



# MT-512G

DIGITAL CONTROLLER FOR COOLING  
WITH NATURAL DEFROST  
AND FOR HEATING

Ver.01



MT512GV01-01T-12371

## 1. DESCRIPTION

The **MT-512G** is a temperature controller and indicator. Controls cooling and defrosts through compressor shutdowns.

## 2. APPLICATIONS

- Counters
- Cooled chambers
- Greenhouses

## 3. TECHNICAL SPECIFICATION

- Power supply:** 90 to 264Vac (50/60Hz)
- Control temperature:** -50 to 99°C (-58 to 99°F)
- Resolution:** 0,1°C (between -10 and 10 °C) and 1°C in the rest of the range
- Maximum current:** 16(8)A/ 250Vac 1HP
- Operating temperature:** 0 to 50 °C
- Operating humidity:** 10 to 90% RH (without condensation)

## 4. CONFIGURATIONS

### 4.1 - Control temperature adjust (SETPOINT)

- Press the frontal key for 12 seconds until appears **SP**;
- Releasing the key, the set control temperature will appear;
- Use the key to change the value. This operation must be done in 4 seconds, otherwise the indication of ambient temperature returns automatically.
- Wait 4 seconds to record and return to the normal operation.

### 4.2 - Parameters alteration

Configuration parameters protected by access code (except setpoint).

- Press the frontal key of the panel for 8 seconds until **CD** appears;
- Releasing the button it will appear **DD**;
- Use the key to insert the code 23 (twenty-three). This operation must be done in 4 seconds, otherwise the indication of ambient temperature returns automatically;
- Wait 4 seconds to the instrument record the access code. At this time **--** appears in the display and then the temperature.

#### After entering the access code:

- If the access code is correct, the controller allows the user to view and change the parameters.
- Press the key as many times as necessary until you reach the desired parameter.
- Wait 2 seconds and then appears the adjusted value.
- Use the key to modify the value;
- Wait 4 seconds until the new value is recorded and the instrument returns to show the room temperature;
- To change another parameter, repeat steps 5, 6, 7 and 8.

**Note:** After entering the access code, be careful not to leave the key idle (without being pressed) between parameter changes for more than 15 seconds.

If this happens, the message **CD** will be displayed and the access to the adjust mode is automatically blocked, requiring entering the code again to make any changes.

### 4.3 - Parameters table

| Fun       | Description   | CELSIUS   |           |         |           | FAHRENHEIT |           |         |           |
|-----------|---|-----------|-----------|---------|-----------|------------|-----------|---------|-----------|
|           |   | Min       | Max       | Unit    | Standard  | Min        | Max       | Unit    | Standard  |
| <b>CD</b> | Access code: 23 (twenty three)                      | -         | -         | -       | -         | -          | -         | -       | -         |
| <b>F1</b> | Control differential (hysteresis)                   | 0.1       | 20        | °C      | 3         | 1          | 40        | °F      | 37        |
| <b>F2</b> | Minimum setpoint allowed for the end user           | -50       | 99        | °C      | -1        | -58        | 99        | °F      | 30        |
| <b>F3</b> | Maximum setpoint allowed for the end user           | -50       | 99        | °C      | 5         | -58        | 99        | °F      | 41        |
| <b>F4</b> | Additional time at the end of the first cycle       | 0         | 99        | min.    | 0         | 0          | 99        | min.    | 0         |
| <b>r1</b> | Cooling time  | 1         | 99        | x10min. | 30        | 1          | 99        | x10min. | 30        |
| <b>r2</b> | Defrosting time                                     | 1         | 99        | min.    | 25        | 1          | 99        | min.    | 25        |
| <b>r3</b> | Initial state up on energizing the instrument       | 0-refrig. | 1-defrost | -       | 0-refrig. | 0-refrig.  | 1-defrost | -       | 0-refrig. |
| <b>r4</b> | Temperature indication locked during defrost (*)    | 0-no      | 1-yes     | -       | 1-yes     | 0-no       | 1-yes     | -       | 1-yes     |
| <b>t1</b> | Delay on the activation of the instrument           | 0         | 99        | min.    | 0         | 0          | 99        | min.    | 0         |
| <b>t2</b> | Delay to turn the cooling output on (heating)       | 0         | 99        | x10sec. | 18        | 0          | 99        | x10sec. | 18        |
| <b>t3</b> | Situation of the compressor with the damaged sensor | 0-off     | 1-on      | -       | 0-off     | 0-off      | 1-on      | -       | 0-off     |
| <b>t4</b> | Indication offset                                   | -5        | 5         | °C      | 0         | -9         | 9         | °F      | 0         |
| <b>t5</b> | Intensity of the digital filter (**)                | 0         | 9         | -       | 5         | 0          | 9         | -       | 5         |
| <b>t6</b> | Operation mode                                      | 0-refrig. | 1-heat.   | -       | 0-refrig. | 0-refrig.  | 1-heat.   | -       | 0-heat.   |

\* Frozen display indication - If **r4** is active, the indication is only released in the following refrigeration cycle and when the temperature reaches the "locked" value again, or after 15 minutes in refrigeration (as a safety measure).

\*\* This filter aims at simulating an increase of environment sensor mass, thus increasing its response time (thermal inertia). The larger the value adjusted in this function, the longest the response time of the sensor.

A typical application requiring this filter is the freezer for ice cream or frozen goods, because when the door is opened a hot air mass reaches the sensor directly, causing a quick rise in the indication of the measured temperature, thus causing the compressor to be activated unnecessarily many times.

## 5. FUNCTIONS WITH FACILITATED ACCESS

### 5.1- Show current status

Press the key and then release it (short touch). Soon the display will show the process that is running and the elapsed time.

Example:

**FR** **01** **92** **--**

The controller is in refrigeration mode for 192 minutes.

**DF** **25** **--**

The controller is in defrost mode for 25 minutes.

**dL** **02** **--**

The controller is executing the delay time to power the instrument on for 2 minutes.

**HE** **--**

The controller is in heating mode.

### 5.2 - Manual defrost

**MT-512G** allows changing from refrigeration to defrost or vice-versa, regardless of what is programmed:

- Press the key for 4 seconds until **df** is displayed;
- If the controller is in the refrigeration cycle, when the key is released the display will show **On** and the defrost cycle will start;
- If the controller is in the defrost cycle, when the key is released the display will show **OF** and the refrigeration cycle will start.

## 6. SIGNALLING

- Er** - Sensor disconnected or temperature out-of-range;
- df** - Indicates the defrost cycle;
- On** - Indicates that the defrost cycle is turned on;
- OF** - Indicates that the defrost cycle is turned off (starts the refrigeration cycle);

- FR** - Indicates the refrigeration cycle;
- HE** - Indicates that the controller is operating in heating mode;
- dL** - Indicates the initial delay;
- PP** - Invalid configuration parameters;

In this situation the outputs are automatically turned off.

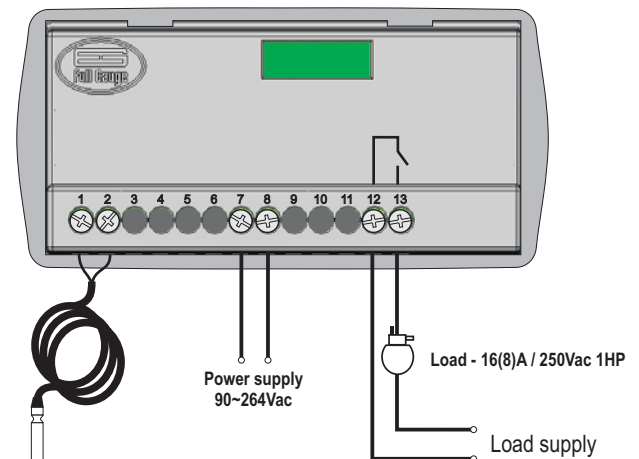
Check which parameters have invalid data and correct them to return to normal operation.

- LED flashing - The controller is in cooling mode (heating) and with the output on;
- LED off - The controller is in cooling mode (heating) and with the output off;
- LED on - The controller is in defrost mode.

## 7. UNIT SELECTION (°C / °F)

- Press the frontal key of the panel for 8 seconds until **Ed** appears;
- Releasing the button it will appear **DD**;
- Use the keys to enter code 31 (thirty-one). This option must be executed within four seconds, otherwise the display will automatically return to showing the room temperature;
- Wait 4 seconds to save the access code;
- Then the display will show the measurement unit in use ( **C** or **F** );
- Press the keys to change the value between **C** and **F** and vice-versa;
- After 4 seconds without pressing any other keys the controller will save the selected unit;
- If the measurement unit is changed, **FC** will be displayed and the parameters will assume their default values.

## 8. WIRING DIAGRAM



Sensor

Power supply  
90~264Vac

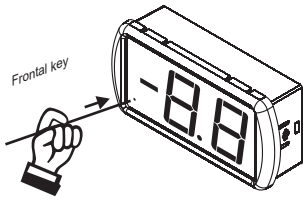
Load - 16(8)A / 250Vac 1HP

Load supply

**Above specified current use a contactor**

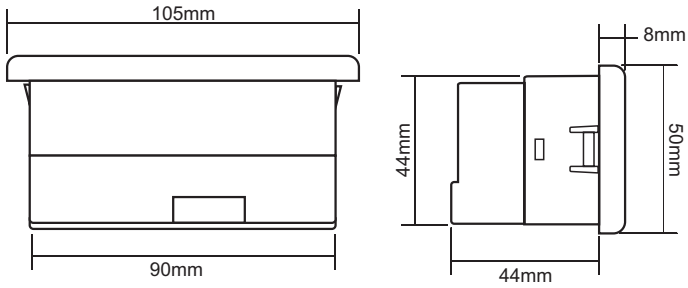
**Note:** The length of the sensor cable may be increased by the user up to 200 meters, using a PP 2 x 24 AWG cable. For immersion in water, use thermometric we

## 9. KEYS



Accessible in the front side of the instrument.

## 10. DIMENSIONS

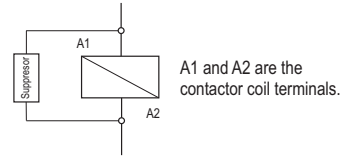


## IMPORTANT

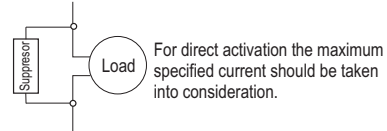
According to the chapters of norm IEC 60364:

- 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



© Copyright 2006 • Full Gauge Controls® • All rights reserved.