TIC-17RGTi

DIGITAL THERMOSTAT

Ver.09

E251415

TIC17RIV09-07T-11848

1. DESCRIPTION

The **TIC17RGTi** is a digital thermostat with easy adjustment and installation. It can be used at hot or cold systems. It has a single button to set all functions.
This product complies with UL Inc. (USA and Canada) and NSF (USA).

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);
- For use in locations subject to splashing water, as in commercial refrigerators, install the protective vinyl that comes with the thermostat.

3. APPLICATIONS

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

4. TECHNICAL SPECIFICATIONS

- **Power supply:** 115 or 230 Vac (50/60 Hz)
  12 or 24 Vdc
- **Control temperature(*):** - 50 to 105 °C
- **Resolution:** 0.1ºC (between -10 and 100 ºC) and 1 ºC outside this range
- **Load current:(**):** 16(8)A / 250 Vac 1 hp
- **Dimensions:** 71 x 28 x 71mm
- **Operation temperature:** 0 to 50°C
- **Operation humidity:** 10 to 90% UR (without condensation)

(*) This instrument operates up to 200°C using a silicone sensor cable (SB59).
(**) 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. CONNECTIONS DIAGRAM

The **TIC17RGTi** thermostat comes in two versions:
-**TIC17RGTi**: 115 V or 230 V power supply.
-**TIC17RGTiL**: 12 V or 24 V power supply.

5.1 Identifications (see Figures I and II)

Figure I: Connection diagram for current loads lower than 16(8) A (requires no breaker)
Figure II: Connection diagram for current loads higher than 16(8) A (requires breaker)
A - **TIC17RGTi** controller (Thermostat);
B - Connection terminals and identifications, from "1 to 12";
C - Temperature sensor (thermistor): connected to terminals "1 and 2" / provided with 2 meters;
D - Network power supply (115 or 230 volts): Phase, Neutral and Earth;
E - Load: it can be a compressor, a fan, a heater, a solenoid valve and others;
F - Transient suppressor filter (RC type): it must be connected in parallel and as close as possible to the load - Figure I;
For loads higher than 16(8) A, the RC suppressor filter must be connected in parallel with coil (G1) of the breaker switch (G) - Figure II.
G - Breaker switch: mandatory for driving loads with current higher than 16(8) A - Figure II.

5.2 Temperature sensor connection

- Connect the sensor wires to terminals "1 and 2" (B). The polarity is irrelevant;
- The length of the sensor cables (C) can be increased by the user himself in up to 200 meters, using a PP2x24 AWG cable;
- For immersion in water, use a thermowell (I-Figure IV), available in Full Gauge Controls product line.

5.3 Thermostat power

Use the terminals as shown in the table below, depending on the version of the instrument:

TERMINALS	TIC17RGTi	TIC17RGTiL
7-8	115 V ~	12 V ≂
7-9	230 V ~	24 V ≂

NOTE: The thermostat comes factory-blocked (H - Figure III) inserted into the terminal "8". To remove it, loosen the screw of the terminal.

- **To install the 12 VDC or 115 VAC power thermostat**, connect the Neutral wire to the common terminal "7" and the power cord (phase) to terminal "8".
In this case, transfer block (H) to terminal "9".
- **To install the 24 Vdc or 230 Vac power thermostat**, connect the Neutral wire to the common terminal "7" and the power cord (phase) to terminal "9". In this case, keep block (H) in terminal "9".

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.

- Observe the connections diagram for the two different situations - Figures I and II;
- Connect the F power phase (electricity transmission network) to post "10" (common of thermostat relay).

5.4.1 For current loads lower than 16(8) A - Figure I:

- Connect load (E) directly to terminal "11" of the thermostat;
- Connect the RC suppressor filter (F) in parallel with the load.

5.4.2 For current loads higher than 16(8) A - Figure II:

- Connect the breaker switch (G) as shown in the diagram presented on Figure II;
- To identify the breaker switch terminals (G), see the manufacturer's instructions;
- Connect one of the coil terminals (G1) of the breaker to terminal "11" of the thermostat and the other terminal to the network's neutral;
- Connect the RC suppressor filter (F) in parallel with coil (G1) of the breaker, ie, connect a cable in each of the coil terminals (G1).

NOTE: Typically, the coil terminals (G1) 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. See item (F) in the Images I and II;
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.

GRAPHIC REPRESENTATION OF THE INSTALLATION TIC17RGTi

FIGURE I

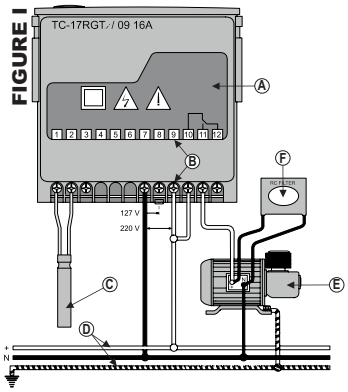


FIGURE II

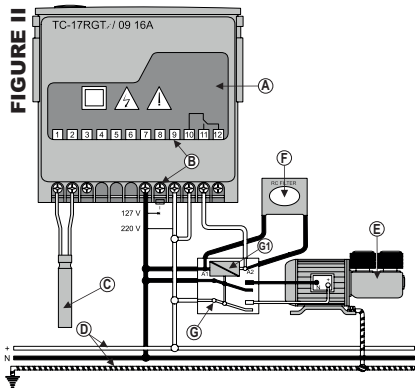


FIGURE III

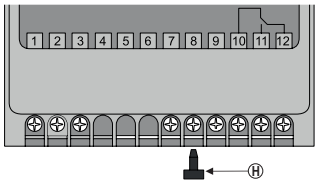


FIGURE IV

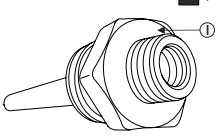


FIGURE V

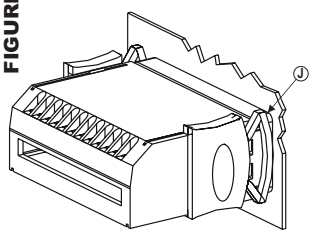
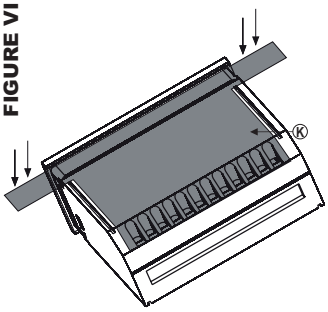


FIGURE VI



REAL REPRESENTATION OF THE INSTALLATION TIC17RGTi

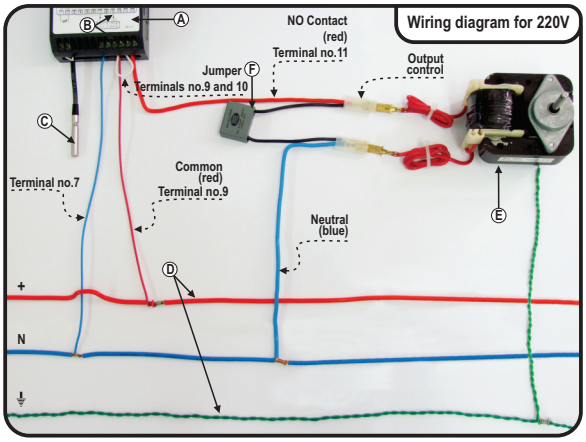


FIGURE VII

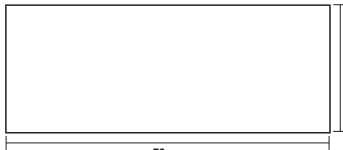
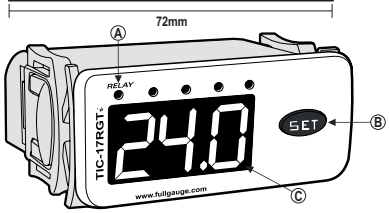


FIGURE VIII



6. INSTALLATION PROCEDURE

a)Cut the sheet where the thermostat will be fixed, with a dimension of 72 x 29 mm - Figure VII;

b)Remove the side latches (J - Figure V): for this, press the central elliptical part (with the Full Gauge Controls logo) and slide the latch backward;

c)Insert the thermostat in the 72 x 29 mm housing socket, from the outside in;

d)Reinstall the latches (J) to fix the thermostat in the housing;

e)Do the electrical wiring as described in item 5.3;

f)Set the parameters as described in Chapter 7.

Protective vinyl (K) - Figure VI: Protects instruments installed in locations subject to splashing water, as in commercial refrigerators.

This adhesive vinyl is with the instrument, inside the packing.

Do the application after finishing the electrical connections.

a) Remove the side latches (J);

b) Remove the protective paper;

c) Apply the vinyl (K) over the entire top, folding the flaps, as indicated by the arrows - Figure VI.

d) Reinstall the latches (J).

NOTE: The protective vinyl is transparent and does not cover the wiring diagram of the controller.

7. SET POINT AND PARAMETER SETTING

A - Led Relay

B - SET key

C - Display

D - Lower limit of operating scale

E - Upper limit of operating scale

Signs

- Led "Relay": when lit, it indicates that the NA contact (terminal "11" of the thermostat) is energized.

- When the Err indication appears on display, it indicates that the sensor is disconnected or the temperature is out of the specified range.

- **AHI** means high temperature alarm.

- **ALO** means low temperature alarm.

- **SOF** means software, and the number that appears next to it represents the version of the controller.

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 key SET for 2 sec. and SP will appear on display. Release the key;

b) After 2 seconds, the currently set control temperature will appear;

c) Press SET to modify the value.

NOTE 1: For each stroke of the SET 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 Hi (see item 7.2.2).

Then, the value returns to the beginning of the scale (- 50°C) or to the minimum limit specified in the parameter setting Lo *(see item 7.2.2)*.

NOTE 2: Keeping the SET 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 Table of parameters

NOTE: Access to all parameters is protected by the Cd access code.
For detailed information, see item 7.2.4. "Entering the 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
Lo	Minimum set allowed to the final user	-50	105(*)	°C	-50
Hi	Maximum set allowed to the final user	-50	105(*)	°C	105

7.2.2 Parameter description

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. 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.

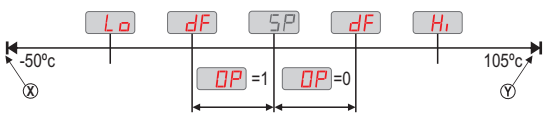
NOTE 1: Together, parameters Lo and Hi limit the thermostat control range. This scale restriction is intended to protect the system and also safety of the application, avoiding for example, be adjusted temperatures outside the tolerated range.*

NOTE 2: The scale capacity limits of the thermostat are represented by the items in Figure IX (X - minimum) and (Y - maximum). Respectively: -50°C and 105°C.

7.2.3 Graphical interpretation of the parameters (Figure IX)

The graph illustrates the meaning of the various parameters on the line of temperatures.

FIGURE. IX



7.2.4 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 SET key pressed for 10 seconds. The display will show the message Cd ; release the key SET;

b)After 2 seconds 000 will show on display;

c)Press the SET 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.

7.2.5 Setting the parameters

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

a)Press the SET key as many times as necessary to select the desired parameter: OP, dF, dL, OF, Lo or Hi: see the parameter description in the previous item 7.2.2;

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

c)Press the SET 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 SET 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 **TIC17RGTi** 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 **TIC17RGTi**, 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

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.