

**TO-72IB**

Ver.01

**TEMPERATURE AND TIME
CONTROLLER FOR OVENS**

TO72IBV01-01B-16908

BEFORE INSTALLING THE CONTROLLER, WE RECOMMEND READING THE INSTRUCTION MANUAL IN FULL TO PREVENT POSSIBLE DAMAGE TO THE PRODUCT.

THROUGH CONTINUOUS DEVELOPMENT, FULL GAUGE CONTROLS RESERVES THE RIGHT TO CHANGE THIS MANUAL INFORMATION AT ANY TIME, WITHOUT PRIOR NOTICE.

1. DESCRIPTION

The **TO-72IB** is a thermostat and timer designed for automation of forced convection ovens or for combined ovens. Through its installation menu it is possible to configure the instrument to operate in the temperature control in gas, electric or wood type ovens. The **TO-72IB** controls the steam injection and furnace illumination and allows you to switch the direction of rotation of the roast, in addition to having an internal buzzer that warns, for example, the end of the roast. Using recipes mode, you can preset up to 12 different recipe options by setting the temperature set point, cooking time, steam operating mode, steam injection time and minimum time between steam injections, keeping the oven ready for the most varied types of cooking. It has an exclusive output for use of an external sound alarm if necessary, and it has the possibility of enabling the thermal protection temperature sensor of the turbine, avoiding overheating. The ThermOn line was developed and produced with high quality raw material and stands out for its unique and differentiated design. Features locking functions, preventing third parties from changing parameters, hermetic front that offers high protection against ingress of dirt and moisture, and more.

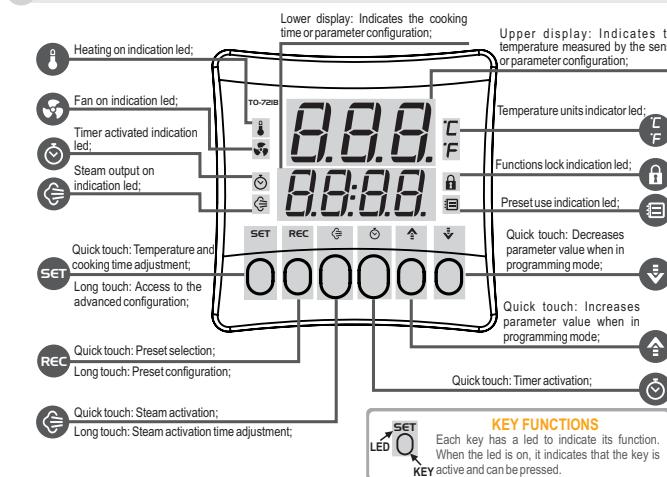
2. MAIN APPLICATIONS

Combined ovens, forced convection ovens, stoves

3. TECHNICAL SPECIFICATIONS

Electric power supply	TO72IB: 85-265Vca ± 10% (50-60Hz) TO72IBL: 12-24Vca/Vdc	Approximate consumption 10VA
Operating temperature	0 to 60°C	
Control temperature	-10 to 500°C / 14 a 932°F	
Operating humidity	10 to 90% UR (without condensation)	
Temperature sensor	Type J or K thermocouple (sold separately)	
Thermal protection sensor	Fan PTC (sold separately)	
Resolution	1°C / 1°F	
Digital Input	E1: door micro switch input	
Flame sensor	E2: flame sensor input	
Relay outputs	6 relay outputs: 5 (3)A / 250Vac 1/8HP	
External audible alarm (buzzer) output	12Vcc/30mA (max)	
Product dimensions (mm)	75 x 75 x 100 (WxHxD)	
Opening dimensions (mm)	67,5 x 67,5	

4. INTRODUCTION



5. INSTALLATION CONFIGURATION

**Func
Edit**

Access the menu setting by pressing the **SET** key for 4 seconds until **Func** is displayed. When **Func** is displayed press the **SET** key again (quick touch). Use the **↑** or **↓** keys to enter the access code 231 and press **SET** (quick touch) again when ready.

Use the **↑** or **↓** keys to select the desired function. The value can be edited with a quick touch on the **SET** key. Use the **↑** or **↓** keys to change the value and press the **SET** key with a quick touch when ready to save the configured value and return to the functions menu. To leave the configuration menu and return to the normal operating mode (temperature indication), press **SET** (long touch) until **---** is displayed.

5.1 Installation setup table

Fun	Function	Description	Min	Max	Unit	Def.
[L]	Access code (231)	Required when you want to change installation setup parameters.	0	9999	-	0
[O]	Oven type selection	Selects the control type of the oven: [ELE] = Electric oven [GR5] = Gas-fired oven [LEN] = Wood-fired oven	ELE	LEN	-	GAS
[T]	Temperature sensor type	Defines the type of temperature sensor to be used with the controller. IMPORTANT: This function is not available for this model.	tc_J	tc_H	-	tc_J
[U]	Temperature units selection	Selects the temperature units the controller will use for its operation.	°C	°F	-	°C
[L]	Language selection	Selects the language the controller will use to display messages: [POR] = Portuguese [ENG] = English [ESP] = Spanish	PORT	ESP	-	PORT
[S]	Enable external audible alarm (buzzer)	Enables or disables the external audible alarm (buzzer). If enabled, the internal audible alarm (buzzer) will be disabled.	OFF	ON	-	OFF
[V]	Internal audible alarm (buzzer) volume	Selects the sound intensity of the internal audible alarm (buzzer). [L] = low volume [M] = medium volume [H] = high volume	MIN	HIGH	-	MED
[D]	Door digital input signal type	[NO] - normally open contact (NO) [NC] - normally closed contact (NC)	NO	NC	-	NO
[F]	Enable fan thermal protection	If enabled, monitors fan temperature. In case of overheating, enters error mode, switching off the outputs of the controller. [ON] = Fan thermal protection enabled. [OFF] = Fan thermal protection disabled.	OFF	ON	-	ON

6. OPERATION

6.1 Oven: Electric

In this operating mode the controller keeps the heating output on until the oven reaches the oven temperature setpoint (SP). The output will be activated again when the temperature drops below the setpoint minus the hysteresis (F04).

6.2 Oven: Gas

In this operating mode the controller automates / monitors the flame ignition and thus the heating of the oven through the activation of the gas output, ignition module, and flame sensor input. The controller keeps the heating output on until the oven reaches the oven temperature setpoint (SP). Heating will be activated again when the temperature drops below the setpoint minus the Hysteresis (F04). The controller permanently monitors the flame sensor to ensure the safe operation of the gas-fired oven. In this way, if there are any abnormalities, errors Er4 - Flame Sensor shorted with the burner and Er5 - Lack of Flame are indicated. For more information check item 9 (Signaling).

6.3 Oven: Wood

In this operating mode the heating output works as an upper threshold alarm, indicating when the temperature exceeds the value adjusted in Oven Temperature setpoint (SP). The audible alarm is also activated to warn the user about the overheating. The output and audible alarm are switched off when the temperature drops below the Oven Temperature setpoint (SP) minus the Hysteresis (F05) or when a **SET** key in the controller's front panel is pressed.

6.4 Default Mode (standard)

In this operating mode the controller performs the gas type control, however the flame sensor is ignored and the controller will not monitor flame presence. The controller will not detect errors Er4 - shorted flame sensor and Er5 - out of gas, resulting in an operation with less safety. **NOTE:** The Default Mode (standard) of operation is available only when the type of oven is adjusted as gas. To execute this operating mode, check item 5.5 Enable Default (standard) Mode of operation.

IN THIS OPERATING MODE THE FLAME SENSOR IS IGNORED AND THE CONTROLLER WILL NOT DETECT THE PRESENCE/LACK OF FLAME, BEING ESSENTIAL FOR THE OPERATOR TO PAY SPECIAL ATTENTION TO CONTROL THE OVEN IN ORDER TO PREVENT GAS ACCIDENTS.

7. OPERATIONS - BASIC LEVEL

The controller has easy access to resources that are relevant to the user of the oven.

7.1 Ajuste da temperatura e temporizador do forno

To adjust oven temperature and timer, perform a quick touch on the **SET** key. Use the **↑** or **↓** keys to adjust the value of the parameter. To advance and/or terminate the adjustment, perform another quick touch on the **SET** key.

**180
SP**

ADJUSTMENT OF THE DESIRED TEMPERATURE (SETPOINT) OF THE OVEN:
Defines the working temperature of the oven. This parameter can be adjusted between the values defined in F02 - Minimum value allowed to configure the oven temperature setpoint and F03 - Maximum value allowed to configure the oven temperature setpoint.

TIMER SETTINGS:

18:00
Defines the cooking time. When the time expires, the audible alarm output is switched on intermittently until any key on the controller's front panel is pressed. The timer can be adjusted between 00:01 and 99:59. The time scale is adjusted in parameter F14 - Time base of the timer.

7.2 Steam activation

The steam operating mode is defined in parameter F18 - Steam Operating Mode. Steam activation depends on parameters F20 - Time interval between steam activations and F21 - Minimum temperature to activate the steam available in the advanced configuration menu. These conditions must be met for the injection of steam in the oven to occur.

7.2.1 Steam activation times

Press the **SET** key and hold for 4 seconds to adjust. Use the **↑** or **↓** keys to adjust the value. To confirm, perform a quick touch on the **SET** key.

FAN CONTROL MODE:

Selects the control mode for the fan:

[ON] = On, the fan is controlled by output FAN 1.**[ALT]** = Alternated, reverses the rotation direction of the fan by outputs FAN 1 and FAN 2, in accordance with parameters F23 and F24.

STEAM OUTPUT ON TIME:

5
This parameter can be adjusted between 1 and 999 seconds and the factory default is 5 seconds.

STEAM OUTPUT OFF TIME:

3
This parameter can be adjusted between 20 and 999 seconds and the factory default is 30 segundos.

NOTE: This parameter is available for adjustment when the steam control mode selected is cyclic, **[F18]=[CYC]**.

7.3 Presets

A recipe contemplates setting the oven temperature, process time, steam operating mode, triggered steam injection time, and deactivated steam injection time.

7.3.1 Preset selection

[REC]

To select a preset in the controller, perform a quick touch on the **REC** key and then use **↑** or **↓** to select the desired preset.
REC - QUICK TOUCH: cancel preset selection;
REC - LONG TOUCH: confirm preset selection;

Icon **[■]** indicates that the preset mode is active.

7.3.2 Preset configuration

To access the preset configuration menu, keep the **REC** key pressed for 4 seconds. Then use **↑** or **↓** to select the parameter to be adjusted, use the **REC** key to access the parameter, and then use **↑** or **↓** to adjust the value of the parameter. To leave the preset menu and return to the normal operating mode (temperature and time indication), keep the **REC** key pressed (long touch) until **---** is displayed.

7.3.2.1 Preset configuration table

Fun	Função	Descrição	Mín	Máx	Unid.	Padr.
[LNF]	Select the preset to be configured	Selects the number of the preset to be configured. There are 12 presets that can be customized by the user.	1	12	-	1
[LSP]	Oven temperature setpoint for the selected preset	Adjustment of the oven temperature setpoint for the preset selected by parameter [LNF] .	(F02)	(F03)	°C (°F)	180 (356)
[LEN]	Timer adjustment for the selected preset	Adjustment of the timer for the preset selected by parameter [LNF] .	00:01	99:59	F14	18:00
[LUF]	Steam operating mode for the selected preset	Defines the steam operating mode for the selected preset [LNF] : [OFF] Off: does not inject steam [MAN] : injects steam when the SET key is pressed. [AUT] : Automatic: automatically injects steam after the time set in F19 has elapsed. [CYC] : Cyclic: injects steam in cycles using the times configured in [UON] and [UOF]	OFF	CYC	-	MAN
[UON]	Steam output time on selected recipe	Time setting of the steam output on the recipe selected by parameter [LNF] .	1	999	Seg.	5
[UOF]	Steam output time off in selected recipe	Setting the steam off time in the recipe selected by the [LNF] parameter. Note: This parameter will only be considered when the mode of operation of the steam in the selected recipe [LNF] is of the cyclicity [CYC] .	20	999	Seg.	30

7.4 Functions lock

L **0** **E**
0 **7**

To enable / disable the functions lock, press the **▲** and **▼** keys and hold for the time configured in parameter F26 - Time for functions lock.
When this configuration is active, the parameters cannot be changed, but they can be viewed. When the lock is active, the parameters available for adjustment are defined in parameter F25 - Functions Lock.
Icon **■** indicates the status of the lock. Icon lit indicates the functions lock is active.

7.5 Enable Default (standard) operating mode

d **E** **F**
E **I** **P** **O**

To enable the Default (standard) operating mode of the oven, the controller must be powered up with the **◇** and **◆** keys pressed until the message appears on the display. This mode is available when the type of oven selected is GAS. For more details about this operating mode check item 6.4 Default Mode (standard).

IN THIS OPERATING MODE THE FLAME SENSOR IS IGNORED AND THE CONTROLLER WILL NOT DETECT THE PRESENCE/LACK OF FLAME, BEING ESSENTIAL FOR THE OPERATOR TO PAY SPECIAL ATTENTION TO CONTROL THE OVEN IN ORDER TO PREVENT GAS ACCIDENTS.

8. OPERATIONS - ADVANCED LEVEL

8.1 Changing the controller parameters

F **nc**
E **d** **l** **t**

Access the advanced configuration menu by pressing the **SET** key for 4 seconds until **Func** is displayed. When **Func** is displayed press the **SET** key again (quick touch). Use the **▲** or **▼** keys to enter the access code 123 and press **SET** (quick touch) again when ready.

Use the **▲** or **▼** keys to select the desired function. The value can be edited with a quick touch on the **SET** key. Use the **▲** or **▼** keys to change the value and press the **SET** key with a quick touch when ready to save the configured value and return to the functions menu.

To leave the configuration menu and return to the normal operating mode (temperature and time indication), press **SET** (long touch) until **---** is displayed.

8.2 Parameter table

FUN	FUNCTION	DESCRIPTION	MIN	MAX	UNIT	DEF.
F00	Access code (123)	Required when you want to change the advanced configuration parameters.	0	9999	-	0
F01	Temperature sensor indication offset	Allows compensating deviations in the sensor temperature reading.	-20 (-4)	20 (36)	°C (°F)	0 (0)
F02	Minimum value allowed to configure the oven temperature setpoint	These parameters serve as the lower and upper threshold for the adjustment of parameter "SP"- oven temperature setpoint.	-10 (14)	F03 (932)	°C (°F)	0 (32)
F03	Maximum value allowed to configure the oven temperature setpoint	They are used to block temperature adjustment and avoid an improper configuration for the operation of the oven.	F02 (932)	500 (446)	°C (°F)	230 (446)
F04	Oven temperature differential (Hysteresis)	The temperature difference to switch on the heating output. This function allows defining a temperature interval within which the heating output will remain on.	1 (1)	20 (36)	°C (°F)	3 (5)
F05	Delay to switch off the temperature control when the door of the oven is opened	Defines the delay to switch off the temperature control when the oven door is opened to allow furnishing the oven without switching off the control. To disable this function, displace the adjustment to the minimum until no(0) is displayed. In this case, the temperature control is switched off as soon as the door is opened.	no(0)	180	seg.	90
F06	Number of attempts to ignite the flame (GAS-FIRED OVEN)	Defines the maximum number of attempts the controller will try to ignite the flame. After using up all attempts, the controller will signal error E-5 - Out of Gas. NOTE: This parameter is used when the type of oven selected is GAS.	1	5	-	3
F07	Ignition output on time (GAS-FIRED OVEN)	Defines the time the ignition output will stay switched on to try igniting the flame. NOTE: This parameter is used when the type of oven selected is GAS.	1	15	seg.	3

FUN	FUNCTION	DESCRIPTION	MIN	MAX	UNIT	DEF.
F18	Interval between ignition output activation (GAS-FIRED OVEN)	Defines the interval between attempts to activate the flame. NOTE: This parameter is used when the type of oven selected is GAS.	1	15	seg.	5
F19	Delay to activate the ignition output after controller start up (GAS-FIRED OVEN)	Defines the delay to activate the ignition output after the gas output is activated in the first attempt to ignite the flame. This time is used so that the gas from the cylinder reaches the burner and then the ignition is activated. Note: This parameter is used when the type of oven selected is GAS.	no (0)	15	seg.	2
F20	Delay of the temperature control after controller start up (GAS-FIRED OVEN)	When the controller is powered up, the fan is activated first and then the flame ignition process commences after the time adjusted in this parameter has elapsed. NOTE: This parameter is used when the type of oven selected is GAS.	no (0)	30	seg.	15
F21	Delay of the temperature control (GAS-FIRED OVEN)	When the controller tries to ignite the flame, for example after the door is opened, the fan is activated first and then the flame ignition process commences after the time adjusted in this parameter has elapsed. NOTE: This parameter is used when the type of oven selected is GAS.	no (0)	30	seg.	5
F22	Timer trigger mode	Defines the timer triggering mode: IRN = Manual, through the ◇ key or E2: Digital input of remote timer trigger. IRP = Start up, when the controller is powered up. ITP = Temperature, when the oven working temperature is reached. NOTE: In modes IRN and ITP the ◇ key or E2: Digital input of remote timer trigger only cancels the timer.	MAN	TMP	-	MAN
F23	Timer counting direction	Defines the direction the timer counts: DEC = time count down; CRE = time count up;	DEC	CRE	-	DEC
F24	Time base of the timer	Defines the time base of the timer: MM:SS = minutes, maximum time 99:59 minutes; HH:MM = hours, maximum time 99:59 hours;	MM:SS	HH:MM	-	MM:SS
F25	Timer reset mode	Defines the timer reset mode, essentially whether the audible alarm will be switched off manually or by time: IRN = Manually through the ◇ key or E2: Digital input of remote timer trigger; IRU = Automatically according to the time defined in parameter F17; NOTE: The timer also resets when the door of the oven is opened, independently of the mode defined in this parameter.	MAN	AUT	-	MAN
F26	Timer reset time base	Defines the time base when the timer is reset: MM:SS = minutes, maximum time 99:59 minutes; HH:MM = hours, maximum time 99:59 hours;	MM:SS	HH:MM	-	MM:SS
F27	Time to reset the timer (aut mode)	Defines the time to reset the timer if automatic reset is selected in parameter F15.	0:01	99:59	F16	0:05
F28	Steam working mode	Defines the steam operating mode for the selected preset [RLNF] : OFF : does not inject steam. IRN : Manual: injects steam when the ◇ key is pressed. IRU : Automatic: automatically injects steam after the time set in F19 has elapsed. IRG : Cyclic: injects steam in cycles using the times configured in [UB0A] and [UB0F] . NOTE: When the preset mode is active, this configuration is made in menu [UB] .	OFF	CYC	-	MAN
F29	Delay to activate the automatic steam	Defines the delay before injecting steam in the oven after the timer is activated. This parameter is valid when automatic steam is adjusted in parameter F18.	1	999	seg.	5
F30	Time interval between steam activations	Defines the minimum time interval between steam activations, i.e. once the steam output is activated, the controller will not activate it again before the time adjusted in this parameter has elapsed. To disable this function, displace the no(0) adjustment to the minimum until no(0) is displayed. NOTE: This parameter is disregarded when the type of steam selected is cyclic.	no(0)	30	min.	no(0)
F31	Minimum temperature to activate the steam	Defines the minimum temperature in the oven to allow activating the steam output. To disable no(-10) this function, displace the adjustment to the no(14) minimum until no(14) is displayed.	500 (932)	°C (°F)	no(-10) no(14)	
F32	Economy mode - oven idle time to switch off the light	Defines the time the oven has to be idle before the controller enters Economy Mode (ECO). When the light bulb output is switched off. Press SET to leave ECO mode.	no(0)	60	min.	15
F33	Fan output on time	Defines the time the fan will stay active in each direction.	1	600	seg.	180
F34	Fan output off time	It must be adjusted with the time required for the fan to stop, so that the rotation reversion can be performed smoothly.	1	30	seg.	15
F35	Functions lock	Defines the functions lock mode: OFF = functions lock disabled; LOC1 = partial functions lock 1 - prevents advanced configuration parameters from being changed; LOC2 = partial functions lock 2 - prevents controller parameters from being changed, only allowing changing presets; ULL = full functions lock, does not allow any parameter adjustment;	OFF	FULL	-	LOC1
F36	Time for functions lock	Defines the time to lock / unlock the functions. For more information see item 7.4 - Functions Lock.	1	30	seg.	10

9. SIGNALING

9.1 Operating mode signaling

Upon power up the controller indicates the operating mode of the oven.

E
E
I
P**O**

Electric Oven
Controller configured with the electric oven logic.

G
A
S
I
P**O**

Gas-fired Oven
Controller configured with the gas-fired oven logic.

W
E
I
P**O**

Wood-fired oven
Controller configured with the wood-fired oven logic.

D
E
F
I
P**O**

Default Mode (standard)

Controller configured with gas-fired oven logic with Default (standard) mode enabled, without flame sensor monitoring. For more information see item 7.5 Enable Default (standard) operating mode;

9.2 Programming signaling

L
O
C
O**n**

Functions lock active

Does not allow adjusting the parameter.
To deactivate functions lock see item 7.4 - Functions lock.

N
O
C
o**d**

Parameter adjustment denied

Enter access code in parameter **L**
O**C** to adjust the parameter value.

E
A
S
P**ro****g**

Receiving data by EasyProg* (programming key)

Updating the parameter table via EasyProg*.

* sold separately

9.3 Process signaling

If the controller detects an error that interferes in the operation of the system, the controller switches off the outputs, switches on the audible alarm intermittently, and indicates the detected failure on the display. To leave error mode, the controller must be switched off, the fault corrected, and the controller switched on again.

E
r
1
E
C
A
L

Providence:
Contact Full Gauge Controls.

E
r
2
P
P
P

Providence:
Reconfigure the function values.

E
r
3
E
N
P

Reason: Temperature sensor disconnected or out of range.
Providence: Check sensor connections and operation.

E
r
4
S
E
n**s**

Reason: Flame sensor short-circuit with burner.
Providence: Check that the flame sensor is in contact with the burner.

E
r
5
G
A
S

Reason: Out of gas, the controller does not detect a flame.
Providence: First check if there is gas available for the oven to operate. Check the presence of flame and the distance between the flame sensor and the burner. Other possibilities for this failure are: flame sensor disconnected or dirty / oxidized, damaged ignition module or gas valve.

E
r
6
t
ur**b**

Reason: Fan overheating, its temperature exceeded the rated temperature of the thermal protection PTC sensor.
Providence: Check the operation of the fan and respective temperature sensor.
OBS: if the thermal protection sensor is not used, connect terminals 3 and 4 with a wire and/or disable parameter **F**
0**8** - Enable thermal protection of the turbine.

9.4 Other signaling

E
C
O
B

Controller in Economy mode. The controller was idle for the time adjusted in F22 - Economy Mode. To leave this mode, press **SET** or open the oven door.

Note: This message is displayed alternately with the oven temperature.

OPEN **door**

Indicates that the oven door is open.

Note: The message keeps cycling on the lower display.

CLOSE **the** **door**

Requests the operator to close the door. Indicates that the door was kept open for the time adjusted in parameter F05. In this mode the controller switches off the heating and activates the audible alarm.

Note: The message keeps cycling on the lower display.

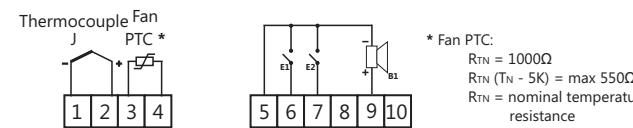
10. INSTALLATION

10.1 Electrical connections

PRODUCT INSTALLATION PRECAUTIONS:

- Before performing any procedure on this instrument, disconnect it from the power grid;
- Ensure that it has adequate ventilation, avoid installation on control panels containing devices that could cause it to operate outside its specified temperature range;
- Install the product away from sources that may generate electromagnetic disturbances, such as: motors, contactors, relays, electrovalves, etc;

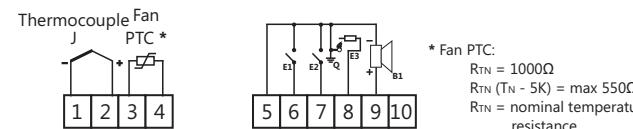
10.1.1 Oven: Electric



* Fan PTC:
RTN = 1000Ω
RTN (Tn - 5K) = max 550Ω
RTN = nominal temperature resistance

E1: Door micro switch
E2: Remote timer trigger
B1: External audible alarm (buzzer)

10.1.2 Oven: Gas



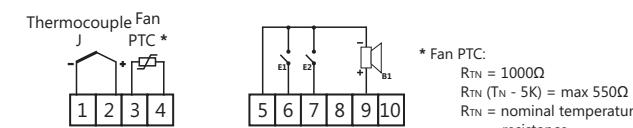
* Fan PTC:
RTN = 1000Ω
RTN (Tn - 5K) = max 550Ω
RTN = nominal temperature resistance

E1: Door micro switch
E2: Remote timer trigger
E3: Flame sensor
B1: External audible alarm (buzzer)
Q: Burner

IMPORTANT:

- It is crucial to install the ignition module next to the burner and as far as possible from the electronic controller;
- The ignition electrode must be installed at a distance of 5 mm from the burner;
- The flame sensor must be installed at a distance of 5 mm from the burner and at least 50 mm from the ignition electrode.

10.1.3 Oven: Wood

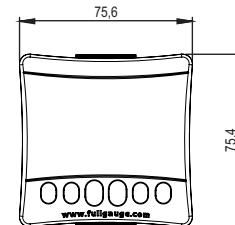


* Fan PTC:
RTN = 1000Ω
RTN (Tn - 5K) = max 550Ω
RTN = nominal temperature resistance

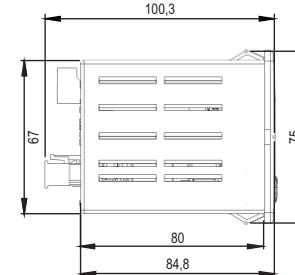
E1: Door micro switch
E2: Remote timer trigger
B1: External audible alarm (buzzer)

11. DIMENSIONS

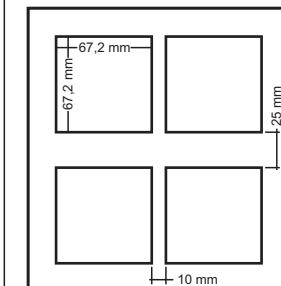
front view



Side view



Panel openings



12. EasyProg* - version 2 or later

It is an accessory the main function of which is to store the parameters of controllers. At any time you can load new parameters of a controller and unload them on a production line (of the same controller), for example.

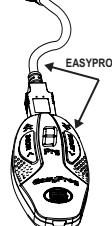
It is provided with three types of connections for loading or unloading the parameters:

- **Serial RS-485:** It is connected by RS-485 network to the controller (only for those controllers provided with RS-485).

- **USB:** It is connected to the computer by USB port, using the Sitrad Preset Editor.

- **Serial TTL:** The controller may be connected directly to EasyProg by Serial TTL connection.

* Sold separately



ENVIRONMENTAL INFORMATION

PACKAGING:

Materials used in the packaging of the Full Gauge Controls products are 100% recyclable. Be sure to dispose of using specialized recycling facilities.

PRODUCT:

The components used in the Full Gauge Controls controllers may be recycled and reused if disassembled by specialized companies.

DISPOSAL:

Do not incinerate or dispose of the controllers that reached the end of their service life in household waste. Be sure to comply with the existing legislation in your area relating to disposal of electronic waste. In the event of doubt, please contact Full Gauge Controls.

WARRANTY - FULL GAUGE CONTROLS

Products manufactured by Full Gauge Controls, as of May 2005, have a ten (10)-year warranty directly with the factory and one (1) year before the reseller network, counted as of the date of consigned sale as stated on the invoice. After this said year before the reseller network, the warranty shall continue to be executed if the instrument is sent directly to Full Gauge Controls. The products are warranted in case of defects in workmanship making them unsuitable or inadequate to the intended applications. The warranty is limited to maintenance of instruments manufactured by Full Gauge Controls, disregarding other kinds of expenses, such as indemnity for damages caused to other equipment.

EXCEPTIONS TO WARRANTY

The Warranty does not cover expenses incurred for freight and/or insurance for sending the products with signs of defect or malfunctioning to the provider of technical support services. The following events are also excluded from warranty: natural wear and tear of parts, external damages caused by falls or inadequate packaging of products.

INVALIDATION OF WARRANTY

The product warranty shall lose validity, automatically, if:

- The instructions for use and assembly contained in the technical description and the installation procedures described in Standard NBR5410 are not followed;

- The product is submitted to conditions beyond the limits specified in its technical description;

- The product is violated or repaired by a person not integrating the technical team of Full Gauge Controls;

- The damages are due to a fall, blow and/or impact, water damage, overload and/or atmospheric discharge.

USE OF WARRANTY

For using the warranty, the customer should send the adequately packaged product, along with the respective invoice to Full Gauge Controls. The customer will bear the freight cost for sending of the products. Also, as much information as possible with regard to the defect verified should be sent, in order to facilitate the analysis, the testing and the performance of the service.

Those processes and any product maintenance shall only be performed by the Technical Support Services of Full Gauge Controls, at the Company headquarters - Rua Júlio de Castilhos, 250 - CEP 92120-030 - Canoas - Rio Grande do Sul - Brazil.