



# I-86 DIGITAL THERMOMETER



The I-86 Digital thermometer allows to program the connection and disconnection temperature through the automatic activation or deactivation of the output relay.  
It offers the possibility to digitally readjust the temperature, as well as an output for external push buttons.  
It also includes a submersible probe, keyboard to program on the board, a led to indicate the connection and a screen for the front panel.

## TECHNICAL CHARACTERISTICS.

Voltage.....	12 or 24 V.D.C.
Minimum Consumption.....	80 mA.
Maximum Consumption.....	130 mA.
Operating Temperature.....	From -20 to 99,5°C.
Temperature Probe.....	KTY81-110. (Included).
Connection Temperature Adjustment.....	From -20 to 99,5°C.
Disconnection Temperature Adjustment.....	From -20 to 99,5°C.
Temperature accuracy.....	0,5°C.
Hysteresis adjustment.....	±25°C.
Display scale.....	Each 0,5°C.
Display.....	4 digits x 0,5" (13,5 mm).
Outputs: Relay with inverted circuit.....	Max. Load 250V / 5A.
Dimensions.....	100 x 42 x 45 mm.

## INSTALLATION AND CONNECTIONS.

**POWER SUPPLY.** See the general wiring map. The module offers two independent power supply inputs, one at 12 VDC and on other at 24 VDC. To correctly use the circuit you will have to select between both feeds, but never use both at the same time.

To supply the circuit at 12 VDC or at 24 VDC, the power supply should be correctly stabilised and filtered. We recommend you to use the FE-103 (12V) or the FE-115 (24) power supplies, which have been developed to perfectly answer to the circuit needs, offering a low ripple level.

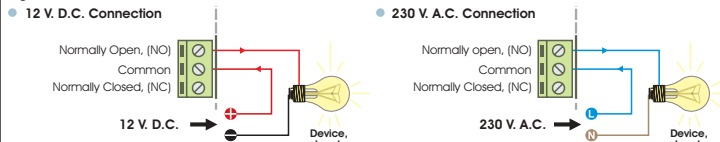
Connect the positive terminal of the power supply to the respective terminal (+12), or to the terminal (+24), according to the required voltage. Then, connect the negative of the power supply to the common negative of the module, as it is indicated in the wiring map.

Install a fuse and a switch has it is indicated on the schedule of the power supply. Both are necessary for the module's protection as well as for your own safety, as it is required by the "CE" regulations.

**OUTPUT CONNECTION. LOAD.** The I-86 output is controlled by a relay, which is electrically insulated from the rest of the circuit and it accepts any load up to 5 A. The relay is not a component supplying voltage but its function is limited to accept or deny the voltage passage like a standard switch. For this reason, you have to supply the load through this component.

The relay has three output terminals: The normally open quiescent (NO), the normally closed quiescent (NC) and the common. Install the load between the Common and the NO in accordance with the schedule (Fig. 1). For the inverse function you have to place the load between the NC and Common.

Fig. 1. Load Connection.

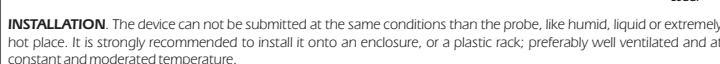


**INFORMATION ABOUT THE RELAY.** A relay output can produce a fluctuation or an incorrect working of the output, and mainly with inductive loads. In such case, you have to install an anti-spark circuit between both contacts of the used relay, as it is indicated on the drawing, to absorb the current peak provoking this problem.

If the load connected to the circuit relay is supplied at 230V, you have to use a (100 nF/400V Type X2 Capacitor and 47W 1/2W resistor (See the Fig.2)

If the load connected to the circuit relay is supplied at 12V or at 24V, you have to remove the resistor and maintain only the type X2 capacitor between two the contacts of the relay. If necessary, you could try different values, from 10 nF till 47 nF, till the fluctuation disappear.

Fig. 2. Anti-Fluctuation relay Filter.



**INSTALLATION.** The device can not be submitted at the same conditions than the probe, like humid, liquid or extremely hot place. It is strongly recommended to install it onto an enclosure, or a plastic rack, preferably well ventilated and at constant and moderated temperature.

**TEMPERATURE PROBE.** The device includes a temperature probe with 1,5m length and a metallic tip. This length is the maximum admitted length by the module to avoid temperature drift. In order to obtain the optimal operating mode from the module, this length mustn't be increased, reduced as possible. The connection has to be done on the screws indicates as "Probe", without polarity.

The probe can be submerged into liquids and exposed to high humidity environments. Nevertheless, the insulating cover is not guaranteed against corrosive materials or temperatures superior to 100°C. The final cover, the metallic tip, is the part where is the sensor. This one has to be in contact with the surface to control or in the centre of the room if you want to control the environmental temperature.

**INSTALLATION OF EXTERNAL PUSH BUTTONS.** The circuit foresees the connection in parallel of external push buttons through the connector situated over the "up" push button. The connection of each of them, indicated by their name, has to be made in reference to the ground terminal of the same connector. The more the cabling used for these connections will be long, the more the circuit will risk to get the parasites and to answer incorrectly. For that purpose, it will be necessary to use the shortest possible length of cable. To connect external push buttons, use a removable female which coincides with the connector, (four 2,54 mm ways), the circuit does not admit direct weld.

## PROGRAMMATION AND STARTING.

**PROGRAMMING OF THE CONNECTION AND DISCONNECTION TEMPERATURE.**  
To access to the Programming mode you have to maintain pressed the "Enter" key, during three seconds by activating the power supply of the circuit.

In the Programming mode, the display decreases its 50 % luminosity, so differing from the Operating mode. If the module detects a period of inactivity superior to 20 seconds, it will automatically left the Programming mode, without changing nothing and showing the Operating mode.

There are three adjustments which the user can make on the module: Connection temperature, Disconnection temperature and a Calibration temperature.

The connection temperature is displayed with a continuous intermittence between the word "On" and the value of this one.

The Disconnection temperature is displayed with the intermittence between the word "Off" and its value, and calibration temperature is displayed thanks to the intermittence with the word "Set". To alternately jump between screens of connection, disconnection and calibration temperature; press briefly the "Enter" key. On each screen, using "up" and "down" keys, you could modify the selected register with an accuracy of 0,5°C. If one of these two keys is maintained pressed, the progress up or down will quickly occur.

**The recording of the changes done in the Programming mode are recorded by pressing the "Enter" key during three seconds.** If you do not wish to record the changes, you can left the Programming mode resetting the power supply or by stopping any operation for at least 20 seconds.

After the Programming mode, the module will automatically in Operating mode by activating or by deactivating the output when the temperature into the probe will coincide with one of both programmed registers.

It is necessary to foresee that the recording occurs at the same time for the three registers, for that, the registers which you wish to maintain without changes must not be modified.

The memory with the registers of the last recording will still remain without electric connection.

## PROGRAMMATION AND STARTING. (SECOND PART).

**CALIBRATION TEMPERATURE.** The module is supplied calibrated by origin in order to guarantee that temperature reading answers the real value detected by the sensor. Nevertheless, for the applications where you wish to make the reading coincide on the display with a concrete value of another measuring device, you have to use the calibration screen, (Set) from the Programming mode.

The temperature adjustment is done by adding or by removing so many degrees as it will be necessary to allow the display reading corresponds to the wished one.

Minimum and maximum admitted by the module are respectively -25 and +25°C.

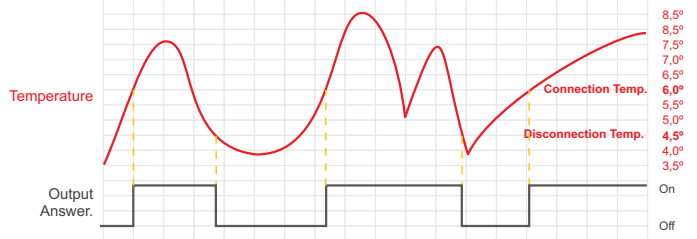
## OPERATING MODE.

**OPERATING MODE.** In operating mode, the module it will normally start when you activate the power supply (except if you start in programming mode) and indicating at any time the temperature detected by the probe. During its operating, the module works in an offline mode. When the temperature will coincide with the programmed connection temperature, the relay output will be activated and maintained until the temperature in the probe coincides with the programmed disconnection temperature. At that moment the relay will be deactivated. This process will be repeated with activation or deactivation of the relay every time the connection and disconnection temperature will coincide in the probe.

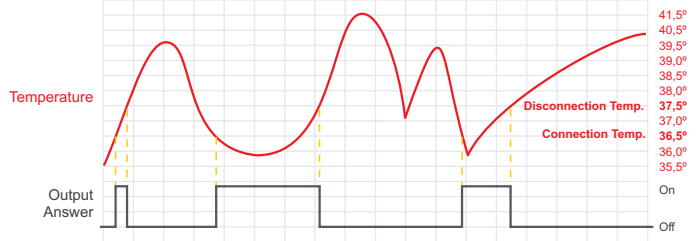
During the operating mode, you can consult the registers from of connection, disconnection or calibration temperature without interrupting the circuit operating mode and without modifying the stored values. Each time you will press the "up" or "down" keys, corresponding screens with their registers will alternately appear. After 5 seconds, they will disappear and the reading of the probe will be displayed once again.

Fig. 3. Some examples of the output connection for different programming.

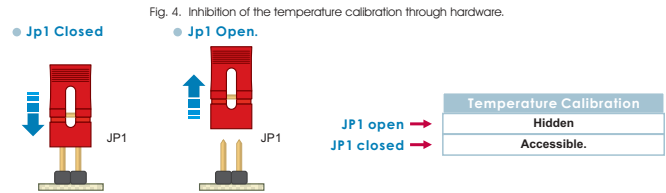
Drawing (example: refrigerator).



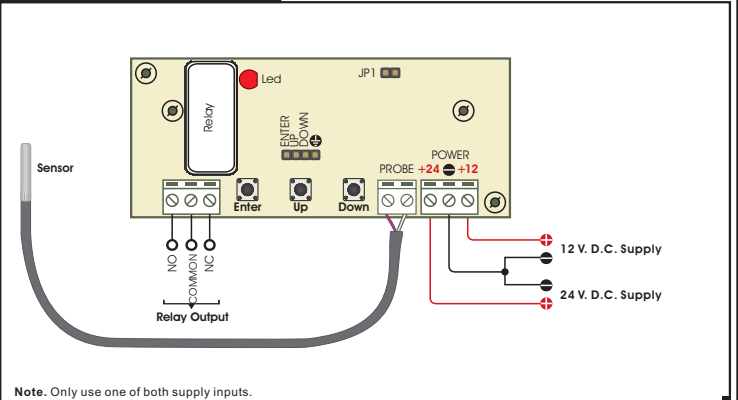
Drawing (example: Heater)



**INHIBITION OF THE CALIBRATION.** The JP1 jumper controls the access to the circuit calibration. If we remove JP1, the calibration screen will not appear and will not be accessible in Programming mode, neither in operating mode. With the inserted JP1 jumper, you can adjust or consult the value of the calibration.



## GENERAL WIRING MAP.



Note. Only use one of both supply inputs.

## TECHNICAL CONSULTATIONS.

If you have any doubt, you could contact your wholesaler or our Technical Department.  
- E-Mail, [sat@cebek.com](mailto:sat@cebek.com) | Fax. 34.93.432.29.95 | by mail. P.O. Box. 23455 - 08080 Barcelona - Spain.  
- Keep the invoice of this module. For any repair, the corresponding invoice had to be added. If the invoice is not presented together with this module, the module's warranty will be automatically cancelled.

All the module's CEBEK have 3 years of total warranty in technical repairing, and spares from the date of buy.



Much more CEBEK module's are available in our products range, please, require our general catalogue or visit our Web side.  
[Http://www.cebek.com](http://www.cebek.com)

