



MT-519R_λ

DIGITAL TEMPERATURE CONTROLLER WITH TWO INDEPENDENT STAGES

Ver.01



MT519R01-02T-12483

1 - DESCRIPTION

MT519R_λ is a digital controller with two independent thermostats allowing functioning in two different rooms. In addition, the two thermostat outputs can be configured as cyclic timers. One alarm output can be linked to one of the thermostats.

2 - APPLICATION

- Boilers
- Ovens
- Heaters
- Freezers
- Chambers
- Hot/cold displays

3 - TECHNICAL SPECIFICATIONS

- **Power supply:** MT-519Ri - 115 or 230 Vac ±10%(50/60 Hz)
MT-519RiL - 12 or 24 Vac/dc
 - **Control temperature:** NTC: -50 to 105°C(*) (with resolution of 0.1°C between -10 and 100°C and 1°C in the rest of the range)
-58 to 221°F(*) (with resolution of 1°F in all range)
 - **Maximum current per output:** **OUT1** and **OUT2:** (NA) - 5(3)A/250Vac 1/8HP
ALRM (NF) - 3A/250Vac resistive load
 - **Dimensions:** 71 x 28 x 71 mm
 - **Operating temperature:** 0 to 50 °C / 32 to 122°F
 - **Operating humidity:** 10 to 90% RH (without condensation)
- (*) This instrument can measure and control up to 200°C (392°F) temperatures, since used with silicone cable sensor (eg.: SB59).

4 - CONFIGURATIONS

4.1 - Temperature adjust (SETPOINT)

- Press **SET** for 2 seconds until until **[5.5.5]** appears, then release it. **[5.P.1]** will appear (if enabled in **[F.0.2]**) and the adjusted temperature for the thermostat 1. Use the keys **▼** and **▲** to change the value and, then press **SET** again.
Set in the same way, the 2nd thermostat (if enabled in **[F.1.6]**).

4.2 - Parameters alteration

- To access the function **[F.0.1]** pressing simultaneously the keys **▼** and **▲** for 2 seconds until appearing **[F.0.1]**, releasing after that. Soon it will appear **[F.0.1]** and then press **SET** (short touch).
- Use the keys **▼** and **▲** to enter with the access code (123) and, when ready, press **SET** to enter.
- Use the keys **▼** and **▲** to access the desired function.
- After selecting the function, press **SET** (short touch) to display the configured value for that function.
- Use the keys **▼** and **▲** to change the value and then press **SET** to record the new value and return to the functions menu.
- To leave the functions menu and return to the normal operation, press **SET** until **---** appear.

4.3 - Parameters table

Fun	Description	CELSIUS				FAHRENHEIT			
		Min	Max	Unit	Standard	Min	Max	Unit	Standard
[F.0.1]	Access code: 123 (one hundred and twenty-three)	-99	999	-	0	-99	999	-	0
[F.0.2]	Thermostat 1 operation mode	0	2	-	1	0	2	-	1
[F.0.3]	Hysteresis of thermostat 1	0.1	5.0	°C	1.0	1	9	°F	2
[F.0.4]	Minimum setpoint allowed to the user (thermostat 1)	-50	105 ^o	°C	-50	-58	221 ^o	°F	-58
[F.0.5]	Maximum setpoint allowed to the user (thermostat 1)	-50	105 ^o	°C	105 ^o	-58	221 ^o	°F	221 ^o
[F.0.6]	Minimum time of thermostat 1 output turned off	0	999	sec	0	0	999	sec	0
[F.0.7]	Thermostat 1 delay when the instrument is powered on	0	999	sec	0	0	999	sec	0
[F.0.8]	Cyclic timer operation mode (thermostat 1)	0	3	-	0	0	3	-	0
[F.0.9]	Cyclic timer - Time off (thermostat 1)	1	999	s/m/h	1	1	999	s/m/h	1
[F.1.0]	Cyclic timer - Time on (thermostat 1)	1	999	s/m/h	1	1	999	s/m/h	1
[F.1.1]	Temperature sensor offset (thermostat 1)	-5.0	5.0	°C	0.0	-9	9	°F	0
[F.1.2]	Alarm display mode (thermostat 1)	0	4	-	0	0	4	-	0
[F.1.3]	Minimum value of the thermostat 1 alarm	-50	105 ^o	°C	-50	-58	221 ^o	°F	-58
[F.1.4]	Maximum value of the thermostat 1 alarm	-50	105 ^o	°C	105 ^o	-58	221 ^o	°F	221 ^o
[F.1.5]	Activation delay of thermostat 1 alarm	0	999	sec	0	0	999	sec	0
[F.1.6]	Thermostat 2 operation mode	0	2	-	1	0	2	-	1
[F.1.7]	Hysteresis of thermostat 2	0.1	5.0	°C	1.0	1	9	°F	2
[F.1.8]	Minimum setpoint allowed to the user (thermostat 2)	-50	105 ^o	°C	-50	-58	221 ^o	°F	-58
[F.1.9]	Maximum setpoint allowed to the user (thermostat 2)	-50	105 ^o	°C	105 ^o	-58	221 ^o	°F	221 ^o
[F.2.0]	Minimum time of thermostat 2 output turned off	0	999	sec	0	0	999	sec	0
[F.2.1]	Thermostat 2 delay when the instrument is powered on	0	999	sec	0	0	999	sec	0
[F.2.2]	Cyclic timer operation mode (thermostat 2)	0	3	-	0	0	3	-	0
[F.2.3]	Cyclic timer - Time off (thermostat 2)	0	999	s/m/h	1	0	999	s/m/h	1
[F.2.4]	Cyclic timer - Time on (thermostat 2)	0	999	s/m/h	1	0	999	s/m/h	1
[F.2.5]	Temperature sensor offset (thermostat 2)	-5.0	5.0	°C	0.0	-9	9	°F	0
[F.2.6]	Alarm display mode (thermostat 2)	0	4	-	0	0	4	-	0
[F.2.7]	Minimum value of the thermostat 2 alarm	-50	105 ^o	°C	-50	-58	221 ^o	°F	-58
[F.2.8]	Maximum value of the thermostat 2 alarm	-50	105 ^o	°C	105 ^o	-58	221 ^o	°F	221 ^o
[F.2.9]	Activation delay of thermostat 2 alarm	0	999	sec	0	0	999	sec	0
[F.3.0]	Alarm output operation mode	0	4	-	0	0	4	-	0
[F.3.1]	Alarm output cyclic timer - Time off	0	999	sec	0	0	999	sec	0
[F.3.2]	Alarm output cyclic timer - Time on	0	999	sec	0	0	999	sec	0
[F.3.3]	Preferential display indication	0	2	-	0	0	2	-	0

(*) This parameter allows adjustments up to 200°C (392°F) but to work on these conditions it has to be used with silicone cable sensor (ex.: SB59).

4.4 - Parameters description

[F.0.1] - Access code (123)

It is necessary to change the configuration parameters. To visualize the adjusted parameters, it is not necessary to insert this access code.

[F.0.2] - Thermostat 1 operation mode

Selects the operating mode of thermostat 1:

[0.F.F] - **Thermostat OFF** - In this mode, temperature sensor 1 can be disconnected. If **[F.0.8]** is configured as s, m or h, output **OUT1** will operate only as cyclic timer.

[1.F.F] - **Thermostat in refrigeration mode** - In this mode, output **OUT1** will be activated when the temperature is above the value set in setpoint 1 plus the hysteresis (**[F.0.3]**). When activated, the output will be deactivated if the temperature drops below setpoint 1. If **[F.0.8]** is configured as s, m or h, output **OUT1** will cycle when the thermostat is refrigerating.

Thermostat in heating mode - In this mode, output **OUT1** will be activated when the temperature is below the value set in setpoint 1 minus the hysteresis (**[F.0.3]**). When activated, the output will be deactivated if the temperature rises above setpoint 1. If **[F.0.8]** is configured as s, m or h, output **OUT1** will cycle when the thermostat is heating.

[F.0.3] - Hysteresis of thermostat 1

It is the difference of temperature (hysteresis) between turn ON and turn OFF the **OUT1** output.

[F.0.4] - Minimum setpoint allowed to the user (thermostat 1)

[F.0.5] - Maximum setpoint allowed to the user (thermostat 1)

Electronic limits whose purpose is prevent that too high or too low setpoint temperatures are regulated.

[F.0.6] - Minimum time of thermostat 1 output turned off

It is the minimum time that the **OUT1** output will keep turned off, it means, the space of time between the last stop and the next start. If **[F.0.8]** is configured as cyclic timer, this time will not be observed.

[F.0.7] - Thermostat 1 delay when the instrument is powered on

A delay that thermostat 1 will wait before activating its control functions. During this time only the temperature is measured.

[F.0.8] - Cyclic timer operation mode (thermostat 1)

Allows configuring the cyclic timer associated to output **OUT1**.

[0.F.F] - **Cyclic timer disabled** - Output **OUT1** will be constantly on or off depending only on the temperature.

[S] - **Cyclic timer activated with time base in seconds**

[M] - **Cyclic timer activated with time base in minutes**

[H] - **Cyclic timer activated with time base in hours**

For configurations in s, m or h (seconds, minutes or hours) output **OUT1** will keep cycling as long as the temperature of the thermostat needs output **OUT1** to be activated.
The initial state of **OUT1** is always on

[F.0.9] - Cyclic timer - Time off (thermostat 1)

[F.1.0] - Cyclic timer - Time on (thermostat 1)

Functions **[F.0.9]** and **[F.1.0]** are used when **OUT1** is configured as cyclic timer, observing the time base configured in **[F.0.8]**.

[F.1.1] - Temperature sensor offset (thermostat 1)

This function allows adjusting any deviation in the reading of sensor 1 caused by an increase (splice) in the sensor cable or occasional replacement.

[F.1.2] - Alarm display mode (thermostat 1)

Selects how the thermostat 1 checks for the presence of an alarm. The activation of this function only enables the alarm display. If the alarm output must also be enabled, function **[F.3.0]** must be configured.

[0.F.F] - Alarm off

[1] - In-range alarm (**[F.1.3]** and **[F.1.4]**)

[2] - Out-range alarm (**[F.1.3]** and **[F.1.4]**)

[3] - In-range alarm relating to the setpoint (**[5.P.1]**-**[F.1.3]** and **[5.P.1]**+**[F.1.4]**)

[4] - Out-range alarm relating to the setpoint (**[5.P.1]**-**[F.1.3]** and **[5.P.1]**+**[F.1.4]**)

[F.1.3] - Minimum value of the thermostat 1 alarm

[F.1.4] - Maximum value of the thermostat 1 alarm

These are the minimum and maximum values for the alarm to actuate if configured in **[F.1.2]**.

[F.1.5] - Activation delay of thermostat 1 alarm

The time that the alarm of thermostat 1 will remain off even in alarm conditions. This time is counted after the time configured in **[F.0.7]** has elapsed.

[F.1.6] - Thermostat 2 operation mode

Selects the operating mode of thermostat 2:

[0.F.F] - **Thermostat OFF** - In this mode, temperature sensor 2 can be disconnected. If **[F.2.2]** is configured as s, m or h, output **OUT2** will operate only as cyclic timer.

[1.F.F] - **Thermostat in refrigeration mode** - In this mode, output **OUT2** will be activated when the temperature is above the value set in setpoint 2 plus the hysteresis (**[F.1.7]**). When activated, the output will be deactivated if the temperature drops below setpoint 2. If **[F.2.2]** is configured as s, m or h, output **OUT2** will cycle when the thermostat is refrigerating.

Thermostat in heating mode - In this mode, output **OUT2** will be activated when the temperature is below the value set in setpoint 2 minus the hysteresis (**[F.1.7]**). When activated, the output will be deactivated if the temperature rises above setpoint 2. If **[F.2.2]** is configured as s, m or h, output **OUT2** will cycle when the thermostat is heating.

[F17] - Hysteresis of thermostat 2

It is the difference of temperature (hysteresis) between turn ON and turn OFF the **OUT2** output.

[F18] - Minimum setpoint allowed to the user (thermostat 2)

[F19] - Maximum setpoint allowed to the user (thermostat 2)

Electronic limits whose purpose is prevent that too high or too low setpoint temperatures are regulated.

[F20] - Minimum time of thermostat 2 output turned off

It is the minimum time that the **OUT2** output will keep turned off, it means, the space of time between the last stop and the next start. If [F22] is configured as cyclic timer, this time will not be observed.

[F21] - Thermostat 2 delay when the instrument is powered on

A delay that thermostat 2 will wait before activating its control functions. During this time only the temperature is measured.

[F22] - cyclic timer operation mode (thermostat 2)

Allows configuring the cyclic timer associated to output **OUT2**.

[FFF] - **Cyclic timer disabled** - Output **OUT2** will be constantly on or off depending only on the temperature.

[S] - **Cyclic timer activated with time base in seconds**

[M] - **Cyclic timer activated with time base in minutes**

[H] - **Cyclic timer activated with time base in hours**

For configurations in s, m or h (seconds, minutes or hours) output **OUT2** will keep cycling as long as the temperature of the thermostat needs output **OUT2** to be activated.

The initial state of **OUT2** is always on.

[F23] - cyclic timer - Time off (thermostat 2)

[F24] - cyclic timer - Time on (thermostat 2)

Functions [F23] and [F24] are used when **OUT2** is configured as cyclic timer, observing the time base configured in [F22].

[F25] - Temperature sensor offset (thermostat 2)

This function allows adjusting any deviation in the reading of sensor 2 caused by an increase (splice) in the sensor cable or occasional replacement.

[F26] - Alarm display mode (thermostat 2)

Selects how the thermostat 2 checks for the presence of an alarm. The activation of this function only enables the alarm display. If the alarm output must also be enabled, function [F30] must be configured.

[FFF] - Alarm off

[1] - In-range alarm ([F27] and [F28])

[2] - Out-range alarm ([F27] and [F28])

[3] - In-range alarm relating to the setpoint (([SP2] - [F27] and [SP2] + [F28])

[4] - Out-range alarm relating to the setpoint (([SP2] - [F27] and [SP2] + [F28])

[F27] - Minimum value of the thermostat 2 alarm

[F28] - Maximum value of the thermostat 2 alarm

These are the minimum and maximum values for the alarm to actuate if configured in [F26].

[F29] - Activation delay of thermostat 2 alarm

The time that the alarm of thermostat 2 will remain off even in alarm conditions. This time is counted after the time configured in [F21] has elapsed.

[F30] - Alarm output operation mode

Selects how the alarm output is activated

[FFF] - Alarm output off

[1] - The alarm output is activated when there is an alarm for thermostat 1

[2] - The alarm output is activated when there is an alarm for thermostat 2

[3] - The alarm output is activated when there is an alarm for thermostat 1 or 2

[4] - The alarm output is activated when there is an alarm for thermostat 1 and 2 at the same time.

Note: The alarm output (relay) has its contact NC (normally closed). With no power to the controller the relay contact remain closed. If controller is powered the relay contact is opened and only will close if [F30] is set differently than [FFF] and an alarm event occur due to this function.

[F31] - Alarm output cyclic timer - Time off

[F32] - Alarm output cyclic timer - Time on

Selects the cycling time of the alarm output when it is active. If one of these functions is set to [0], the output will always be on.

[F33] - Preferential display indication

Selects how the temperatures are shown in the display.

[E-1] - Thermostat 1

[E-2] - Thermostat 2

[RL] - Alternating thermostats 1 and 2

5 - FUNCTIONS WITH FACILITATED ACCESS

5.1 - Register of minimum and maximum temperatures

Press **▲**, led **T1** will turn on showing the minimum temperature recorded. Soon after, the maximum temperature recorded for thermostat 1 will be displayed. Then led **T2** will turn on and the respective minimum and maximum temperatures recorded will be displayed. If any temperature is turned off ([F02] or [F16] in [FFF]), the respective information will not be displayed. Caso alguma temperatura estiver desligada ([F02] ou [F16] em [FFF]), as respectivas informações não serão mostradas.

Note: To reset the registers, keep the key **▲** pressed while the maximum and minimum temperatures are displayed, until [r5E] appears.

5.2 - Alarm inhibition

To disable the alarm, press **▲** and **SET** simultaneously. Only the output will be disabled. The message will keep displaying. When disabled, the alarm will happen again after exiting the current alarm condition and return to a new condition.

5.3 - Viewing current temperatures

If function [F33] is configured as [E-1] or [E-2], the other temperature can be displayed, i.e. upon pressing **▼** and with function [F33] configured as [E-1] temperature 2 will be displayed 2, and if configured as [E-2] temperature 1 will be displayed. The temporary indication lasts 15 seconds.

6 - SIGNALING

T1 - Temperature displayed at sensor 1;

T2 - Temperature displayed at sensor 2;

OUT1 - Thermostat 1 output on;

OUT2 - Thermostat 2 output on;

ALRM - Alarm output on;

[E-1] - Sensor 1 temperature;

[E-2] - Sensor 2 temperature;

[Er1] - Sensor 1 detached or temperature out the range;

[Er2] - Sensor 2 detached or temperature out the range;

[RH] - Thermostat 1 extra-range upper alarm;

[rL] - Thermostat 1 extra-range lower alarm;

[Rin] - Thermostat 1 intra-range alarm;

[RH] - Thermostat 2 extra-range upper alarm;

[rL] - Thermostat 2 extra-range lower alarm;

[Rin] - Thermostat 2 intra-range alarm;

[r5E] - Indicates that the minimum and maximum values are being restarted;

[r5OF] - Indicates the device software version;

[C4C] - Indicates that the chosen output is configured for "cyclic timer" mode.

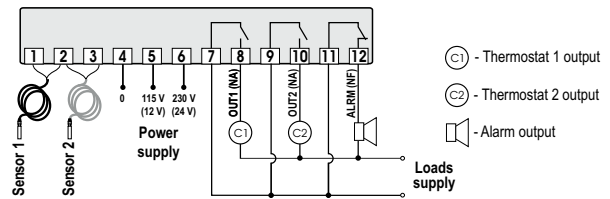
[PPP] - Invalid configuration parameters, in this situation the outputs will be turned off.

Check which parameter have invalid information and correct it to return to normal operation.

7 - UNIT SELECTION (°C / °F)

In order to define the unit that the instrument will operate in, enter function [F01] with the access code 231 and confirm with the **SET** key. The indication [U°C] and soon after the current temperature unit Press **▼** or **▲** to choose between [°C] or [°F] and confirm with the **SET** key. After selecting the unit the [FHE] message will appear, and the instrument will return to the function [F01]. Every time that the unit is changed, the parameters should be reconfigured, since they assume the "standard" values.

8 - WIRING DIAGRAM



	MT-519Ri	MT-519RiL
4 - 5	115V ~	12V ≈
4 - 6	230V ~	24V ≈

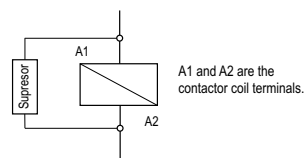
Above specified current use a contactor.

IMPORTANT

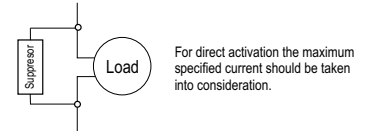
According to the chapters of norm IEC 60364:

- 1: Install protector against overvoltage on the power supply
- 2: Sensor cables and signal cables of the computer may be joined, but not in the same electric conduit through which the electric input and the activation of the loads run
- 3: Install transient suppressors (RC filters) parallel to the loads as to increase the product life of the relays.

Schematic for the connection of suppressors to contactors



Schematic for the connection of suppressors to direct activation loads



Note: Sensor cable length can be increased by the user until 200 meters, using 4 x 0,20mm².



ENVIRONMENTAL INFORMATION

Package:

The packages material are 100% recyclable. Just dispose it through specialized recyclers.

Products:

The electro components of Full Gauge controllers can be recycled or reused if it is disassembled for specialized companies.

Disposal:

Do not burn or throw in domestic garbage the controllers which have reached the end-of-life. Observe the respectively law in your region concerning the environmental responsible manner of dispose its devices. In case of any doubts, contact Full Gauge controls for assistance.



PROTECTIVE VINYL:

This adhesive vinyl (included inside the packing) protects the instruments against water drippings, as in commercial refrigerators, for example. Do the application after finishing the electrical connections.

Remove the protective paper and apply the vinyl on the entire superior part of the device, folding the flaps as indicated by the arrows.

