



TIC-17C

GENERAL PURPOSE DIGITAL THERMOSTAT

Ver.10



TIC17CV10-04T-12367

1. DESCRIPTION

The **TIC-17C** is a digital thermostat with easy adjustment and installation. It can be used at hot or cold systems. All its functions are set up in its only key.

2. SAFETY RECOMMENDATIONS

- Make sure of the correct setting of the thermostat;
- Make sure the power is off and that it is not turned on during installation of the thermostat;
- Read this manual before installing and using the thermostat;
- Use appropriate Personal Protective Equipment (PPE).

3. APPLICATION

- Boilers, ovens, heaters, freezers, counters, refrigerated balconies and others.

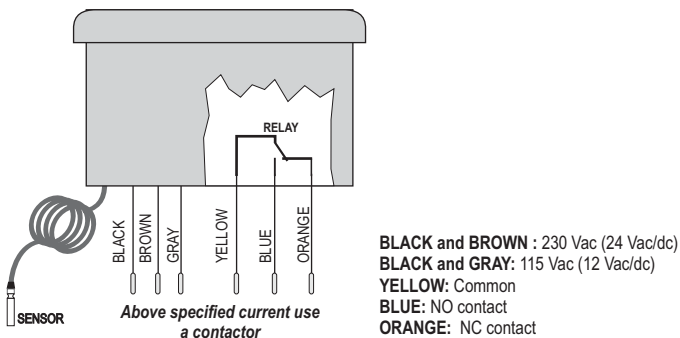
4. TECHNICAL SPECIFICATIONS

- **Power supply:** 115 or 230Vac (50/60 Hz)
12 or 24Vac/dc
- **Control temperature:** -50 to 105 °C
- **Resolution:** 0.1°C (between -10 and 100 °C) and 1 °C outside this range
- **Load current(*):** 16(8)A / 250Vac 1HP
- **Dimensions:** Diameter → 60 mm Depth → 40 mm
- **Operation temperature:** 0 to 60 °C
- **Operation humidity:** 10 to 90% RH (without condensation)

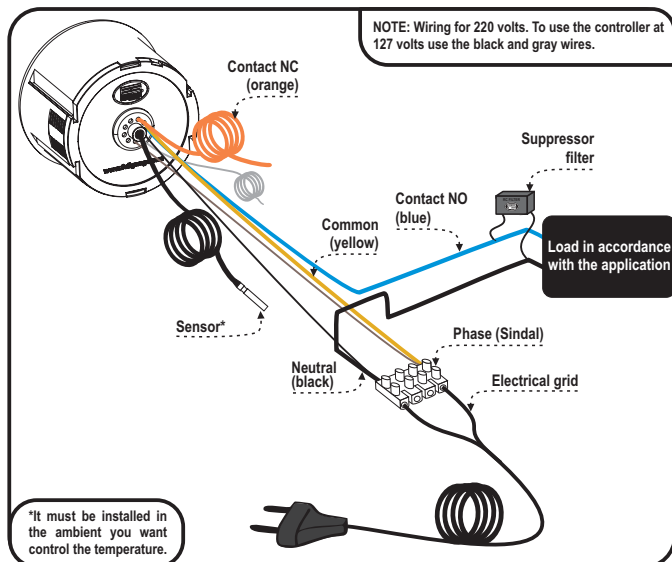
(*) The maximum current 16(8) A means the following:

- 16 A for resistive type loads.
- 8 A for inductive type loads.
- For loads greater than those specified, it is necessary to use a breaker.

5. WIRING DIAGRAM



5.1 Example of controller installation



5.2. Temperature sensor connection

- The length of the sensor cables can be increased by the user himself in up to 200 meters, using a PP2x24AWG cable;
- For immersion in water, use a thermowell, available in Full Gauge Controls product line.

5.3. Thermostat power

Use the colors as shown below:

Colors	TIC-17C
black/gray	115V ~
black/brown	230V ~

5.4. Power supply of the load

ATTENTION: For a correct sizing of the cables, we recommend that the installation is performed by a trained technician;

- Connect the power phase (electricity transmission network) to yellow wire (common of thermostat relay).

5.4.1. For current loads lower than 16(8) A

- Connect load directly to blue wire of the thermostat;
- Connect the RC suppressor filter in parallel with the load.

5.4.2. For current loads higher than 16(8) A

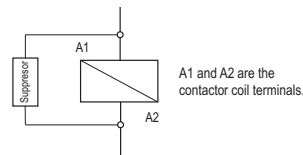
- Connect the breaker switch;
- To identify the breaker switch terminals, see the manufacturer's instructions;
- Connect one of the coil terminals (A1) of the breaker to blue wire of the thermostat and the other terminal (A2 of the contactor) to the network's neutral;
- Connect the RC suppressor filter in parallel with coil of the breaker, ie, connect a cable in each of the coil terminals.

NOTE: Typically, the coil terminals are identified as "A1 and A2".

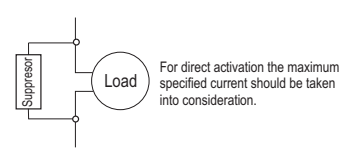
5.5 Recommendations of standards NBR5410 and IEC60364

- 1- Install power surge protectors at the thermostat power supply;
- 2- Install transient suppressors (RC suppressor filter) in parallel with the loads to increase the life of the relays;
- 3- Sensor cables can be together, but not in the same conduit through which the electrical power supply of the thermostat and/or loads go through.

Schematic for the connection of suppressors to contactors

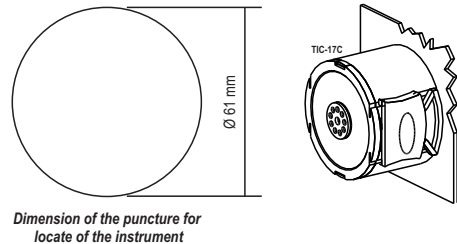


Schematic for the connection of suppressors to direct activation loads



6. INSTALLATION PROCEDURE

- a) Make a drill on the sheet metal with a cup saw, where the thermostat will be fixed, with a dimension of 61 mm;



- b) Remove the side latches: for this, press the central elliptical part (with the Full Gauge Controls logo) and slide the latch backward;
- c) Insert the thermostat in the 61 mm housing socket, from the outside in;
- d) Reinstall the latches, to fix the thermostat in the housing;
- e) Do the electrical wiring as described above;
- f) Set the parameters as described in Chapter 7.

7. SET POINT AND PARAMETER SETTING

Signalling:

RELAY - Turned on NO contact;

- Err** - Detached sensor or temperature out of the specified range;
- AwE** - Instrument working normally;
- OFF** - **RELAY** manually output OFF.

7.1 - Set point setting (control temperature)

Set point **SP**, or control temperature, is the right temperature to keep for a controlled environment, ie the temperature at which the output will be disconnected.

- a) Press **ADJUST** key for 10 sec. and **SP** will appear on display: release the key;
- b) After 10 seconds, the currently set control temperature will appear;
- c) Press **ADJUST** to modify the value:

NOTE 1: For each stroke of the **ADJUST** key, the value increases 0.1°C until the end of the scale (105°C) or to the maximum limit specified in the parameter setting **H_u**.

Then, the value returns to the beginning of the scale (-50°C) or to the minimum limit specified in the parameters setting **L_o**. See the following parameter setting:

NOTE 2: Keeping the **ADJUST** key pressed, the value increment on display is accelerated.

- d) After setting the control temperature, wait 4 sec. and the value will be recorded.

7.2 Parameter setting

7.2.1 Parameters table

The parameters are protected by an access code **Ca** (except the setpoint), which must be entered for that can make changes (see item 7.2.3).

Configuration parameters protected by access code:

Fun	Description	Min	Max	Unit	Default
OP	Operation mode	0-refrig.	1-heat.	-	0
dF	Differential (hysteresis)	0.1	20.0	°C	2.0
dL	Minimum delay to turn on the output	0	999	sec.	0
OF	Offset (local calibration)	-5.0	5.0	°C	0.0
L_o	Minimum set allowed to the final user	-50	105	°C	-50
H_u	Maximum set allowed to the final user	-50	105	°C	105
na	Output manual deactivation available	0-no	1-yes	-	0-no

7.2.2 Parameter description

Follow the description of the graph and previous table.

OP Mode of operation:

Determines the mode of operation according to the purpose of the installation:

0 = cooling 1 = heating

dF Temperature differential (hysteresis):

It is the value of the difference in temperature to reactivate the "Relay" control output.

In other words, the difference between the Set point temperature **SP** and the temperature at which the thermostat relay will be reactivated.

The difference **dF** will be:

***Refrigeration (Operation mode **OP** = "0"):** For a temperature higher than that of the Set point **SP**: The relay on when the temperature is higher than **SP + dF** and off when less than **SP**.

***Heating (Operation mode **OP** = "1"):** For a temperature lower than that of the set point **SP**: the relay on when the temperature is lower than **SP - dF** and off when higher than **SP**.

Example (Heating): If you want to turn on the output with 30°C and turn off at 35°C. In this case, adjust the **OP** with "1", the Set Point **SP** with 35.0 and hysteresis **dF** with 05.0.

NOTE: The setting of a very small hysteresis results in high frequency in the thermostat relay on/off cycles and consequently of the driven load, which may shorten the service life of these components.

dL Minimum delay to turn on the output:

This determines the minimum time during which the output will be off. The counting of the time begins when the output is turned off. If the output is off and you need to turn it back on right away, the relay will be triggered only after the end of the timing adjusted to the **dL** delay.

The goal is to avoid consecutive restarts of output control.

OF Offset:

It allows to compensate deviations in the temperature reading. Example: when changing or altering the length of the sensor cables, it is suggested to take a detour to obtain a better response for the control in question.

NOTE: In order to correct the deviation of the sensor reading, it is necessary to use a standard thermometer, preferably calibrated by an approved laboratory. The driver sensor is placed alongside the standard sensor for a few minutes for the reading to stabilize. Then, based on the reading difference between the sensors, set the offset value in the Off Set function.

Lo Lower limit of the set point*:

Determines minimum adjustment temperature for the set point.

Hi Upper limit of the Set point*:

Determines maximum adjustment temperature for the set point.

NOTE 1*: Together, parameters **Lo** and **Hi** limit the thermostat control range. This scale restriction is intended to protect the system and also safety of the application avoiding, for example, be adjusted temperatures outside the tolerated range.

NA Manual output disable:

Press **ADJUST** for 1 second. In the Off state, the display shows **OFF** and the temperature alternately. For this operation to be available, the **NA** parameter must be set as "1".

7.2.3 Entering the access code

The parameters setting (except set point) is protected by an access code **Cd**.

To access with the code and release the setting of parameters:

a) Keep the **ADJUST** key pressed for 2 seconds: the display will show the message **Cd**; release the key **ADJUST**;

b) After 2 seconds **000** will show on display;

c) Press the **ADJUST** key until **023** appears on display.

NOTE: This operation must be performed within 4 seconds, otherwise the display will show the room temperature. In this case, restart the procedure.

7.2.4 Setting the parameters

After entering the **Cd** access code, in a maximum of 15 seconds:

a) Press the **ADJUST** key as many times as necessary to select the desired parameter: OP, dF, dL, OF, Lo, Hi or MA. See the parameter description in the item 7.2.2;

b) After 2 seconds, the currently set value for the selected parameter will appear;

c) Press the **ADJUST** key as many times as necessary to obtain the desired value for the parameter;

d) Wait 4 sec. and the value will be recorded. The display will return to normal operation, showing the room temperature;

e) Do the same for the setting of all parameters.

NOTE: After entering the access code, be careful not to leave the **ADJUST** key idle (not pressed) for more than 15 seconds between the alteration of one parameter and another. If this happens, **Cd** will appear and access to settings will be automatically blocked, requiring you to enter the 023 code again to make alterations.

8. CONFIGURATION EXAMPLES

Case 1: Configuring the **TIC-17C** for initial fermentation or maturation of an artisanal brewer, where the temperature should be between 17 °C (off) and 20 °C (on).

Case 2: Configuring the **TIC-17C**, used in a cold chamber to maintain the temperature between 6 and 8 °C.

For these cases, make the adjustments suggested in columns "Case 1" and "Case 2" of the following table.

PARAMETER	CASE 1	CASE 2
SP	17.0	06.0
OP	0 - COOLING	0 - COOLING
dF	03.0	02.0
dL	000	000
OF	00.0	00.0
Lo	-50	05.0
Hi	105	10.0
NA	0	0



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.