



dCORE Ver.02

tCORE Ver.02

DIGITAL REFRIGERATION CONTROLLER WITH TOUCH-SENSITIVE KEYS



DTCOREV01-02T-19149

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

- Power save mode
- Touch screen
- Manual defrost
- Function lock
- Turn off control functions
- Sound alarm
- Serial programming

WARNING

BEFORE INSTALLING THE CONTROLLER, WE RECOMMEND THAT YOU READ 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 power source; Make sure that the instrument has adequate ventilation, avoiding installation on panels containing devices that may cause it to operate outside the specified temperature range; Install the product away from sources that may generate electromagnetic disturbances, such as: motors, contactor, relays, solenoid valves, etc;

AUTHORIZED SERVICE:
 Product installation or maintenance may only be performed by qualified professionals;
ACCESSORIES:
 Use original Full Gauge Controls accessories only. If you have any questions, please contact technical support.

AS IT CONSTANTLY EVOLVING, FULL GAUGE CONTROLS RESERVES THE RIGHT TO CHANGE THE INFORMATION CONTAINED IN THE MANUAL AT ANY TIME, WITHOUT PRIOR NOTICE.

1. DESCRIPTION

dCORE and **t**CORE are electronic controllers for refrigeration dedicated to freezers, beverage displays and refrigerated cabinets. These controllers can activate cooling, defrost, fan and lighting systems. In addition, it allows to pre-define up to 4 operating temperatures that are easily changed by its touch-sensitive keyboard (touchpad) for freezers with rotation of different products. The controller supports 2 temperature sensors for the control of the refrigerated environment and intelligent defrost control (start and end of defrost by time or temperature). For a better use for energy, it can control ventilation during the cycle of the compressor and use Smooth Defrost, a defrosting technique that reduces the final temperature of the electrical resistance and the amount of heat emitted. Using its digital input, door opening can be monitored and economic setpoint, defrost or Fast Freezing can be activated. The Fast Freezing function is an alternative for speed up the cooling process, recommended for use after the process of replacing products in the freezer. In addition, **t**CORE controller has system voltage monitoring where the operation of the equipment can be limited to only a safe voltage range, reducing the chance of electrical damage due to the power supply.

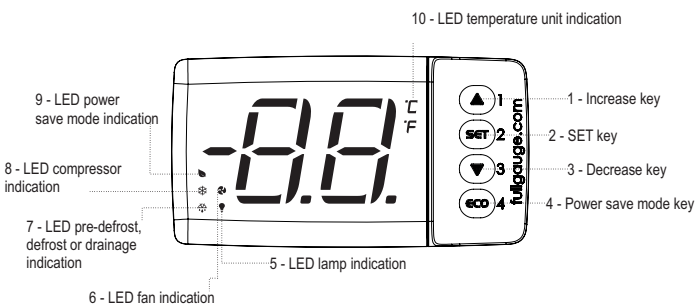
2. APPLICATIONS

- Beverage displays;
- Refrigerated display cabinets.

3. TECHNICAL SPECIFICATIONS

Controller supply	85-240Vac (50/60Hz)
Control temperature	-50 to 60°C (-58 to 99°F)
Operating temperature	0 to 60°C (32 to 140°F)
Resolution	0.1°C between -9.9 and 9.9°C and 1°F in the remainder of the range. 1°F across the range
Maximum relay current	COMP: 10(8)A / 250Vac 1HP - compressor output DEFR: 7A / 250Vac - defrost output FAN: 3(2)A / 250Vac - 1/10HP - fan output LIGHT: 2(2)A / 250Vac - lamp output
Digital input	Configurable dry contact type
Operating humidity	10 to 90% UR (without condensation)
Front dimension (with frame)	100 x 54 x 22mm (3,9 x 2,1 x 0,8")
Front cutout dimension	91 x 45mm (3,6 x 1,7")
Base module dimension	116 x 88 x 27mm (4,6 x 3,5 x 1,1")

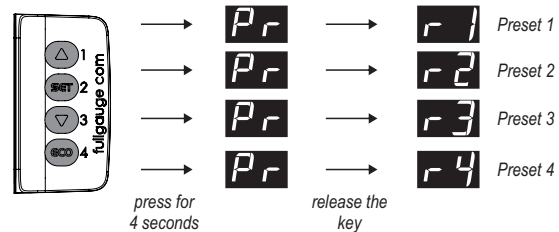
4. INDICATIONS AND KEYS



5. BASIC OPERATIONS

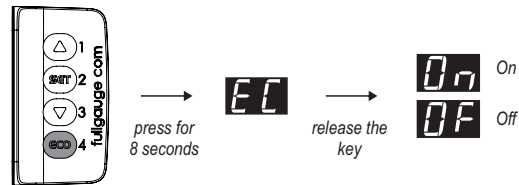
5.1 Change the preset

To select the desired preset, press the corresponding key for 4 seconds until the message [Pr] appears, then release it.



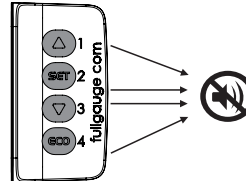
5.2 Turn the economy mode on / off

To turn power save mode on / off, press the ECO key for 8 seconds until the [E] message appears, then release it.



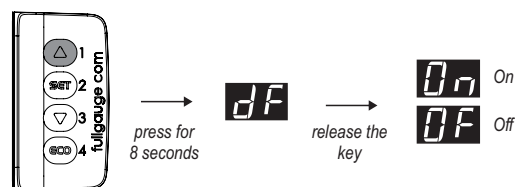
5.3 Disable the alarm

To disable the audible alarm, quickly press any of keys 1, 2, 3 or 4.



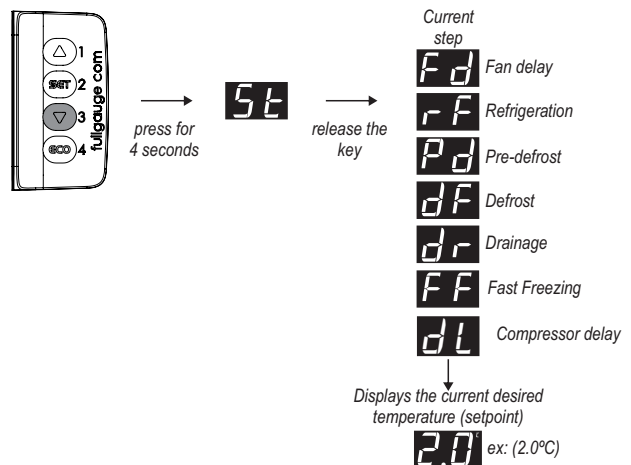
5.4 Manual defrost

To start/stop a manual defrost, regardless of programming, press key 1 for 8 seconds until the message [dF] appears, then release it. The message [On] will be shown when it starts, and [Off] when it is stopped.



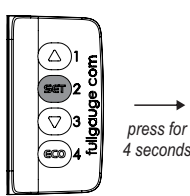
5.5 View process step and current desired temperature (setpoint)

To check which process step is being performed, press key "3" for 4 seconds until the [SE] message appears, then release it. The current process step is displayed followed by the desired operating temperature (setpoint) relative to the operating mode (normal/power save).



5.6 View current sensor temperature and voltage

Press key 2 for 4 seconds until the **[SE]** message appears, then release it. The following information will be shown:



press for 4 seconds

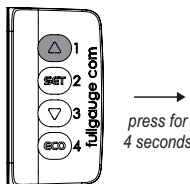
release key

E1	Cabinet Temperature (S1) If [L1] = [1] or [2] Example: 4.5°C
4.5	
E2	Evaporator Temperature (S2) Example: 0.3°C
0.3	
U	Voltage
01	Hundred } (ex: 120V)
20	Unit }

Note: If the sensor S2 or the voltage monitor are disabled, the message **[DF]** is displayed instead of the current value.

5.7 Minimum and maximum temperatures, voltage and number of the open door

Press key 1 for 4 seconds until the message **[LH]** appears, then release it. The controller displays the minimum and maximum temperatures of sensors S1 and S2 (if enabled in function **[54]**), as well as minimum and maximum voltages and the number of times the door has been opened.



press for 4 seconds

release the key

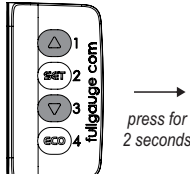
Display view

E1	Cabinet Sensor (S1)
1.2	Minimum temperature (ex: 1.2°C)
2.0	Maximum temperature (ex: 2.0°C)
E2	Evaporator Sensor (S2)
1.2	Minimum temperature (ex: 1.2°C)
2.0	Maximum temperature (ex: 2.0°C)
U	Mains voltage
01	} Minimum voltage (ex: 112V)
12	
01	} Maximum voltage (ex: 125V)
25	
00	Door opening number
01	} Hundred } (ex: 135)
35	

Note 1: To reset the values, press key 1 for 1s during the display of the information and the message **[LE]** will be shown on the display.
Note 2: If the sensor S2 or the voltage monitor are disabled, the message **[DF]** is displayed instead of the minimum and maximum values.

5.8 Select temperature unit

The controller temperature can be displayed either in Celsius (°C) degrees or Fahrenheit (°F) degrees. To configure the unit, press keys 1 and 3 simultaneously for 2 seconds until **[SL]** appears in the display, then release it. Select the **[LD]** menu (press key 2 quickly) enter code **[31]** and confirm. The message **[UN]** will be displayed and then it is possible to switch between the two units mentioned.



press for 2 seconds

release the key

Insert the access code 31

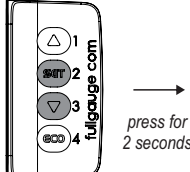
Confirm

Note: Each time the unit is changed the parameters are reset as they assume the "factory default" values.

5.9 Fast Freezing

In Fast Freezing mode, the control uses the temperature limit parameter for fast freezing (**[01]**, **[02]**, **[03]**, **[04]**) to accelerate the refrigeration or freezing process. Upon reaching this temperature or the maximum fast freezing time (**[05]**) the fast freezing process is automatically deactivated.

To start or stop Fast Freezing mode, press keys 2 and 3 for 2 seconds until the **[FF]** message appears, then release it. The **[ON]** message is displayed when it starts and **[OF]** when it is interrupted.



press for 2 seconds

release the key

On

Off

Note: If by activating fast freezing mode the controller identifies that there is a defrost programmed to start by time during this period, the defrost will be anticipated and then starts fast freezing mode.

5.10 Configure the setpoint

To configure the selected preset setpoint press key 2 for 8 seconds until the message **[SP]** appears, then release it. The current setpoint value is displayed. Use keys 1 and 3 to adjust the desired value (setpoint). Press key 2 to confirm.



press for 8 seconds

release the key

Confirm

5.11 Turn the lamp on / off

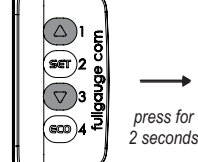
To manually turn the lamp on or off, press the **[LED]** key for 2 seconds until the **[L]** message appears, then release it. The lamp remains on by the time configured in **[P5]**, while the power save mode is not active.

Note: The lamp output must be configured as Light (**[B7]** = **[1]**).

6. ADVANCED OPERATIONS

6.1 Configured parameters display

It is possible to view controller settings without being able to edit them. To do this, press keys 1 and 3 simultaneously for 2 seconds until the message **[SL]** appears, then release it. It is possible to view all controller settings. Navigate between menus using the 1 (increase) and 3 (decrease) keys. Confirm selection with key 2.



press for 2 seconds

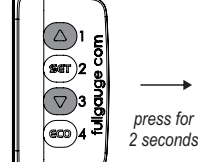
release the key

Confirm

Pressing key 2 for 4 secs. returns to the main screen.

6.2 Changing the configured parameters

Press keys 1 and 3 simultaneously for 2 seconds until the message **[SL]** appears, then release it. Select the **[LD]** menu (short touch key 2) enter code **[23]** and confirm. It is possible to edit all controller settings. Navigate between menus using the 1 (increase) and 3 (decrease) keys. Confirm selection with key 2.



press for 2 seconds

release the key

Enter the access code 23

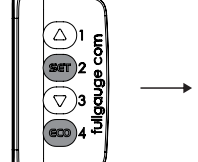
Confirm

Pressing key 2 for 4 secs. returns to the main screen.

6.3 Function Lock

Using the function lock makes operating the instrument safer, with it active, the presets and other parameters are visible to the user, but protected against undue changes (**[L4]** = **[2]**). Or it can be set to allow changes on the presets, and setpoint and locks all other parameters (**[L4]** = **[1]**). When function lock is activated and there is a try to change parameters, the message **[LE]** is displayed.

To enable the function lock, configure the time for function lock in parameter **[L5]**. This is the time to press for validation of the function lock. To lock or unlock the keypad, press keys 2 and 4 for the time set in **[L5]** until the message **[LE]** appears, then release it. An **[UN]** message will be displayed when it is locked and **[DF]** when it is unlocked.



release the key

On

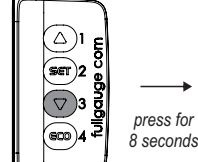
Off

Hold pressing for the time set in **[L5]**.

6.4 Turning the control functions off (Monitoring only)

When turning off the control functions (**[LE]**), the controller will only operate as a temperature and voltage indicator with all outputs disabled. This function can operate as follows:

- [0]** Does not allow control functions to be turned off.
- [1]** Allow to turn control functions on and off only if the functions are unlocked.
- [2]** Allow to turn control functions on and off even if the functions are locked. To switch control functions on/off, press key 3 for 8 seconds until message appears **[LE]**, then release it:



press for 8 seconds

release the key

On

Off

Note: When reconnecting control functions, the controller continues to respect the functions **[L1]** (minimum compressor off time), **[2B]** (Defrost when energizing controller) and **[L5]** (Delay time when powering the controller).

6.5 Functions table

FUN	FUNCTION	DESCRIPTION	CELSIUS (FAHRENHEIT)			
			MIN	MAX	UNIT.	DEFAULT
[E 1]	Desired Temperature (setpoint) (r1)	This is the control temperature of the normal operating mode. When the temperature of sensor S1 (cabinet) is less than or equal to the value configured in this function, the compressor turns OFF.	M1	M2	°C (°F)	-9.0 (16)
[E 2]	Desired Temperature (setpoint) (r2)		M1	M2	°C (°F)	-6.0 (21)
[E 3]	Desired Temperature (setpoint) (r3)		M1	M2	°C (°F)	-1.0 (30)
[E 4]	Desired Temperature (setpoint) (r4)		M1	M2	°C (°F)	2.0 (36)
[E 1]	Desired Temperature (economic setpoint) (r1)	This is the control temperature when the economic operating mode is active. If the sensor temperature S1 (cabinet) less than or equal to the value configured in this function, the compressor turns OFF.	M1	M2	°C (°F)	-4.0 (25)
[E 2]	Desired Temperature (economic setpoint) (r2)		M1	M2	°C (°F)	-1.0 (30)
[E 3]	Desired Temperature (economic setpoint) (r3)		M1	M2	°C (°F)	4.0 (39)
[E 4]	Desired Temperature (economic setpoint) (r4)		M1	M2	°C (°F)	7.0 (45)
[F 1]	Minimum desired temperature (setpoint) permitted for the user	Limits designed to prevent unintentional temperatures from being configured by mistake high or low temperature setpoint, which may result in high power consumption power for keeping the system continuously on.	-50 (-58)	M2	°C (°F)	-50 (-58)
[F 2]	Maximum desired temperature (setpoint) permitted for the user		M1	60 (99)	°C (°F)	60 (99)
[H 1]	Control differential (hysteresis)	This is the difference between turning refrigeration OFF and BACK ON in normal ([H 1]) or power save ([H 2]) operating mode.	0.1 (1)	8.0 (14)	°C (°F)	3.0 (5)
[H 2]	Power Save Control differential (hysteresis)		0.1 (1)	8.0 (14)	°C (°F)	3.0 (5)
[S 1]	Digital filter operating mode	Defines if parameters [S 2] and [S 3] acts on the control or just on temperature display: [0] = Acts on temperature display and on control routines [1] = Acts only on temperature display	0	1	-	0
[S 2]	Digital filter intensity applied to sensor S1 (Cabinet) (Rise)	The value adjusted in this function represents the time (in seconds) for the displayed temperature to change by 0.1°C (1°F) as the temperature rises or falls. Note: A typical application for this type of filter is freezers (such as ice cream displays). As the door is opened for short periods of time, hot air may directly hit the sensor, causing a rapid increase in the measured temperature indication, and often unnecessarily activating the compressor.	0 [of]	20	seconds	0 [of]
[S 3]	Digital filter intensity applied to sensor S1 (Cabinet) (Fall)		0 [of]	20	seconds	0 [of]
[S 4]	Offset of the cabinet sensor indication (sensor S1)	This compensates for any deviations in the sensor reading due to replacement or a change in cable length.	-9.9 (-9)	9.9 (9)	°C (°F)	0.0 (0)
[S 5]	Offset of the Evaporator Sensor (sensor S2)	This compensates for any deviations in the sensor reading due to replacement or a change in cable length. The sensor S2 can be disabled by setting the function to the minimum value until the message [FF] appears. When disabled, all functions that depend on the reading of sensor S2 are disabled.	-10 [of]	9.9 (9)	°C (°F)	0.0 (0)
[O 1]	Temperature limit for Fast Freezing (r1)	This is the minimum temperature the instrument can reach during the Fast Freezing.	-50 (-58)	60(99)	°C (°F)	-14 (7)
[O 2]	Temperature limit for Fast Freezing (r2)		-50 (-58)	60(99)	°C (°F)	-11 (12)
[O 3]	Temperature limit for Fast Freezing (r3)		-50 (-58)	60(99)	°C (°F)	-6.0 (21)
[O 4]	Temperature limit for Fast Freezing (r4)		-50 (-58)	60(99)	°C (°F)	-3.0 (26)
[O 5]	Maximum Fast Freezing time		This is the duration of the Fast Freezing process	0	99	hours
[D 1]	Defrost type	[0] = Electric defrost (electric heaters), only the defrost output is activated. [1] = Hot gas defrost, compressor and defrost outputs are activated. [2] = Natural defrost, only the fan output is activated.	0	2	-	0
[D 2]	Defrost start condition	[0] = Defrost started by time [1] = Temperature-initiated defrost (sensor S2) [2] = Defrost initiated by temperature difference S1-S2 [3] = Defrost initiated by (sensor S2) and temperature difference S1-S2	0	3	-	0
[D 3]	Interval between defrosts if [D 2] = [0] or Maximum time without defrost if [D 2] = [1], [2] or [3]	Determines how often defrost will be performed, which is the time counted from the end of the previous defrost. If the controller is configured to perform temperature defrost ([D 2] = [1], [2] or [3]), this time acts as safety in situations where the evaporator temperature (sensor S2) does not reach the programmed values in [D 5] or [D 6]. This function determines the maximum time the controller remains without defrosting.	1	99	hours	12
[D 4]	Additional time at end of the first cooling cycle	It serves to increase the time interval to start the first defrost only. In multiequipment installations, it is possible to avoid peaks in demand by not matching the defrost start time of each equipment. Note: Scale hours.minutes - time less than 10.0 displays decimal point. Ex: value 1.5 corresponds to 1 hour and 30 minutes.	0.0 [of]	99	hours.minutes	0.0 [of]
[D 5]	Temperature of evaporator to start defrost if [D 2] = [1] or [3]	When the evaporator temperature (sensor S2) reaches the value configured in this function, the controller starts the confirmation time count to start the defrost ([D 7]).	-50 (-58)	60 (99)	°C (°F)	-20 (-4)
[D 6]	Temperature difference to start defrost (S1-S2) if [D 2] = [2] or [3]	When the difference between the cabinet temperature (sensor S1) and the temperature of the evaporator (sensor S2) reaches the value configured in this function, the controller starts confirmation time count to start the defrost ([D 7]).	-50 (-58)	60 (99)	°C (°F)	15 (59)
[D 7]	Low temperature confirmation time (sensor S2) to initiate pre-defrost if [D 2] = [1], [2] ou [3]	If the controller is configured to perform temperature defrost, at the moment the sensor S2 reaches the configured temperature value for defrost, then it starts for pre-defrost process. If this temperature rises above the configured value, the system returns to the refrigeration step.	1	99	minutes	10
[D 8]	Defrost when energizing the controller	Enables defrosting at the moment that the controller is energized, such as when the power returns (in case of power failure).	0 [of]	1 [on]	-	1 [on]
[B 1]	Smooth Defrost	Smooth Defrost mode allows for a smoother defrost, saving energy and preventing the room temperature from rising as much as a standard defrost. In this mode, the defrost output remains on as long as the evaporator temperature (sensor S2) is less than 2°C (36°F), as the temperature is superated the defrost output cycles between ON and OFF as the percentage of time interval (2 min) configured in this function (x10). This mode is active only if sensor S2 is enabled and electric defrost is enabled ([D 1] = [0]).	1	10 [of]	-	10 [of]
[B 2]	Enable tray defrosting	With this function active, the FANS output operates as a second defrost output. This output is triggered during pre-defrost, defrost and drainage. Note: With [B 2] = [0] the fan control functionality is disregarded.	0 [of]	1 [on]	-	0 [of]
[B 3]	Pre-defrost time (pump down)	When defrosting starts, the controller will activate only the fan during this time, in order to harness the residual energy if [B 2] = [0].	0 [of]	99	minutes	0 [of]
[B 4]	Evaporator temperature (sensor S2) to end defrost	If the temperature in the evaporator (sensor S2) reaches the set value, the end of the defrost happens by temperature. It can optimize the defrost process.	-50 (-58)	60 (99)	°C (°F)	40 (99)
[B 5]	Cabinet temperature (sensor S1) to end defrost	If cabinet temperature (sensor S1) reaches the configured value, the end of defrost happens by temperature.	-50 (-58)	60 (99)	°C (°F)	20 (68)

FUN	FUNCTION	DESCRIPTION	CELSIUS (FAHRENHEIT)			
			MIN	MAX	UNIT.	DEFAULT
[b 5]	Maximum defrost time (for safety)	This function configures the maximum defrost duration time. If, within this period, the defrost is not ended by temperature, a dot will flash on the lower right corner of the display (if enabled in [b 8]), indicating that defrost termination occurred by time rather than temperature. This can happen when the temperature configured is too high, the time limit is insufficient, sensor S2 is disconnected or it is not in contact with the evaporator.	1	99	minutes	30
[b 7]	Drainage (dripping) time	Time required for dripping, i.e. to drain the last drops of water from the evaporator. During this time, all outputs remain off. If this step is not desired, adjust this time to [b F].	0 [of]	99	minutes	1
[F 1]	Fan operation mode	<p>[0] - Automatic by time: the fan will be on when the compressor is actuated. When the compressor is off, the fan activates according to times [F 2] and [F 3].</p> <p>[1] - Automatic by temperature: the fan is on always when the compressor is active.</p> <p>When the compressor is OFF, fan turns on when the temperature is greater than setpoint + 60% of the differential and turns off when is less than setpoint + 20% of differential.</p> <p>[2] - Continuous: the fan is always active.</p> <p>[3] - Dependent: the fan starts along with the compressor.</p> <p>[4] - Time after turning off compressor: after turning off the compressor the fan remains on for the time configured in [F 2].</p> <p>Note 1: With sensor S2 enabled, modes 0 and 1 will activate the fan only if the evaporator temperature (sensor S2) is lower than cabinet temperature (sensor S1).</p> <p>Note 2: With sensor S2 enabled, mode 1 will activate the fan only if the evaporator temperature (sensor S2) is lower than the configured setpoint.</p>	0	4	-	4
[F 2]	Fan time on if [F 1] = [0] and [4]	This is how long the fan remains ON.	1	99	minutes	2
[F 3]	Fan time off if [F 1] = [0] (automatic time mode)	This is how long the fan remains OFF.	1	99	minutes	8
[F 4]	Turn off the fan when opening the door	Enable fan to be turned off when opening door [b n] or keep fan on [b F] within the time the door is opened.	0 [of]	1 [on]	-	0 [of]
[F 5]	Evaporator high temperature fan shutdown	Shuts down the evaporator fan if the evaporator temperature is equal or higher than this temperature. During operation if the evaporator temperature exceeds the configured value, the fan is turned OFF, and only restarts with 2°C (4°F) differential. It is a valuable resource when, for example, cooling equipment has been inactive for a few days or when freezer rooms or refrigerated counters are refilled with stock.	-50 (-58)	60 (99)	°C (°F)	60 (99)
[F 6]	Evaporator temperature for fan reactivation after drainage	After defrost and drainage, the fan delay cycle starts. The compressor is started immediately because the evaporator temperature is high, but the fan will only be started after the evaporator temperature drops from the configured value. This function is used to remove the heat that still exists in the evaporator because of the defrost, avoiding putting it into the environment.	-50 (-58)	60 (99)	°C (°F)	2.0 (36)
[F 7]	Maximum fan return time after drainage (fan-delay)	For safety, if the evaporator temperature does not reach the value set in the function [F 6] or the sensor S2 is disconnected, the fan will return after the time configured in this function.	0 [of]	30	minutes	1
[P 1]	Digital input 1 operation mode	<p>[b F] = Digital input disabled</p> <p>[1] = NO Contact - Door Sensor</p> <p>[2] = NC Contact - Door sensor</p> <p>[3] = NO contact - External alarm (indication only)</p> <p>[4] = NC contact - External alarm (indication only)</p> <p>[5] = NO contact - Turn off control</p> <p>[6] = NC Contact - Turn off control</p> <p>[7] = NO pulse - Power save mode</p> <p>[8] = NC pulse - Power save mode</p> <p>[9] = NO pulse - Fast Freezing</p> <p>[10] = NC pulse - Fast Freezing</p> <p>[11] = NO pulse - Defrost</p> <p>[12] = NC pulse - Defrost</p>	0 [of]	12	-	2
[P 2]	Door opening time for instantaneous defrost	If the door is kept open longer than what is defined in this function instantaneous defrost starts as long as the evaporator temperature (sensor S2) is less than [b 4] and the room temperature (sensor S1) is less than [b 5].	0 [of]	99	minutes	30
[P 3]	Door open time to shut down compressor and fan	If the time the door is open is longer than the time configured in this function, both compressor and fan are turned off.	0 [of]	99	minutes	5
[P 4]	Unit of time applied to door closed time to turn off the light	Defines the unit of time used in parameter [P 5]: [0] = Seconds [1] = Minutes [2] = Hours	0	2	-	2
[P 5]	Door closed time to turn off the light	With the door closed, this parameter defines how long for light turn off. It contributes to energy saving. With this function set to the 0 value [b F], the lamp activation functions are ignored and the output remains off.	0 [of]	99	hours	2
[P 6]	Door closed time to enable for economy mode	With the door closed, this parameter defines how much time to active economic mode. On the economy mode the light output will be disabled and the operation setpoint will be changed to the economy setpoint. This time only starts counting after the temperature reaches the setpoint for the first time. Note: Scale hours.minutes - time less than 10.0 displays decimal point. Ex: value 1.5 corresponds to 1 hour and 30 minutes.	0.0 [of]	99	hours.minutes	2.0
[P 7]	Maximum time in economy mode with door closed	Allows you to configure a maximum power save mode actuation time while the door is closed. After this time, the setpoint returns to normal operating mode. This time is calculated in hours. Note: Scale hours.minutes - time less than 10.0 displays decimal point. Ex: value 1.5 corresponds to 1 hour and 30 minutes.	0.0 [of]	99	hours.minutes	0.0 [of]
[E 1]	Minimum time of the compressor turned on	This is the minimum time the compressor will remain on, i.e. the time between the last start and the next stop. It serves to prevent short cycle and high voltage surges.	0 [of]	5	minutes	0 [of]
[E 2]	Minimum time of the compressor turned off	This is the minimum time the compressor will remain off, i.e. the time between the last stop and the next start. It serves to relieve the discharge pressure and increase the service life of the compressor.	0 [of]	5	minutes	0 [of]

FUN	FUNCTION	DESCRIPTION	CELSIUS (FAHRENHEIT)			
			MIN	MAX	UNIT.	DEFAULT
[E3]	Compressor ON time in case of error on cabinet sensor (sensor S1)	If the cabinet sensor (sensor S1) is disconnected or out of range, the compressor turns ON according to the parameters configured in these functions.	0	99	minutes	20
[E4]	Compressor OFF time in case of error on cabinet sensor (sensor S1)	If the cabinet sensor (sensor S1) is disconnected or out of range, the compressor turns OFF according to the parameters configured in these functions.	0	99	minutes	10
[E5]	Delay time when powering the controller	When the instrument is turned on, it remains with the control disabled during the period configured in this function. During this time, it only works as a temperature indicator. It serves to prevent spikes in electricity demand, power grid instability, when there are several equipments connected on the same line. For this, simply configure different times for each equipment. This delay may be of the compressor or defrost (when there is defrost at startup).	0 [of]	99	minutes	2
[R1]	Lamp output mode (LIGHT)	[0] = Output off [1] = Light [2] = Alarm logic Note: If [R1] = [2], alarm logic, the lamp output will be activated according to parameters [R2], [R3], [R4] and [R7].	0	2	-	1
[R2]	Low temperature alarm difference from setpoint	It is the temperature difference in relation to the current setpoint to activate the alarm (buzzer) for LOW room temperature. Example: Setpoint = [3.0], [R2] = [2.0]. In this case, the alarm will only be active if cabinet temperature is below [1.0] ([3.0] - [2.0]).	0 [of]	99 (90)	°C (°F)	10 (18)
[R3]	High temperature alarm difference from setpoint	It is the temperature difference in relation to the current setpoint to activate the alarm (buzzer) for HIGH room temperature. Example: Setpoint = [3.0], [R3] = [1.0]. In this case, the alarm will only be active if the cabinet temperature is higher than [1.3] ([3.0] + [1.0]).	0 [of]	99 (90)	°C (°F)	50 (90)
[R4]	Time the door is open for audible alarm	When the door is opened, the message [D2] will appear on the display and timing for the open door starts. If this time is longer than the time configured in this function, the audible alarm (buzzer) sounds.	0 [of]	99	minutes	1
[R5]	Temperature alarm bypass time	This function is for inhibiting the alarm for a period of time due to possible temperature rise from the defrost, and during defrost, drainage and fan-delay, the alarm is not active.	0 [of]	99	minutes	0 [of]
[R6]	Temperature alarm bypass when powering the controller	During this time, the temperature alarm stays off while waiting for the system to go into operation.	0 [of]	99	minutes	0 [of]
[R7]	Maximum time of compressor ON alarm without reaching setpoint	Alarm to indicate maximum time in hours of compressor ON without reaching the desired temperature (setpoint)	0 [of]	30	hours	0 [of]
[R8]	Defrost alarm indication ended by time	When defrosting is completed by time rather than temperature, the user is notified by a blinking dot in the lower right corner of the display ([]).	0 [of]	1 [on]	-	0 [of]
[L1]	Preferred Display indication	[0] = Temperature S1 [1] = Temperature S2 [2] = Current setpoint	0	2	-	0
[L2]	Temperature indication locked during defrost	[0] = Sensor temperature indication [1] = Display locked - last temperature before defrost (set in [L1]) [2] = Display "[DF]" This function is intended to prevent the display of room temperature rise due to defrost.	0	2	-	1
[L3]	Maximum time of locked indication during defrost process if [L2] = [1] or [2]	During the defrosting process, the last temperature measured in the refrigeration cycle or the message [DF] will be frozen on the display. The indication will be restored when this temperature is reached again or exceeds the time set in this function after the start of the refrigeration cycle (whichever comes first). If set to [DF], the temperature indication will be frozen only in the defrost cycle.	0 [of]	99	minutes	15
[L4]	Function Lock	[0] = Does not allow function locking. [1] = Enables partial Lock, it allows changes on the presets and setpoints and locks all other parameters [2] = Enables full lock, leaving only access to functions available. Note: With this feature enabled, parameters are protected against unauthorized changes, which are available for viewing only. In this condition, when trying to change these values, the message [LF] will be shown on the display.	0 [of]	2	-	2
[L5]	Time to lock functions	With this feature enabled, parameters are protected against unauthorized changes, which are available for viewing only. In this condition, when trying to change these values, the message [LF] will be shown on the display.	15	60	seconds	15
[L6]	Maintenance mode (Turns off the control functions)	Defines the time to press keys 2 and 4 in order to lock or unlock functions editing, if [L4] = [1] or [2].	0 [of]	2	-	0 [of]
[U1]	Minimum working voltage limit	If the voltage value exceeds the limits configured in these functions, the compressor after the time configured in function [U4] has elapsed. To disable voltage monitoring, set [U1] greater than [U2].	9	26	x 10Vac	10
[U2]	Maximum working voltage limit	Note: Parameters available only on product CORE	9	26	x 10Vac	24
[U3]	Voltage measurement offset	It allows compensation for any deviations in the reading of the mains voltage. Note: Parameter available only on product CORE	-10	10	Vac	0
[U4]	Time for voltage validation	This time prevents small voltage variations from prematurely disconnecting the compressor. Note: Parameter available only on product CORE	2	30	seconds	4

7. SIGNALS

Lt

Reason: Low temperature on cabinet sensor (S1).
Provisions: Check sensor S1 connection and functioning (room);
 Check refrigeration system;
 Check function [R2].


Ht

Reason: High mains voltage (S1).
Provisions: Check sensor S1 connection and functioning (room);
 Check refrigeration system and/or door seal;
 Check function [R3].


Lu

Reason: Low mains voltage.
Provisions: Bad power grid quality and voltage below the one configured in [U1].


Hu

Reason: High voltage alarm in the mains.
Provisions: Bad power grid quality and voltage above the that configured in [U2].


Eu

Reason: Invalid voltage reading.
Provisions: Check the supply voltage of the instrument.


Al

Reason: Exceeded maximum compressor on time without reaching control temperature (setpoint).
Provisions: Check compressor and refrigeration system;
 Check door seal;
 Check function [R7].

Ad

Reason: External alarm (digital input)
Provisions: Check the control accessory connected to the digital input;
 Check the connection on the controller;
 Check function [P7].

E1

Reason: Cabinet temperature sensor disconnected or short-circuited.
Provisions: Check the connection on the controller. If necessary, replace the sensor.

E2

Reason: Evaporator temperature sensor disconnected or short-circuited.
Provisions: Check the connection on the controller. If necessary, replace the sensor.

OP

Reason: Open door alert.
Provisions: Make sure the door is properly closed;
 Check limit switch micro or magnetic sensor (reed switch) of the closed-door detection (if applicable), plus the connection to the controller.

LC

Reason: Function lock on.
Provisions: See item 6.3.

OF

Reason: Control functions turned off.
Provisions: See item 6.4.

EP

Reason: Easyprog connected by sending data to the controller.

.

Reason: Alert of defrost concluded by time rather than by temperature. The dot in the lower right corner of the display will flash until the next defrost (if enabled in the function [R8]).
Provisions: Check that there are no burnt heating elements;
 Check if hot gas is circulating;
 Check that the fan is not inoperative or shorted;
 Check that the maximum time for defrost duration is not too short ([b5]).

Pu

Provisions: Contact Full Gauge Controls.

Pp

Provisions: Reset the values of the functions.

Fc

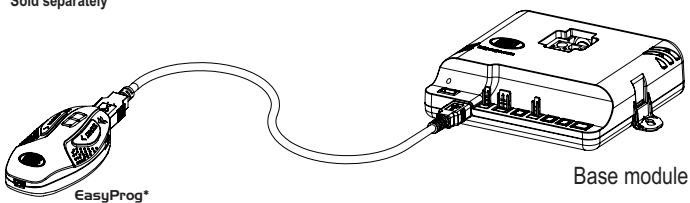
Reason: Communication failure between the front module and the base.
Measures: Check the interconnection cable.

8. PROGRAMMING KEY - EasyProg ver.02 or higher

The main function of this accessory is to store the parameters of the controllers. You can load new parameters from a controller and download to a production line at any time (from the same controller). The controller has a USB connection to upload or download the parameters:

- **USB:** it can be connected to the computer with the USB port, using the Sitrad Recipe Editor the parameters can be copied, edited and saved in **EasyProg ver. 02**. The USB port can also have the function to supply power to **EasyProg ver. 02** and the controller (when used in USB and Serial TTL set).

*Sold separately

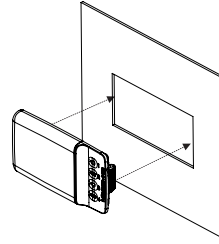


9. INSTALLATION

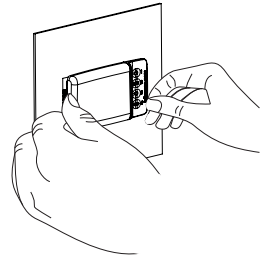
9.1 Attaching the base and front modules

- Front module

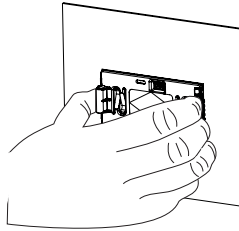
1 Cut out the panel with the measurements indicated. See item 3;



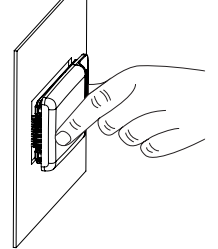
2 To place the front module in the panel, press until it clicks;



3 To remove it, simply press the side locks;

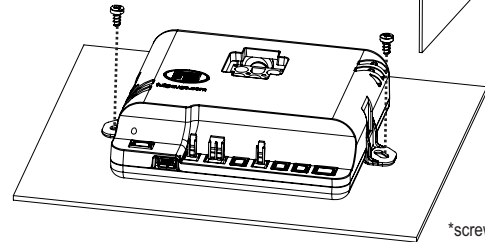


4 Remove the controller from the front of the panel.



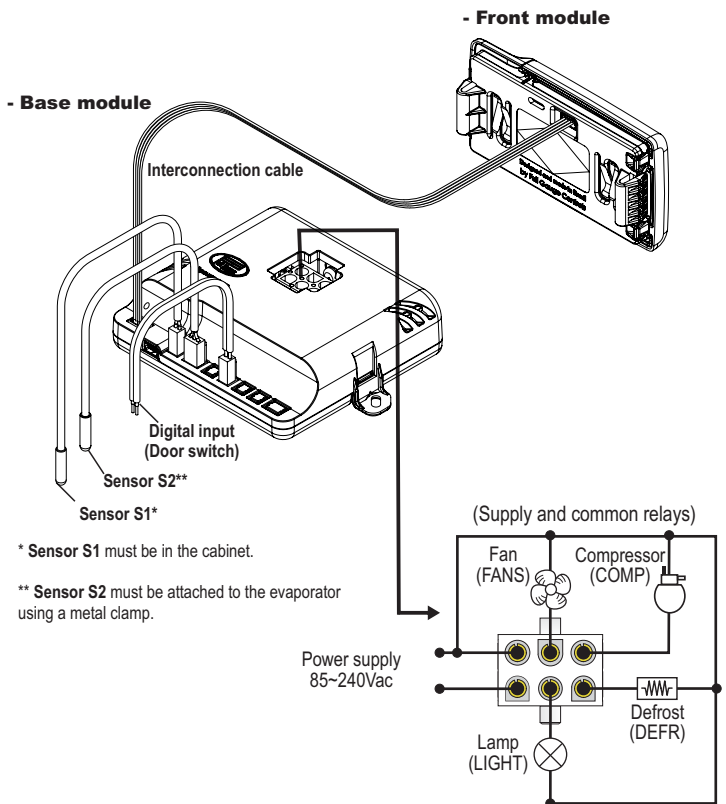
- Base module

Attach the base module with screws*;



*screws not included;

9.2 Wiring Diagram

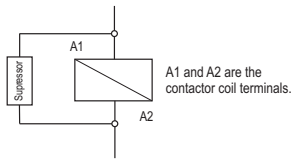


10. IMPORTANT

According to the chapters of the NBR 5410 standards:

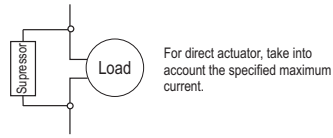
- 1: Install surge protectors against supply surges
- 2: Sensor and serial communication cables may be together, but not in the same conduit through which power supply and load actuators pass
- 3: Install transient suppressors (RC filter) parallel to loads as a way to extend relay life.

Contactor suppressor wiring diagram



A1 and A2 are the contactor coil terminals.

Wiring diagram for direct actuator load suppressors



For direct actuator, take into account the specified maximum current.

Full Gauge Controls available suppressors for sale



ENVIRONMENTAL INFORMATION

Packaging:

The materials used in the packaging of Full Gauge products are 100% recyclable. Try to dispose of it through specialized recycling agents.

Product:

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

Disposal:

Do not burn or dispose of controllers that reach the end of their service life. Observe the legislation in your area regarding the disposal of electronic waste. If you have any questions, please contact Full Gauge Controls.

WARRANTY TERM- FULL GAUGE CONTROLS

Products manufactured by Full Gauge Controls, as of May 2005, have a warranty period of 10 (ten) years directly with the factory and 01 (one) year with accredited resellers, starting from the date of the consigned sale that appears on the tax receipt. After this year with resellers, the warranty will continue to be in force if the instrument is sent directly to Full Gauge Controls. This period is valid for the Brazilian market. Other countries have a warranty of 2 (two) years. Products are warranted in the event of manufacturing failure that makes them unsuitable or inadequate for their intended applications. The warranty is limited to the maintenance of instruments manufactured by Full Gauge Controls, disregarding other types of expenses, such as indemnity due to damage caused to other equipment.

EXCEPTIONS OF THE WARRANTY

The Warranty does not cover shipping and/or insurance costs for shipping products with indications of defect or malfunction to Technical Support. Also, the following events are not covered: natural wear of parts, external damage caused by falls, or improper packaging of products.

LOSS OF WARRANTY

The product will lose the warranty automatically if:

- Failure to follow the instructions for use and assembly contained in the technical description and the installation procedures contained in Standard NBR5410;
- It is subjected to conditions beyond the limits specified in its technical description;
- It is tampered with or repaired by a person not on Full Gauge's technical team;
- Damage is caused by falling, hitting and/or impact, water infiltration, overload and/or atmospheric discharge.

WARRANTY USE

In order to receive the warranty, the customer must send the duly packaged product, along with the corresponding purchase Tax Receipt, to Full Gauge Controls. The shipping charge of the products is at the customer's expense. It is also necessary to send as much information as possible regarding the detected defect, thus enabling faster analysis, testing and execution of the service.

These processes and the eventual maintenance of the product will only be carried out by Full Gauge Controls Technical Assistance, at the Company's headquarters - Rua Júlio de Castilhos 250 - CEP 92120-030 - Canoas - Rio Grande do Sul - Brazil.

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