# PCT-100E Ver.07

**DIGITAL PRESSURE CONTROLLER AND INDICATOR**

Function blocking | Control Functions Shutdown | Serial programming | IP 65 FRONT Protection level | Hour meter


PCT100EV07-03T-17361

⚠ Have this manual in the palm of your hands using the **FG Finder** application

## 1. DESCRIPTION

**PCT-100E** is a pressure switch that is easy to install and apply, aimed at systems that require effective pressure control.
Operating in pressurizing or depressurizing mode, it directly commands loads up to 1HP. In addition, it features digital inputs that allow using external devices to protect the controlled system, an hour meter that stores the number of hours the compressor is in operation and that indicates when to service it. It also has an intelligent function blocking system, preventing unauthorized personnel from changing the control parameters.

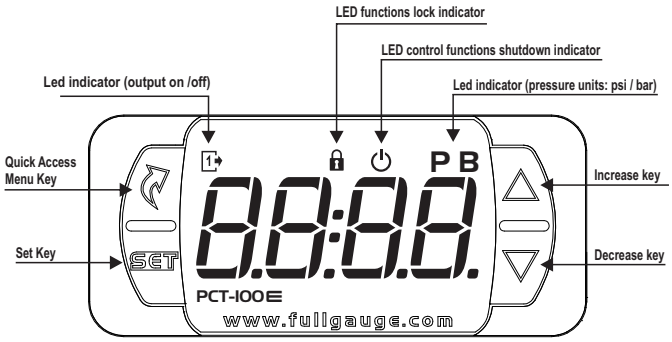
## 2. APPLICATIONS

• Control of suction or discharge in refrigeration systems, control of air compressors and hydraulic pumps.

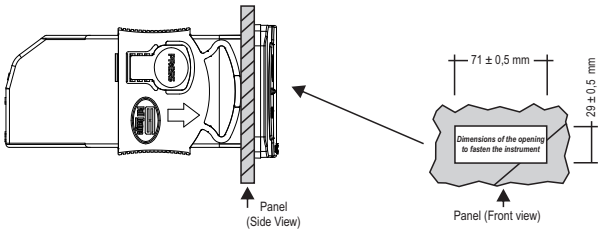
## 3. TECHNICAL SPECIFICATIONS

| | | |
|---|---|---|
| **Power Supply** | **PCT-100E:**<br>**PCT-100EL 12Vac/dc:**<br>**PCT-100EL 24Vac/dc:** | 115 or 230Vac ±10% (50/60 Hz)<br>12Vac/dc ±10% (50/60 Hz)<br>24Vac/dc ± 10% (50/60 Hz) |
| **Pressure control range** | | 0 to 850 psi / 0 to 58.6 bar (configurable sensor operating range) |
| **Approximate consumption** | | ±2.0 VA |
| **Sensors available for acquisition** | | SB69 - 100A* (0 to 100 psi / 0 to 6,9 bar)<br>SB69 - 200A* (0 to 200 psi / 0 to 13,8 bar)<br>SB69 - 500A* (0 to 500psi / 0 to 34,4 bar)<br>SB69 - 850A* (0 to 850psi / 0 to 58,7 bar)<br>*Sensors sold separately. |
| **Pressure resolution** | | 1 psi / 0,1 bar |
| **Operating temperature** | | 0 to 50 °C / 32 to 122 °F |
| **Max. current** | | OUT: 16A / 1HP 250Vac |
| **Operating humidity** | | 10 to 90% UR (without condensation) |
| **Digital inputs** | | Configurable dry contact |
| **Protection level** | | IP 65 (frontal) |
| **Protection level** | | 76x 34 x 77 mm (WxHxD) |
| **Dimensions of the clip for fixing the instrument** | | 71±0,5 x 29 ± 0,5 mm (see item 5) |

## 4. INDICATORS AND KEYS




## 5. INSTALLATION - PANEL AND ELETRIC CONNECTIONS




**⚠ ATTENTION**

FOR INSTALLATIONS THAT REQUIRE WATER TIGHTNESS, THE OPENING TO INSTALL THE CONTROLLER MUST BE 70.5 x 29 mm MAXIMUM. THE SIDE LATCHES MUST BE FIXED SO AS TO PRESS THE SEALING GASKET TO PREVENT INFILTRATION BETWEEN THE OPENING AND THE CONTROLLER.

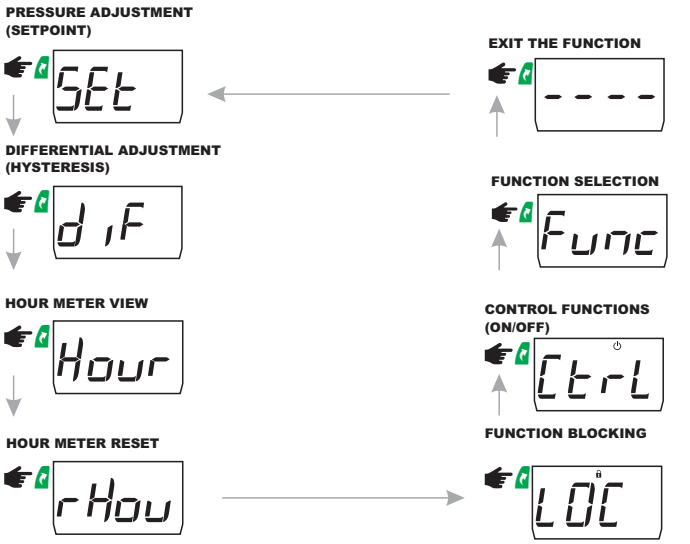
**⚠ IMPORTANT**

IT IS ESSENTIAL TO USE PROPER TOOLS IN ORDER TO AVOID DAMAGE TO THE INSTRUMENT'S CONNECTION TERMINALS:
⊖ 3/32" (2.4 mm) SLOTTED SCREW DRIVER FOR ADJUSTMENTS IN THE SIGNAL TERMINALS;
⊕ #1 PHILLIPS SCREW DRIVER FOR ADJUSTMENTS IN THE POWER TERMINALS;

## 6. OPERATIONS

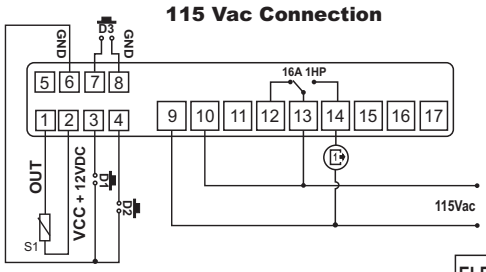
### 6.1 Quick Access Menu Map

To access or browse the quick access menu, use the key (short press) while the controller is displaying the pressure. Each touch displays the next function in the list; to confirm, use the SET key (short press).

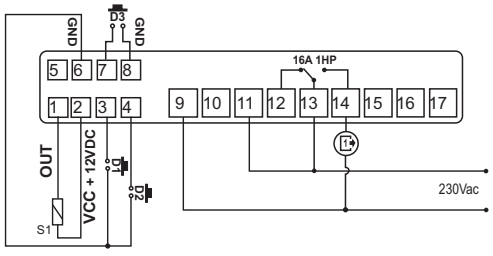



## 5.1 INSTALLATION - ELETRIC CONNECTIONS

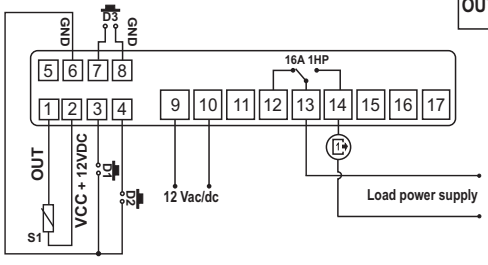
### 115 Vac Connection




### 230 Vac Connection

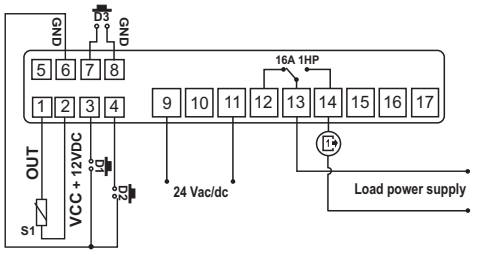



### 12 Vac/dc Connection




**ELECTRICAL CONNECTION OF THE TRANSDUCER:**
**VCC: 12Vdc**
**OUT: 4~20mA**

### 24 Vac/dc Connection



### 6.2 Quick access keys map

When the controller is on temperature display mode, the following keys can be used as a shortcut for the following functions:

| | |
|---|---|
| SET | **Press for 2 seconds: setpoint adjustment** |
| ▲ | **Short press: display of minimum and maximum pressures** |
| ▲ | **Press for 2 seconds: clear history when records are being displayed** |
| ▼ | **Press for 2 seconds: inhibits alarms** |
| ↩ | **Short press: enters quick access menu** |
| ↩ | **Press for 5 seconds: turns the Control Functions Off** |
| ▲ ▼ | **Enters function selection** |

## 6.3 Basic operations

### 6.3.1 Pressure adjustment (setpoint)

To adjust the desired pressure, press SET for 2 seconds. The message [SP] will be shown in the display, followed by the value to adjust the setpoint. Use the keys ▲ or ▼ to change the value and press SET to confirm.
Finally, the indication [----] is signaled concluding the configuration. The setpoint can also be adjusted via quick access menu.

### 6.3.2 Function blocking

The use of the functions lockdown brings greater security to the operation of the instrument. When it is active, the setpoint and other parameters can be visible to the user, but are protected against undue change [F21 = 2] or you can simply block changes to control functions and leave the adjustments of the setpoint and hysteresis enabled [F21 = 1].
To active the functions lock, access the [LOC] option in the quick access menu. The [no] message will be displayed (lock must be enabled and inactive). With that on the display, press the ▼ key for the the time configured for the functions lock (F22), the activation is indicated by the [LOC] [On] message. To enable the use of this function, F21 must be configured with 1 or 2. The message [LOC] when you try to change the parameters indicates that the function lock is active. To turn it off, turn controller off and on again with the key ▼ pressed and hold it down until the message [LOC] [OFF] indicates the unlocking (10 seconds).

### 6.3.3 Turning the Control Functions Off

Turning the control functions off allows the controller to operate just as a pressure indicator, keeping the control output and the alarms disconnected. Use of this feature is enabled or disabled by the control functions shutdown options (F23). When enabled, the control functions are turned off ([CtrL] [OFF]) or on ([CtrL] [On]) through the quick access menu in the option [CtrL].
When the control functions are off, the message [OFF] will be displayed alternately with the pressure and the other messages. It is also possible to switch the control functions on / off by pressing the ↩ key for five seconds.
**Note:** When the control functions are switched back on, the time set in the delay function when the instrument is powered on (initial delay) is counted.

### 6.3.4 Minimum and Maximum Pressure Records

Pressing the ▲ (short press) key while the pressure is being displayed will show the message [rEG] and then the minimum pressure and maximum pressure recorded.
Note.: If the ▲ key is pressed while the records are being displayed the values will be reset and the message [rSEt] will be displayed.

### 6.3.5 Alarm inhibition

A pressure alarm can be inhibited by pressing ▼ for two seconds. For new alarm indications, it is necessary for the instrument to leave the alarm condition and then enter it again, and remain in this condition until the alarm validation time (F15) is exceeded.

### 6.3.6 Hour meter

The hour meter indicates the number of working hours of the compressor control output. The hour meter can be viewed through the quick access menu (↩) in the option [Hour], and the working time of the output is displayed in hours. The working time of the output for maintenance purposes can be configured through function F16.
When the number of working hours of the compressor reaches the value set in this function, the display will show a warning [MAn] indicating that the compressor must be serviced. To switch the alert off or to reset the hour meter, access the option [rHou] in the quick access menu (↩) and press SET. The message [rSt] will be displayed indicating that the counter has been reset.

### 6.3.7 Selection of the units of measurement for pressure

To select the unit in which the device will operate, enter the function [F0] using the access code [23] .Then, press the SET key. The select the desired unit [PSI] or [bAr] using the keys ▲ or ▼, and press SET to confirm. Whenever the units are changed, the functions configuration assumes the factory default, so they must be configured again.

## 6.4 Advanced Operations

### 6.4.1 Access to the main menu

The functions menu can be accessed through the quick access menu, using the [Func] option or by simultaneously pressing the ▲ or ▼ keys whilst the pressure is being displayed. To allow the parameters to be changed, enter [F0] by pressing SET (quick touch) and using the ▲ or ▼ keys enter code 123 (one hundred and twenty-three), and then confirm with SET. To change the other functions, browse the menu using the ▲ or ▼ keys and proceed the same way to adjust them. To exit the menu and return to the normal operation display, press SET (long press) until [----] is displayed.
Note: If the functions lock is active, the controller will show the [LOC] message in the display upon pressing ▲ or ▼ and will not allow the changing of parameters.

## 6.5 Parameter table

| | | PSI | | | | BAR | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Fun** | **Description** | **Min** | **Max** | **Unit** | **Default** | **Min** | **Max** | **Unit** | **Default** |
| [F0] | Access code | 0 | 999 | - | 0 | 0 | 999 | - | 0 |
| [F02] | Operation mode | 0(depress) | 1(press) | - | 1(press) | 0(depress) | 1(press) | - | 1(press) |
| [F03] | Setpoint | 0 | 850 | PSI | 150 | 0,0 | 58,6 | BAR | 10,3 |
| [F04] | Control differential (hysteresis) | 1 | 850 | PSI | 20 | 0,1 | 58,6 | BAR | 1,3 |
| [F05] | Minimum output off time (delay between activations) | 0(No) | 9999 | sec. | 0(No) | 0(No) | 9999 | sec. | 0(No) |
| [F06] | Sensor indication displacement (offset) | -50 | 50 | PSI | 0 | -3,4 | 3,4 | BAR | 0,0 |
| [F07] | Minimum setpoint allowed to the final user | 0 | 850 | PSI | 0 | 0,0 | 58,6 | BAR | 0,0 |
| [F08] | Maximum setpoint allowed to the final user | 0 | 850 | PSI | 850 | 0,0 | 58,6 | BAR | 58,6 |
| [F09] | Delay when powering the instrument on (initial delay) | 0(No) | 9999 | sec. | 0(No) | 0(No) | 9999 | sec. | 0(No) |
| [F10] | Lower pressure limit of the sensor (pressure at 4 mA) | 0 | 850 | PSI | 0 | 0,0 | 58,6 | BAR | 0,0 |
| [F11] | Higher pressure limit of the sensor (pressure at 20 mA) | 0 | 850 | PSI | 500 | 0,0 | 58,6 | BAR | 34,4 |
| [F12] | Alarm mode | 0(Off) | 4 | - | 0(Off) | 0(Off) | 4 | - | 0(Off) |
| [F13] | Low pressure alarm | 0 | 850 | PSI | 0 | 0,0 | 58,6 | BAR | 0,0 |
| [F14] | High pressure alarm | 0 | 850 | PSI | 850 | 0,0 | 58,6 | BAR | 58,6 |
| [F15] | Alarm validation time | 0(No) | 9999 | sec. | 0(No) | 0(No) | 9999 | sec. | 0(No) |
| [F16] | Operating time of the output for maintenance | 0(No) | 9999 | hours | 0(No) | 0(No) | 9999 | hours | 0(No) |
| [F17] | Digital input operating mode 1 | 0(Off) | 6 | - | 0(Off) | 0(Off) | 6 | - | 0(Off) |
| [F18] | Digital input operating mode 2 | 0(Off) | 6 | - | 0(Off) | 0(Off) | 6 | - | 0(Off) |
| [F19] | Digital input operating mode 3 | 0(Off) | 8 | - | 0(Off) | 0(Off) | 8 | - | 0(Off) |
| [F20] | Time for setpoint validation | 0(No) | 30 | sec. | 0(No) | 0(No) | 30 | sec. | 0(No) |
| [F21] | Functions lock mode | 0 | 2 | - | 0 | 0 | 2 | - | 0 |
| [F22] | Time for functions lock | 15 | 60 | sec. | 15 | 15 | 60 | sec. | 15 |
| [F23] | Turning the Control Functions Off | 0(No) | 2 | - | 0(No) | 0(No) | 2 | - | 0(No) |

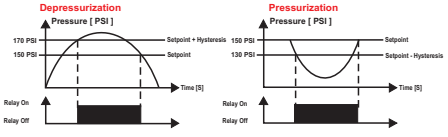
### 6.5.1 Description of the parameters

**F01 - Access Code:**
Required when you want to change setup parameters. This code is not required for viewing the parameters.
It allows entering the access codes provided:
[123] - Allows the access to change the parameters of the table;
[231] - Allows configuring the units of measurement [PSI] or [bAr].

**F02 - Operation mode:**
This function allows configuring the operating mode of the instrument.
[0] - Depressurization;
[1] - Pressurization.

**F03 - Setpoint:**
This is the reference value for pressure control.

**F04 - Control differential**
It is pressure difference (hysteresis) between switching the control output ON and OFF. E.g.: To control the pressure in 150 PSI with a differential of 20 PSI. Therefore, in the depressurizing mode, the output will be switched off at 150 PSI and switched back on at 170 PSI (150+20).
In the pressurizing mode, the output will be switched off at 150 PSI and switched back on at 130 PSI (150-20).




**F05 - Minimum output off time (delay between activations):**
The minimum time the output will remain off, i.e. the length of time between the last stop and the next start up. The main purposes of this function are: minimize interferences in the mains of the facility caused by the simultaneous activations of loads and avoid unnecessary activation of loads when there are fast variations of pressure in the system.
This function can be disable by adjusting it to the minimum value 0 [no].

**F06 - Sensor indication displacement (Offset):**
Allow for the compensation of deviations in the pressure reading of the sensor.

**F07 - Minimum setpoint allowed to the final user:**
Prevents accidental setting of extemely low setpoint pressures.

**F08 - Maximum setpoint allowed to the final user:**
Prevents accidental setting of extremely high setpoint pressures.

**F09 - Delay when powering the instrument on (initial delay):**
This is the time elapsed from initialization, during which the instrument just displays the pressure without activating outputs or validating alarms. In facilities with several equipment units, assigning different values to the delay time at the start up of each device will allow for demand peaks to be avoided when the devices are activated at different times.
This function can be disabled by adjusting it to the minimum value 0 [no]

**F10 - Lower pressure limit of the sensor (pressure at 4mA):**
Pressure applied to the pressure sensor when the output current is 4mA.

**F11 - Higher pressure limit of the sensor (pressure at 20mA):**
Pressure applied to the pressure sensor when the output current is 20mA.

**F12 - Alarm mode:**
Selects how the instrument checks for the presence of an alarm. The activation of this function allows displaying the alarm or switching off the control output.
[OFF] - Alarm turned off;
[1] - Absolute out-of-range alarm acting in the output:
Considers the values defined in [F13] and [F14] as minimum and maximum values to display an alarm and **shut down the control output;**
[2] - Absolute out-of-range alarm (indication only):
Considers the values defined in [F13] and [F14] as minimum and maximum values to display an alarm;
[3] - Out-of-range alarm relating to the output acting setpoint:
Considers the [F03] setpoint and the absolute values defined in [F13] and [F14], i.e., the positive value of these functions as minimum and maximum values to display the alarm ans shut down the control output.
Limits: ([F03] - [F13] and [F03] + [F14]).
[4] - Out-of-range alarm relating to the setpoint (indication only):
Considers the [F03] setpoint and the absolute values defined in [F13] and [F14], i.e., the positive value of these functions as minimum and maximum values to display the alarm.
Limits: ([F03] - [F13] and [F03] + [F14]).

**F13 - Low-pressure alarm:**
**F14 - High-pressure alarm:**
These are the minimum and maximum values to activate the pressure alarm. If the value of function F12 is different from [OFF] and if these values are exceeded, the instrument indicates the low pressure messages [PLo] or high pressure [Ph1], but these events occur in the alarms only after the time and conditions defined in function F15.

**F15 - Alarm validation time:**
This is time that the alarm will remain deactivated, even under alarm conditions. This inhibition time starts being counted after the power on delay expires.
A low pressure [PLo] or high pressure [Ph1] event must remain in this condition for the time set in this function for the instrument to generate a low pressure alarm [APLo] or high pressure alarm [APh1] and act on the control output according to the value defined in function F12.
If an alarm is inhibited by the user (by pressing the ▼ key for two seconds or through the digital inputs), this time is reset.
This function can be disabled by adjusting it to the minimum value 0 [no].

**F16 - Operating time of the output for maintenance:**
Whenever the output is activated the apparatus will count its operating time.
When the counted time is equal or longer than the one set in this function, the display will show the message [MAn1], signalizing that the compressor must be serviced.

**F17 - Digital input operating mode 1:**
It allows choosing the operating mode of the digital input 1.
[0] - Disable;
[1] - NO contact acting on the output by switching it off (external alarm);
[2] - NC contact acting on the output by switching it off (external alarm);
[3] - NO contact, enables the control (external switch);
[4] - NC contact, enables the control (external switch);
[5] - NO contact, alarm inhibition;
[6] - NC contact, alarm inhibition.

**F18- Digital input operating mode 2:**
It allows choosing the operating mode of the digital input 2.
[0] - Disable;
[1] - NO contact acting on the output by switching it off (external alarm);
[2] - NC contact acting on the output by switching it off (external alarm);
[3] - NO contact, enables the control (external switch);
[4] - NC contact, enables the control (external switch);
[5] - NO contact, alarm inhibition;
[6] - NC contact, alarm inhibition.

**F19 - Digital input operating mode 3:**
It allows choosing the operating mode of the digital input 3.
[0] - Disable;
[1] - NO contact acting on the output by switching it off (external alarm);
[2] - NC contact acting on the output by switching it off (external alarm);
[3] - NO contact, enables the control (external switch);
[4] - NC contact, enables the control (external switch);
[5] - NO contact, alarm inhibition;
[6] - NC contact, alarm inhibition;
[7] - NO contact, acting on the output by switching it on independently of the control (external test);
[8] - NC contact, acting on the output by switching it on independently of the control (external test).
**NOTE:** For safety reasons, when the alarm limits [APLo] or [APH1] are reached, the output is switched off.

**F20 - Time for setpoint validation:**
Upon reaching the setpoint the pressure must remain in this condition until this time has elapsed and then switch off the control output (it avoids overshooting in the pump/compressor activation). This function can be disabled by adjusting it to the minimum value 0 [no].
NOTE: For safety reasons, when the alarm limits [APLo] or [APH1] are reached, the output is switched off.

**F21 - Functions lock mode:**
This enables and configures the functions lock.
[0] - Does not allow the function block;
[1] - It allows a partial lock where the control functions will be locked but the adjustment of the setpoint and hysteresis (by quick access), date views, and maximum and minimum record views are allowed.
[2] - It allows the full lock, enabling only the date views and maximum and minimum record views.

**F22 - Time for functions lock:**
Allows lockdown of control functions (see item 6.3.2)
[15] - [60] - Defines the time in seconds for the controller to activate.

**F23 - Turning the control functions off:**
Allows the turning off of the control functions (see item 6.3.3)
[0] - Disables control functions shutdown;
[1] - Enables activation / deactivation of the control functions only if the functions are unlocked;
[2] - Enables activation / deactivation of the control functions even if the functions are locked.

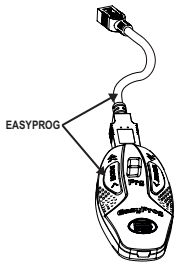
## 7. SIGNALING

| | |
|---|---|
| [Err1] | **Error in sensor: Sensor disconnected or damaged.** |
| [PLo] | **Low-pressure event** |
| [Ph1] | **High-pressure event** |
| [APLo] | **Low-pressure alarm** |
| [APh1] | **High-pressure alarm** |
| [di1] | **Digital input alarm 1** |
| [di2] | **Digital input alarm 2** |
| [di3] | **Digital input alarm 3** |
| [inib] | **Alarm inhibited** |
| [MAn1] | **Compressor maintenance warning** |
| [LOC] [On] | **Function Blocking** |
| [LOC] [OFF] | **Unlocking of functions** |
| [OFF] | **Control functions switched off** |
| [ECAL] | **Contact Full Gauge Control** |
| [PPPP] | **Reconfigure the values of the functions** |

## 8. OPTIONAL ITEMS - Sold Separately

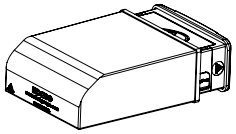
### EasyProg - version 2 or later

An accessory whose main function is to store the parameters of the controllers. At any time you may load new parameters of a controller and download them on a production line (of the same controller), for example.
It has three types of connections for loading or downloading the parameters:
**- Serial RS-485:** It is connected via the RS-485 network to the controller (only for those controllers provided with RS-485).
**- USB:** It is connected to the computer's USB port using Sitrad's Recipe Editor.
**- Serial TTL:** The controller may be connected directly to **EasyProg** via Serial TTL connection.



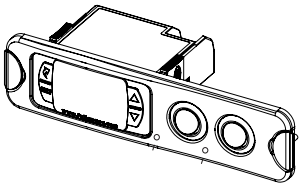

### Ecase

Recommended for the Evolution line, it keeps water from entering the back part of the instrument.
It also protects the product when the installation site is being washed.



### Extended Frame

The Full Gauge Controls extended frame allows the installation of Evolution and Ri line controllers with maximum dimensions of 76 x 34 x 77 mm (opening dimensions of 71 x 29 mm for installation in the extended frame) in several situations, because it does not require precision of the opening to embed the instrument.
It allows for customization through a sticker with the company brand and contact details, in addtion to be supplied with two 10 A (250 Vac) switches that can turn on the internal light, air curtain, system on/off or fan on/off.



**ENVIRONMENTAL INFORMATION**

**Packaging:**

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

**Product:**

The components used in the Full Gauge 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 two (2) - 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;
- The damages are due to a fall, blow and/or impact, water damage, overload and/or atmospheric discharge.

**USE OF WARRANTY**

For use of 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.

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