



TC-960R LOG

CONTROLLER FOR REFRIGERATION AND DEFROSTING

Ver.02



TC960RLOG02-01T-13931

1. DESCRIPTION

TC-960R LOG is a temperature controller for frozen goods that automates the defrosting processes in accordance with the needs of the facility, thus providing large power savings. It has two sensors: one for ambient temperature and the other fixed to the evaporator that controls the defrosting ending and the fan restarting. It is also fitted with an alarm output and buzzer that can be activated by different events. It is fitted with two digital inputs, being able to read the supply voltage (protecting the loads from under- and over-voltage), and an hour-meter function that indicates when the time for compressor maintenance has come. Beyond these resources the instrument has an internal data-logger with 70 hours of autonomy, or almost 3 days (in a 30 seconds sample time). It also has a digital filter for the temperature reading that decrement the response time of the ambient sensor to prevent the compressor action by fast changes of this measurement. Product complies with NSF (United States).

2. APPLICATION

- Refrigerated Trucks
- Refrigeration chambers
- Counters

3 - TECHNICAL SPECIFICATIONS

- **Power Supply:** 12 or 24 Vdc ± 10%
- **Control temperature:** -50 or 75°C / -58 or 167°F
- **Operating temperature:** 0 or 40°C / 32 or 104°F
- **Operation humidity:** 10 or 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: 12(8)A / 240 Vac 1HP
 FANS: 5(3)A / 240Vac 1/8HP (evaporator fans)
 DEFR: 5(3)A / 240Vac (defrost resistance or hot gas)
 ALARM: 5(3)A / 240Vac 1/8HP
- **Dimensions:** 71 x 28 x 71mm

- Sensors:

- S1: ambient temperature sensor (black cable, comes with the product)
- S2: evaporator sensor (gray cable, comes with the product)

4 - CONFIGURATIONS

4.1 - Control temperature adjust (SETPOINT):

- Press **SET** for 2 seconds until **SEt** appears, and release it after that. The adjusted temperature will appear. Use **▼** and **▲** to change the value and then press **SET** to record it. The display will show **ECd** meaning that the setpoint value of the economy setpoint must be adjusted. Use the same procedure to adjust the economy setpoint value and when ready, press **SET** to save and return to the preferred view.

The economy setpoint will be activated in accordance with the hourly setup adjusted through functions F57 to F62.

4.2 - To enter the function menu

Press **▼** and **▲** at the same time for 2 seconds until **SEt** appears, letting off on it instantly. When **LoD** appears, press **SET** (short touch) and enter the code (123) through the keys **▼** and **▲** to confirm press the key **SET**. Through the keys **▼** and **▲** access the other functions and do the same to adjust them. To leave the menu and return to normal operation, press **SET** (Long touch) until **---** appears.

4.3 - Functions

- LoD** Entry of access code
- Fun** Advanced configuration functions
- CLa** Adjustment of clock and date

4.4 - Parameters table

Fun	Description	CELSIUS				FAHRENHEIT			
		Min	Max	Unit	Standard	Min	Max	Unit	Standard
F01	Control differential (hysteresis)	0.1	20.0	°C	2	1	36	°F	4
F02	Minimum setpoint allowed to the end user	-50	F04	°C	-50	-58	F04	°F	-58
F03	Maximum setpoint allowed to the end user	F03	75.0	°C	75.0	F03	167	°F	167
F04	Delay when the instrument is powered on	0	30	min.	0	0	30	min.	0
F05	Offset indication for ambient temperature sensor	-20	20.0	°C	0.0	-36	36	°F	0
F06	Offset indication for evaporator sensor	-20	20.0	°C	0.0	-36	36	°F	0
F07	Operation mode of digital input 1 (*)	0 - disabled	6	-	0	0 - disabled	6	-	0
F08	Operation mode of digital input 2 (*)	0 - disabled	6	-	0	0 - disabled	6	-	0
F09	Evaporator temperature (S2) for fan return after draining	-50	75.0	°C	0.0	-58	167	°F	32
F10	Maximum time of fan return after draining (fan-delay)	0	30	min.	1	0	30	min.	1
F11	Minimum time of compressor turned on	0	999	sec.	0	0	999	sec.	0
F12	Minimum time of compressor turned off	0	999	sec.	0	0	999	sec.	0
F13	Compressor status with inoperative ambient temperature sensor (S1)	0 - off	1 - on	-	1	0 - off	1 - on	-	1
F14	Fan on with compressor off (refrigeration)	0 - no	1 - yes	-	1	0 - no	1 - yes	-	1
F15	Fan stopped for high temperature in the evaporator (S2)	-50	75.0	°C	50.0	-58	167	°F	122
F16	Fan return hysteresis (after stopping due to high evaporator temperature)	0.1	20.0	°C	2.0	1	36	°F	4
F17	Maximum refrigeration time (for security, if F22 = 1)	1	240	hours	24	1	240	hours	24
F18	Evaporator temperature to start defrosting (if F22=1)	-50	75.0	°C	-5.0	-58	167	°F	23
F19	Time to confirm a low S2 temperature to start defrosting (if F22=1)	0	90	min.	10	0	90	min.	10
F20	Maximum time with compressor turned on without reaching the set point (to warn)	0	999	min.	300	0	999	min.	300
F21	Defrosting type	0 - resist.	1 - hot gas	-	0	0 - resist.	1 - hot gas	-	0
F22	Condition to start defrosting (**)	0	2	-	0	0	2	-	0
F23	Interval between defrosts (if F22=0)	1	999	min.	240	1	999	min.	240
F24	Time for collecting the gas before the start of the defrost cycle	0	90	min.	0	0	90	min.	0
F25	Delay before performing the 1st defrost (if F22=0)	0	999	min.	0	0	999	min.	0
F26	Defrost when the instrument is powered on	0 - no	1 - yes	-	0	0 - no	1 - yes	-	0
F27	Evaporator temperature (S2) determine the end of defrost	-50	75.0	°C	40.0	-58	167	°F	104
F28	Maximum defrost duration (for security)	0	90	min.	45	0	90	min.	45
F29	Fan turned on during defrost	0 - no	1 - yes	-	0	0 - no	1 - yes	-	0
F30	Temperature indication (S1) locked during defrosting	0 - no	1 - yes	-	0	0 - no	1 - yes	-	0
F31	Draining time (dripping of defrost water)	0	30	min.	10	0	30	min.	10
F32	Low ambient temperature alarm (S1)	-50	75.0	°C	-50	-58	167	°F	-58
F33	Low temperature alarm hysteresis	0.1	20.0	°C	1.0	1	36	°F	2
F34	High ambient temperature alarm (S1)	-50	75.0	°C	75.0	-58	167	°F	167
F35	High ambient temperature alarm hysteresis	0.1	20.0	°C	1.0	1	36	°F	2
F36	Alarm inhibition time after powering the instrument on	0	999	min.	0	0	999	min.	0
F37	Alarm inhibition time after draining	0	999	min.	0	0	999	min.	0
F38	Inhibition time for the open door alarm (only buzzer)	0	99	min.	0	0	99	min.	0
F39	Alarm time (on cycle)	0	999	sec.	1	0	999	sec.	1
F40	Alarm time (off cycle)	0	999	sec.	1	0	999	sec.	1
F41	Buzzer enabling	0 - disabled	1 - enabled	-	1	0 - disabled	1 - enabled	-	1
F42	Minimum supply voltage (protection)	10	30	Vdc	10	10	30	Vdc	10
F43	Maximum supply voltage (protection)	10	30	Vdc	30	10	30	Vdc	30
F44	Offset voltage indication	-5.0	5.0	Vdc	0.0	-5.0	5.0	Vdc	0.0
F45	Time to validate the voltage reading	0	30	sec.	5	0	30	sec.	5
F46	Datalogger operation mode (***)	0	2	-	2	0	2	-	2

F47	Sampling time (time between records in the memory)	1	999	sec.	30	1	999	sec.	30
F48	Minimum temperature change to force writing data to the memory	0 - disabled	10.0	°C	0	0 - disabled	18	°F	0
F49	Variation of the output to force data recording	0 - no	1 - yes	-	0	0 - no	1 - yes	-	0
F50	Overwrite old records when memory is full?	0 - no	1 - yes	-	1	0 - no	1 - yes	-	1
F51	Number of defrosts per day (Monday)	1	12	-	4	1	12	-	4
F52	Preferred time to start defrosting (Monday to Friday)	00:00	23:50	hours	06:00	00:00	23:50	hours	06:00
F53	Number of defrosts per day (Saturday)	1	12	-	4	1	12	-	4
F54	Preferred time to start defrosting (Saturday)	00:00	23:50	hours	06:00	00:00	23:50	hours	06:00
F55	Number of defrosts per day (Sunday)	1	12	-	4	1	12	-	4
F56	Preferred time to start defrosting (Sunday)	00:00	23:50	hours	06:00	00:00	23:50	hours	06:00
F57	Time to start the economy setpoint (Monday to Friday)	00:00	23:50	hours	20:00	00:00	23:50	hours	20:00
F58	Duration of the economy setpoint (Monday to Friday)	0 - disabled	36	hours	10	0 - disabled	36	hours	10
F59	Time to start the economy setpoint (Saturday)	00:00	23:50	hours	20:00	00:00	23:50	hours	20:00
F60	Duration of the economy setpoint (Saturday)	0 - disabled	36	hours	10	0 - disabled	36	hours	10
F61	Time to start the economy setpoint (Sunday)	00:00	23:50	hours	20:00	00:00	23:50	hours	20:00
F62	Duration of the economy setpoint (Sunday)	0 - disabled	36	hours	10	0 - disabled	36	hours	10
F63	Maximum operation time of the COMP output for maintenance	0 - disabled	999	x 10h	500	0 - disabled	999	x 10h	500
F64	Intensity of the digital filter applied to sensor S1	0	9	-	0	0	9	-	0
F65	Preferred viewing mode (****)	0	2	-	0	0	2	-	0
F66	Network equipment address RS - 485	1	247	-	1	1	247	-	1

(*) Operation mode of digital inputs

- 0 - disabled
- 1 - open door signaling, NC contact
- 2 - defrost by external sync, NC contact
- 3 - pressostat status, NC contact
- 4 - open door signaling, NO contact
- 5 - defrost by external sync, NO contact
- 6 - pressostat status, NO contact

(**) Initial defrost condition

- 0 - time (cyclic)
- 1 - temperature
- 2 - schedule (RTC)

(***) Datalogger operation mode

- 0 - Always Off
- 1 - Always On
- 2 - Manual

(****) Preferred viewing mode

- 0 - ambient temperature
- 1 - supply voltage
- 2 - temperature / voltage (alternately)

4.5 - Parameters description

F01 - 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)

F02 - Minimum setpoint allowed to the end user

F03 - Maximum setpoint allowed to the end user

Electronic limits whose purpose is prevent that too high or too low setpoint temperatures are regulated.

F04 - 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 equipment connected on the same net. For this, just adjust different times for each equipment. This delay may be of compressor or defrost (when exist defrost on turn on).

F05 - Offset indication for ambient temperature sensor

Allows it to compensate for eventual ambient temperature (S1) misreading, usually due to a sensor replacement.

F06 - Offset indication for evaporator sensor

Allows it to compensate for eventual evaporator temperature (S2) misreading, usually due to a sensor replacement.

F07 - Operation mode of digital input 1 (*)

F08 - Operation mode of digital input 2 (*)

Allows to choose between the following operation modes of digital inputs:

- 0 - disabled
- 1 - open door signaling, NC contact;
- 2 - defrost by external sync, NC contact;
- 3 - pressostat status, NC contact;
- 4 - open door signaling, NO contact
- 5 - defrost by external sync, NO contact;
- 6 - pressostat status, NO contact.

Note:

- 1 - When a door opens, the Buzzer sounds (by means of the conditions set in F38 and F41), and the "FANS" output will be turned off. The screen will keep showing **[FAN]**.
- 2 - When an external sync defrost event occurs, the manual defrost will be forced on.
- 3 - When a pressure switch event occurs, the "COMP", "FANS" and "DEFROST" outputs will be turned off. The screen will keep showing **[P-S]**.

F09 - Evaporator temperature (S2) for fan return after draining

After the draining, the fan-delay cycle starts. The refrigeration (COMP) output is turned on, because the evaporator temperature is high, but the fan only is turned on after evaporator temperature decreases the adjusted value. This process is necessary to remove the heat that exists in the evaporator because the defrost, preventing to pass it to the ambient.

F10 - Maximum time of fan return after draining (fan-delay)

For security, if the evaporator temperature does not reach the adjusted value in F09 or the S2 sensor is detached, the fan-delay will happen after passed the adjusted time in this function.

F11 - Minimum time of compressor turned on

It is the time that the compressor will keep turned on, it means, the time period between the last started and the next stopped. It serves to prevent high voltage from the mains.

F12 - Minimum time of compressor turned off

It is the minimum time that the compressor will keep turned off, it means, the time period between the last stopped and the next started. It serves to alleviate the pressure and to increase the useful life of the compressor.

F13 - Compressor status with detached ambient sensor (S1)

If the ambient sensor (S1) is detached or out specified range, the compressor assumes the configured status in this function.

Example: For counters that storage fruits it is better that the compressor keeps turned off, but in counters that storage meats it is better that the compressor keeps turned on.

F14 - Fan on with compressor off (refrigeration)

During refrigeration, the fan can be depend of the compressor status.

"0" = The fan keeps turned on while compressor is turned on (this alternative, in some cases, Possibilities a great economy of electrical energy).

"1" = The fan keeps turned on during all refrigeration cycle.

F15 - Fan stop for high temperature in evaporator

This function cycles the evaporator fan until that ambient temperature approaches of the temperature desired in the refrigerating installation project. This preventing high temperature and suction pressures that can damage the compressor. If the temperature in evaporator pass the adjusted value, the fan is turned off, turning on again with a configurable hysteresis in F16. Valuable resource when refrigeration equipment that had been inactive for a few days or refrigerated cases are restocked with its proper merchandise.

F16 - Fan return hysteresis (after stopping due to high evaporator temperature)

This allows for determining the temperature difference for the fan to resume operation after stopping due to exceeding the desired temperature in the evaporator.

F17 - Maximum time in refrigeration mode (for safety reasons, if F22=1)

This acts as a safety time when the function "defrost by temperature" is enabled (F22 = 1), and the evaporator temperature does not reach the value set in F18. This function determines the maximum time the controller will remain without perform defrosting.

F18 - Evaporator temperature to start defrosting (if F22=1)

When the evaporator temperature reaches the value set in this function the controller starts to count the time to confirm a low S2 temperature to start defrosting (F19).

F19 - Time to confirm a low S2 temperature to start defrosting (if F22=1)

When the evaporator temperature drops and then reaches the value set in F18, the controller starts to count the confirmation time to start defrosting. During this step, if the temperature remains low the controller starts defrosting. Otherwise, if the temperature rises by at least 1°C above the setpoint, the system continues in the refrigeration mode.

F20 - Maximum time with compressor turned on without reaching the set point (to warn)

If the time set in this function is exceeded while the compressor is on and the setpoint is not reached, the display will show **[CNP]**. This indication will disappear when the compressor is turned off.

F21 - Defrosting type

- 0 - Electric defrosting (by resistance), where only the defrost output is activated
- 1 - Defrosting by hot gas, where the compressor output and the defrost output are activated

F22 - Condition to start defrosting (**)

This defines whether defrosting will start by time, by temperature or by scheduling:

- 0 - time (cyclic)
- 1 - temperature
- 2 - schedule (RTC)

F23 - Interval between defrosts (if F22=0)

This determines the time the instrument will wait between defrosts, with the time being counted from the last defrost. Defrosting will only be started if the S2 temperature (evaporator sensor) is below the temperature indicated in F27.

F24 - Time for collecting the gas before the start of the defrost cycle

After starting the defrost the controller will keep only the fan on for this time to use the remaining energy of the gas.

F25 - Delay before performing the 1st defrost (if F22=0)

This function allows extra time for the instrument to remain in the refrigeration mode before performing the first defrost cycle to avoid defrosting several chambers at the same time. This time is shown only before the first defrost cycle when F22=0 (start defrost by time).

F26 - Defrost when the instrument is powered on

It possibilities the defrost at the moment that the controller is turned on, for example, in return of electrical energy (in case of energy lacks).

F27 - Evaporator temperature (S2) determine the end of defrost

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

F28 - Maximum defrost duration (for security)

This function serves to adjust the maximum value of time to defrost. If in this period the evaporator temperature will not reach the configured value in F27 a point will be blinking on inferior down right side of display indicating that the end defrost occurred for time and not for temperature.

This can happen when the adjusted temperature is very high, the limit time will be not enough, the S2 sensor is detached or not in contact with the evaporator.

F29 - Fan turned on during defrost

It possibilities the fan functioning during defrost.

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

F30 - Temperature indication (S1) locked during defrosting

This function is aimed at avoiding a rise in the ambient temperature due to the defrost cycle. The last temperature measured in the refrigeration cycle will be frozen in the display during the defrost cycle. The indication will be un-frozen when the process returns to the refrigeration cycle.

Note: The value entered in F28 cannot be zero.

F31 - Draining time (dripping of defrost water)

Necessary time for dripping, it means, to drain the last water drops of the evaporator. All the outputs keep turned off. If you do not need this stage, adjust this time for "zero".

F32 - Low ambient temperature alarm

If the ambient temperature (S1 sensor) falls below the point set here during the refrigeration cycle it will be indicated in the display by the message **FLD** and the alarm output will be activated.

F33 - Low temperature alarm hysteresis

This value is the temperature difference required to turn off the low ambient temperature alarm output.

F34 - High ambient temperature alarm

If the ambient temperature (S1 sensor) reaches the point set here during the refrigeration cycle it will be indicated in the display by the message **FHH** and the alarm output will be activated.

F35 - High ambient temperature alarm hysteresis

This is the temperature difference required to turn off the high ambient temperature alarm output.

F36 - Alarm inhibition time after powering the instrument on

During this period of time, the high or low temperature alarm is kept off waiting for the system to start working mode. If the voltage is out-of-range or the condition in F20 occurs, the indication will be shown in the display but the relay will only be triggered after the time set in this function.

F37 - Alarm inhibition time after draining

This function works to inhibit the alarm for some time due to an occasional temperature rise caused by the defrost cycle. The alarm is disabled during defrosting and draining operations.

F38 - Inhibition time for the open door alarm (only buzzer)

During this time, the open door alarm is kept off (see also F41).

F39 - Alarm time (on cycle)

This is the period for which the alarm output will stay on. The alarm will sound for the following reasons: High or low temperature (F32 and F34), when the voltage is out-of-range (F42 and F43), and if the compressor is on without reaching the setpoint (F20).

F40 - Alarm time (off cycle)

This is the period for which the alarm output will stay off.

F41 - Buzzer enabling

Enable or disable the activation of the buzzer. This will sound when either of the two digital inputs is set to "open door signaling", and the event has been detected.

F42 - Minimum supply voltage (protection)

F43 - Maximum supply voltage (protection)

Maximum and minimum thresholds for the instrument's supply voltage aiming at protecting the outputs. If the voltage is out of this range, the outputs are turned off.

Note: The selector jumper for the supply voltage must be properly positioned to select between 12 and 24V, as per the connection diagram shown in item 7 of this manual.

F44 - Offset voltage indication

This parameter lets you adjust the offset voltage indication.

F45 - Time to validate the voltage reading

This is the time that the instrument waits before indication an under- or over-voltage after verifying that the voltage is out of the range set in F42 and F43.

F46 - Datalogger operation mode (***)

Allows to choose between the following operation modes of the datalogger:

- 0 - Always Off
- 1 - Always On
- 2 - Manual

F47 - Sampling time (time between records in the memory)

This is the time in seconds that the controller records samples of the temperature information, the output state and the digital input state.

F48 - Minimum temperature change to force writing data to the memory

This is the temperature difference in relation to the last data written in the datalogger so that the data written in the memory are recorded regardless of the sampling time set in F47. Disabled if zero.

F49 - Variation of the outputs to force data recording:

Indicates whether the change in any output will force the recording of data in memory regardless of the time of sampling set in F47:

F50 - Overwrite old records when memory is full?

This function indicates whether the controller should start writing the new data at the beginning of the datalogger's memory when it is full. This prevents that the latest data recorded from equipment be erased first. If set to zero, when the data-logger memory is full the instrument and Sitrad will signal full memory.

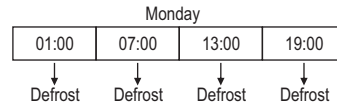
F51 - Number of defrosts per day (Monday to Friday)

The defrost cycles are evenly distributed in accordance with the number of defrosts set per day, always considering the preferred time. The value can be adjusted to 1, 2, 3, 4, 6, 8 or 12. This function works to schedule the operation from Monday to Friday

F52 - Preferred time to start defrosting (Monday to Friday)

This must be set to the preferred time (reference time) for the daily defrost to be performed. This function works to set the time from Monday to Friday.

Example: If the preferred time is set to 1 PM (and the number of defrost cycles is set to 4 and the interval is 6 hours), defrosting will be performed at 1 AM, 7 AM, 1 PM and 7 PM on the same day. In the example, the suggested day is Monday. The idea, however, works for all weekdays.



F53 - Number of defrosts per day (Saturday)

The defrost cycles are evenly distributed in accordance with the number of defrosts set per day, always considering the preferred time. The value can be adjusted to 1, 2, 3, 4, 6, 8 or 12. This function works to schedule the operation for Saturdays.

F54 - Preferred time to start defrosting (Saturday)

This must be set to the preferred time (reference time) for the daily defrost to be performed. This function works to set the time for Saturday.

F55 - Number of defrosts per day (Sunday)

The defrost cycles are evenly distributed in accordance with the number of defrosts set per day, always considering the preferred time. The value can be adjusted to 1, 2, 3, 4, 6, 8 or 12. This function works to schedule the operation for Sundays.

F56 - Preferred time to start defrosting (Sunday)

This must be set to the preferred time (reference time) for the daily defrost to be performed. This function works to set the time for Sunday.

F57 - Time to start the economy setpoint (Monday to Friday)

This is the time for which the setpoint assumed for process control becomes the economy setpoint adjusted in accordance with item 4.1 of this manual.

This function works to set the time from Monday to Friday.

F58 - Duration of the economy setpoint (Monday to Friday)

This is the time (in hours) that the assumed setpoint will be the "economy setpoint" for the week days from Monday to Friday starting from the time set in F57.

F59 - Time to start the economy setpoint (Saturday)

This is the time for which the setpoint assumed for process control becomes the economy setpoint adjusted in accordance with item 4.1 of this manual.

This function works to set the time for Saturday.

F60 - Duration of the economy setpoint (Saturday)

This is the time (in hours) that the assumed setpoint will be the "economy setpoint" for Saturdays starting from the time set in F59.

F61 - Time to start the economy setpoint (Sunday)

This is the time for which the setpoint assumed for process control becomes the economy setpoint adjusted in accordance with item 4.1 of this manual.

This function works to set the time for Sunday.

F62 - Duration of the economy setpoint (Sunday)

This is the time (in hours) that the assumed setpoint will be the "economy setpoint" for Sundays starting from the time set in F61.

F63 - Maximum COMP running hours before maintenance.

Whenever the COMP output is activated the instrument will count its operating time. When the time counted is equal or higher than the time set in this function, the display will show the message **PRM**, meaning that the compressor must be serviced.

Note: The value adjusted in this parameter will be multiplied by ten.

Example: Value adjusted = 1, then 1x10 = 10 hours for the next service.

F64 - Intensity of the digital filter applied to sensor S1

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

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 directly reaches the sensor, causing a quick rise in the indication of the measured temperature, thus causing the compressor to be activated unnecessarily many times.

F65 - Preferred viewing mode (****)

In this parameter the user configures which viewing mode of quantities the display will work, it can be set between:

- 0 - ambient temperature
- 1 - supply voltage
- 2 - temperature / voltage (alternately)

F66 - Network equipment address RS - 485

Equipment's network address for communicating with Sitrad® software.

Note: A network must not have different equipments with the same address.

5 - SEETING CURRENT TIME AND THE DAY FOR THE WEEK

Inside the function menu, press the **▲** key until the message **CLD** appear on the display.

Tap the **SET** key. The settings will appear in the following order:

HOURS → MINUTES → DAY OF THE WEEK

Ex: 12:43 - Friday

12 Hours

43 Minutes

5 Day of the week

6 - FACILITATED ACCESS

6.1 - Process stage, elapsed time and evaporator temperature (S2) and hour-meter

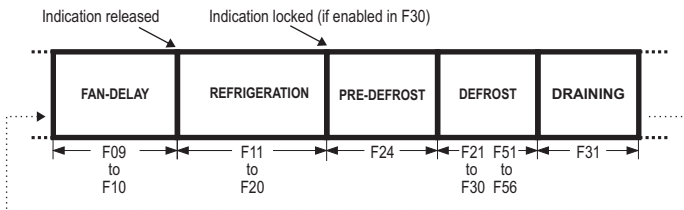
Press **↵**, with a short touch, and the process step and the time elapsed (in minutes) in this process will be shown. Then the evaporator temperature (S2) and the number of hours of the compressor (for maintenance control) will also be shown.

In case of a disconnected sensor or temperature out specified range a **Er2** will appear on the display.

- Process stages:
- dEL** Initial delay (delay to start the control)
 - FAn** Fan-delay (delay to fan return)
 - rEF** Refrigeration
 - PrE** Pre-defrost
 - dEF** Defrost
 - drE** Draining

Hour meter display: **nAn** Number of hours worked by the compressor

NOTE: If the number of hours of the compressor exceeds 999, the number will be shown in two steps: Thousands first and then hundreds, tens and units.



6.2 - Manual defrost (instant)

To perform a manual defrost regardless of programming, keep the key **▲** pressed for 4 seconds until the indication **dEF** is shown. Release the key and **On** will appear. If the instrument is in the defrost cycle and an interruption is required, proceed as per the instructions above until the indication **dEF** is shown. Release the key and **OFF** will appear.

6.3 - Minimum and maximum temperature register

By pressing **▲**, short touch, the **E-1** sign will appear and the maximum and minimum temperatures of the sensor S1 (ambient temperature) will appear. Soon **E-2** will appear showing the minimum and maximum temperatures of the sensor S2 (evaporator). Next will appear the minimum and maximum voltages, preceded by the **UOL** sign.

Note: To reset settings, hold the **▲** key through all the minimum and maximum temperature visualization until **rSE** appear.

6.4 - Visualizing the current weekday and time

Press quickly the **SET** key. It will appear:

DAY OF THE MONTH → **MONTH** → **YEAR** → **HOURS** → **MINUTES** → **SECONDS** → **DAY OF THE WEEK**

6.5 - Viewing the supply voltage

By pressing the **▼** and **SET** keys for 5 seconds, it will appear the supply voltage of the instrument, preceded by the **UOL** message.

6.6 - Clearing datalogger memory:

Press the **▲** and **SET** keys for 4 seconds to display **nEN CLn**. The display shows **no**. If you don't want to clear the memory press **SET**. To clear the memory press **▲** until **YES** is displayed and press **SET** to confirm and exit the function.

6.7 - Manual datalogger activation

Press **▲** and **▼** simultaneously for 10 seconds to activate or deactivate the operation of the internal voltage recorder (data-logger). The message **dEL** will be shown followed by the message **On** when the data-logger is activated and **OFF** when it is deactivated.

Note: The status of the datalogger will only change alternate between **On** and **OFF** if the function F46 is set to 2 (manual datalogger operation).

6.8 - Hour-meter reset

When the number of hours with the compressor on reaches the value set in F63, the display will show a **nAn** warning, indicating that maintenance should be done. To reset this counter (It can be done only after the warning occurs), press **SET** for 10 seconds.

6.9 - Turn off the control functions

Pressing **▼** for 5 seconds, the controller will go to a state where only temperatures and voltages are read, where no control are performed and where all outputs kept off. Communication with SITRAD software and the Datalogger will still work. To make the device fully operational again, press **▲** again for 5 seconds.

7 - UNIT SELECTION (°C / °F)

To define the unit that the system will use to operate, enter into the functions menu **Cod** using the access code "231" and confirm it by hitting key **SET**. Press the **▲** key. It will appear **Unn**, press again **SET** to enter the function. Use the **▼** or **▲** keys to choose between **°C** or **°F** and confirm with the **SET** key. After selecting the unit the **Cod** message will appear, and the instrument will return to the function **FAC**. Whenever the unit is altered, the parameters should be reconfigured, since they assume "standard" values.

8 - INDICATORS AND ALARMS

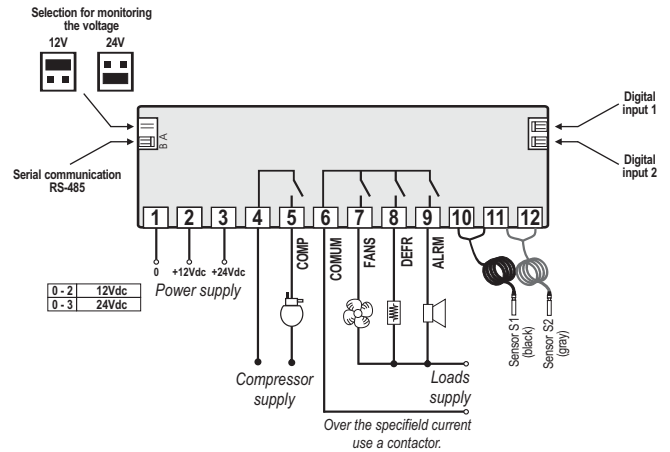
- ALo** - Low temperature
- AHh** - High temperature
- UOL** - Voltage out of range
- OPn** - Open door
- PrS** - Pressostat
- FUL** - Datalogger memory full
- ECO** - Economic setpoint active
- OFF** - Outputs manually deactivated
- nAn** - Compressor maintenance
- CNP** - Compressor ON without reaching the setpoint (F20)
- Er1** - Ambient sensor S1 disconnected or temperature out of range
- Er2** - Evaporator sensor S2 disconnected or temperature out of range
- EEN** - Temperature Indication
- dEF** - Indication that defrost will be performed
- On** - Indication of activation
- OFF** - Indication of deactivation

- Hh** - Indication of high voltage
- Lo** - Indication of low voltage
- nEN** - Reference to the memory of the datalogger
- CLr** - Indication to clear the memory of the datalogger
- rSE** - Indicates that the instrument is resetting the values

Frontal LEDs

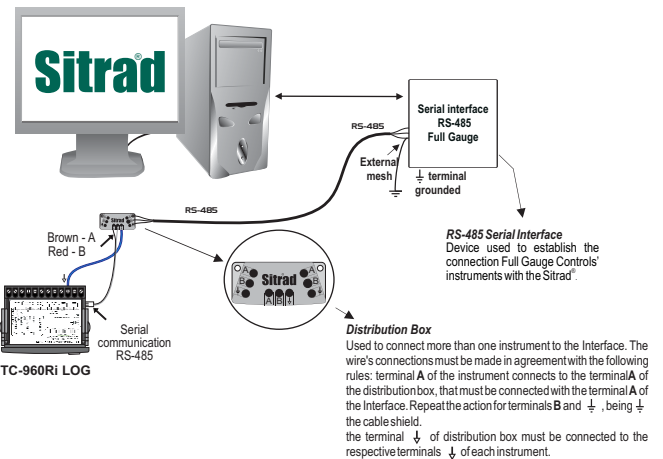
- COMP - refrig / compressor (12A)
- FANS - evaporator fans (5A)
- DEFr - defrost (5A)
- ALRM - alarm (5A)
- ECO - economic setpoint active (saving energy)

9 - WIRING DIAGRAM



- The sensor S1 (black) must be in the ambient.
- The sensor S2 (gray) must be placed in the evaporator through metallic clamp.
- The sensor cable length can be increased by the user until 200 meters using the PP 2 x 24 AWG cable.
- COMP:** 12(8)A / 240 Vac 1HP
- FANS:** 5(3)A / 240Vac 1/8HP
- DEFr:** 5(3)A / 240Vac
- ALARM:** 5(3)A / 240Vac 1/8HP

10 - INTEGRATING CONTROLLERS, RS-485 SERIAL INTERFACE AND COMPUTER



IMPORTANT

- As chapters of IEC 60 364 norms:
- 1: Install protectors against over voltage on power supply
 - 2: Sensor cables and computer signals can be together, however not at the same place where power supply And load drive pass for.
 - 3: Install suppresor of transient (RC filter) in parallel to loads, as for to increase the useful life of the relays.

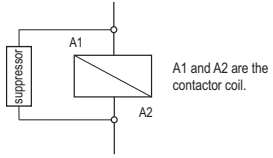
ENVIRONMENTAL INFORMATION

Package:
The packages material are 100% recyclable. Just dispose it through specialized recyclers.

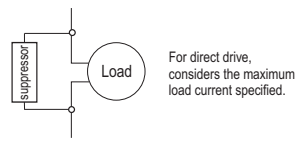
Products:
The electro components of Full Gauge controllers can be recycled or reused if it is disassembled for specialized companies.

Disposal:
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.

Wiring diagram of suppressor in contactors



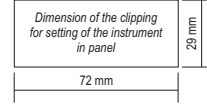
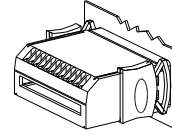
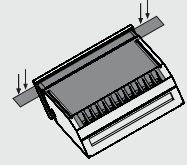
Wiring diagram of suppressor linking in loads direct drive



PROTECTIVE VINYL:

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.

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



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