

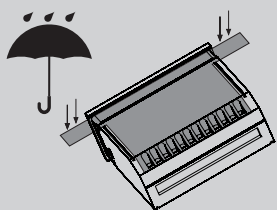


TC900R2HPV01-01T-13651

TC-900R 2HP

CONTROLADOR DIGITAL PARA REFRIGERAÇÃO COM DEGELO
DIGITAL CONTROLLER FOR REFRIGERATION WITH DEFROST
CONTROLADOR DIGITAL PARA REFRIGERACIÓN CON DESHIELO

Ver. 01



VINIL PROTETOR PROTECTIVE VINYL VINOLO PROTECTOR

Protege os instrumentos instalados em locais sujeitos a respingos d'água, como em balcões frigoríficos, por exemplo. Este vinil adesivo acompanha o instrumento, dentro da sua embalagem. Faça a aplicação somente após concluir as conexões elétricas.

This adhesive vinyl (included inside the packing)

protects the instruments against water drippings, as in commercial refrigerators, for example. Do the application after finishing the electrical connections.

Protege los instrumentos instalados en locales sometidos a goteos de agua, como en refrigeradores comerciales, por ejemplo. Este adhesivo acompaña el instrumento, adentro de su embalaje. Haga la aplicación solamente después de concluir las conexiones eléctricas.

Retire o papel protetor e aplique o vinil sobre toda a parte superior do aparelho, dobrando as abas conforme indicado pelas setas.

Remove the protective paper and apply the vinyl on the entire superior part of the device, folding the flaps as indicated by the arrows.

Retire el papel protector y aplique el vinilo sobre toda la parte superior del aparato, doblando los bordes conforme indican las flechas.



INFORMAÇÕES AMBIENTAIS ENVIRONMENTAL INFORMATION INFORMACIONES AMBIENTALES

Embalagem / Package / Embalaje:

Os materiais utilizados nas embalagens dos produtos Full Gauge Controls são 100% recicláveis. Procure fazer o descarte através de agentes recicladores especializados.

The packages material are 100% recyclable. Just dispose it through specialized recyclers.
 Los materiales utilizados en los embalajes de los productos Full Gauge Controls son 100% reciclables. Busque siempre agentes de reciclaje especializados para hacer el descarte.

Produto / Product / Producto:

Os componentes utilizados nos controladores Full Gauge Controls podem ser reciclados e reaproveitados se forem desmontados por empresas especializadas.

The electro components of Full Gauge Controls controllers can be recycled or reused if it is disassembled for specialized companies.

Los componentes utilizados en los instrumentos Full Gauge Controls pueden ser reciclados y aprovechados nuevamente si fueren desmontados por empresas especializadas.

Descarte / Disposal / Descarte:

Não queime nem jogue em lixo doméstico os controladores que atingirem o fim de sua vida útil. Observe a legislação existente em sua região com relação à destinação do produto. Em caso de dúvidas entre em contato com a Full Gauge Controls.

Do not burn or throw in domestic garbage the controllers which have reached the end-of-life. Observe the respectively law in your region concerning the environmental responsible manner of dispose its devices. In case of any doubts, contact Full Gauge Controls for assistance.

No queime ni tire en residuo doméstico los controladores que lleguen al fin de su vida útil. Observe la legislación, existente en su país, que trate de los destinos para los descartes. En caso de dudas comuníquese con Full Gauge Controls.

TERMO DE GARANTIA / TERM OF WARRANTY / TERMO DE GARANTÍA

Os produtos fabricados pela Full Gauge Controls, a partir de maio de 2005, têm prazo de garantia de 10 (dez) anos diretamente com a fábrica e de 01 (um) ano junto às revendas credenciadas, contados a partir da data da venda consignada que consta na nota fiscal. Após esse ano junto às revendas, a garantia continuará sendo executada se o instrumento for enviado diretamente à Full Gauge Controls. Os produtos estão garantidos em caso de falha de fabricação que os torne impróprios ou inadequados às aplicações para aos quais se destinam. A garantia se limita à manutenção dos instrumentos fabricados pela Full Gauge Controls, desconsiderando outros tipos de despesas, como indenização em virtude dos danos causados em outros equipamentos. **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.**

Los productos fabricados por Full Gauge Controls, desde mayo de 2005, tienen plazo de garantía de 02 (dos) años, contados a partir de la fecha de venta consignada en la factura. Los mismos poseen garantía en caso de defectos de fabricación que los vuelvan improprios o inadecuados a las aplicaciones para los cuales se destinan.

EXCEÇÕES À GARANTIA / EXCEPTIONS TO WARRANTY / EXCLUSIÓN DE LA GARANTÍA:

A Garantia não cobre despesas de transporte e/ou seguro para o envio dos produtos com indícios de defeito ou mau funcionamento à Assistência Técnica. Não estão cobertos, também, os seguintes eventos: desgaste natural das peças, danos externos causados por quedas ou acondicionamento inadequado dos produtos.

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.

La Garantía no supe los costes de transporte, flete y seguro, para envío de los productos, con indicios de defecto o mal funcionamiento, a la asistencia técnica. Tampoco están garantizados los siguientes eventos: el desgaste natural de piezas por el uso continuo y frecuente; daños en la parte externa causado por caídas o acondicionamiento inadecuado; intento de reparación/ violación con daños provocados por persona no autorizada por FULL GAUGE y en desacuerdo con las instrucciones que forman parte del descriptivo técnico.

PERDA DA GARANTIA / LOSS OF WARRANTY / PÉRDIDA DE GARANTÍA:

O produto perderá a garantia, automaticamente, se:

- Não forem observadas as instruções de utilização e montagem contidas no descritivo técnico e os procedimentos de instalação presentes na Norma NBR5410;
- For submetido a condições além dos limites especificados em seu descritivo técnico;
- Sofrer violação ou for consertado por pessoa que não faça parte da equipe técnica da Full Gauge;
- Os danos ocorridos forem causados por queda, golpe e/ou impacto, infiltração de água, sobrecarga e/ou descarga atmosférica.

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.

El producto perderá la garantía, automáticamente, cuando:

- no fueren observadas las instrucciones de utilización y montaje contenidas en el descriptivo técnico y los procedimientos de instalación contenidas en la Norma NBR5410;
- fuere sometido a las condiciones fuera de los límites especificados en el respectivo descriptivo técnico;
- fuere violado o reparado por persona que no sea del equipo técnico de Full Gauge Controls;
- el daño fuere causado por caída, golpe o impacto;
- ocurrir infiltración de agua;
- el daño fuere causado por descarga atmosférica;
- ocurrir sobrecarga que cause la degradación de los componentes y partes del producto.

UTILIZAÇÃO DA GARANTIA / USE OF WARRANTY / UTILIZACIÓN DE LA GARANTÍA:

Para usufruir da garantia, o cliente deverá enviar o produto devidamente acondicionado, juntamente com a Nota Fiscal de compra correspondente, para a Full Gauge Controls. O frete de envio dos produtos é por conta do cliente. É necessário, também, remeter a maior quantidade possível de informações referentes ao defeito detectado, possibilitando, assim, agilizar a análise, os testes e a execução do serviço.

Esses processos e a eventual manutenção do produto somente serão realizados pela Assistência Técnica da Full Gauge Controls, na sede da Empresa - Rua Júlio de Castilhos, 250 - CEP 92120-030 - Canoas - Rio Grande do Sul - Brasil (rev. 03).

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 defect 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 - Brazil (rev. 03).

Para usufructuar de esta garantía, el cliente deberá enviar el producto a Full Gauge Controls, juntamente con la factura de compra, debidamente acondicionado para que no ocurra daños en el transporte. Para un mejor atendimento, solicitamos remitir el mayor volumen de informaciones posible, referente a la ocurrencia detectada. Lo mismo será analizado y sometido a testes completos de funcionamiento. El análisis del producto y su eventual mantenimiento solamente serán realizados por el equipo técnico de Full Gauge Controls en la dirección: Rua Júlio de Castilhos, 250 - CEP 92120-030 - Canoas - Rio Grande do Sul - Brasil (rev. 03).

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1 - DESCRIPTION

The **TC900R-2HP** is designed to operate low-temperature equipment and has functions to perform an efficient control of the entire cooling system, managing the defrost operations. It operates with two sensors, one to control the room temperature, and another to control the end of the defrost operation. Its main feature is to have a powerful relay to drive compressors up to 2HP. The defrost output has a relay that supports loads of up to 10A, besides having available the contact NC (normally closed), disconnecting the condenser fans when the defrost is carried out using hot gas, thus providing a more efficient defrost. It has also a digital filter, which is intended to simulate an increase of the mass of the room temperature sensor (S1), thus increasing its response time (thermal inertia), and avoiding unnecessary compressor activations, plus an intelligent key lock system*, which allows the control functions to be turned off.

*patent pending

2 - APPLICATION

- Counters
- Refrigerating balconies
- Solenoid valve

3 - TECHNICAL SPECIFICATIONS

- Power supply: **TC-900R-2HP**: 230Vac $\pm 10\%$ (50/60 Hz) or version 115Vac $\pm 10\%$ (50/60 Hz)
TC-900R-1L 2HP: 12 Vac/dc

- Control temperature: -50 to 75° C / -58 to 167°F
- Operating temperature: 0 to 40°C / 32 to 104°F
- Operating humidity: 10 to 90% RH (without condensation)
- Resolution: 0.1°C from -10 to 75°C and 1°C outside this range / 1°F in all range
- Load current (outputs): COMP: 2HP/ 250Vac (compressor, solenoid valve or contactor)
 DEFR: NO: 10A/ 240Vac 1/4HP (defrost resistance or hot gas)
 NC: 3A
 FANS: 5(3)A/ 240Vac 1/8HP (evaporator fans)

- Dimensions: 71 x 28 x 71mm

- Sensors:

S1: ambient sensor (black)

S2: evaporator sensor (gray)

4 - CONFIGURATIONS

4.1 - Control temperature adjust, thus, it is the desired temperature for the controlled environment or the temperature for which the output will be switched off (SETPOINT)

- Press **SET** for 2 seconds until appears **SEE**, and release it after that. The adjusted operation temperature will appear.

- Use **↵** or **⬆** to change the value and then press **SET** to record it.

4.2 - Parameters table

Fun	Descrição / Description / Descripción	CELSIUS				FAHRENHEIT			
		Mín. Min.	Máx. Max.	Padrão Standard Padrón	Unid. Unit Unid.	Mín. Min.	Máx. Max.	Padrão Standard Padrón	Unid. Unit Unid.
F01	Código de acesso: 123 (cento e vinte e três) / Access code: 123 (one hundred and twenty-three) / Código de acceso: 123 (ciento veintitrés)	-	-	-	-	-	-	-	-
F02	Diferencial de controle (histerese) / Control differential (hysteresis) / Diferencial de control (histéresis)	0.1	20.0	1.5	° C	1	36	3	°F
F03	Deslocamento de indicação da temperatura ambiente em S1 (offset) / Offset indication for ambient sensor / Corrimiento de indicación de la temperatura ambiente en S1 (offset)	-20.0	20.0	0	° C	-36	36	0	°F
F04	Mínimo setpoint permitido ao usuário final / Minimum setpoint allowed to the end user / Mínimo setpoint permitido al usuario final	-50.0	75.0	-50.0	° C	-58	167	-58	°F
F05	Máximo setpoint permitido ao usuário final / Maximum setpoint allowed to the end user / Máximo setpoint permitido al usuario final	-50.0	75.0	75.0	° C	-58	167	167	°F
F06	Retardo na partida (energização) / Delay when the instrument is powered on / Retardo en la partida (energización)	0	30	0	min.	0	30	0	min.
F07	Ponto de atuação do alerta de temperatura ambiente alta / Act point of high ambient temperature alert / Punto de actuación del alerta de temperatura ambiente alta (S1)	-50.0	75.0	75.0	° C	-58	167	167	°F
F08	Tempo em refrigeração (intervalo entre degelos) / Refrigeration time (interval between defrosts) / Tiempo en refrigeración (intervalo entre deshielos)	1	999	240	min.	1	999	240	min.
F09	Tempo mínimo de compressor ligado / Compressor delay after on (on - off) / Tiempo mínimo de compresor conectado	0	999	0	seg./sec./seg.	0	999	0	seg./sec./seg.
F10	Tempo mínimo de compressor desligado / Compressor delay after off (off - on) / Tiempo mínimo de compresor desconectado	0	999	0	seg./sec./seg.	0	999	0	seg./sec./seg.
F11	Situação do compressor com sensor ambiente (S1) desconectado / Compressor status with detached ambient sensor (S1) / Situación del compresor con sensor ambiente (S1) desconectado	0 - deslig. 0 - off 0 - descon.	1 - lig. 1 - on 1 - conecta.	1 - lig. 1 - on 1 - conecta.	-	0 - deslig. 0 - off 0 - descon.	1 - lig. 1 - on 1 - conecta.	1 - lig. 1 - on 1 - conecta.	-
F12	Degelo na partida do instrumento / Defrost when the instrument is powered on / Deshielo en la partida del instrumento	0 - não 0 - no 0 - no	1 - sim 1 - yes 1 - sí	0 - não 0 - no 0 - no	-	0 - não 0 - no 0 - no	1 - sim 1 - yes 1 - sí	0 - não 0 - no 0 - no	-
F13	Temperatura no evaporador (S2) para determinar fim de degelo / Evaporator temperature (S2) for end defrost / Temperatura en el evaporador (S2) para determinar fin de deshielo	-50	75.0	40.0	° C	-58	167	104	°F
F14	Duração máxima do degelo / Maximum duration of defrost (for security) / Duración máxima del deshielo	0 - inativo 0 - disable 0 - inactivo	90	45	min.	0 - inativo 0 - disable 0 - inactivo	90	45	min.
F15	Ventilador ligado durante o degelo / Fan turned on during defrost / Forzador conectado durante el deshielo	0 - não 0 - no 0 - no	1 - sim 1 - yes 1 - sí	0	-	0 - não 0 - no 0 - no	1 - sim 1 - yes 1 - sí	0	-
F16	Tipo de degelo / Defrost type / Tipo de deshielo	0 - elétrico 0 - electric 0 - eléctrico	1 - gás quente 1 - hot gas 1 - gas caliente	0	-	0 - elétrico 0 - electric 0 - eléctrico	1 - gás quente 1 - hot gas 1 - gas caliente	0	-
F17	Indicação de temperatura (S1) travada durante o degelo / Locked temperature indication (S1) during defrost / Indicación de temperatura (S1) bloqueada durante el deshielo	0 - não 0 - no 0 - no	1 - sim 1 - yes 1 - sí	0 - não 0 - no 0 - no	-	0 - não 0 - no 0 - no	1 - sim 1 - yes 1 - sí	0 - não 0 - no 0 - no	-
F18	Tempo de drenagem (gotejamento da água do degelo) / Draining time (dripping of defrost water) / Tiempo de drenaje (goteo del agua del deshielo)	0	30	10	min.	0	30	10	min.
F19	Temper. do evaporador (S2) para retorno do ventilador após drenagem / Evaporator temperature (S2) for fan return after draining / Temp. del evaporador (S2) p/ retorno del forzador después del drenaje	-50	75.0	0	° C	-58	167	0	°F
F20	Tempo máximo para/ retorno do ventilador após drenagem (fan-delay) / Maximum time of fan return after draining (fan-delay) / Tiempo máximo p/ retorno del forzador del drenaje (fan-delay)	0	30	1	min.	0	30	1	min.
F21	Ventilador ligado com compressor desligado (em refrigeração) / Fan on with compressor off (refrigeration) / Forzador conectado con compresor desconectado (en refrigeración)	0 - não 0 - no 0 - no	1 - sim 1 - yes 1 - sí	1 - sim 1 - yes 1 - sí	-	0 - não 0 - no 0 - no	1 - sim 1 - yes 1 - sí	1 - sim 1 - yes 1 - sí	-
F22	Parada do ventilador por temperatura alta no evaporador / Fan stopped for high temperature in the evaporator / Parada del forzador por temperatura alta en el evaporador	-50	75.0	75.0	° C	-58	167	167	°F

		CELSIUS				FAHRENHEIT			
Fun	Descrição / Description / Descripción	Min. Min. Min.	Máx. Max. Máx.	Padrão Standard Padrón	Unid. Unit Unid.	Min. Min. Min.	Máx. Max. Máx.	Padrão Standard Padrón	Unid. Unit Unid.
F23	Tempo para recolhimento do gás antes de iniciar o degelo / Time to collect the gas before starting the defrost / Tiempo para recogimiento del gas antes de iniciar el deshielo	0	999	0	seg./sec./seg.	0	999	0	seg./sec./seg.
F24	Intensidade do filtro digital aplicado ao sensor 1 (0 - desativado) / Intensity of the digital filter applied to the sensor 1 (0 - OFF) / Intensidad del filtro digital aplicado al sensor 1 (0 - desactivado)	0	9	0	-	0	9	0	-
F25	Tempo para bloqueio de teclas / Time to Key blocker / Tiempo para bloqueo de teclas	14 - não 14 - no 14 - no	60	14 - não 14 - no 14 - no	seg./sec./seg.	14 - não 14 - no 14 - no	60	14 - não 14 - no 14 - no	seg./sec./seg.

4.3 - Parameters description

F01 - Access code (123)

To change the parameters it is necessary to use the access code. It is not necessary to use the access code to visualize the adjusted parameters.

F02 - Control differential (hysteresis)

It is the difference of temperature (hysteresis) between to turn OFF and turn ON the refrigeration output. Example: To control the temperature in 4.0°C with differential of 1.0°C. Soon, the refrigeration will be turned off in 4.0°C and turned on again in 5.0°C (4.0 + 1.0)

F03 - Offset indication for ambient sensor

It allows to compensate eventual shunting lines in the reading of ambient temperature (S1) proceeding from the exchange of the sensor or cable length alteration.

F04 - Minimum setpoint allowed to the end user

Sets the minimum adjustment temperature for the setpoint

F05 - Maximum setpoint allowed to the end user

Sets the maximum adjustment temperature for the setpoint (item 4.1).

F06 - Delay when the instrument is powered on

When the instrument is powered on, its control is kept disabled during a time, delaying the start of process. During this time, it works only as temperature indicator. It serves to prevent demand of electric energy peaks, in case of lack or return of the same and when exists a lot of instruments connected on the same net. For this, just adjust different times for each instrument. This delay may be of compressor or defrost (when exist defrost on turn on).

F07 - Act point of high ambient temperature alert

If the ambient temperature (sensor S1) reaches this point during refrigeration, this will be signaled visually through the indication blinking on display (AHi).

F08 - Refrigeration time (interval between defrosts)

It is the time which compressor will turn on and turn off only for ambient temperature and starts to be counted when the fan is turned on, after fan-delay stage (fan return after draining).

F09 - Compressor delay after on (on-off)

It is the minimum time that compressor will keep on, it means, space of time between the last drive and the next stop. It serves to prevent high voltage events in the electric network.

F10 - Compressor delay after off (off-on)

It is the minimum time that compressor will keep off, it means, space of time between the last stop and the next drive. It serves to alliviate the discharge pressure and to increase the time of useful life of the compressor.

F11 - Compressor status with detached ambient sensor (S1)

If the ambient sensor (S1) will be damaged or outside the specified range, the compressor assumes the configured status in this function.

Example: For counters of fruits, it is better to keep the compressor off. In counters of meat it is better to keep the compressor on.

F12 - Defrost when the instrument is powered on

It makes possible the accomplishment of a defrost at the moment that controller is energized, for example, in the return of electrical energy (in case of energy lack)

F13 - Evaporator temperature (S2) for end defrost

If the temperature in the evaporator (sensor S2) reaches the adjusted value, the end of defrost will be for temperature. With this, the defrost process is optimized.

F14 - Maximum duration of defrost (for security)

This function serves to adjust the maximum value of time for defrost. If evaporator temperature does not reach the configured value in F13 in this period a point will blink in the right down side of display indicating that end of defrost occurred for time and not for temperature.

The end of defrost by time (which is not desired) can happen on the following situations:

- Adjusted temperature (F13) too high
- Maximum time of defrost (F14) too short
- Detached sensor or without contact with evaporator

F15 - Fan turned on during defrost

It makes possible the fan functioning during defrost.

Example: Natural defrost or by resistances installed outside the evaporator.

F16 - Defrost type

"0" = Electrical defrost (resistances), where the defrost output is active.

"1" = Defrost by hot gas, where compressor and defrost outputs are actives.

F17 - Locked temperature indication (S1) during defrost

This function prevents that ambient temperature elevation during defrost be visualized, keeping the last indication before defrost. The indication is released again in the initial of refrigeration cycle, after fan-delay.

F18 - Draining time (dripping of defrost water)

Necessary time for dripping, it means, for draining the last water drops of evaporator. All the outputs are kept off. If this stage will not be desired, adjust this time for "zero".

F19 - Evaporator temperature (S2) for fan return after draining (fan-delay)

The fan-delay cycle starts after draining. The refrigeration output (REFR) is active, therefore the ambient temperature is high, but the fan is activated only after the temperature in evaporator is less than the adjusted value. This process is necessary to remove the heat that still exists in the evaporator because

of defrost, preventing to transfer this heat to the ambient.

F20 - Maximum time of fan return after draining (fan-delay)

For security, if the temperature in the evaporator does not reach the adjusted value in F19 or sensor S2 is detached, the fan-delay will happen on the adjusted time in this function.

F21 - Fan on with compressor off

During the refrigeration cycle, the fan activation may depend on the compressor status.

"0" = The fan is actived only while the compressor is active. This alternative, in some cases, allows great economy of electric energy.

"1" = The fan is kept on during all refrigeration cycle.

F22 - Fan stopped for high temperature in evaporator

If the temperature in evaporator exceed the adjusted value, the fan is turned off and turned on again with a fixed hysteresis of 2°C below this value.

F23 - Time to collect the gas before starting the defrost

This is to collect the remaining gas from the refrigerating gas line before starting the defrosting cycle, thus increasing the system efficiency. Only the FANS output remains ON during this time.

F24 - Intensity of the digital filter applied to the sensor 1 (0-off)

This filter aims at simulating an increase of the mass of environment sensor (S1), thus increasing its response time (thermal inertia). The larger the value adjusted in this function, the longest the response time of sensor S1.

A typical application requiring this filter is the freezer for ice cream or frozen goods, because when the door is opened a hot air mass reaches the sensor directly, causing the indication of the measured temperature to rise quickly and the compressor to be activated unnecessarily many times.

F25 - Time to Key blocker

This function allows to block the keys settings.

5 - OPERATION

5.1 - Parameters visualization

- Press at the same time **▼** and **▲** for 2 seconds until appear **[Fun]**, releasing them after that. Soon, appears **[F01]**.
- Use **▼** or **▲** to access the desired function.
- After selecting the function, press **[SET]** (short touch) to visualize the configured value.
- Press again **[SET]** (short touch) to return the functions menu.
- To reset the menu and return to normal operation (temperature indication), press **[SET]** until appear **[---**.

5.2 - Parameters configuration

- Access the function F01 by pressing at the same time **▼** and **▲** for 2 seconds until **[Fun]** appear, releasing then after that. Soon will appear **[F01]**, and then press **[SET]** (short touch).
- Use **▼** or **▲** to enter the access code (123), and then press **[SET]**.
- Select the desired function and visualize the configured value (see itens 5.1-b and 5.1-c).
- Use **▼** or **▲** to change the value and then press **[SET]** to record the configured value and return to the functions menu.
- To reset the menu and return to normal operation (temperature indication), press **[SET]** until appear **[---**.

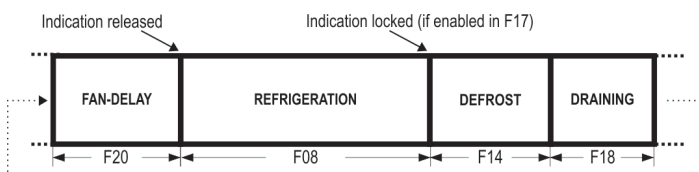
5.3 - Process stage, elapsed time and evaporator temperature (S2)

Press **▼**. The stage of the process will appear, the elapsed time (in minutes) and evaporator temperature (S2).

In case of detached sensor or temperature out specified range will appear **[Err2]**.

Process stages:

- [DEL]** Initial delay (delay to start the control)
- [FRN]** Fan-delay (delay to fan return)
- [REF]** Refrigeration
- [DEF]** Defrost
- [DRN]** Draining



5.4 - Manual defrost

To do a manual defrost, regardless of the programming, keep pressed **▲** for 4 seconds, until appears the indication **[DEF]** **[ON]**.

If the instrument is in defrost and you want to finish it, follow the above instructions, until appears the indication **[DEF]** **[OFF]**.

5.5 - How to determine the end defrost by temperature

- a) Adjust the follow functions with maximum values:
- Refrigeration time (F08 = 999 min)
 - Evaporator temperature for end defrost (F13 = 75.0 °C / 167°F)
 - Maximum duration of defrost (F14 = 90 min)
- b) Wait until an ice layer to be created on the evaporator
- c) Do a manual defrost, pressing  for 4 seconds, until appear  .
- d) Observe the melting process.
- e) Wait until melt all ice layer on the evaporator to consider the defrost finished.
- f) Check the evaporator temperature read by the sensor S2 at this moment, pressing the key  (see item 5.3) and copy this value to the function F13 - Evaporator temperature (S2) for end defrost.
- g) As security, adjust again the function F14 - Maximum duration of defrost, that depends of the defrost type. Example: Electrical defrost (resistance) = 45 minutes as maximum
Defrost for by hot gas = 20 minutes as maximum
- h) Now adjust the function F08 - Refrigeration time with the desired value.

5.6 - Indicators and alarms

The led's signals indicate the status of the outputs:

COMP: Compressor or liquid gas solenoid

FANS: Evaporator fans

DEFR: Defrost (resistance or hot gas)

 Ambient sensor disconnected or out of range.

 Evaporator sensor disconnected or out of range.

 High ambient temperature alarm.

 Whenever the defrost ends due to time and not temperature, a point located in the lower right-hand corner of the display will continue to blink until the next defrost, and will indicate the following possibilities:

- The interval between defrost cycles is too long;
 - There are burned heating elements;
 - The hot gas is not circulating;
 - There is a nonworking fan or the set maximum defrost time is not enough;
-  Invalid configuration parameters;
- In this situation the outputs are turned off;
 - Check which parameters have invalid data and correct them to return to normal operation.

5.7 - Minimum and maximum temperatures register

Press , soon  appears and the minimum and maximum temperatures of S1 sensor (ambient temperature). After soon  appears and the minimum and maximum temperatures of S2 sensor (evaporator).

Note: To reset the registers keep pressed the key  during the visualization of the minimum and maximum temperatures until  to be showed.

5.8 - Selection of the unit (C° / F°)

In order to define the unit that the instrument will operate in, enter function "F01" with the access code "231" and confirm with the  key. Press the  key and the indication  will appear. Press  to choose between  or  and confirm. After selecting the unit the message  will appear, and the instrument will return to the function "F01". Every time that the unit is changed, the parameters should be reconfigured, since they assume the "standard" values.

5.9 - Key blocking

For security reasons this controller permits blocking the key settings.

With this feature enabled, the setpoint and further settings are protected against undue alterations.

In other words, the user can only see the setpoint and settings, when trying to change the settings the controller will display the message .

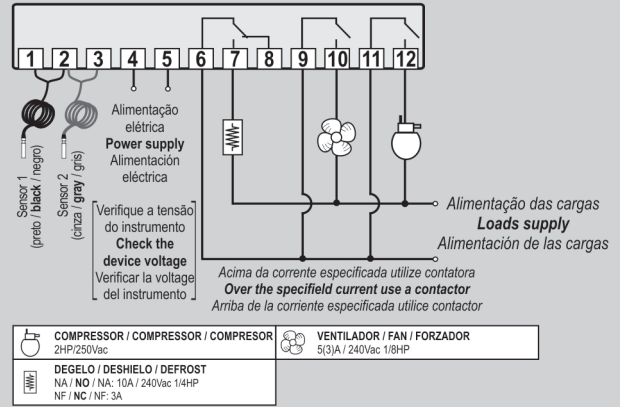
To lock the keys, set function "F25 - Time for key lock" between 15 and 60 seconds, which means the time the key (DEC) must remain held down by the user in order to lock the keys of the instrument. If you are not interested in using the key lock function, set function F25 to "14".

To block, hold the key  for the time programmed in function F25.

The controller will display the message  + .

To unblock, turn off the controller and turn it back on holding the key  for 10 seconds until the message  +  be displayed.

6 - ESQUEMA DE LIGAÇÃO / ELECTRICAL CONNECTIONS / CONEXIONES ELÉCTRICAS



- O sensor S1 deve ficar no ambiente (preto).
- The sensor S1 (black) must be in the ambient.
- El sensor S1 debe quedar en el ambiente (negro).

- O sensor S2 deve ficar fixado no evaporador através de abraçadeira metálica (cinza).
- The sensor S2 (gray) must be placed in the evaporator through metallic clamp.
- El sensor S2 debe quedar fijado en el evaporador a través de abrazadera metálica (gris).

IMPORTANT / IMPORTANT / IMPORTANTE

Conforme capítulos da norma NBR 5410:

According to the chapters of norm IEC 60364:

Conforme capítulos de la norma IEC 60364:

1: Instale protetores contra sobretensões na alimentação.

1: Install protector against overvoltage on the power supply.

1: Instale protectores contra sobretensiones contra sobretensiones en la alimentación.

2: Cabos de sensores e de comunicação serial podem estar juntos, porém não no mesmo eletroduto por onde passam alimentação elétrica e acionamento de cargas.

2: Sensor cables and signal cables of the computer may be joined, but not in the same electric conduit through which the electric input and the activation of the loads run.

2: Los cables de sensores y de señales de computadora pueden estar juntos; sin embargo, no en el mismo electroducto por donde pasa la alimentación eléctrica y la activación de cargas.

3: Instale supressores de transientes (filtro RC) em paralelo às cargas, como forma de aumentar a vida útil dos relés.

3: Install transient suppressors (RC filters) parallel to the loads as to increase the product life of the relays.

3: Instale supresores de transientes (filtros RC) en paralelo a las cargas, con la finalidad de aumentar la vida útil de los relés.

A Full Gauge Controls disponibiliza supressores para venda

Suppressors on offer from Full Gauge Controls

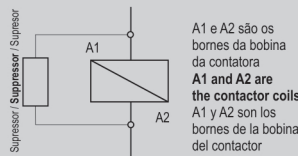
Full Gauge Controls possui supressores para venda

Nota: O comprimento do cabo do sensor pode ser aumentado pelo próprio usuário, em até 200 metros, utilizando cabo PP 2 x 24 AWG. Para imersão em água utilize poço termométrico.

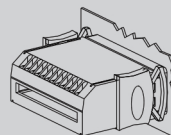
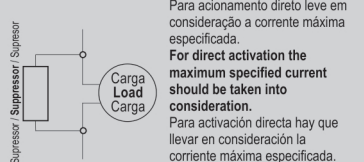
Note: The length of the sensor cable may be increased by the user up to 200 meters, using a PP 2 x 24 AWG cable. For immersion in water, use thermometric well.

Nota: El propio usuario puede aumentar la longitud del cable del sensor hasta 200 metros, utilizando un cable de PP 2 x 24 AWG. Para inmersión en agua utilice pozo termométrico.

Esquema de ligação de supressores em contadoras / **Contact suppressor connection diagram** / Esquema de conexión de supresores en contactores



Esquema de ligação de supressores em cargas acionamento direto / **Diagram for suppressor installation for direct drive load inputs** / Esquema de conexión de los supresores en cargas de activación directa



Dimensões do recorte para posicionar o instrumento / **Dimension of the clipping for setting of the instrument in the panel** / Dimensión del recorte para fijación del instrumento

72 mm

29 mm