MT-622E Ver.08

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

Full Gauge® CONTROLS

| Buzzer | Functions lockdown | Control functions shutdown | Serial programming | **IP 65** FRONT Protection level |

MT622EV08-01T-15736

c **UL** us
E251415

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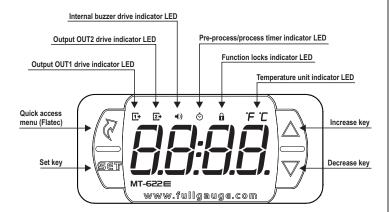Product complies with UL Inc. (United States and Canada).
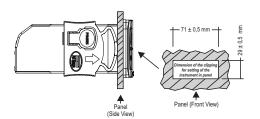
2. APPLICATIONS

• Fryers
• Ovens

3. TECHNICAL SPECIFICATIONS

Power supply	**MT-622E:** 115/230 Vac ±10% (50/60 Hz) **MT-622EL:** 12/24 Vac/dc +10% (50/60 Hz)
Control temperature	0 to 600°C / 32 to 1112°F
Operating temperature	0 to 50 ºC / 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	1ºC / 1ºF
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 ± 0,5 x 29 ± 0,5 mm (see item 5)

4. INDICATIONS AND KEYS

- Internal buzzer drive indicator LED
- Output OUT2 drive indicator LED
- Output OUT1 drive indicator LED
- Pre-process/process timer indicator LED
- Function locks indicator LED
- Temperature unit indicator LED
- Quick access menu (Flatec)
- Set key
- Increase key
- Decrease key

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5. INSTALLATION - ELECTRICAL CONNECTIONS AND PANEL

71 ± 0,5 mm
29 ± 0,5 mm

Dimension of the clipping for setting of the instrument in panel
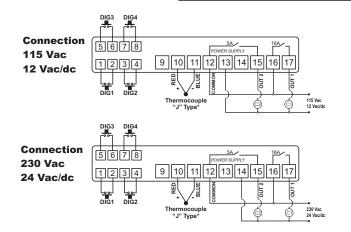
Panel (Side View)
Panel (Front View)

⚠ **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

C1 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)
SEt

EXIT THE MENU

LOCK FUNCTION
LOC

FUNCTION SELECTION
Func

CONTROL FUNCTIONS SHUTDOWN
CtrL

REGISTRATION OF TEMPERATURE MÍN. AND MÁX.
rE9

CLEAR VALUES MÍN. AND MÁX.
CrE9

6.2 Facilitated key map

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

Key	Function
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.

6.3 Basic operations

6.3.1 Adjusting the desired temperature (setpoint) and time process

If it is configured not to use formulas (F03= `no`):
- Press and hold the 🔧 key for two seconds, until the message `SEt` appears;
- Then the message `SP1` will appear and it will be possible to adjust the stage 1 setpoint;
- Use the keys ▼ or ▲ to change the value, and press 🔧 to confirm.

It will then be possible to adjust the setpoint of stage 2 `SP2` and the process time (`tNr`).

Note 1: The adjustment of the stage 2 setpoint can only be configured if the unit is set to operate as a thermostat or steam (F28 = 0 , 1 or 11).

Note 2: When F49=4, it is possible to set a time lapse for each timer, identified by the message `tNr1` , `tNr2`, `tNr3` and `tNr4`.

Note 3: If the 2nd stage operating mode is configured with the cyclic timer (F28= 5, 6, 7, 8, or 9), it will be possible to set the timer values `tOn` and `tOFF`.

If it is set to use formulas (F03= `YES`):
Each formula can be configured to use different values for the setpoint, hysteresis of stage 1 and the time of the process. To select the formula:
- Press and hold the 🔧 key for two seconds, until the message `SEt` and `SP1` appears;
- You will then see the currently selected formula.
- Use the ▼ or ▲ keys to select which of the 5 formulas will be used:
`rc1` - Formula 1;
`rc2` - Formula 2;
`rc3` - Formula 3;
`rc4` - Formula 4;
`rc5` - Formula 5.
To confirm the selection, press 🔧 .

Then setpoint of stage 2 `SP2` can be adjusted, if configured to operate as a thermostat (F28 = 0 or 1).

Note 1: The values of the functions of each formula are configured in the parameter menu.

Note 2: The formulas are linked only to the first timer. In case of F49=4, only the value of `tNr2`, `tNr3` and `tNr4` can be configured manually.

6.3.2 Process Timer

The process timer is a time counter. It is manually started after the end of the programmed time displays the message `End` on the controller's display, if F49=0. If F49=1, 2, 3 or 4, the controller will be operating 4 timers, each operated by a digital input. Thus, the message displayed at the end of the time count for each timer will be `End1`, `End2`, `End3` and `End4`.

Through function F48, the instrument can be configured to sound an alarm at the end of processing time.

Please note that when the process time ends, this does not affect the output of the thermostats (unless F54 is different from `no`).

6.3.3 Function block 🔒

The use of the function block brings greater security to the operation of the device. When active, the setpoint and other parameters are visible to the user, but also protected against undue changes (F51=2), or you can block the control function changes and leave the adjustment of the setpoint, process times, and cyclic timer times enabled (F51=1). Using the key 🔘 (quick touch), access the function `LOC` in the quick access menu, confirm by pressing 🔧 (quick touch), then the message `no` ,will be displayed. After that hold down the key ▼ for the time configured for the function lock (F52), until `LOC` . is displayed. Upon releasing the key, the message `On` , will be displayed indicating that the block function has been activated.

To unlock, turn the controller off and then turn it on again with the key ▼ held down. Hold down the key until `LOC` is displayed. Keep the key held down for ten seconds and the message `OFF` will be shown on the display indicating the deactivation of the block function once the key is released.

6.3.4 Control Functions Shutdown

With the shutdown of the control functions the controller will operate only as a temperature indicator and output relay stays off.

The way to operate the control functions shutdown depends on the parameter setting " `F53` - **Control functions shutdown**":
`0` Does not allow the shutdown of the control functions.
`1` Allows to turn on and off the control functions only if the functions are unlocked.
`2` Allows to turn on and off the control functions even when the functions are locked. With key 🔘 (quick touch), select `Ctrl`, then press 🔧 (quick touch) to confirm.

6.3.5 Changing display during process

With the process timer is in progress, press the 🔧 key (short press) to switch the information on the screen between temperature and remaining time of each process.
`tENP` - Temperature
`tNr1` - Remaining time of process 1
`tNr2` - Remaining time of process 2
`tNr3` - Remaining time of process 3
`tNr4` - Remaining time of process 4
Note: In operating modes 1 and 4 of the F49, you can also observe the remaining time of process through the push buttons.

6.3.6 Registers of minimum and maximum temperature

Pressing key ▲ or also through the quick access menu (see chapter 6), the message `rEg` will appear, followed by the minimum and maximum recorded temperatures.

To turn the current minimum and maximum values off, press key 🔘 (short press), until the message `CrEg` is displayed. Press key 🔧 to confirm.

6.3.7 Steam Activation

If the operation mode of the 2nd stage is configured as steam (F28=11) and the key ▲ is held down for 1 second, the controller will show the message `uAP` and the OUT2 output will be activated, remaining so for the time configured in F55 or until the temperature reaches the minimum activation value.

The minimum temperature for the steam activation is configured in `SP2` (see item 6.3.1). If this temperature is not reached or the time between steam activations configured in F56 has not elapsed, the message `nuAP` will be displayed during the attempt to activate the steam.

6.3.8 Unit Selection (ºC / ºF)

To determine the unit in which the instrument will operate, enter function " `F01` " with access code `231` press key 🔧 now the user can select the unit by pressing keys ▲ ▼ where the messages `ºC` or `ºF` will alternate. Press key 🔧 to confirm the desired unit. Then, the indication that corresponds to the unit *C* or *F* will come on.

Every time the unit is changed, the parameters must be reconfigured, since they are assumed the "standard" values.

6.4 Advanced operations

6.4.1 Changing the parameters of the controller

Access function `F01` by pressing keys ▲ and ▼ simultaneously or through the quick access menu. After that, `F01` will appear, then, press the 🔧 key (short press). Use keys ▲ or ▼ to enter with access code `123` and, when ready, press 🔧 . Use keys ▲ or ▼ to access the desired function.

After selecting the function, press the key 🔧 (short press), to visualize the set value for that function. Use keys ▲ or ▼ to change the value, and when ready, press 🔧 pto memorize the set value and return to the functions menu. To exit the menu and return to normal operation (temperature indication) press and hold 🔧 until `----` .

OBS: If the lock function is active, by pressing the ▲ or ▼ to change the value of the function, the controller will displays the message `LOC` and will not allow to set the of the parameter.

6.5 Parameter table

Fun	Description	CELSIUS				FAHRENHEIT			
		Min	Max	Unit	Standard	Min	Max	Unit	Standard
`F01`	Access Code (123)	-	-	-	-	-	-	-	-
`F02`	Indicator Offset (offset)	-40	40	-	0	-72	72	-	0
`F03`	Using formulas in the 1st stage	no	yes	-	no	no	yes	-	no
`F04`	Operation Setpoint of the 1st stage (rc1)	0	600	°C	20	32	1112	°F	68
`F05`	Operation Setpoint of the 1st stage (rc2)	0	600	°C	20	32	1112	°F	68
`F06`	Operation Setpoint of the 1st stage (rc3)	0	600	°C	20	32	1112	°F	68
`F07`	Operation Setpoint of the 1st stage(rc4)	0	600	°C	20	32	1112	°F	68
`F08`	Operation Setpoint of the 1st stage(rc5)	0	600	°C	20	32	1112	°F	68
`F09`	Differential control of the 1st stage (rc1) (*)	1	40	°C	2	1	72	°F	3
`F10`	Differential control of the 1st stage (rc2)	1	40	°C	2	1	72	°F	3
`F11`	Differential control of the 1st stage (rc3)	1	40	°C	2	1	72	°F	3
`F12`	Differential control of the 1st stage (rc4)	1	40	°C	2	1	72	°F	3
`F13`	Differential control of the 1st stage (rc5)	1	40	°C	2	1	72	°F	3
`F14`	Process time (rc1)	1	999	sec./min.	5	1	999	sec./min.	5
`F15`	Process time (rc2)	1	999	sec./min.	5	1	999	sec./min.	5
`F16`	Process time (rc3)	1	999	sec./min.	5	1	999	sec./min.	5
`F17`	Process time (rc4)	1	999	sec./min.	5	1	999	sec./min.	5
`F18`	Process time (rc5)	1	999	sec./min.	5	1	999	sec./min.	5
`F19`	Operational Mode of the 1st stage	0	2	-	1	0	2	-	1
`F20`	Minimum setpoint allowed to the end user (1st stage)	0	600	°C	0	32	1112	°F	32
`F21`	Maximum setpoint allowed to the end user (1st stage)	0	600	°C	600	32	1112	°F	1112
`F22`	Minimum delay to re-connect the output of the 1st stage	0	999	sec.	0	0	999	sec.	0
`F23`	Temperature to terminate preheating	1	600	°C	60	33	1112	°F	140
`F24`	Time base used to preheat	0	3	-	0	0	3	-	0
`F25`	Time that preheating is connected	1	999	sec./min.	1	1	999	sec./min.	1
`F26`	Time that preheating is disconnected	1	999	sec./min.	1	1	999	sec./min.	1

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: YES = 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 tⁿr , 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 the F21 "Maximum setpoint allowed to the end user (1st stage)."
YES - **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 End 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 End 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 1disconnected 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).

F29 - Minimum setpoint allowed to the end user (2nd stage):
F30 - Maximum setpoint allowed to the end user (2nd stage):
The electronic limits have the purpose of preventing the use, by mistake, of very high or low temperature setpoints. When the 2nd stage is defined as an alarm, the setpoints are defined in F29 and F30.

F31 - Control differential (hysteresis) of the 2nd stage:
This is the temperature difference (hysteresis) between turning on and off the 2nd stage output.

F32 - Minimum delay to re-connect the output of the 2nd stage:
This is the minimum time in which the output of the 2nd stage is off, i.e. the time between the last stop, and the next start up (only if F28 = 0 or 1).

F33 - Delay to enable the alarm when the instrument is powered on (F28=2,3 or 4):
This function is to disable the alarm for a period of time because the system has not yet reached the working temperature.

F34- Time the ALARM/TIMER is on:
This function is to adjust the time that the output of the 2nd stage will remain activated if it is set as an alarm or timer.

F35 - Time the ALARM/TIMER is off:
This function is to adjust the time that the output of the 2nd stage remains switched off if it is configured as an alarm or timer. To always keep the alarm triggered, just set "0" in this function.

F36 - Time to reactivate the alarm when manually disabled:
This function configures the alarm manual inhibition. If it enters into alarm condition, it can be inhibited manually by pressing 🔇 key.
If a value between 1 and 999 minutes is set when it reaches an alarm condition and is disabled manually, it can only be activated again after that time elapses.
If the automatic mode is selected ($\boxed{Auto}$), the alarm, after being disabled, will only be triggered if the normal condition returns and alarm condition returns, with no time limit. Set to 0, the manual deactivation is itself disabled.
$\boxed{Auto}$ - Alarm will sound again when you leave and return to the alarm condition
$\boxed{OFF}$ - Manual deactivation disabled
$\boxed{1}$ ~ $\boxed{999}$ - Time that the output of alarm remains disabled (in minutes)

F37 - Time base of Cyclic timer (F28=5, 6, 7, 8 or 9):
If the output OUT 2 is configured as a cyclic timer, the time base in which the output remains switched on and switched off can be set to seconds or minutes. The setting of the switched on and switched off the time base is, respectively:
$\boxed{0}$ - Seconds/Seconds;
$\boxed{1}$ - Seconds/Minutes;
$\boxed{2}$ - Minutes/Seconds;
$\boxed{3}$ - Minutes/Minutes.

F38 - Time for activation of 2nd stage cyclic timer:
This is the delay time to activate the cyclic timer if it is set to be triggered by the setpoint of the 1st stage (F28=6).
If the cyclic timer is linked to the 1st stage (F28 = 12), this delay time will be counted from when the 1st stage thermostat is activated.

F39 - Operational Mode of the audible alarm:
$\boxed{0}$ - Intra-range alarm
$\boxed{1}$ - Extra-range alarm
$\boxed{2}$ - Alarm relating to the first stage ($\boxed{SP1}$ - F40 and $\boxed{SP1}$ + F41)

F40 - Activation point of the audible alarm (lower limit):
This is the lowest temperature to activate the audible alarm according to the operating mode selected.

F41 - Activation point of audible alarm (upper limit):
This is the upper temperature to activate the audible alarm according to the operating mode selected.

F42 - Time audible alarm is connected:
Time that the audible alarm will remain powered (active cycle).

F43 - Time audible alarm is disconnected:
Time that the audible alarm will remain off (inactive cycle). To disable the audible alarm, adjust the value "O" for this function

F44 - Audible alarm deactivation time when turning the controller on:
This is the time that the buzzer will remain off, even in an alarm condition. This time is to disable the audible alarm while the system has not yet reached working conditions.

F45 - Time to reactivate the audible alarm when manually disabled:
This function configures the buzzer manual inhibition. If it enters into alarm condition, the buzzer can be inhibited manually by pressing 🔇 key.
If a value between 1 and 999 minutes is set, when the audible alarm reaches an alarm condition and is disabled manually, it can only be activated again after that time elapses.
If the automatic mode is selected ($\boxed{Auto}$), the audible alarm, after being disabled, will only be triggered if the normal condition and the alarm condition returns, with no time limit. Set to 0, the manual disability is disabled.
$\boxed{Auto}$ - The audible alarm sounds again when leaving and there is a new alarm situation
$\boxed{OFF}$ - Disabled
$\boxed{1}$ ~ $\boxed{999}$ - Time in which the audible alarm remain disabled (in minutes)

F46 - Enabling and viewing mode of the process timer:
This function is used to enable or disable the process timer. If it is enabled, it may be configured to, during the process, show the temperature or remaining time. The choice of the information to be displayed when the timer is triggered depends on the user's needs.
$\boxed{0}$ - Disabled
$\boxed{1}$ - During the process it shows temperature
$\boxed{2}$ - During the process it shows the remaining time

F47 - Time base of the timer:
Allows to select which time base will be used to count the processing time.
$\boxed{0}$ - Seconds
$\boxed{1}$ - Minutes

F48 - Audible alert at the end of the process (Buzzer):
$\boxed{no}$ - Disables the audible alarm to indicate the end of the process
$\boxed{YES}$ - Enables the audible alarm to indicate the end of the process

F49 - Operational mode of digital inputs:
This function allows to set the operating mode of the digital inputs:
$\boxed{0}$ - 1 Timer - DIG1 (START) and DIG2 (STOP):
Digital input 1 (DIG1) or ▼ operates as START or PAUSE command and digital input 2 (DIG2) or ▲ operates as STOP command.The controller applies the configured value in process time on a single internal timer. When activating the digital input 1 (DIG1) or ▼ ,the controller starts the process time counting.
PAUSE: If the process timing is in progress and is triggered digital input 1 (DIG1) or ▼ , the count will paralyze and press again to continue the digital input 1 (DIG1) or ▼ .
When activating the digital input 2 (Dig 2) or ▲ , the process timing is closed. If the process is closed and the digital input 1 (DIG1) or is triggered, the controller opens a new count for the process time.

Note: The keys ▼ and ▲ function as START and STOP only with F49 = 0.

$\boxed{1}$ - 4 timers (Closed contact = START/ REMAINING TIME/ STOP):
In this operation mode, the controller will operate with 4 timers using the same process time. Each digital input starts working as START, REMAINING TIME and STOP for each timer. In this operation mode are provided keys PUSH BUTTON type (without mechanical retention of the contact). When turn on the key the electrical contact changes state, and to release it, back to idle status (NO).
Example: If timer 1 is stopped and digital input 1 (DIG1) is triggered, appears in display $\boxed{StA1}$ message, and started timing. At the end of configured time, appears $\boxed{End1}$ message on the display, indicating the end of the process time. The message will be displayed until DIG1 is pressed again. If during the counting of time input is triggered again, a message process time ($\boxed{tnr1}$ + time) appears. If the DIG1 input is pressed for 1s before finishing the timing, the process is closed and displays the $\boxed{End1}$ message. Similarly is the operation of DIG2, DIG3 and DIG4 digital inputs.

$\boxed{2}$ - 4 timers (Closed contact = START, open contact = STOP):
In this operation mode, the controller will operate with 4 timers using the same process time. Each digital input starts working as START and STOP for each timer. In this operation mode are provided keys ON/OFF type (NO with mechanical retention of the contact). By closing the contact, the timing is initiated, and by opening, is closed.
Example: If timer 1 is stopped and digital input 1 (DIG1) contact is closed, appears in display $\boxed{StA1}$ message, and started timing. At the end of configured time, appears $\boxed{End1}$ message on the display, indicating the end of the process time. The message will be displayed until the DIG1 input contact is opened. If the DIG1 input contact is open before finishing the timing, the process is closed and displays the $\boxed{End1}$ message. Similarly is the operation of DIG2, DIG3 and DIG4 digital inputs.

$\boxed{3}$ - 4 timers (open contact = START, closed contact = STOP):
In this operation mode, the controller will operate with 4 timers using the same process time. Each digital input starts working as START and STOP for each timer. In this operation mode are provided keys ON/OFF type (NC with mechanical retention of the contact). By opening the contact, the timing is initiated, and by closing, is closed.
Example: If timer 1 is stopped and digital input 1 (DIG1) contact is open, appears in display $\boxed{StA1}$ message, and started timing. At the end of configured time, appears $\boxed{End1}$ message on the display, indicating the end of the process time. The message will be displayed until the DIG1 input contact is closed. If the DIG1 input contact is closed before finishing the timing, the process is closed and displays the $\boxed{End1}$ message. Similarly is the operation of DIG2, DIG3 and DIG4 digital inputs.

$\boxed{4}$ - 4 Independent timers (Closed contact = START / STOP):
In this mode the operation is identical to the F49 = 1, with the difference that each of the 4 timers has a different time. The process times are set in $\boxed{tnr1}$, $\boxed{tnr2}$, $\boxed{tnr3}$ and $\boxed{tnr4}$, as described in 6.3.1.

F50 - Intensity of the digital filter:
This filter is intended to simulate the increase of the sensor mass, thereby increasing its response time (thermal inertia). The higher the value set in this function the higher the response time of the sensor will be.

F51 - Functions block:
This allows and configures the function block (see item 6.3.3).
$\boxed{0}$ Does not allow the function block.
$\boxed{1}$ Allows a partial block where the control functions will be locked but the adjustment of the setpoint, process times, cyclic timer times and visualization of the maximum and minimum record are allowed.
$\boxed{2}$ Allows a full block, enabling only the visualization of the processes, turning off the control functions, and visualization of the maximum and minimum record.

F52 - Time for function block:
Defines the time in seconds for the command to activate the block according to the procedure described in item 6.3.3.

F53 - Control functions shutdown:
Allows the turning off of the control functions (see item 6.3.4).
$\boxed{0}$ Disables the control functions shutdown.
$\boxed{1}$ Enables activation/deactivation of the control functions only if the functions are unlocked.
$\boxed{2}$ Enables activation/deactivation of the control functions even if the functions are locked.

F54 - Linking the thermostats to the process times:
$\boxed{no}$ - Linking disabled
$\boxed{1}$ - Thermostat of the 1st stage linked to the process time
$\boxed{2}$ - Thermostat of the 2nd stage linked to the process time (if F28 = 0 or 1)
$\boxed{3}$ - Both thermostats linked to the process times
If enabled, the chosen thermostat will only control the temperature during the process time and will switch off the corresponding output after this time. If configured as $\boxed{no}$, the end of the process time does not result in the shutdown of the outputs.

F55 - Time to activate the steam output (F28=11):
Is the time for which OUT2 will remain on during the steam activation using the key ▲ .

F56 - Time between activations of the steam output (F28=11):
Is the minimum time between steam activation using the key ▲ .
This function can be disabled by adjusting it to the minimum value 0 $\boxed{no}$.

F57 - Pre-process time (F49=0):
Is the time that precedes the process time. The normal process time is started after this time. During the pre-process time, the LED timer indicator flashes faster than it does during the process time, and the message $\boxed{PrEP}$ is displayed alternately with the process time.
For five seconds at the end of the pre-process, the buzzer will cycle and OUT2 (if F28=10) will cycle according to the times configured in F34 and F35.
This function can be disabled by adjusting it to the minimum value 0 $\boxed{no}$.

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.
$tⅿr1$ $tⅿr2$ $tⅿr3$ $tⅿr4$	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.

EASYPROG
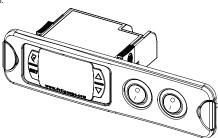
8.2 Ecase

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.
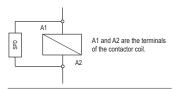
8.3 Extension Frame

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 instalation of SPD in magnectic contactor

A1 and A2 are the terminals of the contactor coil.

RC FILTER

Wiring diagram for instalation of SPD in line with loads

For direct drive take in to consideration the specified maximum current.