

## INSTRUCTIONS FOR USE AND INSTALLATION OF 6 SERIES (MTR 6, MTRT 6), 10 SERIES (MTR 10, MTRT 10) AND 11 SERIES (MTR 11, MTRT 11, MTD 11, MTA 11) MICROPROCESSOR BASED TEMPERATURE CONTROLLERS.

### INSTALLATION

- 1.0 For correct functioning, this controller needs an operating temperature of  $-10...+60^{\circ}\text{C}$  and 15%...80% Relative Humidity (not condensing).

The instrument is secured to the panel from the rear by means of the suitable brackets.

- 1.1 Connect the red wire of the sensor to the terminal No. 12 (No. 8 for 6 series) and the other two wires to the terminals No. 11 and 10 (No. 7 and 6 for 6 series). Should you extend the cable, ensure correct polarity of wire.

**Caution!** The '3-wire' connection allows the sensor cable to be extended even up to 100 m without having to recalibrate the instrument. Although the controller has a very high degree of insensitiveness to EMI noises, we recommend using shielded cable (grounding the shielding only at one end of the cable) in order to avoid the problems caused by radio interference generated by the switching of large loads (especially inductive) which, in the long run, may compromise the proper functioning of the sensor. For the reasons given above, it is essential TO LOCATE THE SENSOR CABLE APART FROM POWER LINES and use separate conduits.

- 1.2 Connect the load to control to the:

terminals No. 2 and 3 (diameter 4 mm<sup>2</sup> max.) (6 and 11 series);

terminals No. 5 and 7 (diameter 4 mm<sup>2</sup> max.) (10 series).

Connect the auxiliary load to the terminals No. 4 and 5 of the MTA 11 and MTD 11 (diameter 4 mm<sup>2</sup> max.)

The maximum commutable power is 1800 VA (240Vac 7A) for a resistive load and 170 Watt (1/4 HP) for an electrical motor.






- 1.3 Connect the power supply to the terminals No. 8 and 9 (4 and 5 for 6 series).






**Caution!** Where delicate or valuable products have to be maintained in special conditions, the same instrument should not be used for both control and limit functions. In such cases a separate instrument for each function is recommended.

### FUNCTIONS SELECTABLE THROUGH THE KEYBOARD


- 2.0 The instrument has front panel keys, which carry out different operations according to the moment when they are pressed. To show this diversity, a one-second indication shows you in what operation mode the instrument is functioning.

**Caution!** The keyboard is made of plastic (polycarbonate) capable of carrying out an unlimited number of operations keeping its properties unaltered. Nevertheless, we recommend operating the keys with the care normally due for such types of electronic equipment.


- 2.1 Key  To check or change the stored SET POINT value, press the key ; «SP» will appear on the display and then will be followed by the SET value. When the key is released, the display starts blinking, thus indicating that from that moment the microprocessor is in the PROGRAMMING mode. If within 4 sec the key  or  is pressed briefly the SET POINT will be, respectively, decreased or increased by one unit at a time, and if the key is kept pressed, the displayed value will change with progressively higher speed. Once the desired SET POINT is selected, its storage occurs after 4 sec have elapsed since the last operation (AUTOMATIC mode) or by pressing the key  (IMMEDIATE mode). In any case, before the unit switches back to the NORMAL display and control function, the microprocessor shows that the storage has been made by displaying «En».


- 2.2 Key  To check or change the HYSTERESIS value, press the key ; «dt» will be displayed and the «Dt» value will follow immediately afterwards. By pressing the key  or  the HYSTERESIS value will be, respectively, decreased or increased. Once the desired value is selected, store it by pushing the key .


- 2.3 Example of SET POINT value modification from  $-5$  to  $-7^{\circ}\text{C}$ .

Press the key ; «SP» appears for 1 sec and then «05».


By releasing the key, the display blinks on «05» and the microprocessor enters the PROGRAMMING mode.

Within 4 sec press the key  briefly; the display is decreased to «06».


Press the key  again; the display will show «07».


Press  briefly; the display shows «En» for 1 sec, immediately afterwards the temperature measured by probe will be displayed and the instrument will restart controlling the temperature according to the new SET value.

**Example of HYSTERESIS value modification from  $+1$  to  $+4^{\circ}\text{K}$ .**

Press the key ; «dt» appears on the display for 1 sec, then «001» is shown.

By releasing the key, the display blinks on «001».

Within 4 sec press and keep pressed the key ; the display will automatically change from «001» in «002», «003», when «004» is reached release the key.

Press  briefly; the display shows «En» for 1 sec, immediately afterwards the temperature measured by the sensor will be displayed and the instrument switches back to the NORMAL mode with the new HYSTERESIS value.

\*\* When the main relay (RL1) is energized a red point in the lower right-hand side corner of the display lights up.

\*\* **PROTECTION:** In case of a probe failure, «OF» or «-OF» appears on the display; in the models MTR 6, MTRT 6, MTR 10, MTRT 10, MTR 11, MTRT 11 and MTD 11 the relays are de-energized. With respect to the MTA 11, the main relay (RL1) is de-energized while the auxiliary relay (RL2) is energized.



In addition to the SET POINT and DIFFERENTIAL settings, the models MTRT 6, MTRT 10, MTRT 11 and MTD 11 have the following controls:

- 2.4 Key To check or change the stored pauses of defrosting, press the key ; «dEF» will be displayed for 1 sec and then will be followed by the indication of the number of defrosting cycles per 24 hours; for ex. «c02» indicates that the relay will be stopped twice in 24 hours. This value can be changed by pressing the key or and can be set from a minimum of 1 pause «c01» to a maximum of 24 pauses «c24», i.e. one every hour. Once the desired number of pauses is set, press once more to set the duration of said pauses; «d01» appears on the display, thus indicating that each pause will have a duration of 1 min. By pressing or said duration can be set from a minimum of «d01» (1 min.) to a maximum of «d99» (99 min.). Store the desired value by pressing the key .

- 2.5 The timer is reset each time the controller is switched off and on. Therefore, if the values «d02» and «d20» are set, 12 hours after the controller has been switched on, there will be a pause with duration of 20 minutes, in other words the relay (RL1) will remain de-energized (OFF) for 20 minutes regardless of the temperature during that period. The MTD 11 has an auxiliary relay (RL2) for defrost-system control or for fan lock-out; this relay remains energized during the defrost period.

The DEFROSTING condition is indicated by a flashing red point in the upper left-hand side corner of the display.

The controller also gives the possibility of starting a manual defrosting by pressing the key first and simultaneously. The timer will be automatically synchronized at the start of the new defrost period.

In addition to the SET POINT and DIFFERENTIAL settings, the model MTA 11 has the following controls:

- 2.6 Key To check or change the ALARM value, press the key ; «AL» will be displayed and will be followed by the ALARM value, i.e. the threshold that causes the auxiliary relay (RL2) to be energized. When the key is released, the display starts blinking. If within 4 sec the key or is pressed the ALARM will be, respectively, decreased or increased. After programming the desired ALARM value, press one more time; in this way you have access to the selection of the ALARM start-up. By pressing the key and select whether the ALARM relay is to be energized at values higher «hi» or lower «LO» than the programmed threshold. After programming, press the key a third time in order to store the desired value. The ALARM condition is indicated by a flashing red point in the upper left-hand side corner of the display. The ALARM hysteresis is factory set at 2°K.

#### MODIFICATION OF THE REGULATION LIMITS AND CALIBRATION

- 3.0 To change the SET POINT and HYSTERESIS LIMITS proceed as follows:

turn off the instrument; with a screwdriver or any other object of suitable dimensions, press the SET UP button visible through the hole on the rear of the case. While keeping it pressed, turn on the instrument.

In way you enter THE REGULATION LIMITS MODIFICATION phase, during which the display blinks continuously.

If the preliminary operations have been carried out correctly, when the unit is switched on the display will show «OF» for 1 sec, then followed by the MINIMUM SET POINT LIMIT. By using the key or set the desired value and store it by pressing the key ; «En» will be displayed.

After this value has been stored, the MAXIMUM SET POINT LIMIT is displayed. Also this value can be changed by means of or . Once the desired value is selected, store it by pressing the key . After that, the MAXIMUM HYSTERESIS LIMIT (Dt) will be displayed. By changing the sign of this limit the type of regulation carried out by the controller can be chosen. In fact if the «Dt» has a POSITIVE value (ex. 010) the function will be REFRIGERATION (relay OFF at Temp. ≤ of SET). Vice versa, if the value is NEGATIVE (ex. -10), the instrument will control the temperature in HEATING (rélay OFF at Temp. ≥ of SET.).

To set the HYSTERESIS LIMIT press the key and . Store by pressing again. With this last operation the SET UP ends and this is indicated by the inscription «St» (stop) on the display; now simply turn off the instrument which, from this moment onwards, is customized to meet your exact requirements.

#### RECALIBRATION

- 3.1 Should a recalibration of the instrument be necessary, use an accurate reference thermometer with which to check the temperature measured by the sensor. To obtain greater accuracy, immerse the sensor and the probe of the reference thermometer in a liquid, so that the two probes will be at the same temperature. After that, slowly turn the calibration trimmer inside the case accessible through the hole located on the left-hand side (0 ADJ.).