	A	
		Nominal voltage	230	V _{AC}	
	PIN 11	Max. current	N.C.	A	
		Nominal voltage	N.C.	V _{AC}	
	PIN 12	Max. current	4	A	
		Nominal voltage	230	V _{AC}	

Plug **IN**: Limit values for power supply sources ($T_A = 25^\circ\text{C}$)

Plug	Pin	Parameter	Value	Unit	Remarks
IN	PIN 2	Max. current	100	mA	Pin 2 (max. current: 100 mA) is provided to supply power to the three flowmeters connected to Pins 5, 6 and 7
		Nominal voltage	5	VDC	



7. Key

F/S - 10-pin plug (master) for CS vertical

Plug for communication interfaces, flash/serial

ICP - 6-pin comb connector (master) for CS vertical

Plug for programming microcontroller

IN - 7-pin snap-on connector (master) for CS vertical

PIN	Description	Designation
1	GND	—
2	+ 5 VDC (OUT)	+
3	Filling level sensor	LIV
4	Safety sensor	SAFE
5	Flowmeter 1 (volumetric meter station 1)	CV1
6	Flowmeter 2 (volumetric meter station 2)	CV2
7	Flowmeter 3 (volumetric meter station 3)	CV3

OUT - 12-pin snap-on connector (master) for CS vertical

PIN	Description	Designation
1	Electric valve tea2/safety (single phase 230 V AC)	EV7
2	Electric valve tea1 (single phase 230 V AC)	EV6
3	Boiler filling (single phase 230 V AC)	EV5
4	N.C.	
5	Electric valve coffee station 3 (single phase 230 V AC)	EV3
6	Electric valve coffee station 2 (single phase 230 V AC)	EV2
7	Electric valve coffee station 1 (single phase 230 V AC)	EV1
8	Pump (single phase 230 V AC)	PUMP
9	Neutral conductor power supply (230 V AC)	
10	Neutral conductor power supply (230 V AC)	N
11		
12	Neutral conductor power supply (230 V AC)	F

LCD - 16-pin D-plug (master) for CS vertical

Plug for 16 × 2 LCD display

PF1 - Horizontal fuse-holder

Fuse holder for 3.15 A fuse (time-lag fuse)

ADJ - Plug for jumper

Plug for jumper to select operating mode (SENSIBILITY)
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RV1 - Dimmer

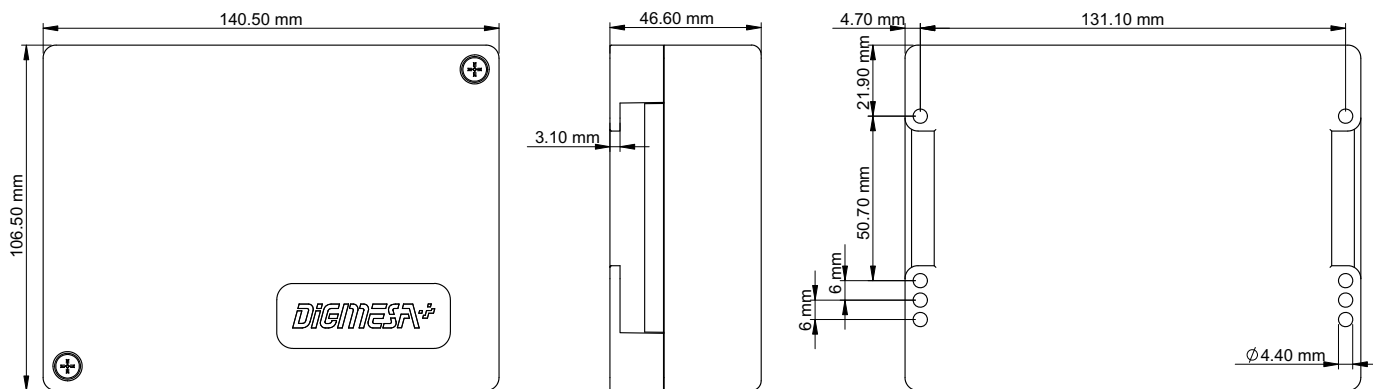
Dimmer for setting brightness of LCD display
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GR1 / GR2 / GR3 - 16-pin D-plug (master) for CS vertical

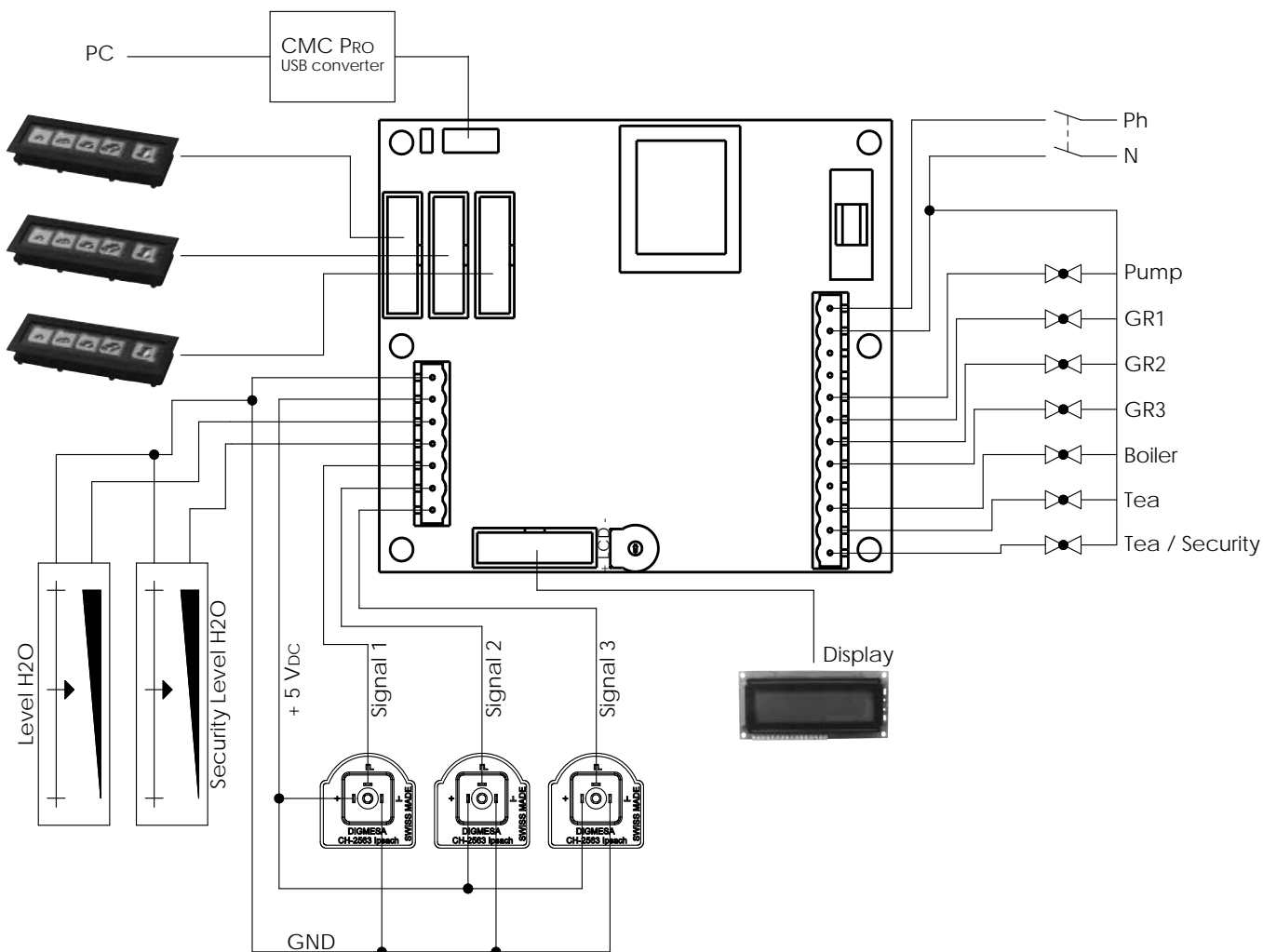
PIN	Designation	Description
1	LED 1 "ES" (keypad 1 / 2 / 3)	Display, showing that espresso is being dispensed
2	Button 1 „ES" (keypad 1 / 2 / 3)	Command to dispense espresso
3	LED 2 "2ES" (keypad 1 / 2 / 3)	Display, showing that 2x espressos are being dispensed
4	Button 2 „2ES" (keypad 1 / 2 / 3)	Command to dispense 2x espressos
5	LED 3 "COF" (keypad 1 / 2 / 3)	Display, showing that coffee is being dispensed
6	Button 3 "COF" (keypad 1 / 2 / 3)	Command to dispense coffee
7	LED 4 "2COF" (keypad 1 / 2 / 3)	Display, showing that 2x coffees are being dispensed
8	Button 4 "2COF" (keypad 1 / 2 / 3)	Command to dispense 2x coffees
9	LED 5 "CONT" (keypad 1 / 2 / 3)	Display, showing that unportioned coffee is being dispensed
10	Button 5 "CONT" (keypad 1 / 2 / 3)	Command to dispense unportioned coffee
11	Cancel LED 1, 2, 3, 4 and 6 (keypad 1 / 2 / 3)	-
12	Cancel buttons 1, 2, 3, 4 and 6 (keypad 1 / 2 / 3)	-
13	Cancel LED 5 (keypad 1 / 2 / 3)	-
14	Cancel button 5 (keypad 1 / 2 / 3)	-
15	LED 6 "TEA" (keypad 1 / 2 / 3)	Display, showing that tea is being dispensed
16	Button 6 „TEA" (keypad 1 / 2 / 3)	Command to dispense tea

8. Dimensions

Housing material ABS UL-95

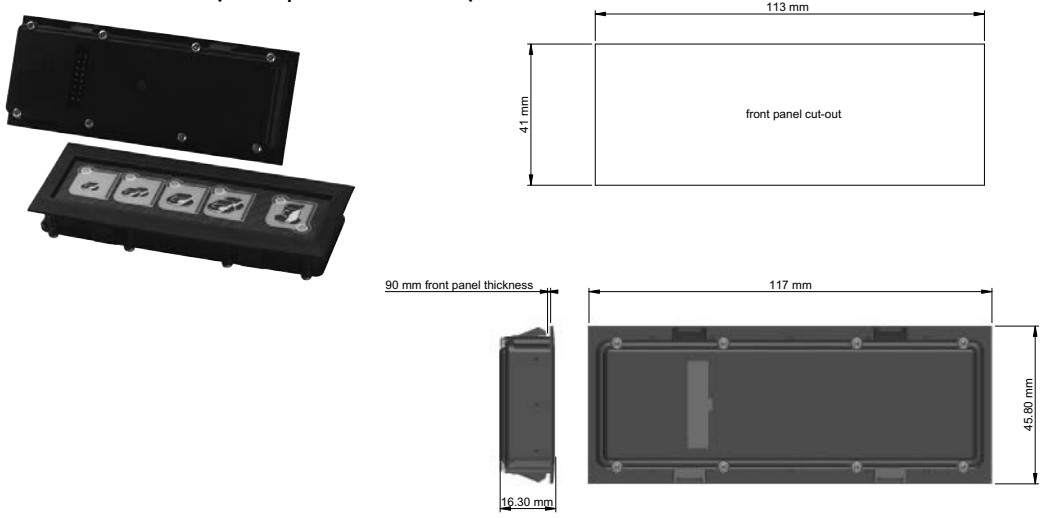


9 Connection diagram

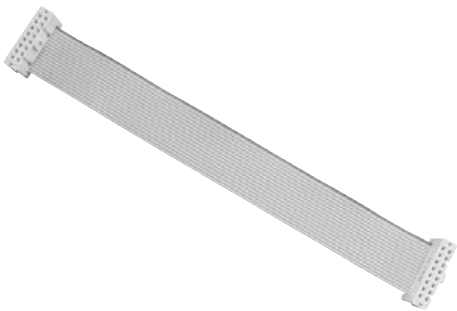


10. Accessories

CMC PRO keypad # 924-2000/00001, front frame keypad with 5 buttons and LED display. Easy installation using latch mechanism (front panel thickness).



CMC PRO keypad cable #940-2000/00100
1 metre ribbon cable CMC PRO keypad



CMC PRO USB cable #940-2000/00001
2 metres USB data cable CMC PRO - PC



CMC PRO Display #920-2000/00001
16 x 2 display including 1 metre connecting cable

