MT-514E Faston Ver.02

DIGITAL CONTROLLER FOR HEATING OR COOLING WITH DEFROST AND CONFIGURABLE ALARM OUTPUT

Have this manual in the palm of your hand by **FG Finder** application.

Connector for quick coupling | Audible Alarm | Defrost | Function blocking | Control functions shutdown | Serial Programming | IP 65 FRONT Protection level

E251415

MT514EFASTONV02-03T-16721

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-514E FASTON** is a temperature controller for applications in refrigeration or heating. It has an internal buzzer and an alarm output can also be configured for electric defrost or hot gas. The minimum and maximum is displayed at the touch of a single key (Flatec).
Another available feature is the shutdown of the control functions, making it possible for the **MT-514E FASTON** only operate as a temperature gauge. And through a system functions, prevents unauthorized persons from changing control.
Product conforming to UL Inc. (United States and Canada).

2. APPLICATION

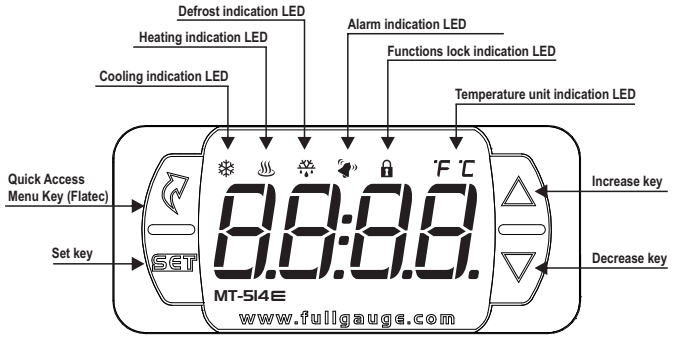
- Vaccine refrigerators
- Refrigerated counters
- Freezer rooms
- Hot counters
- Greenhouses

3. TECHNICAL SPECIFICATIONS

Power supply	**MT-514 E Faston:** 115 or 230 Vac ±10%(50/60 Hz) **MT-514 EL Faston:** 12 or 24 Vac/dc +10%
Control temperature	-50 to 105°C (-58 to 221°F)*
Operating temperature	0 to 50 °C / 32 to 122°F
Load current (outputs)	**OUT1:** 16(12)A 250Vac 2HP **OUT2:** 10A / 240Vac 1/4HP
Operating humidity	10 to 90%RH (without condensation)
Dimensions (mm)	76 x 34 x 84 mm (WxHxD)
Dimensions of the clipping for fixing of the instrument	71 ± 0,5 x 29 ± 0,5 mm (see item 5)

(*) This instrument measures and controls temperatures of up to 200°C/392°F, using the silicone sensor cable SB59 (sold separately).
Note: The sensor cable lenght can be increased by the user up to 200 meters using PP 2 x 24 AWG cable.

4. INDICATIONS AND KEYS



6. WIRING DIAGRAM

6.1. Identifications (see Images I to IV)

- **Image I:** MT-512E 2HP Faston, supplied at 115 Vac.
- **Image II:** MT-512E 2HP Faston, supplied at 230 Vac.
- **Image III:** MT-512EL 2HP Faston, supplied at 12 Vac/dc.
- **Image IV:** MT-512EL 2HP Faston, supplied at 24 Vac/dc.

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.

Image I

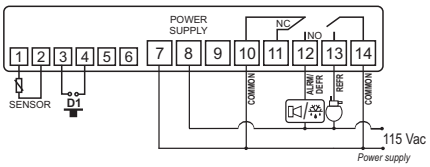


Image II

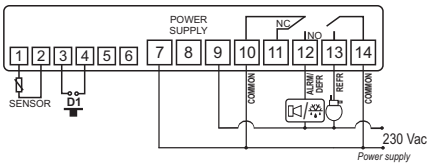


Image III

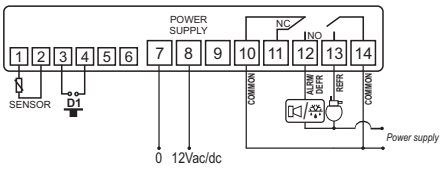
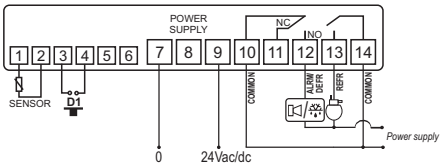
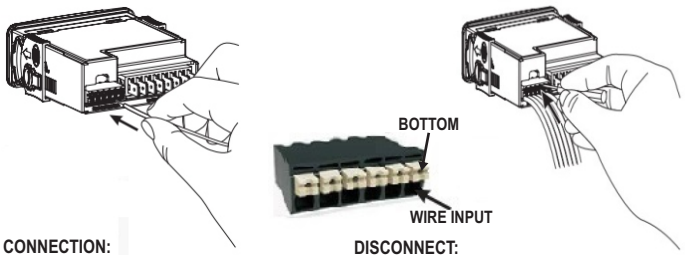


Image IV



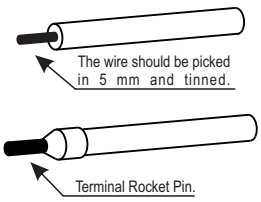
NEW CONNECTION SYSTEM (QUICK COUPLING): FASTON and PUSH-IN FAST



CONNECTION:
- Hold the wire near its end and insert it into the desired slot.
- If necessary, press the bottom to assist the connection.

NOTE:
- In the Push-In connectors the maximum wire gauge that can be used is 1.5mm².
- The wires must be tinned or use Rocket Pin terminals with a maximum gauge of 0.75mm².

DISCONNECT:
- To disconnect the cord, press the bottom and remove it.



6.1. Temperature sensor connection

- Connect the **sensor S1** wires to terminals "1 and 2" spring type connector. The polarity is not relevant.
- Length of the sensor cables can be increased by user himself to up to 200 meters, using a PP 2x24 AWG cable.

6.2. Recommendations of IEC60364 standard

a) Install overload protectors in the controller supply.
b) Install transient suppressors – suppressor filter RC – in the circuit to increase the service life of the controller relay. See connection instructions of the filter on the previous page.
c) The sensor cables may be together, but not in the same conduit where the power supply of the controller and/or of the loads passes through.

7. FIXING PROCEDURE

a) Cutout the panel plate (Image V - item 13) where the controller will be fixed, with dimensions X = 71±0,5 mm and Y = 29±0,5 mm;
b) Remove the side locks (Image VI - item 13): To do this, squeeze the elliptical central part (with the Logo Full Gauge Controls) and move the latches back;
c) Pass the wires through the cutout of the plate (image VII - Item 13) and make the electrical installation as described in item 6;
d) Insert the controller into the panel cutout, from the outside in;
e) Replace the latches and push then until they are pressed against the panel, securing the controller to the housing (see arrow in Figure VI - item 13);
f) Adjust the parameters as described in item 9.

⚠ **WARNING: for installations requiring liquid-tight sealing, the cut-off for the installation of the controller should be at must 70.5x29mm. The side latches must be secured so that they press the rubber sealing to prevent infiltration between the cutout and the controller.**

Vinyl protector - Image IX (item 13)

Protects the controller should when installed in a place with splashing water, such as in refrigerated counters. This adhesive vinyl accompanies the instrument, on the packaging.

⚠ **IMPORTANT: Apply only after completing electrical connections.**

a) Retract the lateral locks (Image VI - item 13);

b) Remove the protective film from the adhesive side of the vinyl;

c) Apply the vinyl over the whole top, folding the flaps, as indicated by the arrows - Image IX (item 13);

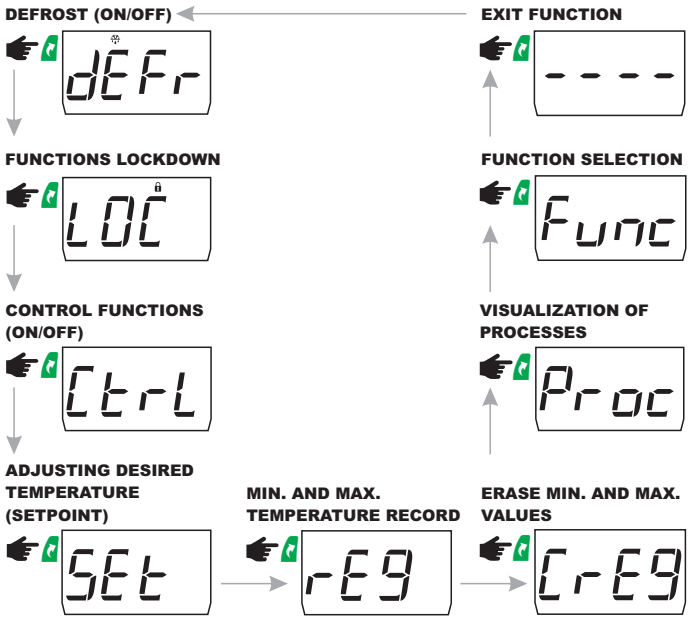
d) Reinstall the latches.

NOTE: The vinyl is transparent, allowing to visualize the electric scheme of the instrument.

6. OPERATIONS

6.1. Quick Access Menu Map

To access or browse in the quick access menu, use the key (quick touch) while the temperature is being displayed by the controller. Each touch displays the next function of the list; for confirming, use the SET key (quick touch). For further details, refer to chapter 6.3.



6.2 Quick access keys map

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

SET	**Hold down for 2 seconds: setpoint adjustment.**
▼	**Quick touch: current process display.**
▼	**Hold down for 2 seconds: inhibit audible alarm (buzzer).**
▲	**Quick touch: maximum and minimum temperature display.**
	Pressed for 5 seconds: turn on/turn off the control functions.
▲	**Hold down for 4 seconds: carries out manual defrost.**
	Quick touch: enters quick access menu.
▲ ▼	**Hold down simultaneously: enters function selection.**

6.3. Basic operations

6.3.1. Adjusting desired temperature (setpoint)

If configured not to use recipes (F03= no):

- Hold down the SET key for 2 seconds until the message SEt is displayed;
- Then the message SP will be displayed and the setpoint may be adjusted;
- Use the ▼ or ▲ keys for changing the value, then press SET to confirm.

If configured to use presets (F03= YES):

Each preset may be set up to use different values for the Setpoint, Control differential (hysteresis) and Cooling time (interval between defrosts).

To select the preset:

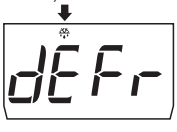
- Hold down the SET key for 2 seconds until the message SEt is displayed;
- Then the currently selected preset will appear rc1 or rc2 .
- Use the ▼ or ▲ keys to select which of the 2 presets will be used.
- To confirm the selection, press SET .

Note: The values of functions Setpoint, Control differential (hysteresis) and Cooling time (interval between defrosts) for each preset are set up in the parameters menu.

6.3.2. Manual defrost

The manual defrost is carried out through the quick access menu. Hold down the key (quick touch) until the message dEFr appears (flashing ❄ LED), and then press the SET key (quick touch) to make a selection. Then the message dEFr On will appear (❄ LED on).

To turn off defrost manually press the key (quick touch) until the message dEFr appears (flashing ❄ LED). Press the SET key (quick touch) to select. Then the message dEFr OFF appears (❄ LED off).



The manual defrost may also be activated/deactivated by holding down the key ▲ for 4 seconds.

6.3.3. Functions lockdown

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 changes (F36=2) or you can block changes of control functions and leave the adjustment of the setpoint enabled (F36=1).

Using the key (short touch), access the function LOC in the easy menu, confirm by pressing SET (short touch), then the message no will be displayed. After that keep the key ▼ pressed for the time configured for the functions lockdown (F37), until LOC is displayed. The message On will be displayed indicating the lockdown function is activated upon releasing the key.

To unlock, turn the controller off and then turn it on again with the key ▼ pressed. Keep the key pressed until LOC is displayed. Keep the key pressed for ten seconds and the message OFF will be shown on the display indicating the deactivation of the lockdown function when the key is released.

6.3.4. Control functions shutdown

The shutdown of the control functions allows the controller to operate only as a temperature indicator, keeping the control outputs and alarms off. The use of this feature is enabled or disabled by the shutdown function of the control functions (F38). When enabled, the control functions and alarms are switched off (CtrL OFF) or on (CtrL On) in the quick access menu through the CtrL option. When the control functions are off, the message OFF is displayed alternating with the temperature and other messages. Also is possible turn on/ turn off the control functions by pressing the key for 5 seconds.

Note: By switched on again the control functions are counted the time defined in the instrument energization delay and alarm inhibition time by temperature.

6.3.5. Visualization of Processes

To view the process and the time elapsed, press ▼ (quick touch) or by the (Flatec) key pressing it until the message Proc appears. This way, the controller will display the current process status, and the following messages may appear on the display:

dEL - Initial delay (delay in the instrument start-up)
rEFr - Cooling
Hot - Heating
dEFr - Defrost
drAi - Drainage
---- - Control functions off

6.3.6. Minimum and Maximum Temperature Record

Pressing down the ▲ key or also via the quick access menu (see chapter 6), will cause the message rE9 to be displayed, then the minimum and maximum temperatures recorded.

For erasing the current minimum and maximum values, hold down the key (quick touch) until the message CrE9 is displayed, then the message CodE will appear; enter the value 123 , then confirm with the SET key. If the code is correctly entered, the message rSt will be displayed. rSt . This procedure keeps unauthorized users from erasing the minimum and maximum temperature records.

Note 1: The minimum and maximum temperature records shall only be performed after the elapsing of the alarm inhibition time when energizing the controller and after the delay in the instrument energizing F27 + F19 .

Note 2: The minimum and maximum temperature records shall only be performed after the compressor reaches the active preset setpoint ; before that, the ---- messages will be displayed for the records of minimum and ---- for the records of maximum temperature.

6.3.7. Unit Selection

To select the temperature unit in which the instrument will operate enter the function F01 using the access code 231 then press the SET . key. Then, select the unit desired °C or °F using the ▲ ▼ keys; to confirm press SET . Every time the unit is changed, the functions settings return to the default value, thus, they must be set up again.

6.3.8. Buzzer inhibition

When activated, the buzzer can be inhibited by pressing the ▼ key for two seconds. The Buzzer will remain inhibited until a new alarm event takes place.

6.4. Advanced operations

The functions menu can be accessed through the quick access menu (according to chapter 6), option Func or by pressing simultaneously ▼ and ▲ during the temperature display. To allow change of parameters, enter F01 by pressing SET (quick touch) and using the ▼ or ▲ keys enter code 123 (one hundred and twenty-three), and then confirm with SET . For changing the other functions, browse the menu through the ▼ or ▲ keys and proceed the same way in order to adjust them. To exit the menu and return to the normal operation, press SET (long touch) until ---- is displayed.

OBS: If the functions lockdown is enabled, when pressing the ▼ or ▲ keys, the controller will display the message LOC and will not allow parameter adjustment.

6.5. Parameters table

		CELSIUS				FAHRENHEIT			
Fun	Description	Min	Max	Unit	Standard	Min	Max	Unit	Standard
F01	Access code 123	-	-	-	-	-	-	-	-
F02	Sensor indication displacement (offset)	-5.0	5.0	°C	0	-9	9	°F	0
F03	Using Presets	no	yes	-	no	no	yes	-	no
F04	Output operating mode OUT1	0-cool.	1-heat.	-	0-cool.	0-cool.	1-heat.	-	0-cool.
F05	Operation setpoint (rc1)	-50	200	°C	4	-58	392	°F	39
F06	Control differential (Hysteresis) (rc1)	0.1	20	°C	1	1	36	°F	1
F07	Cooling time (interval between defrosts) (rc1)	1	999	min.	240	1	999	min.	240
F08	Defrost time (rc1)	0(no)	999	min.	30	0(no)	999	min.	30
F09	Operation setpoint (rc2)	-50	200	°C	0	-58	392	°F	32
F10	Control differential (Hysteresis) (rc2)	0.1	20	°C	1	1	36	°F	1
F11	Cooling time (interval between defrosts) (rc2)	1	999	min.	240	1	999	min.	240
F12	Defrost time (rc2)	0(no)	999	min.	30	0(no)	999	min.	30
F13	Minimum setpoint allowed to the end user	-50	200	°C	-50	-58	392	°F	-58
F14	Maximum setpoint allowed to the end user	-50	200	°C	75	-58	392	°F	167
F15	Minimum OUT1 output time on	0(no)	999	sec.	20	0(no)	999	sec.	20
F16	Minimum OUT1 output time off	0(no)	999	sec.	20	0(no)	999	sec.	20
F17	Initial status when energizing the instrument	0-cool.	1-defr.	-	0-cool.	0-cool.	1-defr.	-	0-cool.
F18	Temperature indication locked during defrost	no	yes	-	no	no	yes	-	no
F19	Instrument energization delay	0(no)	240	min.	0(no)	0(no)	240	min.	0(no)
F20	Compressor status with the sensor damaged	0	2	-	0	0	2	-	0
F21	Compressor time on in case of error	1	999	min.	15	1	999	min.	15
F22	Compressor time off in case of error	1	999	min.	15	1	999	min.	15
F23	Maximum Compressor on without reaching setpoint	0(no)	240	min.	0(no)	0(no)	240	min.	0(no)
F24	Low temperature alarm	-50	200	°C	-50	-58	392	°F	-58
F25	High temperature alarm	-50	200	°C	200	-58	392	°F	392
F26	OUT2 output operating mode	1	5	-	1	1	5	-	1
F27	Alarm inhibition time when energizing the controller	0(no)	999	min.	0(no)	0(no)	999	min.	0(no)
F28	Alarm inhibition time by temperature	0(no)	999	min.	0(no)	0(no)	999	min.	0(no)
F29	Enable buzzer	0(off)	1	-	0(off)	0(off)	1	-	0(off)
F30	Digital input operating mode	0(no)	6	-	0(no)	0(no)	6	-	0(no)
F31	Output on time in OUT2 alarm status	0	999	sec.	1	0	999	sec.	1
F32	Output off time in OUT2 alarm status	0	999	sec.	1	0	999	sec.	1
F33	Open door time for alarm	0(no)	999	min.	0(no)	0(no)	999	min.	0(no)
F34	Operating mode of the digital filter	0	1	-	0	0	1	-	0
F35	Digital filter intensity applied to the sensor	0(no)	20	sec.	0(no)	0(no)	20	sec.	0(no)
F36	Functions lockdown	0	2	-	0	0	2	-	0
F37	Time for functions lockdown	15	60	sec.	15	15	60	sec.	15
F38	Control functions shutdown	0(no)	2	-	0(no)	0(no)	2	-	0(no)

6.5.1. Description of parameters

F01- Access code 123 (one hundred and twenty-three):
This is required when intending to change the configuration parameters. Entering of this code is not required if the intention is just visualizing the parameters adjusted.
It allows entering of the expected access codes:
123 - Allows access for changing the table parameters.
231 - Allows configuring of the unit of measurement °F or °C.
231 - To select the unit in which the instrument will operate enter the function F01 using the access code 231 then press the SET key. Then, select the unit desired °C or °F using the ▲ or ▼ keys; to confirm press SET.
NOTE: *Every time the unit is changed, the parameters should be reset, since they assume the 'standard' values of the parameter's table.*

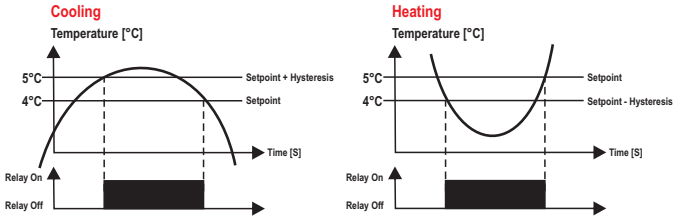
F02 - Sensor indication displacement (offset):
Allows compensation for any temperature deviations from sensor replacement or change in the cable length.

F03 - Using Presets:
Allows configuration of the controller so as whether or not to use the presets:
no **- No:** If configured this way, the instrument will not use the preset values in the control routines. For this purpose, the setpoint SP will be used, adjusted via the quick access menu. The control differential to be used shall be the same as in preset rc1, F06 "OUT1 output control differential (rc1)". The cooling time to be used shall be the same as in preset rc1, F07 "OUT1 output cooling time (rc1)". Defrost time to be used will be the same as in preset 1, F08 "OUT1 output defrost time (rc1)".
The value configured in SP may be adjusted between F13 "Minimum setpoint allowed to the end user" and F14 "Maximum setpoint allowed to the end user".
In this configuration, the controller will not indicate which preset is enabled.
YES **- Yes:** Selection of presets will be made through the quick access menu, in the same way as for adjusting the setpoint. In this configuration, the controller will indicate in the display which preset is enabled, rc1 or rc2. If configured this way, in the control routines the instrument will use the values of setpoint, control differential, cooling time and defrost time configured in the parameters table.

F04 - Output operating mode OUT1:
Selects the out1 output operating mode:
0 - Cooling
1 - Heating

F05 - Operation setpoint (rc1):
It is the reference value for temperature control, that is, the temperature to be maintained in a controlled environment when preset (rc1) is used.

F06 - Control differential (Hysteresis) (rc1):
It is the difference in temperature (hysteresis) between TURNING ON and OFF the cooling (or heating) when recipe (rc1) is used.
Example: One wants to control the temperature at 4.0 °C with a differential of 1.0 °C. Therefore, the cooling is switched off at 4.0 °C and switched back on at 5.0 °C (4.0 + 1.0).



F07 - Cooling time (interval between defrosts) (rc1):
Corresponds to the time the controller will act on cooling when preset (rc1), is used; following this period, the controller enters the natural defrost process.

F08 - Defrost time (rc1):
It is the defrost duration time when preset (rc1) is used. Within this period, the relay will remain off; following this period, the controller will then return to the cooling state.

F09 - Operation setpoint (rc2):
It is the reference value for temperature control, that is, the temperature to be maintained in a controlled environment when preset (rc2) is used.

F10 - Control differential (Hysteresis) (rc2):
It is the difference in temperature (hysteresis) between TURNING ON and OFF the cooling (or heating) when preset (rc2) is used.
Example: One wants to control the temperature at 4.0 °C with a differential of 1.0 °C. Therefore, the cooling is switched off at 4.0 °C and switched back on at 5.0 °C (4.0 + 1.0).

F11 - Cooling time (interval between defrosts) (rc2):
Corresponds to the time the controller will act on cooling when recipe (rc2) is used; following this period, the controller enters the natural defrost process.

F12 - Defrost time (rc2):
It is the defrost duration time when preset (rc2) is used. Within this period, the relay will remain off; at the end of this period, the controller will return to the cooling state.

F13 - Minimum setpoint allowed to the end user:
Avoids regulation of excessively low setpoint temperatures by mistake.

F14 - Maximum setpoint allowed to the end user:
Avoids regulation of excessively high setpoint temperatures by mistake.

F15 - Minimum OUT1 output time on:
It is the minimum time the compressor will remain on, i.e. the time interval between the last start-up and the next stop.

F16 - Minimum OUT1 output time off:
It is the minimum time the compressor will remain off, i.e. the time interval between the last stop and the next start-up. It is used to relieve the discharge pressure and increase the service life of compressor.

F17 - Initial status when energizing the instrument:
It allows defrosting when controller is energized such as, for example, upon resuming of electric power (in the event of power outage).
0 - Cooling
1 - Defrost

F18 - Temperature indication locked during defrost:
If F18 is enabled, the indication will only be released at the next cooling cycle after the temperature reaches the "locked" value again, or after 15 minutes in cooling (as a safety measure).

F19 - Instrument energization delay:
This function being enabled, when the instrument is energized it only works as temperature indicator remaining with the output off during the defined time. In installations with several units of equipment, configuring different values for the delay time in the start-up of each instrument, it is possible to avoid peaks of demand by activating the loads at different times.
This delay may be of the compressor or of defrost (when defrost is configured at the start).
Note: At its end, the count of minimum time of output off is started, if there is any.

F20 - Compressor status with the sensor damaged:
If the sensor is in short-circuited, off or out of the measure range, the compressor assumes the set status in this function.
0 - Compressor off
1 - Compressor on
2 - Cycling according to times defined in F21 and F22
Note: If in the heating mode, and in error, the output will be switched off.

F21 - Compressor time on in case of error:
F22 - Compressor time off in case of error:
These determine the minimum time the compressor will remain on/off, respectively, if the sensor is off or out of the measure range.

F23 - Maximum Compressor on without reaching setpoint:
This is the maximum time the compressor may remain on without reaching the setpoint during the cooling process for safety reasons. If this time is surpassed, the output is switched off and also the visual alarm ALrC and the audible alarm (buzzer) will be activated. This function can be switched off by setting it at the minimum value 0 no.
Note: In this situation, the controller should be switched off and switched back on so as to continue with the operation.
Note 2: If the OUT2 output is set up to work differently from the alarm, this will also be switched off for safety reasons.

F24 - Low temperature alarm:
The temperature below which the instrument will indicate visual low temperature alarm AtLo and the audible alarm (Buzzer). The differential for alarm shutdown is set at 0.1 °C/1 °F. This alarm considers the temperature displayed, thus being influenced by the indication of temperature lockdown during defrost F18.

F25 - High temperature alarm:
The temperature above which the instrument indicates high visual temperature alarm [AtH1] and the audible alarm (Buzzer). The differential for alarm shutdown is set at 0.1 °C/1 °F. This alarm considers the temperature displayed, thus being influenced by the indication of temperature lockdown during defrost [F18].
Note: For safety reasons, output OUT1 is switched off when the controller is configured for heating and a high temperature alarm [athi] occurs, or when it is configured for cooling and a low temperature alarm [atlo] occurs. For this reason you must configure the alarm threshold above (if heating) or below (if cooling) the desired temperature (setpoint of output OUT1).

F26 - OUT2 output operating mode:
Selects the OUT2 output operating mode:
[1] **- Absolute extra-range alarm:** Considers the values defined in [F24] and [F25] as minimum and maximum values to activate the alarm output.
[2] **- Extra-range alarm relating to the setpoint:** Considers the active preset setpoint [rc1] or [rc2] and the absolute values defined in [F24] and [F25], i.e. the positive value of these functions as minimum and maximum values to activate the alarm output.
For example:
Desired temperature [SP]: -5 °C
Low temperature alarm [F24]: 2 °C
High temperature alarm [F25]: 2°C
Limits: ([SP] - [F24] and [SP] + [F25]).
The low temperature alarm will be signaled at -7°C(-5 -2) and the high temperature alarm at -3°C(-5+2).
[3] **- Electric defrost (by resistance):** Where only the OUT2 output is activated during the defrost process.
[4] **- Hot gas defrost:** Where the OUT1 and OUT2 compressor outputs are activated during the defrost process.
[5] **- OUT2 output as OUT1 output NC:** In this option, the OUT2 output is activated when OUT1 output is deactivated, irrespectively of the state (cooling/heating or defrost), except when the sensor is in error [F20].
Note: If the OUT2 output is configured to work differently from alarm, the indications of absolute alarm are still visual (messages in the display) and audible (if the buzzer is enabled).
Note 2: If the OUT2 output is configured to work as defrost (electrical or hot gas), after elapsing of defrost time a fixed 2-minute time period is counted for drainage. This time is necessary for the dripping, i.e. for the last drops of water to run from the evaporator. Within this period, outputs OUT1 and OUT2 remain off.

F27 - Alarm inhibition time when energizing the controller:
This is the time during which the alarm remains off even under conditions of alarm during the instrument start-up. This time will be counted after elapsing of the time configured in [F19]. This function can be switched off by setting it at the minimum value 0 [no].

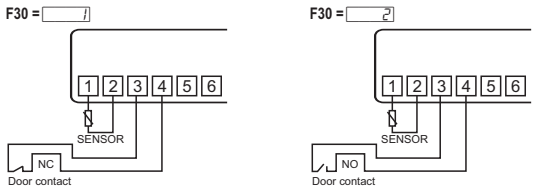
F28 - Alarm inhibition time by temperature:
With this configuration active, the temperature will need to remain in the alarm condition during the inhibition time set, for the alarm to be indicated. That way one can prevent alerts resulting from specific temperature variations, and after defrost.

F29 - Enable buzzer (0-Disabled/1-Enabled):
Allows enabling and disabling of the internal buzzer for alarm signaling.

F30 - Digital input operating mode:
Selects the digital input operating mode.
[no] - Disabled
[1] - Digital input: Open door (active at the contact closing)
[2] - Digital input: Open door (active at the contact opening)
[3] - Digital input: External alarm/power outage (active at the contact closing)
[4] - Digital input: External alarm/power outage (active at the contact opening)
[5] - Digital input: Open door and power outage (active at the contact closing)
[6] - Digital input: Open door and power outage (active at the contact opening)

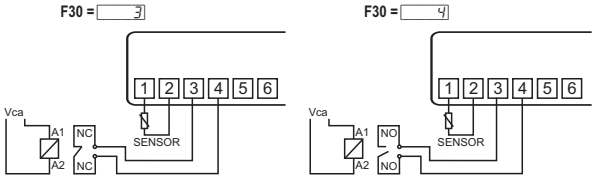
Examples of connection for detecting open door alarm:

This configuration may be used for the **MT-514E Faston** to detect whether the door has been left open for a time above the value set up in "[F33] - Time with open door to trigger alarm". In this configuration, the message [AOPn] is displayed when an open door alarm is detected. To that end, the user may use the NO or NC pushbuttons (not supplied) connected to the digital input, as shown in examples below:

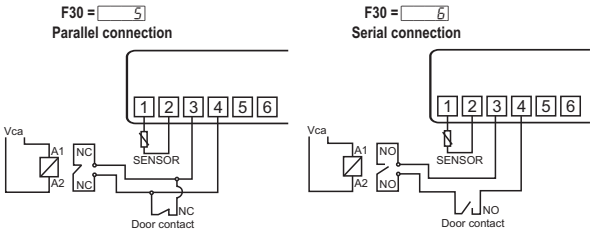


Examples of connection for power outage detection:

This configuration may be used when **MT-514E Faston** is being energized by a 12/24 V DC battery (common in vaccine refrigerators) and one wants to detect when a power outage occurred (115/230 V AC). In this configuration, the message [AUoL] is displayed when alarm is detected for power outage. To that end, the user may utilize a contactor or auxiliary contact (not supplied), where NC (F30=[3]) or NO (F30=[4]) contacts are connected to the digital input and contacts A1 and A2 (contactor coil) are connected to the power system, as shown in examples below:



Example of connections for detecting open door and power outage:
This configuration may be used to detect power outage alarm (115/230 V AC) and also to detect that the door has been left open (either one event).
In those configurations, the messages [AUoL] and [AOPn] are displayed alternately when alarm event is detected (power outage or open door alarm).
For this purpose, the user may use the pushbuttons (not supplied) and a contactor or auxiliary contact (not supplied) connected in series or in parallel, as shown in examples below:



F31 - Output on time in OUT2 alarm status:
F32 - Output off time in OUT2 alarm status:
Selects the cycling time in seconds of the alarm output when it is active. If any of those functions are set with a value of [0] the output will be permanently active.

F33 - Open door time for alarm:
If the door remains open for a time equal to, or greater than, the one configured in this parameter, the controller will set off a visual open door alarm [AOPn] and the audible alarm (Buzzer).
The alarms are suspended upon the door closing. The audible alarm may be inhibited through the ▼ key (pressed for 2s). This function can be switched off by setting it at the minimum value 0 [no].
Note 1: In order for the open door alarm to operate, the function "Digital input operating mode" [F30] must be configured as open door contact.
The audible alarm is activated only if the buzzer is enabled in the function "Enable Buzzer (0-Disabled /1-Enabled)" [F29].
Note 2: If the function "Digital input operating mode" [F30] is configured as open door contact, the open door indication [OPEn] will be displayed every time the door is open, except for the cases of alarm.

F34 - Operating mode of the digital filter:
[0] - The filter acts both on the rise as on the decrease temperature.
[1] - The filter acts only in the temperature rise ramp. When the temperature falls, your response will be immediate.

F35 - Digital filter intensity applied to the sensor:
This filter has the purpose of simulating increase in thermal mass at the sensor thereby increasing its response time (thermal inertia). The higher the value set in this function, the more time the sensor takes to respond.
This function can be switched off by setting it at the minimum value 0 [no].

F36 - Functions lockdown:
This allows and configures the functions lockdown.
[0] - Do not allow the functions lockdown.
[1] - Allow a partial lockdown where the control functions will be locked but the adjustment of the setpoint, manual defrost, and maximum and minimum record are allowed.
[2] - Allow the full lockdown, enabling only the manual defrost and maximum and minimum record.

F37 - Time for functions lockdown:
Allow lockdown of control functions (see item 6.3.3).
[15] - [60] Defines the time in seconds for the controller to activate.

F38 - Control functions shutdown:
Allow control functions shutdown (see item 6.3.4).
[no] Disables the 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. SIGNALS

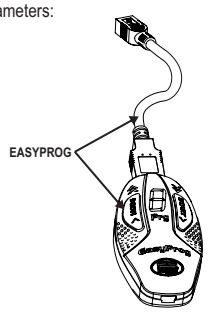
[Err1]	**Sensor disconnected or damaged.**
[dEFr] [On]	**Manual activation of defrost process.**
[dEFr] [OFF]	**Manual activation of end of defrost process.**
[AtLo]	**Low temperature alarm.**
[AtHi]	**High temperature alarm.**
[ALrC]	**Compressor reached maximum time on limit without reaching SP.**
[AUoL]	**Power outage alarm indication.**
[AOPn]	**Open door alarm indication.**
[OPEn]	**Open door indication.**
[inib]	**Buzzer inhibited.**
[LOC] [On]	**Functions lockdown.**
[LOC] [OFF]	**Unlocking of functions.**
[OFF]	**Control functions off.**
[ECAL]	**Contact Full Gauge Controls.**
[PPPP]	**Reconfigure the values of the functions.**

8. OPTIONAL ITEMS - Sold Separately

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:

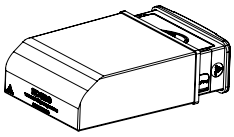
- Serial RS-485: It connects via RS-485 network to the controller (only for controllers that have RS-485).
- USB: it can be connected to the computer via the USB port, using Sitrad's Recipe Editor.
- Serial TTL: The controller can be connected directly to **EasyProg** by the TTL Serial connection.



Ecase

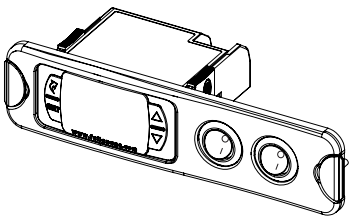
It is recommended for the Evolution line, keeps water from entering the back part of the instrument. It also protects the product when the installation site is washed.

NOTE: Ecase is compatible with the use of small type Faston terminals, usually with silicone protection.



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.



Electrical noise suppressing filter

Contact suppressor connection diagram

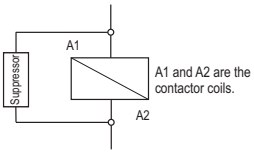
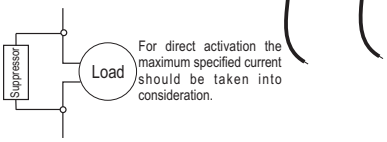
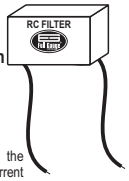


Diagram for suppressor installation for direct drive load inputs





12. ANNEXES - Reference Images

Image V

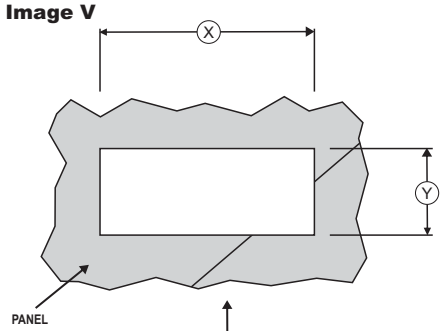


Image X

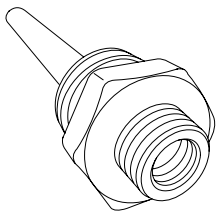
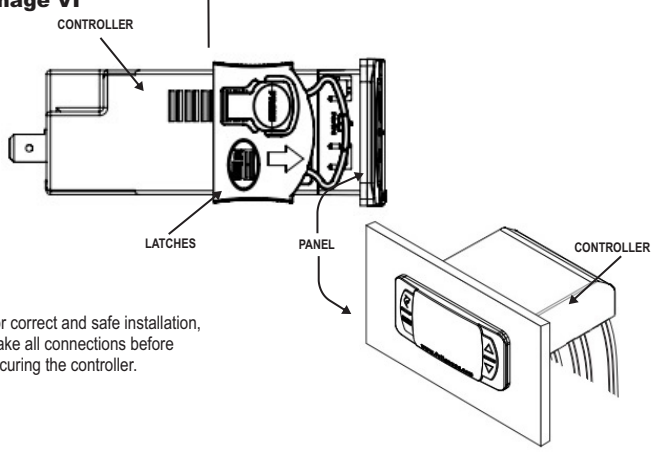


Image VI



For correct and safe installation, make all connections before securing the controller.

Image VII

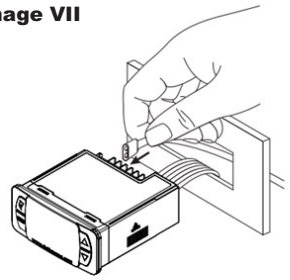
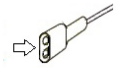


Image VIII

IMPORTANT:
Faston connectors should be protected with covers, preferably silicone.



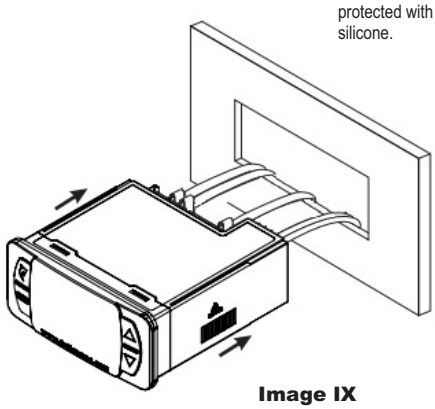
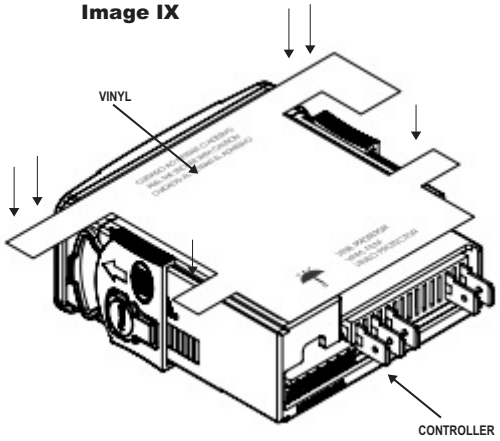


Image IX



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

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