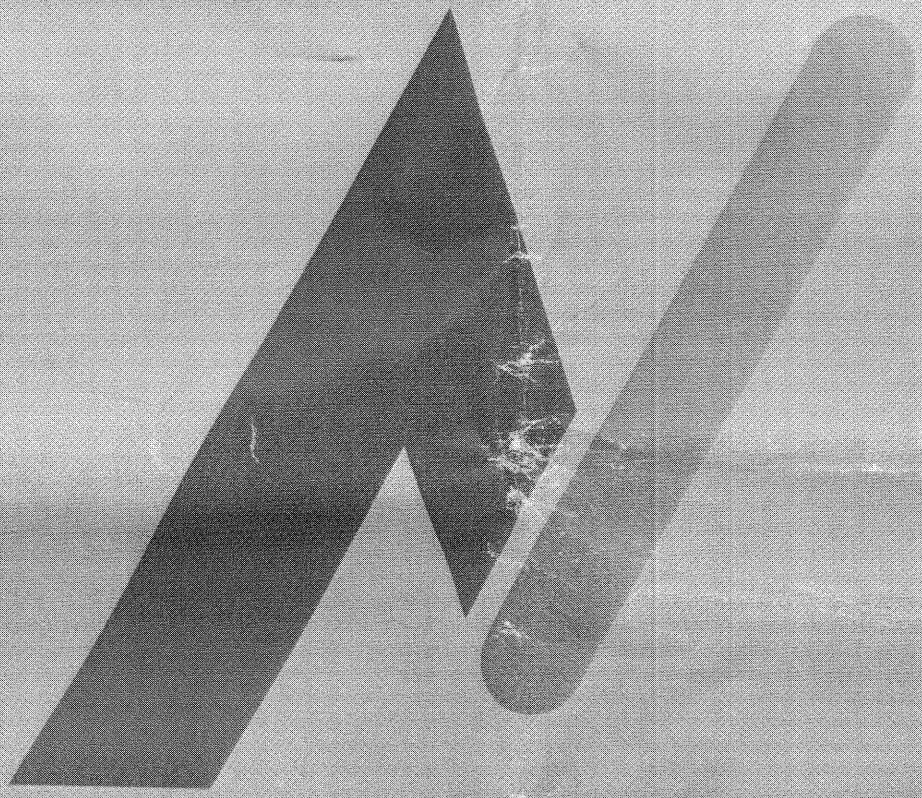
Installation and Operating Instructions

RC2.. series



Programmable Controllers with "R.T.Clock, Data-Logger and RS485" Data-Communication for Refrigerated-Units

1.00 TECHNICAL-DATA

DISPLAY

- 3-digits, 10 mm high, 7-segments green LED's (only for panel mounting 35x77 mm, when "INFRARED option" is present)
- 3-digits, 14,2 mm high, 7-segments green LED's

MEASURE RANGE

- PTC-sensor : –55°C to 55 °C / -67°F to 127 °F
- NTC-sensor : –50°C to 40 °C / -58°F to 104 °F

ANALOG INPUTS TYPES "ON REQUEST"

- PTC-semiconductor
- NTC-sensor

DIGITAL INPUTS

- Inputs type: for normally closed external contact

DIGITAL OUTPUTS

- N° of outputs: see "wiring diagrams" (Ref. 3.00)
- Relays contact type: see "wiring diagrams" (Ref. 3.00)
- Max. current-rate switching: see "wiring diagrams" (Ref. 3.00)
- Max. load-power control: see "electrical wiring" (Ref. 2.62)

REAL TIME CLOCK (on request)

- Accuracy: better than 1 s / 25 Hrs.
- Back-up: by lithium battery, 7-years typical life

TTL SERIAL PORT (for short distance data-communication)

- No-insulated serial port
- Short-circuit protection

RS485 DATA COMMUNICATION (on request)

- No-insulated serial port
- INCE property protocol (1.00 version)

MEMORY

- Non-volatile EEPROM

PERFORMANCES

- Accuracy: better than 0,5 °C / 1 °F (the indicated value includes also thermal drift within the operating °T range, repeatability, long term stability, auto-heating of PTC sensor)
- Resolution: 1 °C / 1 °F
- Sampling time: 1 second

OPERATING CONDITIONS

- Ambient temperature: 0 to 50 °C
- Storage temperature: -30 to 80 °C
- Relative humidity: 30 to 85 R.H. % (non condensing)

POWER SUPPLY "ON REQUEST" (according to Hdw. Model)

- 12 Vac / dc, ± 10 % - 50/60 Hz.
- 230 Vac, ± 10 % - 50/60 Hz.

MECHANICAL DATA

Cases (H – W – L)

- Panel mounting: 35x75 mm – 60 mm depth
- DIN-rail mounting: 4-Din standard module
- Wall mounting: 114x170 mm – 60 mm depth

Front panel protection

- IP 65

Connections

- Screw terminal block for 2,5 mm² gauge wire
- Plug-in terminal block for 2,5 mm² gauge wire (only for wall mounting execution)

Plastic material

- Self extinguishing ABS, U.L. 94 V0 type

2.00 INSTALLATION

2.10 APPROPRIATE APPLICATION

- Each controller is designed to control various type of refrigeration existing equipment, according to performances/technical features of each model. The controller cannot be used as a safety cut-out device or excess temperature limiter. **If the controller is used for other purposes than those stated here, it should not be considered "appropriate application".**
- Only connect sensors supplied by INCE instrument. If a replacement sensor is required, only use sensors of same type. We recommend to make sure about the application limits of each controller (see Technical Data).

2.20 SAFETY

2.21 Caution

- Caution – Mains voltage
- Never expose the unit to water or moisture in order to avoid possible risk of
- The controller must be installed in a place where temperature and R. humidity do not exceed the value indicated in the technical data. Extreme temperature variations in combination with high atmospheric humidity may lead to the formation of condense water.
- Even if the control–circuit voltage is switch OFF, high voltage may still be applied to the unit. For this reason, isolate all electrical circuits before starting any operation.
- Never expose the unit to excessive heat, dust corrosive gases and vibrations. Avoid knocks and pressure loads. If the housing is damaged, there is a risk of an electrical shock causing death or injury.
- If the unit cannot be operated without the risk of danger, it must be taken out of service and precautions taken so that it cannot be switched ON again unintentionally. This applies, in particular, if the housing has damage which is visible, the unit is no longer operational or it has been stored for a long time in unfavourable conditions.
- The unit must not be opened. If it is thought that the unit may be defective, send it back to the dealer or manufacturer with a precise description of the fault.

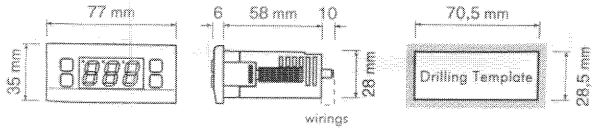
2.22 Safety precautions

- All electromagnetic loads interference (solenoid valves, contactors, alarm horns, motors) should be suppressed directly by an RC line filter "SNUBBER" in parallel to the coil.
- We recommend to make sure about the maximum switching rate of the relays and relative terminals. If this not observed, there is a risk that the contacts may pit or stick, with the result that the equipment will not operate correctly and it may be damaged.
- Sensor leads must be kept separately from main voltage wires (without crossing and creating coils). The clearance should be at least 5 cm.
- Sensor leads cannot cross and create coils with other leads carrying main voltage, in order to avoid high frequency noise induced.
- Separate the power supply of the loads (compressor, fans, etc.) from the power supply of the controller. Tighten the terminals carefully; excessive strain will result in damage to the controller.

2.30 MOUNTING

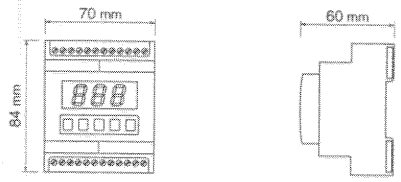
2.31 Panel mounting

To flush panel mount your controller, first verify that the depth of your cabinet will accommodate the length of the instrument's plus 10mm Min. for wiring connections. We recommend to leave on the back cabinet enough to avoid compression or excessive bending of the cables.



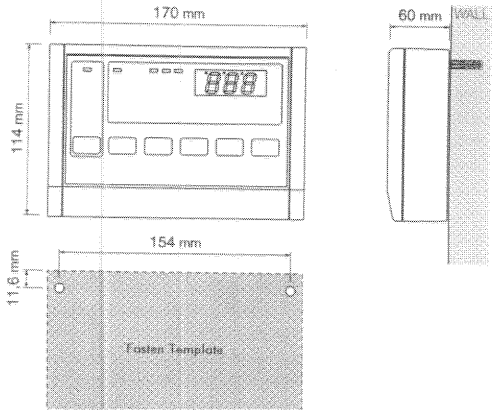
2.32 DIN rail mounting

The unit in 4-modules DIN rail execution, can be easily used either in electrical boxes (DIN rail mounting) or for mounting applications using the two dual function clamps. If DIN rail mounting is required, follow the diagrams below and cut 4-DIN sized hole on the electrical box front panel (when outside frontal instrument display is required).



2.33 Wall mounting

Before mounting Your controller first verify the position where it should be installed and makes sure also about the depth allowed for Your devices, which should not interferes directly with any other things behind the installation.
When You are ready for installation, fasten your controller to the wall, or whenever is required, by means of 2-screws through the mounting-holes (located in both side of the enclosure), as indicated in the below diagrams:



When You are ready for installation, fasten your controller to the wall, or whenever is required, following the "directives" below indicated:

1) Removes the 4-screws **-A-** located in the frontal - body / controller **-B-** see *fig. 1;*
2) Separates the controller **-B-** from the main body **-C-**, see *fig. 2;*
3) Split-out completely the controllers from the main body, see *fig 2.* To facilitate this operation, is advisable to use a small tool through which to exert slight and uniform force on both side of socket - connector.
   WARNING: we recommend to avoid forcing to much into the socket - connector **-D-** and as well into the P.C. board **-E-** which could damage both and also the "controller";
4) When the operation above mentioned is completed, Your device is ready for mounting / installation. Fasten the main body **-C-** to the wall, or wherever is required, by means of screws **-F1-** and **-F2-** through the 2-mounting holes **-G-** located in both sides of the main body, see *fig. 3;*
   WARNING: before mounting Your controller, first verify the position where it should be installed and make sure about the Max. depth allowed for Your devices, which should no-interferes with any other things behind the installation.
5) Carry-out the electrical wirings on the terminal-block **-H-** (see fig. 3) following strictly the wiring - diagram and relative technical specification indicated in the internal wiring label and as well in the next paragraphs 2.50 "INPUT WIRINGS", 2.60 "ELECTRICAL WIRING" and 3.00 "WIRING DIAGRAMS";
6) Re-insert the female socket-connector **-D1-** into the male-socket connector **-D2-** located on the P.C. board **-E-** see *fig. 4;*
7) Fit the controller **-B-** into mail body **-C-** by exerting slightly pressure and fasten both through screws **-A-**, ("reverse operations" respect these indicated in *fig. 2 and 1*, as indicated in the *fig. 4*);
8) Snap-in the 2-lateral plastic covers **-I1-** ans **-I2-** in the frontal sides of your controller by exerting slightly pressure, as indicated in the *fig. 5.*

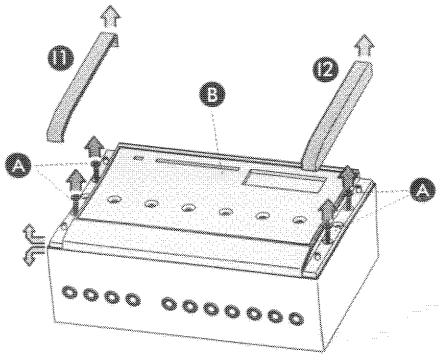


fig. 1

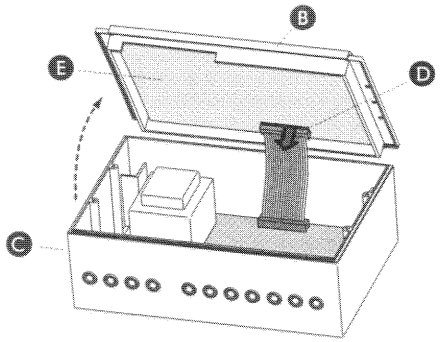


fig. 2

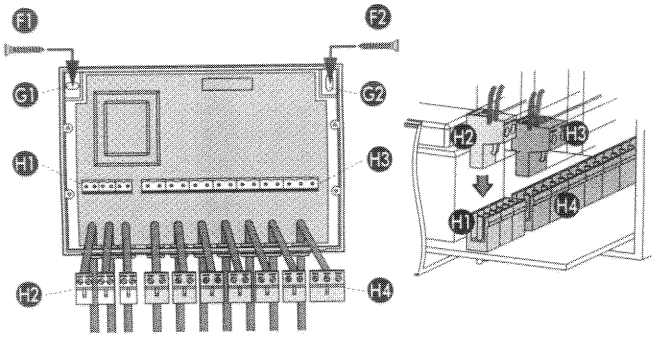


fig. 3

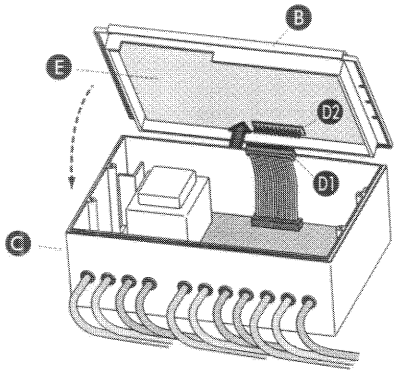


fig. 4

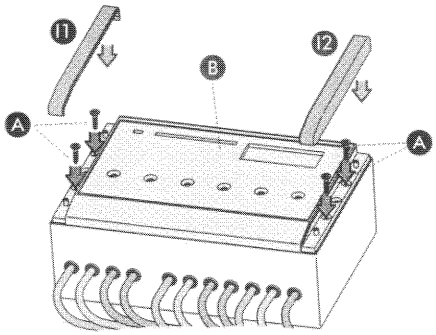


fig. 5

2.40 PROBES INSTALLATION

2.41 *Cold - room temperature probe*

This probe must be installed in a place protected from "direct air - flow" (i.e. from fans or doors), which can alterate the temperature reading.
We recommend also to place the probe in the most suitable cold - room area to detect the "average temperature".

2.42 *Evaporator temperature probe*

- The probe must be installed between the fins of the evaporator, in the most cold area, where probably the ice is thicker.
- Don't place the probe near the heating elements, otherwise the defrost cycle will stop too early. If the probe used is not water-proof, place it with the head upward, so the possible drops/condensation cannot penetrate into the bulb and damage the sensor.

2.43 *Auxiliary temperature probe (only when "analog input 3" is present, Ref. ordering code 13)*

According to the design, features and performances of your plant and related "input3 function" requirement, this probe can be used to perform various functions, one among those listed below (according to "ordering code"):

- ***Preset function***

Ordering Code (input 3 function)	Place of installation	Probe function
13T	Cold-room	°T read-out
13L	Cold-room	°T logging

- ***User-selectable function***

Parameter Setting	Place of installation	Probe function
CH1 = 0		Ecluded
CH1 = 3	Cold-room	°T read-out
CH1 = 4	Cold-room	°T logging

INSTALLATION GENERAL DIRECTIVES

This probe must be installed in the appropriate place, taking into consideration of course its "preset function" (when ordering code **13T** or **13L**) or its "selected function" by parameter **CH1** (when ordering code **13U**) as indicated above.

When You are ready for "probe 3" installation, we recommend to follow the "general directives" below indicated:

- **When "°T. read-out" is selected** (see ordering code 13T or 13U and config. parameter CH1=3)
  We recommend to follow the same directives indicated in the paragraph **2.41** above, taking also into consideration that this probe provides "°T. read-out" when the control is based on main-input / sensor 1

- **When "T. logging " is selected** (see ordering code 13L or 13U and config. parameter CH1=4)

  The temperature probe must be installed in a place protected from external / direct "air - flow" (i.e. from fans or doors heating sources, etc), which can alterate the correct temperature reading.

  We recommend also to place the probe in the most suitable cold-room area for the "average-temperature reading and logging.

2.50 INPUTS WIRING

2.51 *PTC/NTC-temperature sensors*

- The maximum tested sensor cable length is 100 mt., with a minimum cross section of 2x0.75mm².
- In case of long-distance probe installation from the controller, You can prolonges the probe cable up to 100 m max. (typical max. length) without any re-calibration.
- If a longer cable is required (respect the standard one), solder the extension cable to the sensor cable to prevent contact resistance. It is advisable to use shielded cables when extension sensor is required. All shields must be routed at the side of the controller to one earth / protective potential. The extension cable shield must not be connected on the sensor side, otherwise bonding currents may occur via the shielding.

2.52 *Application in Critical Environment*

- We recommend to use screened cable for the probes, with screen connected to earth.
- If the previous suggestions are not sufficient; if strong radio disturbances are present, could be necessary to screen the controller with a metallic screen, connected to earth.

2.60 ELECTRICAL WIRINGS

2.61 *Loads wiring*

We recommend to use wires with adequate cross - section, according to "Loads Power - rate"; anyway don't exceed 2,5 mm gauge wires to avoid damaging the terminal block.

WARNING: In any model equipped with **"1-common"** relay connection (see "WIRING DIAGRAMS", Ref. paragraph 3.00.) " the Max Current-rate applicable must not - exceed 10A.

2.62 *Max. Load - power allowed*

Before wiring Your loads, we recommend to check carefully the Max. Current switching-rate of each relay output used in your controller, taking into consideration for safety reason the following "typical rules":

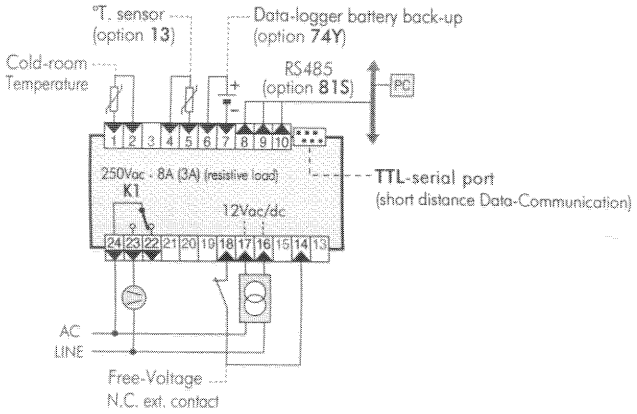
- 5A resistive load / 0,7A inductive load
- 8A resistive load / 2 A inductive load
- 16A resistive load / 3,5 A inductive load

3.00 WIRING DIAGRAMS

3.10 CONTROLLERS FOR REFRIGERATED-UNITS **"WITHOUT"** HEATERS BASED DEFROST (OFF-cycle defrost only)

3.11 PANEL MOUNTING, CASE 35x77mm - 65mm DEPTH

• Mod. RC231 - 1-Control output (compressor)

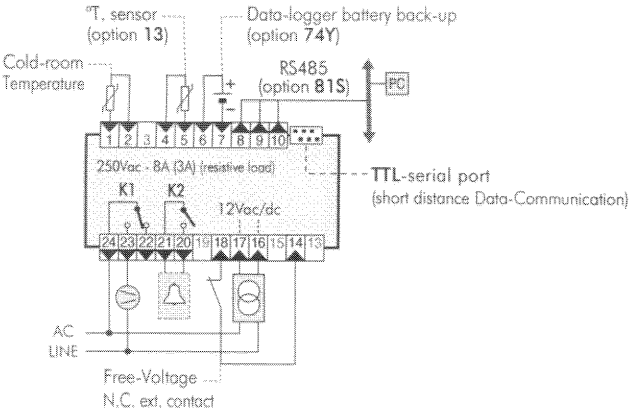


OPTIONS "on request"

TEMPERATURE SENSOR TYPES	
Option 1P	PTC-sensor
Option 1A	NTC-sensor
RS485 DATA COMUNICATION	
Option 81N	None
Option 81S	Present
DATA LOGGER (battery back-up)	
Option 74N	None
Option 74Y	Present

ANALOG INPUT 3	
Option 13N	None
Option 13T	°T. read-out
Option 13L	°T. logging
Option 13U	User-selectable

• Mod. RC232/1A - 1-Control output (compressor) + 1-Alarm output



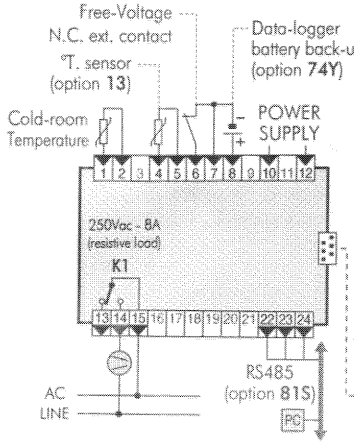
OPTIONS "on request"

TEMPERATURE SENSOR TYPES	
Option 1P	PTC-sensor
Option 1A	NTC-sensor
RS485 DATA COMUNICATION	
Option 81N	None
Option 81S	Present
DATA LOGGER (battery back-up)	
Option 74N	None
Option 74Y	Present

ANALOG INPUT 3	
Option 13N	None
Option 13T	°T. read-out
Option 13L	°T. logging
Option 13U	User-selectable

3.12 DIN-RAIL MOUNTING, 4-MODULES TYPE

• Mod. RC211 - 1-Control output (compressor)



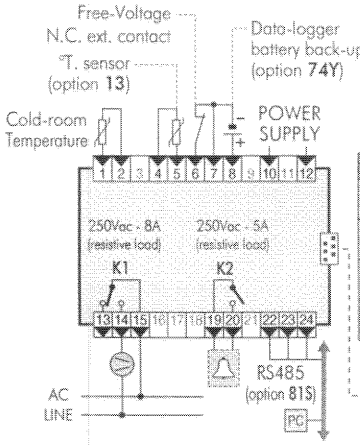
POWER SUPPLY (on request when ordring)		
Option 98L	12 Vac/dc,	±10%
Option 98M	24 Vac,	±10%
Option 98U	115 Vac,	±10%
Option 98H	230 Vac,	±10%

OPTIONS "on request"

TEMPERATURE SENSOR TYPES	
Option 1P	PTC-sensor
Option 1A	NTC-sensor
RS485 DATA COMUNICATION	
Option 81N	None
Option 81S	Present
DATA LOGGER (battery back-up)	
Option 74N	None
Option 74Y	Present

ANALOG INPUT 3	
Option 13N	None
Option 13T	°T. read-out
Option 13L	°T. logging
Option 13U	User-selectable

• Mod. RC212/1A - 1-Control output (compressor) + 1-Alarm output



POWER SUPPLY (on request when ordring)		
Option 98L	12 Vac/dc,	±10%
Option 98M	24 Vac,	±10%
Option 98U	115 Vac,	±10%
Option 98H	230 Vac,	±10%

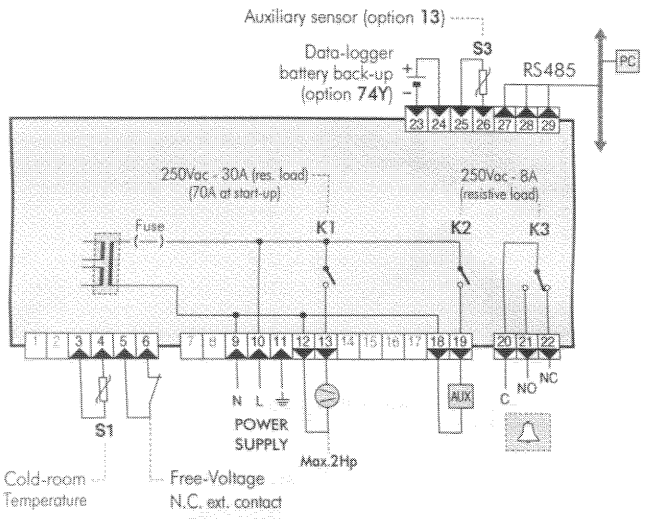
OPTIONS "on request"

TEMPERATURE SENSOR TYPES	
Option 1P	PTC-sensor
Option 1A	NTC-sensor
RS485 DATA COMUNICATION	
Option 81N	None
Option 81S	Present
DATA LOGGER (battery back-up)	
Option 74N	None
Option 74Y	Present

ANALOG INPUT 3	
Option 13N	None
Option 13T	°T. read-out
Option 13L	°T. logging
Option 13U	User-selectable

3.13 WALL MOUNTING, CASE 114x170 - 60mm DEPTH

• Mod. RC253 - 2-Control outputs + 1-Alarm output



OPTIONS "on request"

TEMPERATURE SENSOR TYPES	
Option 1P	PTC-sensor
Option 1A	NTC-sensor

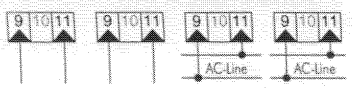
DATA LOGGER (battery back-up)	
Option 74N	None
Option 74Y	Present

ANALOG INPUT 3	
Option 13N	None
Option 13T	°T. read-out
Option 13L	°T. logging
Option 13U	User-selectable

POWER SUPPLY "on request"

Options

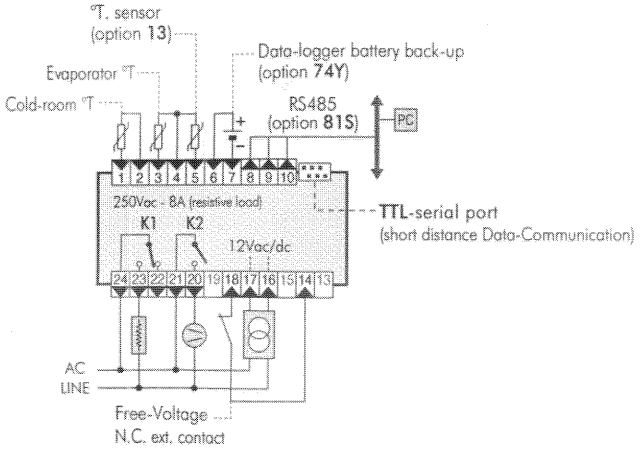
98L	98M	98U	98H
12Vac/dc ±10%	24Vac/dc ±10%	115Vac ±10%	230Vac ±10%



3.20 CONTROLLERS FOR REFRIGERATED-UNITS WITH "**HEATERS** / **HOT-GAS**" BASED DEFROST

3.21 PANEL MOUNTING, CASE 35x77mm - 65mm DEPTH

• Mod. RC232 - 2-Control outputs (compressor + defrost)



OPTIONS "on request"

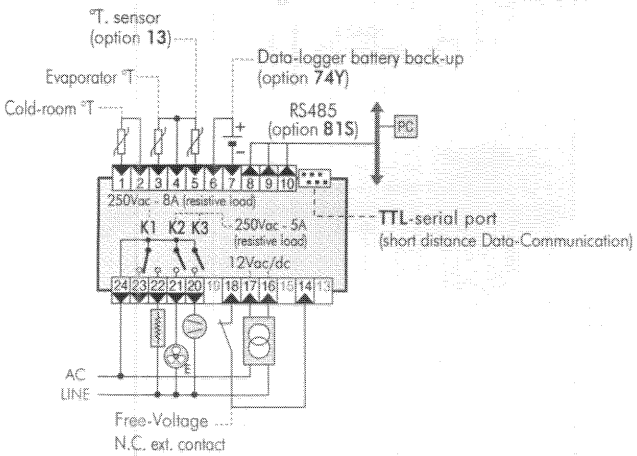
TEMPERATURE SENSOR TYPES	
Option 1P	PTC-sensor
Option 1A	NTC-sensor

RS485 DATA COMUNICATION	
Option 81N	None
Option 81S	Present

DATA LOGGER (battery back-up)	
Option 74N	None
Option 74Y	Present

ANALOG INPUT 3	
Option 13N	None
Option 13T	°T. read-out
Option 13L	°T. logging
Option 13U	User-selectable

• Mod. RC233 - 3-Control outputs (compressor, defrost and fan)



OPTIONS "on request"

TEMPERATURE SENSOR TYPES	
Option 1P	PTC-sensor
Option 1A	NTC-sensor

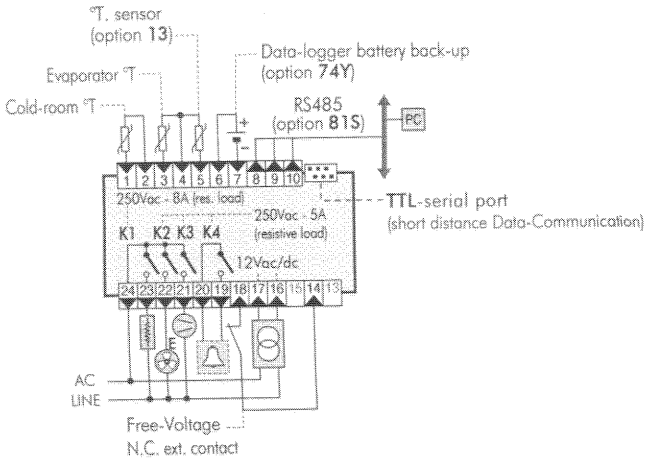
RS485 DATA COMUNICATION	
Option 81N	None
Option 81S	Present

DATA LOGGER (battery back-up)	
Option 74N	None
Option 74Y	Present

ANALOG INPUT 3	
Option 13N	None
Option 13T	°T. read-out
Option 13L	°T. logging
Option 13U	User-selectable

3.22 DIN-RAIL MOUNTING

• Mod. RC234 - 3-Control outputs (comp., defrost and fan) + 1-Alarm output

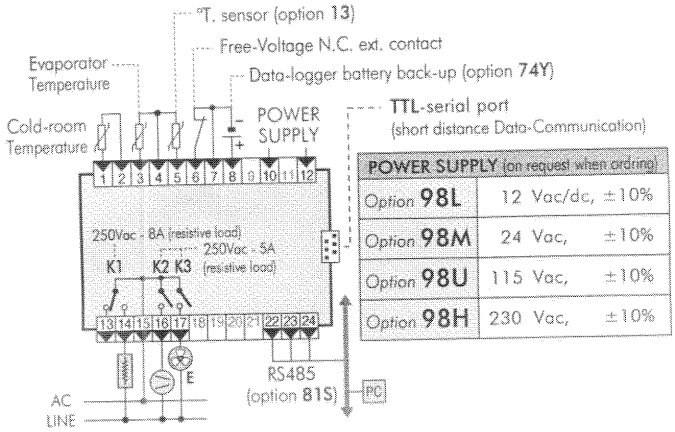


OPTIONS "on request"

TEMPERATURE SENSOR TYPES	
Option 1P	PTC-sensor
Option 1A	NTC-sensor
RS485 DATA COMUNICATION	
Option 81N	None
Option 81S	Present
DATA LOGGER (battery back-up)	
Option 74N	None
Option 74Y	Present

ANALOG INPUT 3	
Option 13N	None
Option 13T	°T. read-out
Option 13L	°T. logging
Option 13U	User-selectable

• Mod. RC213 - 3-Control outputs (compressor + defrost + fan)



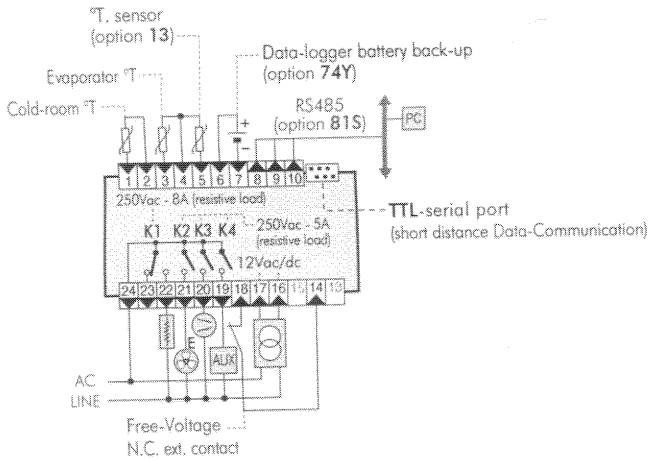
POWER SUPPLY (on request when ordring)	
Option 98L	12 Vac/dc, ±10%
Option 98M	24 Vac, ±10%
Option 98U	115 Vac, ±10%
Option 98H	230 Vac, ±10%

OPTIONS "on request"

TEMPERATURE SENSOR TYPES	
Option 1P	PTC-sensor
Option 1A	NTC-sensor
RS485 DATA COMUNICATION	
Option 81N	None
Option 81S	Present
DATA LOGGER (battery back-up)	
Option 74N	None
Option 74Y	Present

ANALOG INPUT 3	
Option 13N	None
Option 13T	°T. read-out
Option 13L	°T. logging
Option 13U	User-selectable

• Mod. RC234/B - 3-Control outputs (comp., defrost and fan) + Auxiliary output

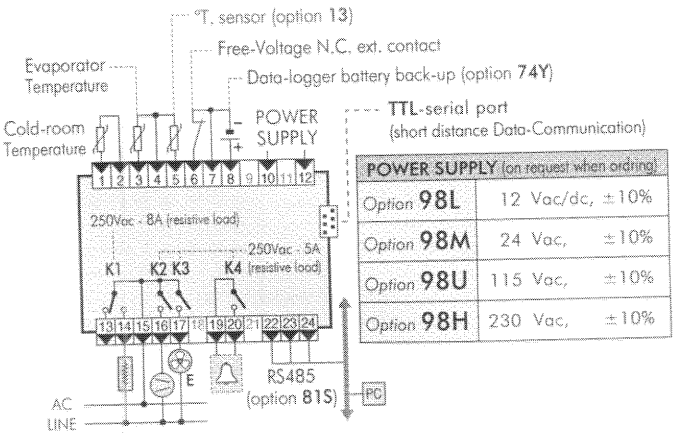


OPTIONS "on request"

TEMPERATURE SENSOR TYPES	
Option 1P	PTC-sensor
Option 1A	NTC-sensor
RS485 DATA COMUNICATION	
Option 81N	None
Option 81S	Present
DATA LOGGER (battery back-up)	
Option 74N	None
Option 74Y	Present

ANALOG INPUT 3	
Option 13N	None
Option 13T	°T. read-out
Option 13L	°T. logging
Option 13U	User-selectable

• Mod. RC214 - 3-Control outputs (compressor+defrost+fan) + 1-Alarm output



POWER SUPPLY (on request when ordring)	
Option 98L	12 Vac/dc, ±10%
Option 98M	24 Vac, ±10%
Option 98U	115 Vac, ±10%
Option 98H	230 Vac, ±10%

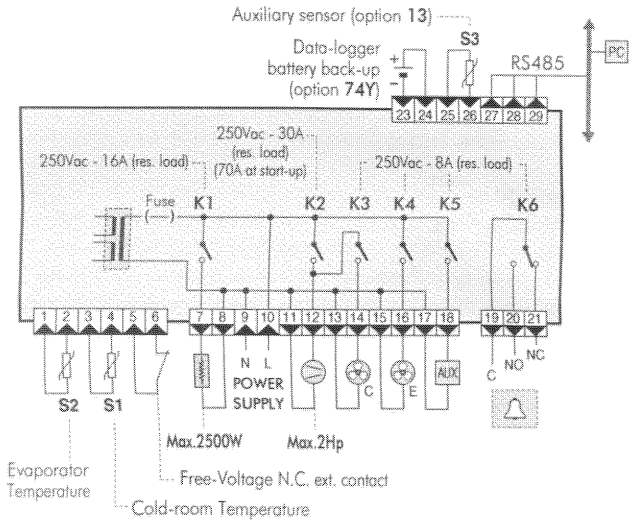
OPTIONS "on request"

TEMPERATURE SENSOR TYPES	
Option 1P	PTC-sensor
Option 1A	NTC-sensor
RS485 DATA COMUNICATION	
Option 81N	None
Option 81S	Present
DATA LOGGER (battery back-up)	
Option 74N	None
Option 74Y	Present

ANALOG INPUT 3	
Option 13N	None
Option 13T	°T. read-out
Option 13L	°T. logging
Option 13U	User-selectable

3.23 WALL MOUNTING, CASE 114x170 - 60mm DEPTH

• Mod. RC256 - 5-Control outputs + 1-Alarm output



OPTIONS "on request"

TEMPERATURE SENSOR TYPES	
Option 1P	PTC-sensor
Option 1A	NTC-sensor

DATA LOGGER (battery back-up)	
Option 74N	None
Option 74Y	Present

ANALOG INPUT 3	
Option 13N	None
Option 13T	°T. read-out
Option 13L	°T. logging
Option 13U	User-selectable

POWER SUPPLY "on request"

Options

98L	98M	98U	98H
9 10	9 10	9 10 AC-Line	9 10 AC-Line
12Vac/dc ±10%	24Vac/dc ±10%	115Vac ±10%	230Vac ±10%

4.00 FRONT - PANEL FUNCTIONS

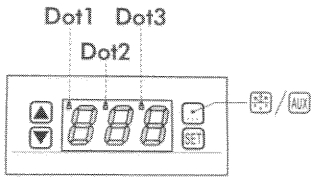
4.10 FRONT PANEL LAYOUT

4.11 Basic models

- **Panel mounting, case 35 x 77mm - 60mm depth:**

Models:

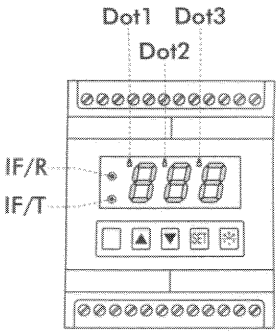
RC231
RC232/1A
RC232
RC233
RC234
RC234/B



- **DIN - rail mounting, 4-modules format:**

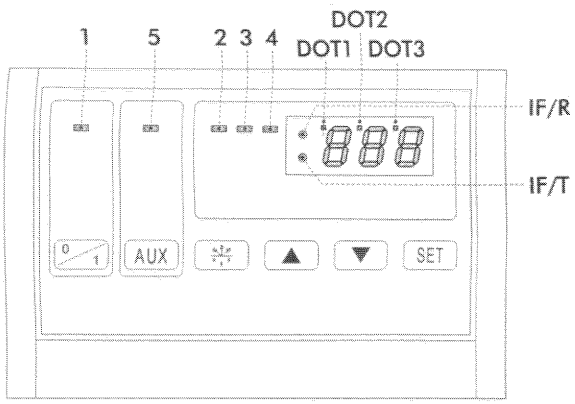
Models:

RC211
RC212/1A
RC213
RC214



- **Wall mounting, case 114x170mm - 60mm depth:**

Models: **RC253** and **RC256**

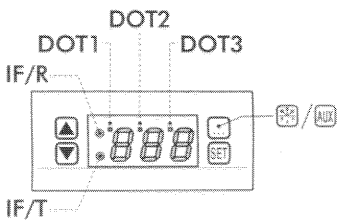


4.12 Models "on request" with INFRARED data-communication and 3-digits display-10mm high

- **Panel mounting, case 35 x 77mm - 60mm depth:**

Models:

RC231
RC232/1A
RC232
RC233
RC234
RC234/B



4.20 KEYS MAIN-FUNCTION

▲ To increase the value of displayed parameter.
Note: in all models equipped with "AUXILIARY OUTPUT"
(see Mod. RC2..../B) this key can be used also for manual defrost-cycle start-up

▼ To decrease the value of displayed parameter

SET To display the operating set point and to confirm any new selected value

❄ To start manually a defrost-cycle

0/1 To switch ON/OFF the unit

AUX To switch ON/OFF the **auxiliary output** (light manual control)

4.30 DISPLAY FUNCTIONS

4.31 Standard models

(see models-list above, Ref. 4.11)

- 3-digits , 7-segments Green LED's display (digit 14mm high)
- during normal operation the display shows the cold-room temperature
- during setting parameters, it can display the label of each operating parameters
- during alarm conditions, it displays alternatively and in sequence every 5s the cold-room temperature and the related "flashing alarm-message"

4.40 LED's INDICATIONS

4.41 Common DOT's indications

- **DOT's 1,2 and 3 "flashing"**: programming-phase
- **DOT 1 is ON**: evaporator-fan is ON
- **DOT 1 "flashing"**: stand-by BIAS operation is ON (energy saving/night setback)
- **DOT 2 is ON**: defrost is ON
- **DOT 3 is ON**: compressor is ON
- **DOT 3 "flashing"**: deep-freezing function is ON

4.42 LED's indication

(only for Mod. RC253 and RC256)

- **LED#1 is ON**: general alarm is ON
- **LED#2 is ON**: evaporator fan is ON
- **LED#3 is ON**: defrost-cycle is ON
- **LED#4 is ON**: compressor is ON
- **LED#5 is ON**: auxiliary output is ON

4.43 INFRARED - LED's for Data-Communication "on request"

(see ordering code "83")

- **IF/T**: INFRARED transmitter for "data-downloading" (by "INCE" portable module Mod. IR104).
- **IF/R**: INFRARED receiver for "preset-programs loading" (by "INCE" portable module Mod. IR200).

4.50 DISPLAYING

4.51 How to display the "main operating set point"

- Push the SET key, the main set point value will be displayed for 15s.

4.52 How to display the "evaporator-temperature"

*(only for models equipped with **"analog inputs 2"**, see Evaporator °T. sensor)*

- Push the ▼ key for 1s; the evaporator-temperature reading by sensor 2 will be displayed for 3s.

4.53 How to display the temperature-reading by "sensor 3"

*(only when **"analog input 3"** is present, see "option3")*

- Push the ▲ key for 1s, the temperature reading by input 3 will be displayed for 3s.

4.54 How to display the actual "remaining-time" to the next defrosting cycle

*(only when configuration **CA2=0**/interval-time based defrost start-up mode)*

- Push the ❄ key for 1st; the actual "remaining-time" (in hours) to the next defrosting cycle will be displayed for 3s.

4.55 How to display the "starting-time" scheduled of next defrosting cycle

*(only when configuration parameter **CA2=1** / R.T.C. based defrost start-up mode)*

- Push the ❄ key for 1s, the precise "starting-time" scheduled of next defrost will be displayed (in Real-time with 10-Minutes resolution).

4.60 DIAGNOSTIC-DATA FACILITIES

4.61 How to display any "Current Alarm Messages"

- Push ▼ + ✳ keys for 3s to ENTER in the "Diagnostic Data-Bank".
- When one or more alarm conditions are recognised, the labels related to "current alarm-conditions" are displayed in sequence every 2s, following a priority given by the software (see next paragraph 6.10 - Ref. TROUBLE SHOOTING).

WARNING: when no-alarm condition is recognised, the **message "000"** flashes on the display for 2s.

4.62 How to start the Automatic-routine to display and scrolling in sequence the "Highest temperature" reading and the related data

(year, month, day and time when the Pick-value has been recorded)

- Push the ▲ key for 5s to start the automatic-routine.

4.63 How to start the automatic-routine to display in sequence the"lowest temperature" reading and the related data

(year, month, day and time when the "valley" value has been recorded)

- Push the ▼ key for 5s to start the automatic-routine.

4.64 How to start the automatic-routine to display and scrolling in sequence the "diagnostic-data"

(year, month, day and time when each event/alarm occurred)

- Push the ▲ + ✳ keys for 3s to start the automatic-routine.

WARNING: when no-data are recorded in the data-bank, the **message "000"** flashes on the display for 2s.

4.65 How to start the automatic-routine to display in sequence the "previous operating set point" and related data

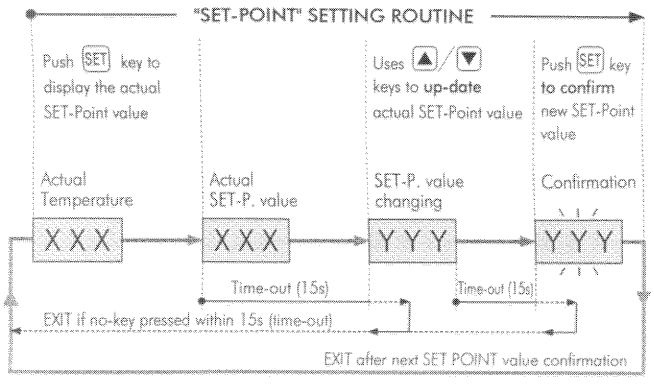
(year, month, day and time when previous set point changing)

- Push the ▲ + ▼ + ✳ keys for 1s to start the automatic-routine.

4.70 SETTING (without password protection)

4.71 How to display and set the "main operating set-point"

- Push the SET key for 1 s ; the main set point is displayed for 15 s.
- To modify the displayed value push the ▲ or ▼ key. When the required value is displayed, push the SET key (before time-out of 15s) to confirm and store the new set point.
- If no-key is pushed within 15 seconds, the controller leaves from the programming phase and it returns automatically to normal operation based on previous set point value (the new one is not - accepted due to EXIT by time-out).

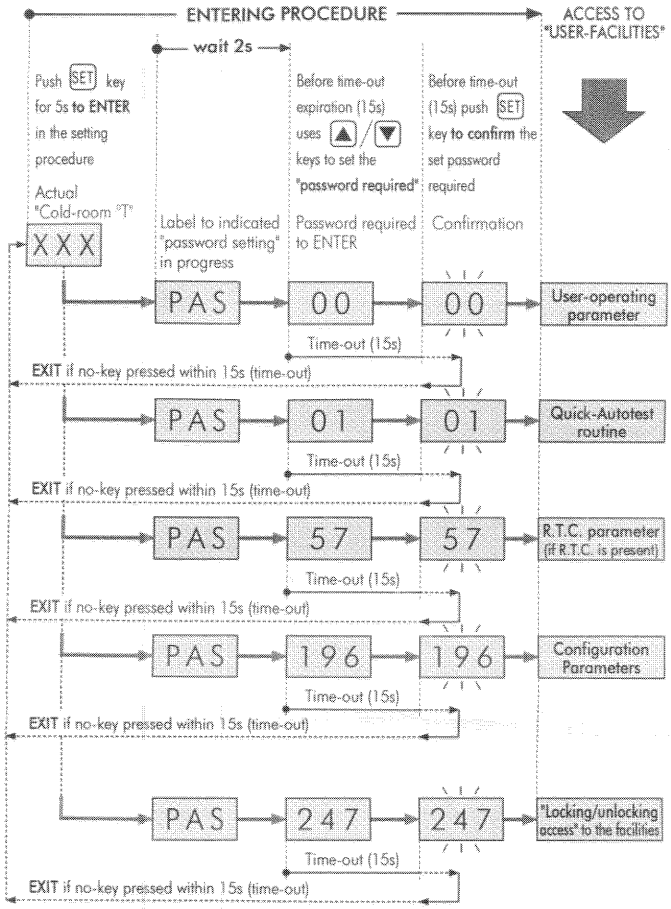


4.80 USER-FACILITIES WITH ACCESS PROTECTED BY "PASSWORD"

4.81 "Entering common procedure" to each user-facility

In each Hdw. model there are some user-facilities which access is protected by "password" in order to avoid possible tampering of Your device by not-authorised/ qualified personnel.

When entering in such facilities is required, we recommend to check carefully the appropriate "password code" following the procedure as indicated in the below flowchart:



4.82 How to enter in the "user-menu" and set the operating parameter

- set the "**password code 00** "following the procedure indicated in the paragraph 4.81 above;
- when the password code "00" is displayed, push SET key to confirm the password and to enter in the "user-menu". The confirmed password "00" blinks for 2s to indicate its confirmation and then the label related to first parameter is displayed for 2s.

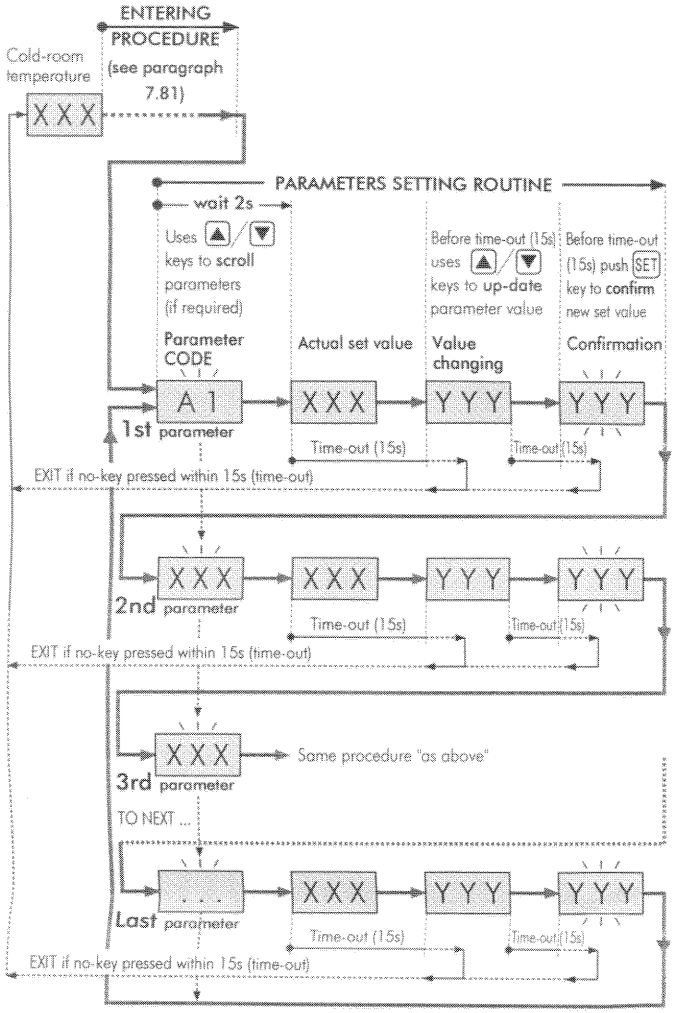
WARNING: if the displayed parameter is not required, uses the ▲ / ▼ keys "to scroll" the operating parameter, until the label/code of the parameter required will be displayed;

- after 2s from "parameter-label displaying", the related set-value appears for at least 15s. (time-out);
- within the time-out expiration (15s), uses ▲ or ▼ keys "to set/modify" the displayed parameter-value;
- within the time-out expiration (15s), push SET "to confirm" the new set-value. The new confirmed value blinks on the display for 2s to indicate its confirmation and storage;
- after new - value confirmation, on the display appears for 2s. the code of the next parameter; afterward the actual value will be displayed. To modify its value follows same procedures as mentioned above.

WARNING: if no-key is pushed within 15s (time-out) the controller leaves the programming - phase and it returns automatically to display the "Process-Variable as during normal operation.

(see " Parameter-Setting Flowchart " on the next page...)

Parameter-Setting Flowchart



4.83 How to enter in the "configuration Menu" and set the related operating parameters

- Set the "**password code 196**" following the procedure indicated in the **paragraph 4.81** above;
- To set the configuration parameters, follows same procedure as indicated in the **paragraph 4.82** above.

4.84 How to enter in the "R.T. Clock Configuration Menu" and set the related operating parameters

- Set the "**password code 57**" following the procedure indicated in the **paragraph 4.81** above;
- To set the configuration parameters, follows same procedure as indicated in the **paragraph 4.82** above.

4.85 How to enter and start the "Quick Autotest routine"

- Set the "**password code 01**" following the procedure indicated in the **paragraph 4.81** above;
- When the appropriate password is confirmed, the quick autotest routine will be performed automatically.

WARNING: for any further details, see next **paragraph 6.00** ("DIAGNOSTICS") and relative routine - flowchart

4.86 How to enter and "look/unlock" the access to the user-facilities above mentioned

- Set the "**password code 247**" following the procedure indicated in the **paragraph 4.81** above;
- When the appropriate password is confirmed, on the display appears the label related to "actual set-configuration" ("**OFF**" if access is locked or "**ON**" if its unlocked);
- Within the time-out expiration (15s) use the ▲ / ▼ key to select "**ON**" label when unlocked access is required, or "**OFF**" label when locked access is required;
- Within the time-out expiration (15s), push the SET key to "confirm" the new set configuration. The new confirmed label (ON or OFF) blinks on the display for 2s to indicate its confirmation and storage.

WARNING: when "OFF configuration" is selected, the access to the user-facilities is locked and this feature could be useful to avoid accidentally possible tampering of Your device by no-authorised or qualified personnel.

4.90 MANUAL OPERATION FROM FRONTAL-KEYPAD

4.91 How to activate "manually" a Defrost-cycle

Any models, except Mod. RC234/B

- Push the ❄ key for 5s.

Only for Mod. RC234/B

- Keep pressed the ▲ key for at least 10s.

WARNING:

A) in all models, when a defrost manual start-up it's not allowed, the **message "000"** flashes on the display for 2s.

B) in all models RC234/B, the ▲ key has a dual-function. Due to such reasons, when a "Defrost MANUAL start-up" it's required, we recommend to keep pressed the ▲ key for at least 10s.

4.92 How to start a "deep-freezing" function

- Push the ▼ + SET keys together for 5 s.

WARNING: when "deep-freezing" function is not allowed (i.e. when defrost is ON), the **message "000"** flashes on the display for 2s.

4.93 How to activate/de-activate "stand-by" operation (energy saving/night set-back)

- Push the ▲ + SET keys together for 5 s.

4.94 How to MUTE the acoustic alarm

*(only for models equipped with a "**built-in buzzer**", see ordering code "94")*

- Push the ▼ key for 5 s.

WARNING: when "MUTE" is entered, the **message "SIL"** flashes on the display for 2s.

4.95 How to "de-energise" the alarm relay output

- push the ▼ key for 5s to MUTE the acoustic alarm (if present) and as well "to enable" the alarm-output de-energising procedure;
- after MUTE the acoustic alarm, push the ▼ key for 5s to de-energise the alarm relay output.
- when "alarm relay" is de-energised manually by frontal keypad, the **message "rLE"** flashes on the display for 2s.

WARNING: after MUTE procedure and relay output de-energisation, both alarm signals are kept in "stand-by" and an alarm-delay starts again if the Cold-room temperature remains outside of the High/low limits allowed. When the alarm - delay is elapsed, if the Cold-room temperature is still outside of the high/low limits, another alarm-signal is generated and in such case both relay and acoustic alarm are turned ON again.

4.96 How to reset the "highest / lowest" process variable reading

- Push the ▲ + ▼ keys for 3s.

WARNING: when "RESET" is performed, the displayed temperature flashes on the display for 2s.

4.97 How to reset the content of the "diagnostic data-bank"

- when the "diagnostic - data routine" is performed and in progress, You may reset all recorded alarms/events from last reset ("Diagnostic Data-Bank) following the procedure indicated below:

when the message "**rES**" on the display, within 10s (time-out), push ▼ key to reset all data stored in the "diagnostic data-bank" from last reset.

WARNING:

A) The reset has no - influence on the main data - bank of the data-logger which data are recorded and held separately in a re-usable E^2 memory;

B) When one or more alarm conditions are present, the "Data-bank RESET" is not-permitted and the label **"000"** flash on the display.

4.98 How to exclude "Manually" the High/Low °T alarm

- Push the ▲ + ▼ + SET keys.
- The message "**ALE**" flashes for 3s on the display to indicate that the High/Low °T alarm is excluded for a period of time as set by user-parameter **F3**.

4.99 How to reset the controller (default-values re-loading)

- Switch OFF your controller.
- Push the [▲] + [▼] + [SET] keys and than switch ON again the power supply. Keeping pressed such keys until the message **"DEF"** will be displayed.
- After power ON, the display shows "- - -" for 3s and than the label **"DEF"** will flashes for 3s when the default values are re-stored in EEPROM.

4.100 How to changeover the auxiliary output

(only for Models equipped with "auxiliary output")

- Push the [AUX] key for 1s to changeover the auxiliary output (ON/OFF manual control).

4.101 How to "switch ON/OFF" your device by frontal keypad

- Push the [0/1] key for 3s.

WARNING: the main ON/OFF switching by frontal keypad it's excluded when configuration parameter **CC1=6** (Remote ON/OFF control).

5.00 OPERATING PARAMETER

5.01 Configuration Parameters-List

CODE	DESCRIPTION	SETTING	SOFTWARE - MASK's				NOTES (common to any models)
			RC231 RC232/1A RC211 RC212/1A RC253	RC232	RC233 RC234 RC213 RC214 RC256	RC234/B	
			With Off-cycle defrost	Without fan-control	Electrical/ Hot-gas defrost	With ON/OFF aux. output	
DEFROST							
CA1	Defrosting mode	**0** = compressor shut-OFF during defrost **1** = hot gas, with compressor forced ON		0	0	0	
CA2	Defrost start-up mode	**0** = by interval time **1** = by real time clock	0	0	0	0	
CA3	Defrost-end mode	**0** = by time **1** = defrost-end based on cold-room °T. when °T. rises at least 3°C above the operating range (SP + differential)	0	0	0	0	
		2 = defrost-end based on evaporator °T.					
CA4	1st defrost after power ON	From 0 to 99 Mins. (when **CA4 = 0**, the 1st defrost will start when the interval time set by parameter **b1** is elapsed)		20	20	20	when **CA3=2**
CA5	Min. time between cooling deactivation (compressor forced OFF) and **"Hot gas"** defrost start-up	From 0 to 20 Mins. (**0 = time excluded**) *NOTE*: set rate must be < than rate set by **b3**		3	3	3	when **CA1=1**
FAN							
Cb1	Fan operating mode during normal operation (fan shut-OFF during defrost)	**0** = fan runs continuously **1** = fan runs in parallel to compressor **2** = fan ON / OFF control based on evaporator "dynamic °T. threshold" set by parameter **C3**			0	0	
DIGITAL INPUT (external contact)							
CC1	Function of digital input # 1	**0** = digital input excluded **1** = alarm signalling **2** = control outputs cut - OFF and alarm signalling **3** = door "Status" recognition (fan cut-OFF and °T. alarm exclusion when door is open) **5** = stand-by BIAS operating mode (energy saving / night set-back) **6** = remote ON / OFF control **7** = remote defrost start-up (by pulse signal / 5 to 30 sec.)	2	2	2	2	
CC2	"Status changing recognition" delay of digital input #1	From 1 to 250 s	30	30	30	30	
READ-OUT							
Cd2	Display up - dating time when °T. increase	0 to 99 sec. (**0 = excluded**)	0	0	0	0	
Cd3	Display up - dating time when °T. decrease	0 to 99 sec. (**0 = excluded**)	0	0	0	0	
Cd4	°T. displaying mode during defrost	**0** = last value detected before defrost start-up **1** = operating set point	0	0	0	0	
Cd5	Lower set point limit	From -55 °C to upper limit (**Cd6**)	-30 °C	-30 °C	-30 °C	-30 °C	
Cd6	Upper set point limit	From 55 °C to lower limit (**Cd5**)	30 °C	30 °C	30 °C	30 °C	
SAFETY							
CE1	Compressor operating mode when door opening	**0** = compressor output forced OFF **1** = NO-influence on the compressor output	0	0	0	0	when **CC1=3**
CE3	Compressor "STATUS" in case of main input fault	**0** = output forced OFF **1** = control output forced ON **2** = control outputs activation / deactivation based on "Emergency routine" and timed-cycle set by parameters **d1** and **d2**	0	0	0	0	

continue.....

CODE	DESCRIPTION	SETTING	SOFTWARE - MASK's				NOTES (common to any models)
			RC231 RC232/1A RC211 RC212/1A RC253	RC232	RC233 RC234 RC213 RC214 RC256	RC234/B	
			With Off-cycle defrost	Without fan-control	Electrical/ Hot-gas defrost	With ON/OFF aux. output	
MONITORING							
CF1	Serial address	0 to 255 (0 = excluded)	0	0	0	0	
CF2	Transmission baud rate	**0** = 2400 **1** = 4800 **2** = 9600 **3** = 19200	2	2	2	2	
DATA LOGGING (only if "Data Logger" is present, see option #74 when ordering)							
CG1	Recording interval time	From 1 to 99 Min.	15	15	15	15	
CG2	"Alarm" Status logging	**0** = none **1** = yes ("dynamic" recording mode when an alarm is recognised)	1	1	1	1	
CG3	"Main events" logging (ON/OFF main switching, door-opening / closing and defrost starting / duration time	**0** = none **1** = yes ("dynamic" recording mode when a main event is recognised)	1	1	1	1	
CG4	Main operating parameter "changing"	**0** = none **1** = yes ("dynamic" recording mode when parameter-value changing)	1	1	1	1	
CG5	°T sensor logging	**1** = Cold-room °T. logging (input 1) **2** = Cold-room °T. (input 1) + input 3 °T. logging **3** = Cold-room + Evaporator °T. logging (input 1 + 2) **4** = both inputs °T. logging (input 1, 2 and 3)	1	1	1	1	
TEMPERATURE INPUT #3 (only if "Analog input #3" is present, see option #3 when ordering)							
CH1	User – selectable "function"	**0** = input excluded **3** = °T. readout only **4** = °T. logging only	0	0	0	0	

CODE	DESCRIPTION	SETTING	SOFTWARE - MASK's				NOTES (common to any models)
			RC231 RC232/1A RC211 RC212/1A RC253	RC232	RC233 RC234 RC213 RC214 RC256	RC234/B	
			With Off-cycle defrost	Without fan-control	Electrical/ Hot-gas defrost	With ON/OFF aux. output	
CONTROL							
A1	Thermostat differential (hysteresis)	From 1 to 20 °C	2	2	2	2	
A2	Anti-short cycling time for compressor safety	From 0 to 20 min.	1	1	1	1	
A3	Set point increasing during stand-by BIAS operation (energy saving / night set - back)	From 0 to 20°C (**0 = excluded**)	5 °C	5 °C	5 °C	5 °C	
A6	Deep – freezing function Max. duration	From 0 to 250 mins.		250	250	250	
DEFROST							
b1	Interval time between 2-defrost cycle	From 0 to 99 Hrs. (**0 = defrost excluded**)	6	6	6	6	when **CA2=0**
b2	Min. differential between cold room °T and evap. °T. for defrost start-up authorisation	From 1 to 20 °C		10 °C	10 °C	10 °C	when **CA3=2**
b3	Defrost Max. duration	From 1 to 99 mins. *NOTE:* set rate must be > than rate set by **CA5**	40	40	40	40	
b4	Defrost-end temperature	From 0 to 50 °C		7 °C	7 °C	7 °C	when **CA3=2**
b5	Ice – dripping time	From 0 to 99 mins.		3	3	3	when **CA3=2**
EVAPORATOR FAN							
C1	Max. delay of fan start-up after power ON	From 0 to 99 mins.			20	20	
C2	Max. delay of fan start-up after defrosting cycle	From 0 to 99 mins.			10	10	
C3	Min. differential between cold-room and evaporator °T. for fan start-up based on "**dynamic °T. threshold**"	From 1°C to 20 °C			5 °C	5 °C	
SAFETY							
d1	Time of compressor ON in case of probe failure (emergency operation)	From 0 to 99 mins. (0=compressor forced OFF)	10	10	10	10	when **CE3=2**
d2	Time of compressor OFF in case of probe failure (emergency operation)	From 1 to 99 mins.	20	20	20	20	when **CE3=2**
READOUT							
E1	Offset on °T. sensor #1 (thermostat / cold room °T. sensor)	From 0 to ± 20°C	0	0	0	0	
E2	Offset related to °T. sensor #2 (evap. °T.)	From 0 to ± 20°C		0	0	0	
E3	Offset related to °T. sensor #3	From 0 to ± 20°C	0	0	0	0	when "**input3**" is present
E4	Max. delay for real - °T. displaying after defrost end	From 0 to 99 mins.	20	20	20	20	
ALARM							
F1	Max. temperature	From 2 to 50 °C above the operating set point	10 °C	10 °C	10 °C	10 °C	
F2	Min. temperature	From 2 to 50 °C below the operating set point	10 °C	10 °C	10 °C	10 °C	
F3	Temperature alarm "manual exclusion" by frontal keypad	From 1 to 250 mins.	120	120	120	120	
F6	Max. time allowed of "door open" and alarm °T. exclusion	From 1 to 99 mins.	20	20	20	20	when **CC1=3**
F7	Max. time allowed of "power failure"	From 1 to 120 mins.	10	10	10	10	
F8	°T. alarm delay after power ON	From 1 to 250 mins.	250	250	250	250	
F9	°T. alarm delay during normal operation	From 1 to 250 mins.	30	30	30	30	
F10	°T. alarm delay after defrost END	From 1 to 250 mins.	60	60	60	60	
F11	°T. alarm delay after door closing	From 1 to 250 mins.	60	60	60	60	when **CC1=3**

*5.03 REAL-TIME CLOCK MENU (only when **RTC** is present and recognised by **Hardware Jumper**)*

CODE	PARAMETER DESCRIPTION	CLOCK SETTING	DEFAULT VALUE			NOTES (common to any models)
			Fully programmable controllers for refrigerated units with "OFF cycle" based defrost	*Fully programmable controllers with for refrigerated units with "Electrical heaters/hot gas" based defrost*		
			RC231 RC232/1A RC211 RC253 RC212/1A	RC232	RC233 RC234 RC213 RC214 RC256 / RC234/B	
CURRENT "REAL TIME-CLOCK" SETTING						
tA1	YEAR setting	0 to 99				
tA2	MONTH setting	1 to 12				
tA3	DAY setting	1 to 31				
tA4	Current DAY of the week	1 to 7 (7 = sunday)				
tA5	Current HOUR setting	0 to 23				
tA6	Current MINUTE setting	0 to 59				
WEEK-DAYS DEFROST (from "Monday to Saturday")						
tb1	Defrost cycle #1 starting-time	00:0 to 23H : 5 (10 mins. resolution / 1-digit = 10 mins)	07:0	07:0		when CA2=1
tb2	Defrost cycle #2 starting-time		13:0	13:0		
tb3	Defrost cycle #3 starting-time		19:0	19:0		
tb4	Defrost cycle #4 starting-time		23:0	23:0		
tb5	Defrost cycle #5 starting-time		00:0	00:0		
tb6	Defrost cycle #6 starting-time		00:0	00:0		
WEEK-END DEFROST (on "SUN" only)						
tc1	Defrost cycle #1 starting-time	00:0 to 23H : 5 (10 mins. resolution / 1-digit = 10 mins)	08:0	08:0		when CA2=1
tc2	Defrost cycle #2 starting-time		14:0	14:0		
tc3	Defrost cycle #3 starting-time		23:0	23:0		
tc4	Defrost cycle #4 starting-time		00:0	00:0		
tc5	Defrost cycle #5 starting-time		00:0	00:0		
tc6	Defrost cycle #6 starting-time		00:0	00:0		
WEEK-DAYS ENERGY SAVING						
td1	Daily starting-time of stand-by BIAS operation (energy saving / night set-back)	00:0 to 23H : 5 (10 mins. resolution / 1-digit = 10 mins)	20:0	20:0		
td2	Stand-by BIAS duration	0 to 99 Hours	8	8		
WEEK-END ENERGY SAVING						
tE1	Stand-by BIAS operations starting-time on Sunday (energy saving / night set-back)	00:0 to 23H : 5 (10 mins. resolution / 1-digit = 10 mins)	05:0	05:0		
tE2	Stand-by BIAS duration	0 to 99 Hours	24	24		

WARNING:

1. When configuration parameter **tb1 ÷ tb6**, **tc1 ÷ tc6**, **td1** and **tE1** are set to **"00:0"** (or **td2 / tE2 = 0**), the related function is excluded;

2. When "AUTOMATIC stand-by" BIAS operation is ON (energy saving based on Real Time Clock) the manual control by frontal keypad or digital input (when config. parameter **CC1=5**) are always excluded.

6.00 DIAGNOSTIC

6.10 TROUBLES-SHOOTING

DISPLAY MESSAGE	EVENT TYPE (cause)	OUTPUTS - STATUS/OPERATION	RESET MODE		
			Visual Alarm Reset (displayed message)	Alarm MUTE (if acoustic alarm is present)	Alarm Ouput "de-energyzing" (if present)
EVENTS DISPLATING ONLY					
HI	" °T. Pre-alarm " condition • Cold-room °T. is "**higher**" than value set by parameter **F1**	• No-influence on the control outputs • No-influence on the alarm outputs • alarm message is displayed every 5s (after the P.V) and the related label "**flashes**" for 3s	"Pre alarm" message disappears when the "Cold-room °T." drops and returns within "**normal operating - band**"		
LO	" °T. Pre-alarm " condition • Cold-room °T. is "**lower**" than value set by parameter **F2**	• No-influence on the control outputs • No-influence on the alarm outputs • alarm message is displayed every 5s (after the P.V) and the related label "**flashes**" for 3s	"Pre alarm" message disappears when the "Cold-room °T." risess and returns within "**normal operating - band**"		
ALARM-MESSAGE DISPLAYING AND HOLD IN "DIAGNOSTIC DATA BANK"					
EEE	Memory data losses	• alarm - LED 1 **"is ON"** (if present) • alarm message is displayed every 5s (after the P.V) and the related label "**flashes**" for 3s • alarm output is ON • control outputs forced OFF	• automatic reset when "**setting - parameter procedure**" start/when a new set value is confirmed • automatic-reset when "**DEFAULT values up-loading**" at power ON by means of frontal keypad	• automatic reset when "**setting - parameter procedure**" start/when a new set value is confirmed • automatic-reset when "**DEFAULT values up-loading**" at power ON by means of frontal keypad	• automatic reset when "**setting - parameter procedure**" start/when a new set value is confirmed • automatic-reset when "**DEFAULT values up-loading**" at power ON by means of frontal keypad
HIA	**HIGH TEMPERATURE ALARM** • The Cold-room °T. is higher than "**High alarm limit**" (set by parameter F1) *for a time longer than* Max. time allowed set by parameter **F9**	• alarm message is displayed every 5s (after the P.V) and the related label "**flashes**" for 3s • alarm output is ON • no-influence on the control outputs	• "Alarm message" disappears when the "Cold-room °T." drops and returns within "**normal operating - band**"	• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad	• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad (after "MUTE" of acoustic alarm)
LOA	**LOW TEMPERATURE ALARM** • The Cold-room °T. is lower than "**Low alarm limit**" (set by parameter F2) for a time longer than Max. time allowed set by parameter **F9**	• alarm message is displayed every 5s (after the P.V) and the related label "**flashes**" for 3s • alarm output is ON • no-influence on the control outputs	• "Alarm message" disappears when the "Cold-room °T." rises and returns within "**normal operating - band**"	• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad	• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad (after "MUTE" of acoustic alarm)
PF1	"**Analog input 1/main °T. sensor failure**" (cold-room °T. sensor)	• alarm message "flashes" • Alarm output is ON • Compressor output control based on "**emergency routine**" (according to setting of parameter **CE3**) • no-influence on the other control outputs	• "Alarm message" disappears when the failure / event disappears	• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad	• Automatic reset when the "**alarm-/event**" disappears
PF2	"**Analog input 2/ °T. sensor 2 failure**" (evaporator temperature)	• alarm message is displayed every 5s (after the P.V.) and the related label "**flashes**" for 3s • alarm output is ON • no-influence on the control outputs • defrost termination when "Max defrost duration" set by parameter "**b3**" is elapsed (time-out) • fan start-up after defrost-end when "Max. fan delay" set by parameter **C2** is elapsed (time-out)	• "Alarm message" disappears when the failure / event disappears	• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad	• Automatic reset when the "**alarm-/event**" disappears

continue.....

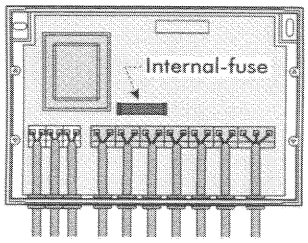
PF3	"Analog input 3" failure (input circuitry or "sensor 3" fails)	**IF "PARAMETER CH1=3"** (°T. readout based on analog input 3) • alarm - LED 1 "**is ON**" (if present) • °T. "**sensor 3**" is excluded • read-out changeover from °T. reading by "**sensor 3**" to "**sensor 1**" (Cold-room °T.) • no-influence on the control outputs **IF "PARAMETER CH1=4"** (°T. logging based on analog input 3) • alarm - LED 1 "**is ON**" (if present) • °T. logging function by sensor # 3 is excluded • When the event / sensor - failure is recognised, the "**temperature logging stop**" and the event - data are recorded at every sampling - time until the failure disappears • the Data - logger continuous recording any other alarm/events according to configuration-parameters **CG1**, **CG2**, **CG3**, **CG4** and **CG5** • no influence on the control output • alarm output is ON	• "Alarm message" disappears when the failure / event disappears	• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad	• Automatic reset when the "**alarm-/event**" disappears
FUL	**Full "Data-Bank" capacity**	**Only when Data-Logger is present** (see option 74Y) • Alarm - LED 1 "**is ON**" (if present) • Data-Logger remains in "**Stand-by**", until data-downloading procedure is performed • Date, month and time when "data-logger stop" are recorded in the main Data-Bank, together with the related alarm label • Alarm output is ON • No-influence on the control outputs	• "Alarm message" disappears when the data-downloading procedure is performed regulary	• "Alarm message" disappears when the data-downloading procedure is performed regulary • Manual reset by frontal keypad	• "Alarm message" disappears when the data-downloading procedure is performed regulary • Manual reset by frontal keypad (after "MUTE" of acoustic alarm)
ALARM-MESSAGES HOLD IN THE "DIAGNOSTIC DATA-BANK"					
A3	**The "deep-freezing" function is not completed** • A power-failure occurred before expiration of "timed – cycle" set by parameter **A6**	**When "Product temperature reading" is excluded (see configuration parameter CH1 = 0, 3 or 4)** • no - influence on the control output • no - influence on the alarm output		• automatic reset after "**time - out**" of 1-hours from power ON • manual reset by frontal keypad	
A4	**Too - long defrost cycle -duration** (or wrong parameters setting) • The defrost - cycle is terminated by "**time-out**" (when safety-time set by parameter **b3** is elapsed), instead to terminate by evaporator °T. as during normal operation	**Only when "defrost -end" based on evaporator temperature is selected** (see parameter **CA3= 2**) • no - influence on the control output • no - influence on the alarm output			
A5	**General alarm** • The ext. contact (related to digital input) is "**open**" for a time longer than Max. rate allowed set by parameter **CC2** and an alarm signal is generated	**If "config. parameter " CC1=1** • no - influence on the control output • no - influence on the alarm output		• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad	
A6	**Main general alarm** • The ext. contact (related to digital input) is "**open**" for a time longer than Max. rate allowed set by parameter **CC2** and an alarm signal is generated	**If "config. parameter " CC1=2** • Control outputs forced OFF • Alarm output is ON		• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad	• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad (after "MUTE" of acoustic alarm)
A7	**Too - long time door - opening** • The ext,. door - switch (related to digital - input) is "**open**" for a time longer than Max. rate allowed set by parameter **F6** and an alarm signal is generated.	**If "config. parameter " CC1=3** • alarm output is ON • fan is forced OFF • compressor operating - mode according to set config. parameter **CE1** • no - influence on the other control outputs • °T. alarm is excluded for a delay-time set by parameter **F11**		• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad	• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad (after "MUTE" of acoustic alarm)

A9	"Too - long "power failure • A power failure duration "longer" than the max. time allowed set by parameter **F7** has been recognised	**When defrosting cycle is ON and "parameter CA3=0"** (defrost-end by time) • if the power failure event duration is longer than time set by parameter **b3** (max. defrost duration), the previous defrost cycle is considered terminate regularly; • if the defrost elapsed time + power failure duration time is less than time set by parameter **b3** (max. defrost duration), after power ON a defrost cycle will be performed for the "**time missing**"; • this alarm has no-influence on the control and alarm outs. **When defrost cycle is ON and "parameter CA3=1**(defrost-end based on room-temperature) • if after power-ON the room-temperature is higher than "**set point + differential + 3°C**" (or than 7°C "absolute rate"), the previous defrost cycle is considered terminate regularly; • if after power-ON the room-temperature is still lower than "**set point + differential + 3°C**", (or than 7°C absolute rate), a defrost will be performed; • this alarm has no-influence on the control and alarm outs. **When defrost cycle is ON and "parameter CA3=2"** (defrost-end based on evaporator temperature) • if after power-ON the evap. temperature "**is higher**" than the value set by par. **b4** (defrost-end °T.), the previous defrost cycle is considered performed regularly and a new defrost will be performed regularly at the time - scheduled; • if after power-ON the evaporator temperature is still lower than differential-value set by parameter **b2** (Min. differential between cold-room °T. and evp.°T.) a defrost cycle will be performed after the delay set by par. **CA4;** • this alarm has no-influence on the control and alarm outs.			
A10	"Real - time Clock "Failure (or R.T.C. data - losses)	**ENERGY SAVING OPERATING MODE (when R.T.C fails)** • No - influence on the control output • alarm output is ON • R.T. Clock parameters Menù is excluded • R. T. C. operation is excluded • Power - Failure logging is excluded • "**automatic**" stand-by BIAS operation is excluded (energy saving / nigh set back) The "Energy Saving Cycle" (night set back) may be activated / de - activated manually by frontal keypad or by digital input when configuration parameter **CC1=5** **If configuration parameter CA2 = 1** (defrost start-up based on R.T. Clock) • No - influence on the control output • alarm output is ON • "**Daily/week-end**" defrost starting-time management by R. T. Clock is excluded. When such event occurs, the defrost start-up mode change over automatically from **R. T. Clock** to "**interval time**" as set by parameter **b1**.		• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad	• Automatic reset when the "**alarm-/event**" disappears • manual reset by frontal keypad (after "MUTE" of acoustic alarm)

6.20 THE DEVICE REMAINS "OFF"

(only for "wall mounting" executions, see Mod. **RC254** and **RC256**)

When you try to switch-ON your wall mounting controller Mod. RC254 or RC256, but without success, we recommend first of all to check carefully the "internal fuse" fitted on the P.C.B. as indicated in the diagram below.



If an overload occured in the power supply circuitry and if the "internal fuse blown", remplave it with another equivalent one, following the procedure as indicated in the previous paragraph **2.33**.

WARNING: we recommend to use only standard fuse - 1A Max, "5x20 type".

6.30 THE "MESSAGE OFF" IS DISPLAYED

(only for "wall mounting" executions, see Mod. **RC254** and **RC256**)

- When "**OFF-message**" is displayed, your controller is switched OFF.
- To switch-ON again your controller, follows the procedure indicated in the previous paragraph **4.101**.

7.00 CALIBRATION

Each controller is automatically calibrated by means of computer before leaving the "SMART system" factory. If displayed value is incorrect check the connections and the wiring of the probe, especially when the cables junctions are present. If it's impossible to remove the cause of error, set through the specific parameter "offset" the value to add or subtract from the reading to reach the correct displayed value.

7.10 ANALOG INPUTS "OFFSET"

A possible "readout error" may be compensated by the operator through a specific parameter (see operating parameter menu).

HOW TO PROCEED: compare the temperature detected near to the sensor 1, 2 or 3 (if presents) with the "related value displayed". If the temperature detected near to the sensor 1, 2 or 3 (if presents) is **lower** than the one displayed, set a "negative offset" (as the difference between the two values) by means of the related parameter **E1**, **E2** or **E3**. If the measured value is **higher** than the one displayed, set a "positive offset" (as the difference between the two values) by means of the related parameter **E1**, **E2** or **E3**.

WARNING: we recommend to take into consideration that any possible additional resistance of leads cable (e.g. due to length variation) may cause error in accuracy.

8.00 MAINTENANCE

8.10 CLEANING

Clean the face of the controller with a soft cloth and soapy water. Do not use benzene, thinner or abrasive detergent. Do not hose down the controller or use hot caustic solutions. The controller is dust and drip proof and meets IEC IP54 standards but is not intended to be hosed down. Also, clean any dust that may be present around the controller in order to avoid that this dust may find it's way inside the controller enclosure and potentially short-circuits may occurs.

Periodically check all connections made to the controller; make also sure that all connections are secure and that all wires are in good condition. Make sure the terminals are clean and free from any particles which could potentially short terminals. Check for wire fraying at the terminals which could also cause short-circuit.

8.20 REFURBISHING

The controller can be furbished to like a new condition. Enclosures and faceplates can be changed by authorised repair persons at authorised repair centres. Do not bang or scratch the case. Take particularly good care of the faceplate. Do not scratch it or operate the front panel keys with sharp objects such as pencils and instruments screwdrivers which can puncture.

8.30 REPAIRING

All repairs must be made by authorised repair persons at authorised centres. If the controller is opened and tempered with in any manner, the warranty is void. All warranty repair determinations have to be made by authorised repair person after inspection of the controller. All repair work and cost for both warranty and no-warranty repairs will be explained and given before the repairing start-up. For any assistance, please contact the nearest "SMART system" centre.

IMPORTANT

SMART system's *products are not authorised for use as critical components in life support devices or systems without the express written approval of the president of* **"SMART system srl"**. *The* **"SMART system srl"** *reserves all rights to modify the characteristics of its instruments, to discontinue the production of any model, as well as to change the prices at any time without previous notification.*

SMART system s.r.l.
Via XXV Aprile, 13
33070 Maron di Brugnera (PN) - Italy
C.F. e P.IVA 03646160261
Tel. (++39) 0434 613658 • Fax (++39) 0434 613227
www.smartsystem.it • E-mail: info@smartsystem.it