

## Operating instructions Multifunction controller

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## Introduction

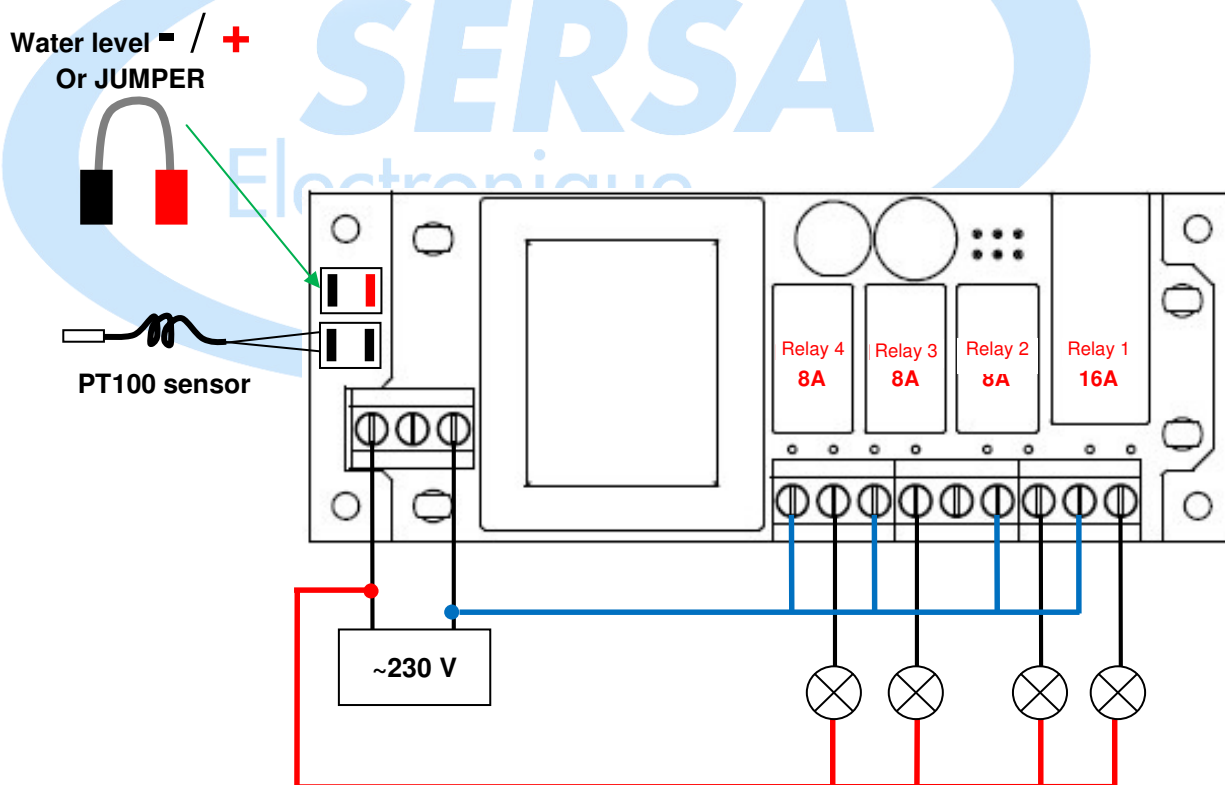
The purpose of this document is to define the complete performance of the software, which is developed for the multifunction controller.

## 1 - Characteristics

This software has the following characteristics:

- 1 PT100 input:
  - Range of operation : -50°-300°C
  - Useful range: -20°-110°C
- 1 input for "Water level"
- 3 outputs on 8 A contact
- 1 output on 16 A contact
- 1 3-digit display
- 4 buttons
- 2 LED
- Power supply: 230 Vac

## 2 - Connection scheme

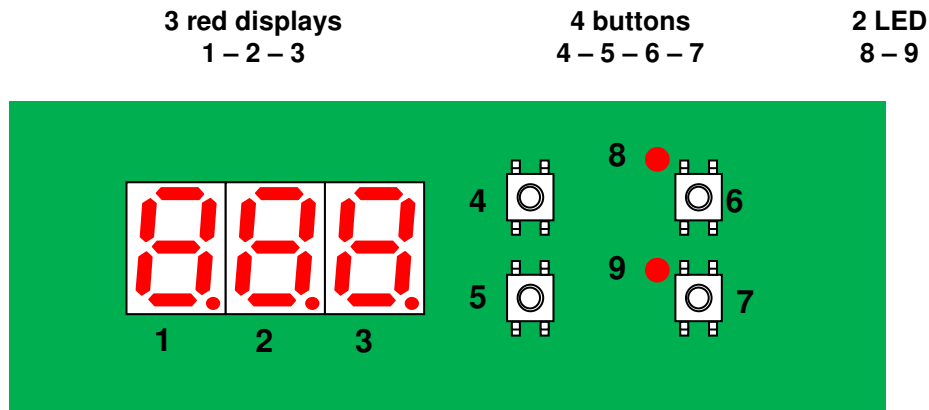


- Relay N°. 1 controls REGULATION.
- Relay N°. 2 controls the LIGHTING output.
- Relay N°. 3 controls the ELECTRIC VALVE for Water filling.
- Relay N°. 4 controls VENTILATION.

## 3 - Functions

There are different operating modes to fit your different machines. A combination of buttons will allow you to select the desired operating mode.

In the rest of the document and in order to avoid any ambiguities, a number should be assigned to each element of front.



Abbreviations:

- $T_{mes}$  : Temperature that is measured by the PT100 sensor.
- $T_{cons}$  : Temperature Set

### 3.1 Start-up

Pushing button N°. 6 starts the controller: ON

LED N°. 8 is on.

Pushing again button N°. 6 stops the controller: OFF

LED N°. 8 is off.

When the board is switched on, the display shows for 2 seconds:

- On display N°. 1, the program that is selected from 1 to 12
- On display N°. 2, the operating mode
  - 1: Heating regulation
  - 2: Cooling regulation
  - 3: Bain Marie
  - 4: Power-dosing unit (Cyclic Ratio)
- On display N°. 3, the software version

Example: 841

- Program N°. 8,
- Power-dosing unit operating mode,
- Software version N°. 1.

Warning: Even if the controller is OFF, it is always energized.

## 3.2 General

### 3.2.1 Ventilation

The VENTILATION output follows the ON/OFF status of the controller.  
When the controller is ON, relay N°. 4 is activated.  
When the controller is OFF, relay N°. 4 is not activated.

### 3.2.2 Lighting

Button N°. 7 activates or does not activate the LIGHTING.  
Pushing button N°. 7 activates relay N°. 2.  
LED N°. 9 is on.  
Pushing again button N°. 7 deactivates relay N°. 2.  
LED N°. 9 is off.

The status of this output is not saved after a power failure.

### 3.2.3 Display

- Default display of the measured temperature,
- Display of the Set value if pushing buttons N°. 4 or 5,
- Display « --- » if  $T_{mes}$  is less than  $-20^{\circ}\text{C}$ ,
- Display « --- » if  $T_{mes}$  is greater than  $300^{\circ}\text{C}$ ,
- The unit point follows the status of relay N°. 1.

### 3.2.4 Management of failures

Stop of relay N°. 1 and display « --- »

- If  $T_{mes}$  is less than  $-20^{\circ}\text{C}$  or greater than  $300^{\circ}\text{C}$ .
- If PT100 is not connected
- If PT100 is short-circuited.

## 3.3 HEATING mode

### 3.3.1 Type of operation

Relay N°. 1 is active:

- if  $T_{mes} \leq T_{cons}$
- if  $T_{mes} < (T_{cons} - \text{hysteresis})$

Relay N°. 1 is inactive:

- if  $T_{mes} > T_{cons}$

$\Delta T$  hysteresis:  $2^{\circ}\text{C}$

### 3.3.2 Parameters (see §6)

- Set temperature Minimum
- Set temperature Maximum
- Set temperature by Default

### 3.3.3 Management of buttons

Buttons N°. 4 and 5: Pushing once displays the Set value.

If you continue to push, you may change the Set value between the minimum and maximum values.

## 3.4 COOLING mode

### 3.4.1 Type of operation

#### Cooling regulation:

Relay N° 1 is active:

- if  $T_{mes} \geq T_{cons}$
- if  $T_{mes} > (T_{cons} + \text{hysteresis})$

Relay N° 1 is inactive:

- if  $T_{mes} < T_{cons}$

$\Delta T$  hysteresis: 2°C

#### Defrost:

Defrost cycles are programmed.

Regulation is deactivated during this period.

Two parameters define these cycles:

- The period between 2 defrosts
- Defrost timespan

### 3.4.2 Parameters (see §6)

- Set temperature Minimum
- Set temperature Maximum
- Set temperature by Default
- Time between 2 defrosts
- Defrost times

### 3.4.3 Management of buttons

Pushing once buttons N° 4 or 5 displays the Set value. If you continue to push, you may change the Set value between the minimum and maximum values.

## 3.5 POWER-DOSING UNIT mode

### 3.5.1 Type of operation

Proportional control:

- Relay N° 1 is activated during  $T_{on}$ .
- Relay N° 1 is deactivated during  $T_{off}$ .

Example: On a cycle time of 330 seconds, if the heating percentage (Set Value) is 40%,  $T_{on}$  is equal to 132 seconds and  $T_{off}$  is equal to 198 seconds.

No failures are managed.

It is not necessary to connect a temperature sensor.

Display of the heating percentage in 0 and 100% in steps of 10%

### 3.5.2 Parameters (see §6)

- Total cycle time

### 3.5.3 Management of buttons

Pushing once buttons N° 4 or 5 displays the Set value. If you continue to push, you may change the Set value between 0 and 100% in steps of 10%.

## 3.6 BAIN-MARIE mode

### 3.6.1 Type of operation

The operation is the same as that of the heating regulation.  
But this regulation is active only if the water level is reached.

### 3.6.2 Management of water level

- As long as the water level is not reached, the control relay N°. 3 of the electric valve is controlled and the control relay N°. 1 is switched off.
- When this level is reached for more than 10 s, the filling is stopped and the regulation is allowed.
- When the level is not detected for more than 3 s, the filling is reactivated and the regulation is again stopped.
- If the water level is shunted, it is deemed as reached and the relay N°. 3 of the electric valve is not activated.

### 3.6.3 Parameters (see §6)

- Set temperature N°. 1
- Set temperature N°. 2
- Set temperature N°. 3
- Set temperature N°. 4

### 3.6.4 Management of buttons

Pushing once buttons 4 or 5 displays the Set value. If you continue to push, you may change the Set value between 1 and 4.

## 3.7 BAIN-MARIE WITH AIR mode

### 3.7.1 Type of operation

The operation is the same as that of the Main-Marie with water.  
The water level should be shunted, it is deemed as reached and the relay N°. 3 of the electric valve is not activated.

## 4 - Setting

For each operating mode, the boards should be delivered with the corresponding set parameters according to your requirements.

Several parameters are available:

1. Program selection (1 to 12),
2. Automatic restart after a power failure,
3. The temperature offset,

The Setting mode is activated by simultaneously pushing buttons N°. 5 and 6 when the power is turned on.

If no action is performed for more than one minute, the system is reset and returns to normal mode.

During the Setting phase, all the outputs are deactivated.

### 4.1 Program selection

The display shows the current program in the form **P01** to **P12**.

Pushing buttons N°. 4 or 5 allows you to modify the selected program.

Any modification of program returns to the default Set value.

The next parameter is set by pushing the button N°. 6.

### 4.2 Automatic restart

This function determines the performance of controller after a power failure.

If the device is OFF before a power failure, it will always reset to the OFF status when the power supply returns.

If the device is ON before a power failure, this parameter defines its state when the power supply returns.

The display shows **On** or **Off**.

Pushing buttons N°. 4 or 5 allows you to modify the value.

The next parameter is set by pushing the button N°. 6.

### 4.3 Setting of the temperature offset

The display shows the measured temperature.

Pushing buttons N°. 4 or 5 allows you to modify the offset value over a range of +/- 10°C.

Attention, the boards are calibrated at the factory.

The next parameter is set by pushing the button N°. 6.

## 5 - Available programs

### 5.1 HEATING programs

Program N°.	Minimum Set value	Maximum Set value
1	50°	110°
7	0°	110°
11	-20°	110°

### 5.2 COOLING programs

Program N°.	Minimum Set value	Maximum Set value	Period between 2 Defrosts	Defrost Time
2	-5°	10°	6 hours	30 minutes
8	-20°	30°	6 hours	30 minutes
12	-20°	30°		

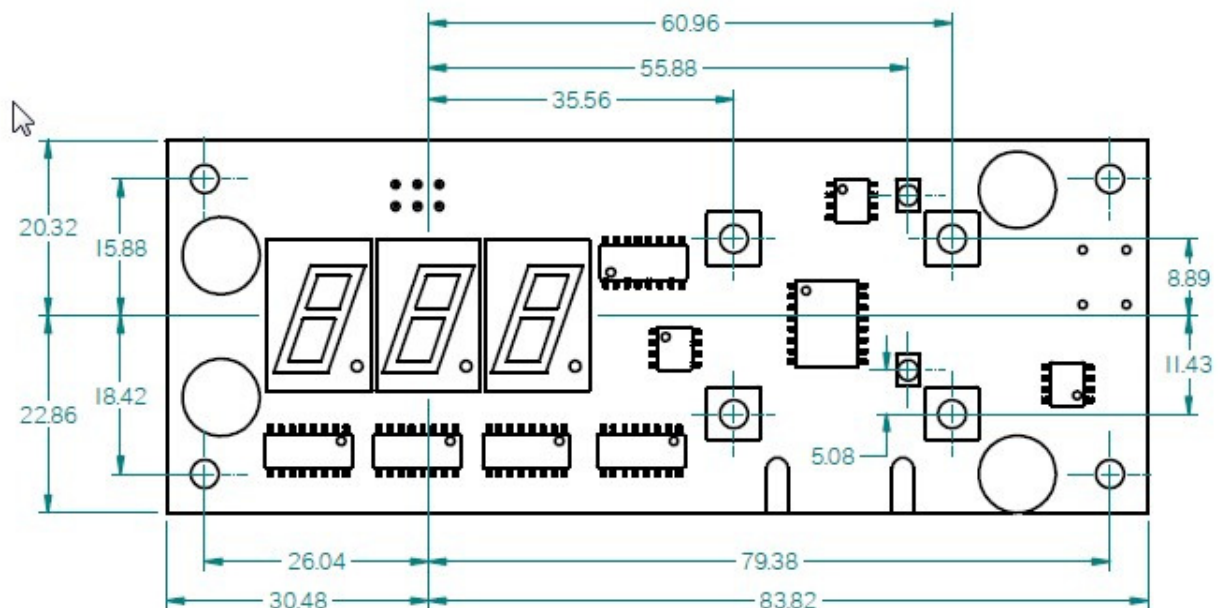
### 5.3 DOSING DEVICE programs

Program N°.	Cycle time	Minimum Set value	Maximum Set value
5	165 seconds	0%	100%
6	330 seconds	0%	100%
10	600 seconds	0%	100%

### 5.4 BAIN-MARIE programs

Program N°.	Set value N°. 1	Set value N°. 2	Set value N°. 3	Set value N°. 4
3	65°	75°	85°	95°
4	80°	90°	100°	110°
9	50°	60°	70°	80°

## 6 - Mechanical schemes



Cutting for 7-segment displays, 40x20 over crayon N°. 1

Holes for push buttons,  $\Phi$  10

Holes for LEDs,  $\Phi$  4

Holes for fasteners,  $\Phi$  3.3