



MT-622E^{Ver.08}

TWO STAGE DIGITAL CONTROLLER
WITH ALARM AND CYCLIC TIMER
AND PROCESS TIMER



Buzzer



Functions
lockdown



Control functions
shutdown



Serial
programming



IP 65
FRONT
Protection
level



EVOLUTION



CALUS
E251415

MT622EV08-05T-15736

WARNING

BEFORE INSTALLING THE CONTROLLER, WE RECOMMEND READING THROUGH THE ENTIRE INSTRUCTION MANUAL IN ORDER TO AVOID POSSIBLE DAMAGE TO THE PRODUCT.

PRECAUTIONS WHEN INSTALLING THE PRODUCT:

Before performing any procedure on this instrument, disconnect it from the mains; Ensure that the instrument has adequate ventilation and avoid installation in panels containing devices that may cause it to operate outside the specified temperature limits; Install the product away from sources that may generate electromagnetic disturbances such as: motors, contactors, relays, solenoid valves, etc;

AUTHORIZED SERVICE:

The installation or maintenance of the product must be performed by qualified professionals only;

ACCESSORIES:

Only use original Full Gauge Controls accessories.

If you have any questions, please contact technical support.

DUE TO YOUR CONSTANT EVOLUTION, THE FULL GAUGE CONTROLS RESERVES THE RIGHT TO CHANGE THE INFORMATION CONTAINED IN THIS MANUAL AT ANY TIME WITHOUT NOTICE.

1. DESCRIPTION

The **MT-622E** is a temperature controller that uses a thermocouple type J as sensor, has two outputs for temperature control and internal buzzer. It also has a timer that can operate in different modes, triggered by digital inputs, which indicates the end time of one or two processes.

The first stage can use a cyclic preheating mode, and the second stage can function as an alarm, a cyclic timer or end of process indication. It is also possible to use 5 configurable recipes, which allows to quickly change the values for the temperature setpoint and the hysteresis of the first stage and the processing time.

Product complies with UL Inc. (United States and Canada).

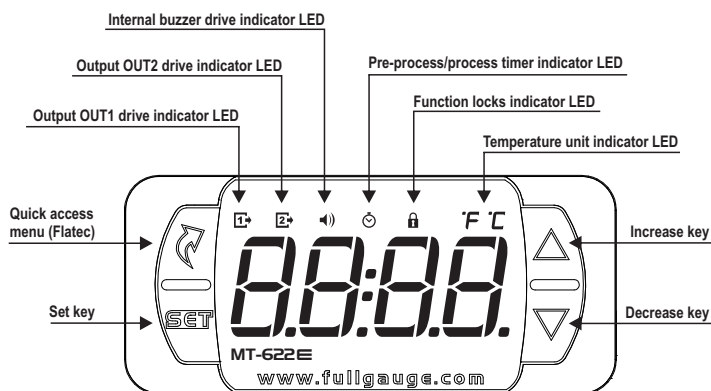
2. APPLICATIONS

- Fryers
- Ovens

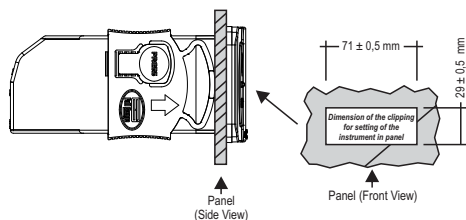
3. TECHNICAL SPECIFICATIONS

Power supply	MT-622E: 115/230 Vac $\pm 10\%$ (50/60 Hz) MT-622EL: 12/24 Vac/dc $\pm 10\%$ (50/60 Hz)
Control temperature	0 to 600°C / 32 to 1112°F
Operating temperature	0 to 50 °C / 32 to 122°F
Current output	OUT 1: 16(8)A / 250 Vac 1HP - 4000W OUT 2: 5(3)A / 250 Vac 1/8HP
Resolution	1°C / 1°F
Operating humidity	10 to 90% UR (non-condensing)
Sensor	J type Thermocouple (sold separately)
Dimensions (mm)	76 x 34 x 77 mm (WxHxD)
Dimensions of the clipping for fixing of the instrument	71 $\pm$ 0,5 x 29 $\pm$ 0,5 mm (see item 5)

4. INDICATIONS AND KEYS



5. INSTALLATION - ELECTRICAL CONNECTIONS AND PANEL



ATTENTION

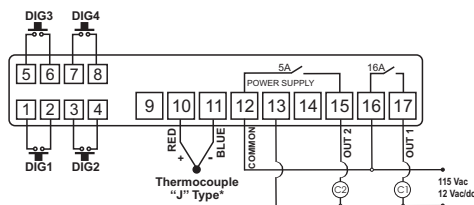
FOR INSTALLATIONS WHERE A SEALING IS REQUIRED TO AVOID LIQUID CONTACT, THE CUT FOR THE CONTROLLER MUST BE OF 70.5x29mm MAXIMUM. THE SIDE LOCKS MUST BE FIXED SO IT PRESSES THE RUBBER SEALING AVOIDING INFILTRATION BETWEEN THE CUT AND THE CONTROLLER.

IMPORTANT

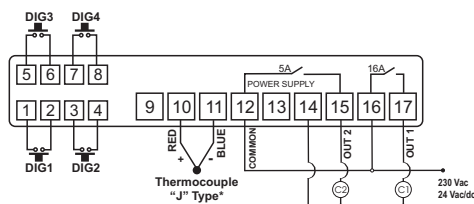
THE USE OF APPROPRIATE TOOLS IS ESSENTIAL TO AVOID DAMAGE IN THE CONNECTION AT INSTRUMENT TERMINALS:

- ⊖ SCREWDRIVER SLOT 3/32" (2.4mm) FOR ADJUSTMENTS IN THE SIGNAL TERMINALS;
- ⊕ SCREWDRIVER PHILLIPS #1 FOR ADJUSTMENTS IN THE POWER TERMINALS;

Connection 115 Vac 12 Vac/dc



Connection 230 Vac 24 Vac/dc



POWER SUPPLY

Pins	MT-622E	MT-622EL
12 and 13	115 Vac	12 Vac/dc
12 and 14	230 Vac	24 Vac/dc

(C) and (C2) loads

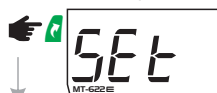
*Sensor sold separately

6. OPERATIONS

6.1 Facilitated menu map

By pressing **▲** it is possible to navigate through the function menus. For more details, see chapter 6.3. See the functions map below:

ADJUSTING THE DESIRED TEMPERATURE (SETPOINT)



EXIT THE MENU



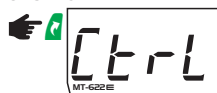
LOCK FUNCTION



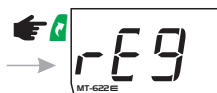
FUNCTION SELECTION



CONTROL FUNCTIONS SHUTDOWN



REGISTRATION OF TEMPERATURE MIN. AND MAX.



CLEAR VALUES MIN. AND MAX.



6.2 Facilitated key map

When the controller is on display temperature, the following shortcut keys are used for the following functions:

SET	Pressed 2 seconds: Adjusts the setpoint or change of recipe.
SET	Short press: Inhibits alarm and buzzer (if activated).
▲	Short press: Maximum and minimum temperatures display.
▲	Pressed 1 second: Steam output activation.
SET	Short press: With process timer driven - Switches display between temperature and remaining time.
▲	Short press: Starts process.
▲	Short press: Ends process.*
▲	Enter the function selection.

*If the operation mode of the 2nd stage is configured as steam (F28=11), the time for pressing the key becomes 4 seconds to end the process.

Fun	Description	CELSIUS				FAHRENHEIT			
		Min	Max	Unit	Standard	Min	Max	Unit	Standard
F27	Maximum time to preheat	1	999	min.	5	1	999	min.	5
F28	Operational Mode of the 2nd stage	0	12	-	3	0	12	-	3
F29	Minimum setpoint allowed to the end user (2nd stage)	0	600	°C	0	32	1112	°F	32
F30	Maximum setpoint allowed to the end user (2nd stage)	0	600	°C	600	32	1112	°F	1112
F31	Control differential (hysteresis) of the 2nd stage	1	40	°C	2	33	72	°F	3
F32	Minimum delay to re-connect the output of the 2nd stage	0	999	sec.	0	0	999	sec.	0
F33	Delay to enable the alarm when the instrument is powered on	0	999	min.	0	0	999	min.	0
F34	Time the ALARM/TIMER is on	1	999	sec./min.	1	1	999	sec./min.	1
F35	Time ALARM/TIMER is off	0	999	sec./min.	1	0	999	sec./min.	1
F36	Time to reactivate the alarm when manually disabled	auto	999	min.	auto	auto	999	min.	auto
F37	Time base of cyclical timer	0	3	-	0	0	3	-	0
F38	Time for activation of 2nd stage cyclic timer	0	999	sec.	5	0	999	sec.	5
F39	Operation Mode of audible alarm	0	2	-	1	0	2	-	1
F40	Activation point of audible alarm (lower limit)	0	600	°C	0	32	1112	°F	32
F41	Activation point of audible alarm (upper limit)	0	600	°C	600	32	1112	°F	1112
F42	Time audible alarm is connected	1	999	sec.	1	1	999	sec.	1
F43	Time audible alarm is disconnected	0	999	sec.	1	0	999	sec.	1
F44	Audible alarm deactivation time when turning the controller on	0	999	min.	0	0	999	min.	0
F45	Time to reactivate the audible alarm when manually disabled	auto	999	min.	auto	auto	999	min.	auto
F46	Enabling and viewing mode of the process timer	0	2	-	2	0	2	-	2
F47	Time base of the timer	0	1	-	1	0	1	-	1
F48	Audible alert at the end of the process (Buzzer)	no	yes	-	yes	no	yes	-	yes
F49	Operational mode of digital inputs	0	4	-	0	0	4	-	0
F50	Intensity of the digital filter	0	9	-	0	0	9	-	0
F51	Function block	0	2	-	0	0	2	-	0
F52	Time for function block	15	60	sec.	15	15	60	sec.	15
F53	Control functions shutdown	no	2	-	no	no	2	-	no
F54	Linking the thermostats to the process times	0(no)	3	-	0(no)	0(no)	3	-	0(no)
F55	Time to activate the steam output (F28=11)	1	20	sec.	6	1	20	sec.	6
F56	Time between activations of the steam output (F28=11)	no	20	min.	1	no	20	min.	1
F57	Pre-process time (F49=0)	no	999	sec.	no	no	999	sec.	no

Legend:

F5

 = yes

no

 = no

6.5.1 Parameters description

F01 - Access Code:

This is necessary when you want to change the configuration parameters. It is not necessary to insert this code to see the set parameters.

F02 - Indicator Offset (offset):

Allows the compensation of eventual deviations in temperature reading, caused by the change of the sensor or changing the length of the cable.

F03 - Using formulas in the 1st stage:

Allows to configure the controller in order to use the formulas or not:

no

 - **No:** If setup this way, the instrument will not use the receipt values in the control routines. For this, setpoint 1

SP1

 will be used and process time

ET

, which are adjusted through the easy access menu. The differential control to be used will be the same as formula 1, F09 "Differential control of the 1st stage (rc1)."

The value set in

SP1

 can be set between F20 "Minimum setpoint allowed to the end user (1st stage)" and F21 "Maximum setpoint allowed to the end user (1st stage)."

F55

 - **Yes:** If configured this way, the instrument uses the control routines of the setpoint values, differential control and process time of the formula that is active.

The formula selection will be made through the easy access menu, in the same way as adjusting the setpoint. However, the value shown on the display will be the name of the formula that is active.

Example:

rc1

F04 - Operation setpoint for the 1st stage (rc1):

F05 - Operation setpoint for the 1st stage (rc2):

F06 - Operation setpoint for the 1st stage (rc3):

F07 - Operation setpoint for the 1st stage (rc4):

F08 - Operation setpoint for the 1st stage (rc5):

These parameters specify the desired temperature for each formula in the 1st stage.

F09 - Differential control of the 1st stage (rc1) (*):

F10 - Differential control of the 1st stage (rc2):

F11 - Differential control of the 1st stage (rc3):

F12 - Differential control of the 1st stage (rc4):

F13 - Differential control of the 1st stage (rc5):

These parameters specify the desired temperature for each formula in the 1st stage.

(*) The function F09 is used when F03=0 together with

SP1

 or when F03=1 in combination with setpoint

rc1

.

F14 - Process Time (rc1):

F15 - Process Time (rc2):

F16 - Process Time (rc3):

F17 - Process Time (rc4):

F18 - Process Time (rc5):

These parameters specify the duration of the process for each formula.

F19 - Operational mode of the 1st stage:

Allows to configure the operating mode of the 1st stage.

0

 - **Cooling:** The 1st stage operates in cooling mode. For temperature control, the instrument uses one of selected recipe or setpoint. In this control mode the instrument is permanently operating the OUT 1 output to maintain the desired temperature. The end of process time does not imply shutdown of OUT 1 output. It is only indicated by the message

ET

 in the display and drive the internal buzzer.

1

 - **Heating:** The 1st stage operates in heating mode. For temperature control, the instrument uses one of selected recipe or setpoint. In this control mode the instrument is permanently operating the OUT 1 output to maintain the desired temperature. The end of process time does not imply shutdown of OUT 1 output. It is only indicated by the message

ET

 in the display and drive the internal buzzer.

2

 - **Preheating/Heating:** This operation mode is similar to heating mode, however, when to connect the controller is done the preheating. This preheating is accomplished by switching the state of the OUT 1 output. The amount of time per cycle that the output remains switched on and off is set in the F25 and F26 functions.

The controller remains in the preheating mode until it reaches the temperature configured in F23, or until the time configured in F27. When it reaches the temperature or preheating timeout, the controller will operate in heating mode.

Note: If the thermostat of the 1st stage is linked to the processes (F54 =

1

), the output OUT1 will be switched off at the end of the process.

F20 - Minimum setpoint allowed to the end user (1st stage):

F21 - Maximum setpoint allowed to the end user (1st stage):

The electronics limits have the purpose of preventing, by mistake, the use of very high or low set temperature setpoints.

F22 - Minimum delay to re-connect the output of the 1st stage:

It is the minimum time that the output of the 1st stage is off, i.e. the time between the last stop and the next start.

Note: This time will only be taken into consideration after the preheating end, if F19 = 2.

F23 - Temperature to terminate preheating:

Temperature that the output stops OUT 1 preheating and starts to operate in the heating mode. To carry out the preheating F19 must be set to (F19 = 2) when connecting the controller.

F24 - Time base used to preheat:

Allow the setting of the time bases in order to turn on and off the output OUT 1 when operating in the preheating mode. The possible settings for time on and time off are respectively:

0

 - Seconds/Seconds;

1

 - Seconds/Minutes;

2

 - Minutes/Seconds;

3

 - Minutes/Minutes.

F25 - Time that preheating is connected:

This function is to adjust the time that the controller stays connected with output OUT 1 connected when the 1st stage is in the preheat mode.

F26 - Time that preheating is disconnected:

This function is to adjust the time that the controller stays connected with output OUT 1 disconnected when the 1st stage is in the preheat mode.

F27 - Maximum time to preheat:

This function serves as security for finalizing the preheating mode. It limits the maximum operating time of the cyclic mode, if the temperature read by the controller does not reach the value configured in F23. After this time, the controller will operate in heating mode, as a simple thermostat, even without reaching the temperature configured in F23.

F28 - Operational mode of the 2nd stage:

0

 - Refrigeration

1

 - Heating

2

 - Alarm intra-range

3

 - Alarm extra-range

4

 - The extra-range alarm related to the first stage ((

SP1

 - F29 and

SP1

 + F30)

5

 - Independent Cyclic timer

6

 - Cyclic timer triggered by the setpoint of the 1st stage

7

 - 1st stage coupled to the cyclic timer (timer starts on)

8

 - 1st stage coupled to the cyclic timer (timer starts off)

9

 - Output of the cyclic timer is always connected when the output of the 1st stage is connected.

10

 - End of process alarm

11

 - Steam

12

 - Cyclic timer linked to the 1st stage thermostat (timer starts on)

Note: When F28=10, the output OUT 2 is triggered at the end of the process according to the times set in functions F34 and F35 (time base only in seconds).

7. SIGNALS

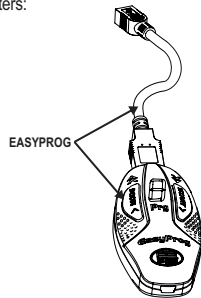
Err	Sensor damaged, disconnected or out of temperature range.
Ctrl On	Control functions on.
Ctrl Off	Control functions off.
Loc On	Lock functions.
Loc Off	Unlocking functions.
uAP	Steam.
nuAP	Invalid conditions for activating the steam.
PreP	Pre-process in progress.
StA1 StA2 StA3 StA4	Start of the process time.
End1 End2 End3 End4	End of the process time.
tAr1 tAr2 tAr3 tAr4	Remaining time of process.

8. OPTIONAL ITEMS - Sold Separately

8.1 EasyProg - version 2 or higher

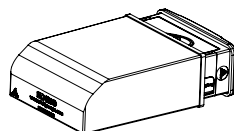
It is an accessory that has as its main function to store the parameters of the controllers. At any time, you can load new parameters of a controller and unload them on a production line (of the same controller), for example. It has three types of connections to load or unload the parameters:

- **Serial RS-485:** It connects via RS-485 network to the controller (only for controllers that have RS-485).
- **USB:** it can be connected to the computer via the USB port, using Sitrad's Recipe Editor.
- **Serial TTL:** The controller can be connected directly to **EasyProg** by the TTL Serial connection.



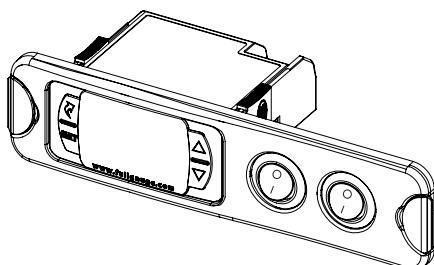
8.2 Ecase

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



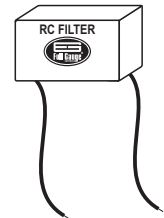
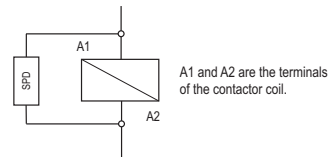
8.3 Extension Frame

The Full Gauge Controls extension frame allows the installation of Evolution / Ri line with measures 76x34x77 mm (dimensions of the clipping for fixing in the extension frame is 71x29mm) in varied situations, since it eliminates precision cut to embed the instrument. Allows customization via a sticker with the brand and the company contact, and accompany two 10A (250 Vac) switches that can trigger internal light, air curtain, on / off system or fan.

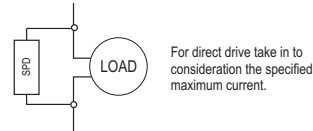


8.4 Surge Protective Device (SPD)

Wiring diagram for installation of SPD in magnetic contactor



Wiring diagram for installation of SPD in line with loads



ENVIRONMENTAL INFORMATION

Packaging:

The materials used in the packaging of Full Gauge products are 100% recyclable. Try to perform disposal through specialized recyclers.

Product:

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

Disposal:

Do not incinerate or dispose the controllers that have reached the end of their service as household garbage. Observe the laws in your area regarding disposal of electronic waste. If in doubt, please contact Full Gauge Controls.

WARRANTY - FULL GAUGE CONTROLS

Products manufactured by Full Gauge Controls, as of May 2005, have a two (02) year warranty, as of the date of the consigned sale, as stated on the invoice. They are guaranteed against manufacturing defects that make them unsuitable or inadequate for their intended use.

EXCEPTIONS TO WARRANTY

The Warranty does not cover expenses incurred for freight and/or insurance when sending products with signs of defect or faulty functioning to an authorized provider of technical support services. The following events are not covered either: natural wear and tear of parts; external damage caused by falls or inadequate packaging of products.

LOSS OF WARRANTY

Products will automatically lose its warranty in the following cases:

- The instructions for assembly and use found in the technical description and installation procedures in Standard IEC60364 are not obeyed;
- The product is submitted to conditions beyond the limits specified in its technical description;
- The product is violated or repaired by any person not a member of the technical team of Full Gauge Controls;
- Damage has been caused by a fall, blow and/or impact, infiltration of water, overload and/or atmospheric discharge.

USE OF WARRANTY

To make use of the warranty, customers must send the properly packaged product to Full Gauge Controls together with the invoice or receipt for the corresponding purchase. As much information as possible in relation to the issue detected must be sent to facilitate analysis, testing and execution of the service.

These procedures and any maintenance of the product may only be provided by Full Gauge Controls Technical Support services in the company's headquarters at Rua Júlio de Castilhos, 250 - CEP 92120-030 - Canoas - Rio Grande do Sul - Brasil

Rev. 03

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