

# ECO 6

## USER AND INSTALLATION MANUAL

HIGH PERFORMANCE CONTROLLER FOR  
STATIC AND VENTILATED REFRIGERATORS  
RANGE [-30°C - +10°C]

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## 1.0 SAFETY

Keep this book in a place easy to consult.

Do not power the controller before and during any mechanical or electrical intervention. Inside there are parts under high voltage that may persist after disconnecting the device from the mains.

There are no parts inside the controller that can be used by the user.

ATEX controllers do not provide for any protection of the loads connected, therefore they must be protected against short circuits, overcurrents or overvoltages and in temperature with the use of protective devices suitable for the purpose such as fuses, magnetothermal switches, etc.

Failure to comply with safety standards during installation, such as failure to observe the instructions in this instruction manual, could reduce the safety level of our controllers.

ATEX controllers have a degree of immunity to electromagnetic disturbances in compliance with EEC directives. To reduce the causes of radiated or conducted type disturbances that could propagate through the probes, the loads and the power supply of the controller, cabling the wires avoiding their passage adjacent to high current loads or electromagnetic fields.

If temperature probes are in contact with food substances, verify that these comply with the health regulations for use in the food sector.

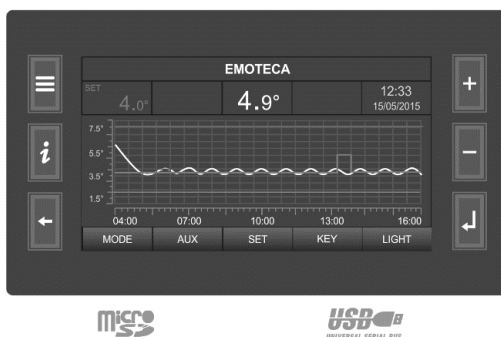
In the event that the controllers are used in equipment in which a malfunction could result in a risk situation for people or animals, adequate safety systems must necessarily be provided that enter into operation automatically in the event of malfunctioning.

## 2.0 DISPLAY PANEL OPTIONS

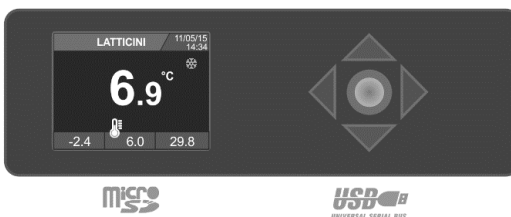
**D4**  
7"



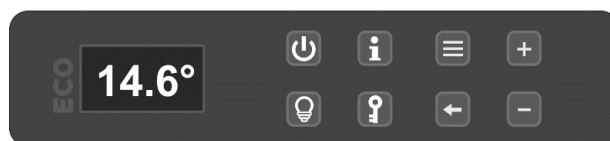
**D3**  
5"



**D2**  
2.4"



**D1**  
128x64



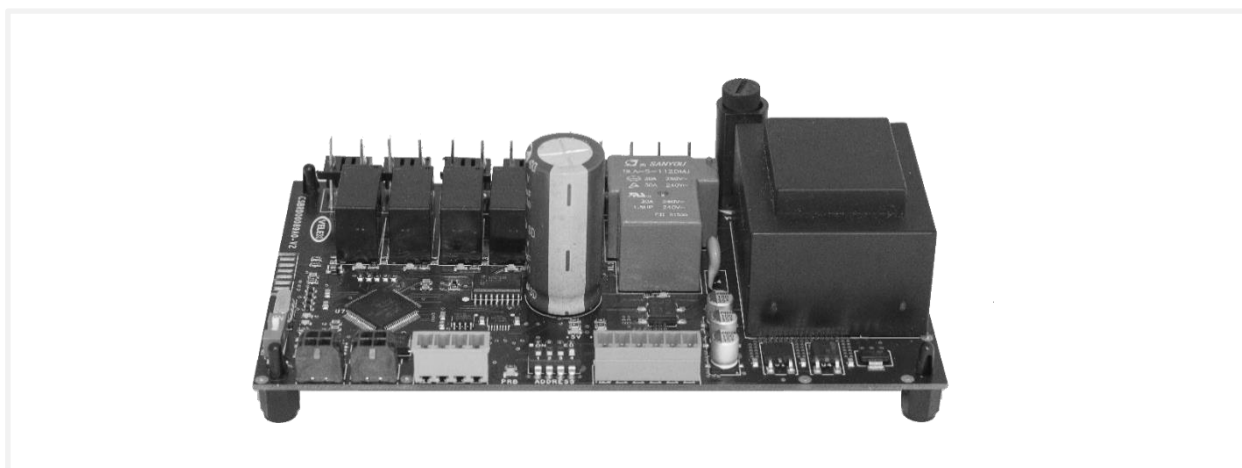
**FLEX**



### 3.0 TECHNICAL FEATURES

ECO 6 CONTROLLER	
Power Supply	230Vac – 50/60Hz
Dimensions	L156 x W87 x H38mm
Logic	Microcontroller
Inputs	N°3 NTC [-49.9, +99.9]°C N°2 door switch and high pressure switch
Relay outputs	30A-5A-5A-5A-5A-5A
Gates	Nr 2 CANBUS
Sensors	Power Supply Board Temperature

#### ECO 6 CONTROLLER

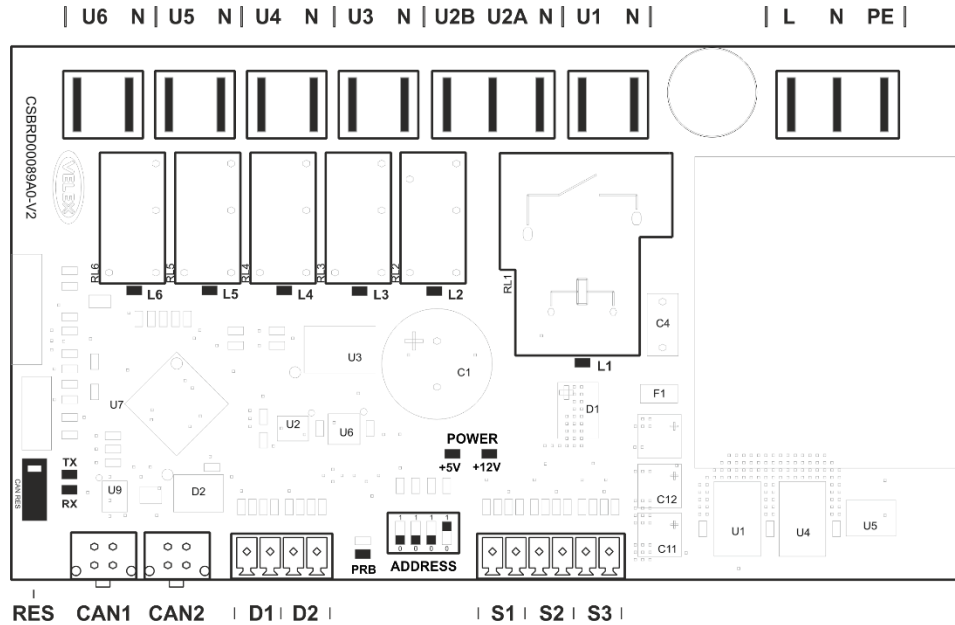


#### ORDER CODES:

**BT92204100** [WITHOUT HOUSING]

**BT92204000** [WITH 9 DIN MODULE HOUSING]

### 3.1 BOARD LAYOUT



#### 3.11 ADDRESS SETTINGS



one board: set address **1**



dual board: set address **3**

#### 3.12 CANBUS TERMINATION RESISTOR

- **CAN RES** one board: **switch 0**
- **CAN RES** dual board: **switch 1**

#### NOTES

The U1-U6 relay outputs are configurable

### 3.2 MONITORING LEDs

#### 3.2.1 OUTPUTS LED [ L1 ... L6 ]

Each active relay output is indicated by a red LED.

#### 3.2.2 PROBES CHECK

PRB > probe inputs

- **Regular status:** the LED lights up every 3 seconds
- **Fail status:** LED is on

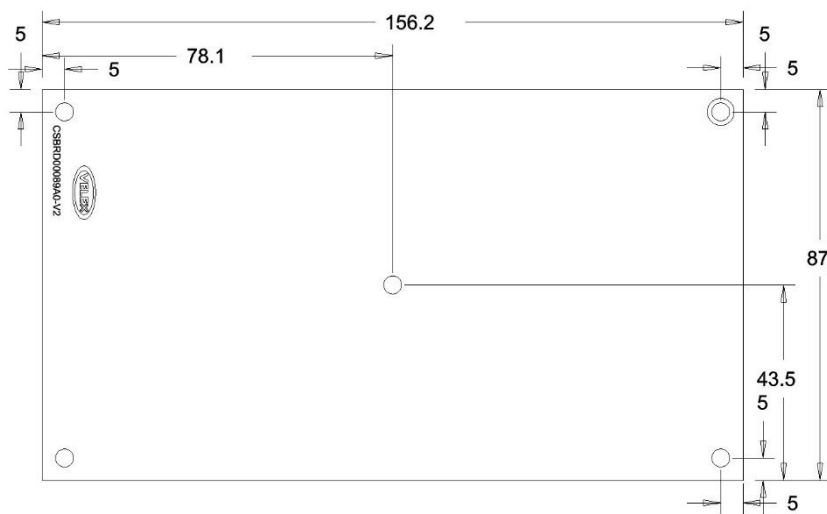
#### 3.2.3 POER SUPPLY LED

Green and yellow leds indicate the presence of +12V e +3V power supply

#### 3.2.4 COMUNICATION LED

For each CANBUS port, the reception and transmission status is indicated by a pair of LEDs.

### 3.3 DRILL MAP



## 4.0 INSTALLATION

### 4.1 DISPLAY PANEL

The size of the drilling template for the insertion of the display frame varies according to the size of the selected panel (see reference manuals). The electrical connection between the panel and the controller must only be carried out using the 4-pin serial cable provided by ATEX. The display panel must be mounted in a position that is not subjected to shocks, vibrations, splashes of water and in any case where the temperature and humidity do not exceed the specification values.

### 4.2 ECO 6 CONTROLLER BOARD

The controller must be powered at 230Vac. When inserting fastons or connectors, do not bend the printed circuit board which could damage or break components. Switch on the power supply for 230 / 110Vac loads on N = neutral, L = line and PE = ground respecting the positions. The pins of the connectors marked N are in parallel with each other. The U1-U2-U3-U4-U5-U6 pins report the input phase when the respective relays are enabled. Using the RL1 - RL6 parameters, the outputs can be configured according to the required action described in the table on page 9. The board can be fastened using plastic spacers or using the fixing hooks using the 9 DIN modules support that can be supplied on request.

#### 4.2.1 I/O FLYING CONNECTORS

CODE	TYPE	APPLICATION
BT92007012	CONN. CPM 4P 3P81 USCITA CAVO 90°	DIGITAL INPUTS
BT92007013	CONN. CPM 6P 3P81 USCITA CAVO 90°	NTC PROBES



### 4.3 COMPATIBILITY TOWARDS ATEX TESTING SYSTEMS

The TOP\_FOOD controller board installed on the refrigerating unit and connected to ATEX test systems via CANBUS allows direct load control and parameter configuration.



## 4.4 ANALOG AND DIGITAL INPUTS

### 4.41 THERMOSTAT PROBE S1

Install the NTC thermostat probe in a position not subjected to airflows in order to be able to measure the actual temperature of the refrigerated compartment. The NTC probe is enabled by IS1 parameter; to connect the NTC probe to the board use a 6-pin male connector, 3.81 step. OF1 parameter is dedicated to the calibration of the S1 thermostat probe.

### 4.42 EVAPORATOR PROBE S2

Position the defrost-end evaporator probe between the lamellar pack fins in order to obtain a sufficient temperature detection sensitivity. For refrigerating units with electric defrosting, the probe must be positioned at the beginning of the circuit and locked in contact with the evaporator pack tube by bending the aluminum slats around the probe bulb. For the groups with hot gas defrost the probe must be positioned at the outlet of the circuit and locked in contact with the evaporator pack pipe. To connect the NTC probe to the board use a 6-pin male connector, 3.81 step. OF2 parameter is dedicated to the calibration of the S2 evaporator probe.

### 4.43 CONDENSER PROBE S3

Fix the condenser probe with a clamp on the condenser outlet tube. To connect the NTC probe to the board use a 6-pin male connector, 3.81 step. OF3 parameter is dedicated to the calibration of the S3 condenser probe.

### 4.44 DOOR SWITCH DIGITAL INPUT D1

The digital input D1 is dedicated to the micro-switch door, observing the configurable contact n.o. or n.c.. To connect the micro-switch cables to the board, use a 2-pin or 4-pin male connector, 3.81 step.

### 4.45 DIGITAL INPUT D2

The digital input D2 is dedicated to the high pressure switch, observing the configurable contact n.o. or n.c... To connect the pressure switch cables to the board, use a 2-pin or 4-pin male connector, 3.81 step.

#### 4.5 RELAY OUTPUTS U1-U2-U3-U4-U5-U6

Actions of the relay outputs can be configured through the parameters RL1-RL7 with reference to the values shown in the following table and respecting the maximum current admitted on each output.

ACTION	ID
COOLING	01
DEFROST	02
EVAPORATOR FAN	03
CONDENSER FAN	04
LIGHT	05
HEATING	06
DOOR RESISTOR	07
WATER DRAIN	08
REMOTE ALARM N.C. NOT SILACYABLE	09
REMOTE ALARM N.C. SILACYABLE	10
REMOTE ALARM N.O. NOT SILACYABLE	11
REMOTE ALARM N.O. SILACYABLE	12
DELAYED COMPRESSOR	13
DEFROST_2	14
DEFROST VALVE	21
DRYING RESISTOR	22
SWIVEL PLATE	23
ACTIVE LOAD	24
DEFROST VALVE ACCORDING TO COMPRESSOR	25
RECIRCULATION FAN (only with FLEX panel)	36

## 5.0 COOLING [01]

### 5.1 THERMOSTATING

It is the main operating mode for maintaining the coldroom temperature at the set set. The regulation is of the upper and lower band type with reference to the set and to the HYH and HYL regulation differentials with reference to the relay configured with action 01. The compressor stop will occur when the value measured by the probe S1 has reached the value  $[SPU - HYL]^{\circ}C$  and time DAC expired. The compressor will restart when the value measured by probe S1 has reached the value  $[SPU + HYH]^{\circ}C$ . The ADL parameter prevents close starts of the compressor during the thermostatic cycles. The parameter ASS defines the starting delay time of the compressor at start-up. For  $HYH = 0$  the controller actions are stopped

#### 5.11 PCOMPRESSOR PERCENT USAGE

The hourly compressor operating time percentage is calculated from the pull-down and recovery phases after defrost. The value is stored in volatile memory so that a shutdown of the controller will reset the value.

#### 5.12 COMPRESSOR HOURS COUNTER

The compressor operating hours with hourly resolution are stored. The data is converted and displayed on the display in working hours.

#### 5.13 WARNING COMPRESSOR USAGE

If the compressor operating percentage calculated within 24 hours exceeds the value defined by the CPH parameter, the COMPRESSOR USE warning is shown on the display; the event is not recorded and the adjustment does not change. The cancellation of the message coincides with the silence of the buzzer.

## 5.2 ACTIONS IN THERMOSTAT PROBE FAILURE

### 5.21 TIMED ADJUSTMENT

This is the criterion used in case the failure of the thermostat probe S1 occurs before the calculation of the average compressor operating times; therefore the times refer to the parameters CON (compressor switch-on minutes) and COF (compressor pause minutes). In this temporary operating mode the set temperature can not be controlled with the required accuracy.

### 5.22 WEIGHT ADJUSTMENT

This is the criterion used when the failure of the thermostat probe S1 occurs when the evaporator calibration data are not yet available. The temperature is controlled with the average compressor switch-on and switch-off times previously calculated. In this condition the maintenance of the temperature is sufficiently assured if the conditions of loading, of ambient temperature do not change and frequent door openings do not intervene.

### 5.23 ADJUSTMENT WITH EVAPORATOR PROBE

This is the criterion used in case the failure of the thermostat probe S1 occurs in the presence of the calibration data. Temperature control is transferred to the evaporator probe ensuring that the setpoint temperature is maintained even in case of door openings or load changes.

## 6.0 DEFROST [02]

### 6.1 DEFROST MODE

The controller manages several defrost types according to the DOP parameter with reference to the relay configured with action 02: defrost by stop, electric defrost, hot gas defrost.

#### 6.11 COMPRESSOR STOP

The defrost by stop forces the shutdown of the compressor and activates the evaporator fans until the end defrost conditions are reached; this configuration usually does not require the use of the evaporator probe and the term occurs with reference to the DT1 time. From the keyboard it is possible to interrupt the action in progress when the defrost is started manually.

#### 6.12 ELECTRIC DEFROST

The electric defrost switches off the compressor by activating the defrosting resistance until the condition  $S2 > DTE$  is reached or the DTO time has elapsed. From the keyboard it is possible to interrupt the action in progress when the defrost is started manually.

#### 6.13 HOT GAS

The hot gas defrost turns the compressor on and activates the solenoid valve until the condition  $S2 > DTE$  is reached or the DTO time has elapsed. From the keyboard it is possible to interrupt the action in progress when the defrost is started manually.

### 6.2 ACTIVATION

Defrosts can be started immediately or at the end of the cycle; in the latter condition, if the compressor cycle does not end within 15 minutes from the request, defrosting is always started, provided that the condition  $S2 < DTE$  is verified.

#### INHIBITIONS

A defrost request, with the exception of the defrost protection, is denied if, in at least one of the last three cycles of thermostat control of the machine, the condition  $S2 > [DTE + 1] ^\circ C$  has occurred. This in order to inhibit defrosting almost useless because in such conditions the evaporator can not be packaged with ice.

The criterion is enabled if the conditions are met:

- Evaporator probe S2 present and not faulty
- reached the first setpoint from the start

Instead it is disabled in configuration with double defrost.

## 6.21 MANUAL

Manual defrosts can be activated from the keypad on the appropriate menu.

## 6.22 TIMER

Defrosts occur every ITD hours of operation. The start of the defrost can take place immediately or at the end of the compressor cycle according with the DOP superparameter.

## 6.23 COMPRESSOR HOURS

Defrosts occur every ITD hours of compressor run. The start of the defrost can take place immediately or at the end of the compressor cycle.

## 6.24 REAL TIME CLOCK

The time defrosts can be at most four starting at SD1, SD2, SD3 SD4. The start of the defrost can take place immediately or at the end of the compressor cycle coherently according with the settings.

## 6.25 OFF & CLEAN

Energy defrost with end defrost temperature increased by +5°C compared to the ordinary one and activated by the Off & Clean function when the cooling unit is switched off.

## 6.26 AUTOMATIC

The Automatic Defrosting algorithm is a system for detecting the presence of frost on the evaporator. The use of automatic defrosting requires the presence of two temperature probes: thermostat probe and one in contact with the evaporator. Switch door installed is recommended.

### 6.261 ICE DETECTION SENSITIVITY

The parameter SDT represents the sensitivity for the detection of ice on the lamellar pack and the consequent start of defrosting:

Recommended values:

- SDT = 1.5 for low-temperature refrigerators
- SDT = 1.1 for positive temperature refrigerators

In any case, we recommend testing the equipment to correctly set the ice sensitivity.

### 6.262 PROTECTION

For situations of a particularly packaged evaporator, for example due to repeated door openings, a protective defrost was started

## 6.27 LOW EVAPORATION

See par 7.4

### 6.3 EVAPORATOR FAN ACTION DURING DEFROST

The following modes refer to the FOP parameter:

- **Forced on:** indicated for defrost at compressor stop
- **Forced off:** indicated for all other types of defrost
- **Modulated by FSD:** for all types of defrost, excluding defrost by compressor stop, where a better defrosting efficiency is required.

In this case the evaporator fans will follow the following criteria based on the FOP parameter:

Absolute fan set: Fan OFF:  $S2 \geq FSD$ ; Fan ON:  $S2 < FSD - HFF$

Setpoint fan setpoint: Fan OFF:  $S2 \geq SPU + FSD$ ; Fan ON:  $S2 < SPU + FSD - HFF$

### 6.4 CONDENSER FAN ACTION DURING DEFROST

According to the FOP parameter the condenser fans can be forced **on**, **off** or **modulated** with reference to the FCE parameter. In this case the condenser fans during defrosting follow the following rule:

**Fan OFF:**  $S3 \leq FCE$ ;      **Fan ON:**  $S3 > FCE + HYF$

### 6.5 DEFROST END

When the temperature DE1, read by evaporator probe, is reached the controller ends the defrost phase. From this moment the controller activates or not the dripping phase according to the value of DRP parameter: DRP = 0 implies the jump of dripping phase DRP > 0 implies its execution for DRP seconds. Once the dripping phase is completed, the compressor is enabled. The evaporator fans will start when the S2 probe is lower than the temperature defined by the FAS parameter in order not to introduce hot air into the coldroom. If the probe S2 is not installed or faulty, the evaporator fans will start after FAD seconds from the compressor start.

#### 6.5.1 DOUBLE EVAPORATOR PROBE

In refrigeration cabinets with double evaporator probe installed, the defrosting term occurs when both probes have reached the defrost temperature end defined by DE1 parameter. For this condition the S3 NTC input must be configured as the second evaporator probe. The management of dripping and protection time-out follows the previous criteria specified.

### 6.6 TIME-OUT DEFROSTING

If defrost temperature end DE1 is not reached by S2 probe in DT1 minutes, a warning is given on the display and the event is recorded in Fault List. If the probe S2 is not installed, the DT1 value represents the defrost end time.

## 6.7 DEFROST IN PULL DOWN

If the PDD parameter is set higher than 0, the defrost start when the temperature has reached (SPU-PDD)°C.

## 6.8 DEFROST 2 [14]

In refrigerators with a double evaporator (ice cream display cabinets) the defrosts on the first and second evaporator must be managed separately according to the specified methods. Input S3 NTC can therefore be configured as a second evaporator probe (IS1 superparameter) which detects the start defrost 2 only if temperature  $S3 < DE2$  and ends defrosting for  $S3 \geq DE2$ . DT2 parameter defines the time-out defrost of the 2nd evaporator, after which the defrost action 2 ends even if  $S3 \leq DE2$  with sending the relative fault status. In case of probe S3 disabled or faulty, the duration of the second defrost is DT2 minutes; dripping time is decreased by the end of the most long-lasting defrost or, in the case of defrost in cascade, the dripping time of the 2nd defrost is equal to the first with independent timer. The DRE parameter (0-10) defines the start defrost mode 2 in the following three cases:

### 6.81 IN MAIN DEFROST CASCADE

Set DRE=0: the defrost on the 2nd evaporator starts at the end of the first defrost. The term means the closure of the action 2 without waiting for the dripping time to expire.

### 6.82 SYNCHRONOUS TO THE FIRST DEFROST (EVERY DEFROST)

Set DRE=1: at each defrost request, both the defrost on the first evaporator and on the 2nd evaporator are activated. In the configuration with hot gas defrost the first defrost remains active as long as the second one is not finished. In the configuration with electric defrost the first defrost closes when the DE1 evaporator temperature is reached or when maximum DT1 time is reached, regardless of the status of the 2nd defrost.

### 6.83 SYNCHRONOUS AT THE FIRST DEFROSTING AFTER MAIN DEFROSTS

Set DRE>0: in this condition the DRE parameter defines how many main defrosts the secondary one takes which starts synchronously with the first one. In the configuration with hot gas defrost the first defrost remains active as long as the second one is not finished. In the configuration with hot gas defrost the first defrost remains active as long as the second one is not finished. In the configuration with electric defrost the first defrost closes when the DE1 evaporator temperature is reached or when maximum DT1 time is reached, regardless of the status of the second defrost.



## 6.9 THERMAL PROTECTION

### 6.91 CRITERION

Thermal protection is enabled if the following conditions are met:

- Function enabled by the OS1 parameter weight 32
- S1 and S2 probes present and not faulty
- S2 probe configured as evaporator probe
- U2 relay configured with defrost action [02]
- Reached the first setpoint from the power-on

### 6.92 DESCRIPTION OF THE CRITERION

If the following conditions are detected during operation:

- $[S2-S1] > 25^{\circ}\text{C}$  with  $\text{SPU} \geq 0^{\circ}\text{C}$
- $[S2-S1] > 50^{\circ}\text{C}$  with  $\text{SPU} < 0^{\circ}\text{C}$

the THERMAL PROTECTION WARNING is generated and the controller operation changes according to the type of defrost. If, with warning of active thermal protection and forced compressor on (in case of electric defrost), the condition  $S2 < \text{LBT } ^{\circ}\text{C}$  is reached, or if at any time the authorization criteria are no longer satisfied, the warning stops and the controller resumes to regulate as usual.

### 6.93 RELAY U2 WITH ACTION ELECTRIC DEFROSTING

The outputs associated with the following actions are **forced off**:

*defrost, evaporator fans, light, heating action, door resistance, condenser drain, humidification and dehumidification.*

The outputs associated with the following actions are **forced on**:

*cooling, condenser fans*

### 6.94 U2 RELAY WITH CYCLE INVERSION DEFROST ACTION

The outputs associated with the following actions are **forced off**:

*cooling, defrost, evaporator fans, light, warm action, door resistance, condenser drain, humidification and dehumidification.*

The output associated with the *condenser fan action* is **forced on**

## 7.0 FANS EVAPORATOR [03]

### 7.1 FANS ACCORDING TO COMPRESSOR

In this configuration, defined by FOP parameter, with reference to the relay configured with action 03, the evaporator fans will have consent only with the compressor on. Otherwise they will remain disabled. In addition to the main consent, the evaporator fans are subject to the following conditions:

**Fan ON** for  $S2 \leq FAS$ ; **Fan OFF** for  $S2 > [FAS + HFF]$ ;

FAS parameter represents the fan ignition temperature

During the defrost phase the criteria defined by the FOP parameter are observed.

#### 7.11 S2 PROBE NOT INSTALLED OR FAULT

- Enabled when the FAD has expired
- According to the compressor during thermostat phase
- During defrost phase the criteria defined by the FOP parameter will be observed.

### 7.2 INDEPENDENT FANS

In this configuration, defined by FOP parameter, the evaporator fans will have consent only with reference to the condition:

**Fan ON** for  $S2 \leq FAS$ ; **Fan OFF** for  $S2 > [FAS + HFF]$

#### 7.22 S2 PROBE NOT INSTALLED OR FAULT

The evaporator fans will remain on until the FAD has expired when the controller is switched on. During the defrost phase the criteria defined by the FOP parameter are observed.

### 7.3 FANS IN DOOR OPENING

In case of door opening the evaporator fans are stopped for DOO seconds after which they resume operation regardless of the status of the door switch. When the door is again closed, the evaporator fans start after 10 seconds.

### 7.4 LOW TEMPERATURE EVAPORATOR FAULT

If is reached the condition  $S2 < LBT$  a defrost phase is forced. If the recovery phase of temperature, after the forced defrost, intercepts again the condition  $S2 < LBT$ , three thermostatic modes are used: with reference to the calibration data, with average compressor times, with CON / COF times. In this condition the controller will record the event in the Failure List. The cancellation occurs by switching off and restarting the controller. If the temperature recovery phase leads to reaching the set with  $S2 > LBT$ , then the regulation will take place normally and the fault condition will not be generated.

## 8.0 CONDENSER FANS [04]

The condenser fans are thermostated during the cooling action with the following criteria and with reference to the relay configured with action 04:

### 8.1 FANS ACCORDING TO COMPRESSOR MODE

**Off:**  $S3 \leq FCE$ ; **On:**  $S3 > [FCE + HYF]^{\circ}C$

**Off** after 10 seconds from compressor off

#### 8.11 S3 PROBE NOT INSTALLED OR FAULT

In case of S3 probe faulty or disabled, the condenser fans replicate the operation of the compressor while in defrosting follow the criteria defined by the FOP parameter.

### 8.2 INDEPENDENT FANS FROM THE COMPRESSOR

**Off:**  $S3 \leq FCE$ ; **On:**  $S3 > [FCE + HYF]^{\circ}C$

During defrosting, the condenser fans can be configured on, off or thermostated according to FOP parameter.

#### 8.21 S3 PROBE NOT INSTALLED OR FAULT

In case of S3 probe faulty or disabled, the condenser fans replicate the operation of the compressor while in defrosting follow the criteria defined by the FOP parameter.

### 8.3 HIGH CONDENSATION FAULT

#### 8.31 DETECTION AND ACTIONS STOP

If the temperature read by S3 condenser probe exceeds the temperature value defined by the MCT parameter, all the outputs are turned off except for the condenser fan which is forced on.

#### 8.32 FAULT FOR RESTORE TIME

The automatic reset occurs as soon as the temperature read by the S3 probe falls below the value  $[MCT-DCR]^{\circ}C$ . The RMT parameter represents the maximum time allowed for the automatic reset above which the controller records the HIGH CONDENSATION event and notifies to display. In this condition the reset must be done switching the thermostat off and on again.

### 8.33 FAULT FOR EVENTS NUMBER

If, within a TBP minute, a PMT number of events described is counted, to the next one, the reset will be manual: the reset of the regulation will be turned off and on the controller, provided that the condition [MCT-DCR]°C is verified at power-on. The notification of the fault follows the rules described in the previous paragraph.

### 8.34 ALARM CLEAR

The fault is canceled by turning the thermostat off and then on again.

## 8.4 CLOGGED CONDENSER WARNING

### 8.41 DETECTION

The presence of impediments on the condenser such as grease and dust accumulated over time leads to increase the value of the differential condenser temperature. The condenser differential temperature is calculated each time the compressor is switched on. If the average value of the thermal jump, purified from the peak values, is greater than or equal to the value of the DCN parameter, the CONDENSER WARNING is notified to display.

### 8.42 INHIBITIONS

- S3 condenser probe not installed (FCE = 50 ° C) or in fault
- First compressor cycle after switching on, after defrosting and after opening the door;
- Maximum condenser temperature lower than the value (FCE + 15°C).

### 8.43 WARNING CLEAR

The warning is clear by pressing the confirm key on the keypad.

## **8.5 HIGH PRESSURE CONTROL**

The controller detect a high pressure switch transition from open to closed circuit or vice versa in digital input D2. The transition has the effect to stop the regulation.

### **8.51 AUTOMATIC RESET**

In High pressure condition the compressor is forced off; during this status the controller is in pause with no warning. When the high pressure switch off, the thermostat is reactivated (automatic reset) according to anticycling control time.

### **8.52 MANUAL RESET**

If, within a TBP time, a PMT number of high pressure switch are counted, the fault is active and recorded to the next one; as a consequence, the compressor is forced off until the controller is switched off and on again (manual reset).

### **8.53 BUZZER SILENCE AND ALARM RESET**

During this fault state, the display shows the fault label HIGH PRESSURE. Silencing involves both switching off the buzzer and deleting the message. A power failure will not erase this status.

## 9.0 ACCESSORY FUNCTIONS

### 9.1 LIGHT [05]

Light is controlled through configured relay with action 05.

Light is switched on by a door opening and off when is closed if  $DLT=0$ ; for  $DLT > 0$  light goes off automatically after DLT seconds from the opening.

Light can be switched on/off from keypad if  $DLT=0$ ; for  $DLT > 0$  light goes off automatically after DLT seconds from click on.

Light is switched off in EcoMode phase according to LGH parameter.

### 9.2 HEATING ACTION [06]

Configured relay with action 6 is enabled when  $S1 < [SPU-HYC]^{\circ}C$  and disable when S1 probe reaches the setpoint. If cooling and heating actions are planned in the installation, the HYL parameter must be set equal to zero.

### 9.3 FRAME RESISTOR [07]

The anti-icing control activates the configured relay with action 7 when  $S1 \leq SPX^{\circ}C$  and is deactivated for  $S1 > [SPX + 2]^{\circ}C$ .

### 9.4 DRAIN RESISTOR [08]

The condensate drain function activates the configured relay with action 8 for DCD minutes from the beginning of each defrost. Th function has the purpose of heating the water drainage pipe which otherwise would remain frozen blocking the water conveyance on the collection tank.

### 9.5 REMOTE ALARM RELAY N.C. NOT SILACYABLE [09] / SILACYABLE [10]

The configured relay with action 9 /10 is normally enabled and disabled when fault or alarm occurred. The keyboard silence, during the alarm state, does not enables the configured relay with action 9. The keyboard silence, during the alarm state, enables the configured relay with action 10.

### 9.6 REMOTE ALARM RELAY N.A. NOT SILACYABLE [11] / SILACYABLE [12]

The configured relay with action 11 /12 is normally disabled and enabled when fault or alarm occurred. The keyboard silence, during the alarm state, does not disables the configured relay with action 11. The keyboard silence, during the alarm state, disables the configured relay with action 12.

### 9.7 2<sup>nd</sup> DELAYED COMPRESSOR [13]

The delayed compressor function activates the configured relay with action 13 [compressor 2] after CDE seconds from the main compressor and turns it off synchronously to the main compressor.

### 9.8 DEFROST MANAGEMENT 2 [14]

See chapter 6.7

### **9.9 DRYING RESISTOR [22]**

The configured relay with action 22 is enabled each time the dry phase is activated.

### **9.10 SWIVEL PLATE [23]**

The relay configured with action 23 is enabled/disabled each time the button plate is pressed. Opening the door disables the output until it is closed again.

### **9.11 ACTIVE LOADS [24]**

The active loads function activates the configured relay with action 24 in the switch-on state of the controller and switches it off in Stand-By mode.

### **9.12 ELECTRIC VALVE [25]**

The liquid electric-valve function activates the configured relay with action 25 during compressor on and deactivates it during the compressor off and defrost phase.

### **9.13 WINERY FUNCTION**

With the IS2 parameter (weight 512) the S2 input is set as thermometric probe. This configuration is used, for example, to read the temperature of red wines in cellars with stratified temperature. There are no temperature alarm limits referred to these probes.

### **9.14 PASTRY/ICE CREAM FUNCTION**

This function is enabled through the FOP superparameter weight 256:

If the set is positive, the evaporator fans are configured independently

If the set is negative, the evaporator fans are configured in parallel with the compressor.

### **9.15 SECOND THERMOSTAT FUNCTION (only with FLEX panel)**

Probe S2 can be configured, via parameter IS2 (weight 512), as thermostat probe 2.

The setting limits of the second setpoint (parameter SP2) are predefined between SL2 and SH2.

Action 37 configures the associated relay with cooling function, action 38 configures the associated relay with heating function. Cooling hysteresis is defined by parameter HY2, hot hysteresis is defined by parameter HC2. Parameter AD2 sets the anti-pendulum time. For the second zone the recording of temperature alarms is not provided.

### **9.16 SHOWCASE MODE (only with FLEX panel)**

The showcase function is enabled for LGH weight 128.

With the device in Stand-by it is possible to switch on/off the lights from the panel or from the application.

### **9.17 RECIRCULATION FAN [36] (only with FLEX panel)**

Through the UP key of the FLEX display panel, in normal operation, it is possible to switch on/off the recirculation fan; if running, the fan icon lights up.

**9.18 LIGHT OFF ON SCHEDULE (only with FLEX panel)**

A new parameter LOF [0-23] defines the time for switching off the light when the time passes [0=disabled]. There are no inhibitions if the light is subsequently switched on from the keyboard. The switch-off time can be set via LOF menu or through the application.

**9.19 SWITCHING ON TIME UNIT (only with FLEX panel)**

The parameter UST [0-23] defines the time of activation of the refrigeration unit from the Stand-by state. The switch-on time can be set via the COOL MENU on the panel or from the application.



## 10.0 HUMIDITY CONTROL WITHOUT PROBE

For positive ventilated cabinets, humidity control can be carried out by means of the evaporator fan timing. The function is enabled according to FOP parameter. This function is disabled in the following cases: until the first setpoint is reached, in the recovery phase after a defrost and after a door opening.

### 10.1 ADJUSTMENT CRITERION

The minimum settable set cannot fall below 60%, the maximum no more than 90% therefore the RHU parameter setting is conditioned to this restriction.

#### Adjustment between 60% - 75%

For humidity set between 60% and 75% the evaporator fan output remains completely off during the compressor pause. When the compressor is on, the evaporator fans follow an on/off cycle with a total period of 60 seconds [Table A].

#### Adjustment between 75% - 90%

For humidity set between 75% and 90% the evaporator fan output remains on during the compressor run while during the compressor pause remains on for a time proportional to the average compressor time pause [Table B].

TABLE A		
RH%	FAN ON	FAN OFF
60	16	44
61	18	42
63	21	39
63	24	36
64	27	33
65	30	30
66	34	26
67	37	23
68	40	20
69	42	18
70	45	15
71	49	11
72	52	8
73	55	5
74	58	2
75	60	0

TABLE B	
RH%	FAN ON %
75	0
76	3
77	5
78	8
79	10
80	13
81	16
82	19
83	21
84	25
85	29
86	35
87	44
88	55
89	73
90	100

## 11.0 OFF & CLEAN

### 11.1 PURPOSE

This function is used in ice cream cabinets. When the artisan gelato is removed from the trays it is useful to generate a cycle of ice melting and drying. The function consists of the following phases: defrost, ventilation and shutdown.

#### 11.01 OFF & CLEAN PHASES

When the user menu function is started, an energetic defrost is forced to ensure sufficient evaporator cleaning. In this condition defrost temperature end will be  $[DE1 + 10]^{\circ}\text{C}$ . At the end of the defrost phase, the evaporator fans will be activated for OCD minutes. At the end of the ventilation phase, the controller switches off automatically. The phases in progress are indicated on the display. During execution it is possible to switch off the controller. An interruption of energy during the OFF&CLEAN phase generates the reactivation of the evaporator fans when energy is restored.

## 12.0 ENERGY SAVING

### 12.1 ECONOMY

The ECONOMY function reduces the consumption of the refrigerator unit as soon as the percentage of compressor use reaches the CPM% value. In this condition the operating setpoint is temporarily increased by SPI $^{\circ}\text{C}$ ; the reset occurs at the pre-established conditions.

#### 13.11 ACTIVATION /DEACTIVATION

After AES consecutive hours during which the hourly compressor percentage is higher than or equal to the CPM percentage value, the operative setpoint changes from SPU $^{\circ}\text{C}$  to  $[SPU+SPI]^{\circ}\text{C}$ .

### 12.2 ECOMODE

The EcoMode function reduces the cabinet consumption by increasing of SPI $^{\circ}\text{C}$  the operative setpoint from one hour of the day defined by NDS parameter for NDD hours. During ECOMODE phase the light function and electric-key mode follow the settings defined by LGH parameter. For CLO > 0 the function is enabled from 00:00 of the day defined by the parameter itself for a duration of 24 hours. Through the USER MENU is possible to set the ECOMODE parameters.

## 13.0 TEMPERATURE ALARMS

### 13.1 TYPES

The controller detects the types of temperature alarms described below and records the last 8 events in FIFO register with reference to the NTC thermostat probe S1.

- HIGH TEMPERATURE
- HIGH TEMPERATURE FOR MAINS ABSENCE
- HIGH TEMPERATURE FOR OPEN DOOR
- LOW TEMPERATURE
- HIGH TEMPERATURE BOARD

### 13.2 HIGH TEMPERATURE ALARM

Related parameters:

- ALH: High temperature limit (relative or absolute)
- ADS: Alarm delay at power up
- ADF: Alarm delay after defrost
- ALD: Alarm delay

#### 13.21 PREALLARM WARNING

In the condition  $S1 > [SPU + ALH]^{\circ}C$  if ALH parameter is defined as a relative limit or  $S1 > ALH^{\circ}C$  if is defined as an absolute limit the controller counts down the following pre-alarm times and notices warning to display panel. To disable the pre-alarm warning refer to OS1 parameter.

- ADS: at power up until the set is reached
- ADF: after a defrost until the set is reached
- ALD: during the thermostatisation

#### 13.22 ALARM NOTICE AND STORAGE

If after alarm delay time the temperature exceeding the limits, an alarm is given with buzzer active and the event is recorded in the ALARM LIST. Until the alarm is closed, the duration increase with one minute of resolution.

The last 8 alarms are saved with the following data:

*- START DATE / HOUR - ALARM TYPE - PEAK TEMPERATURE - DURATION in minutes*

### 13.23 ALARM END

The alarm or pre-alarm status is closed when probe S1 detects the condition  $S1 \leq [SPU+ALH]^{\circ}C$  if ALH parameter is configured as a relative limit or  $S1 \leq ALH^{\circ}C$  if is configured as an absolute limit. Until the alarm is closed, the duration increase with one minute of resolution.

The last 8 alarms are saved with the following data:

- *START DATE / HOUR - ALARM TYPE - PEAK TEMPERATURE - DURATION in minutes*

## 13.3 LOW TEMPERATURE ALARM

Parameters:

- ALL: Low temperature limit
- ALD: Alarm delay

### 13.31 PREALLARM WARNING

In the condition  $S1 < [SPU-ALL]^{\circ}C$  if ALL parameter is defined as a relative limit or  $S1 < ALL^{\circ}C$  if is defined as an absolute limit the controller counts down pre-alarm times (see par.14.21) and notices warning to display panel. To disable the pre-alarm warning refer to OS1 parameter.

### 13.32 ALARM NOTICE AND STORAGE

If after alarm delay time the temperature exceeding the limits, an alarm is given with buzzer active and the event is recorded in the ALARM LIST. Until the alarm is closed, the duration increase with one minute of resolution.

The last 8 alarms are saved with the following data:

- *START DATE / HOUR - ALARM TYPE - PEAK TEMPERATURE - DURATION in minutes*

### 13.33 ALARM END

The alarm or pre-alarm status is closed when probe S1 detects the condition  $S1 \geq [SPU-ALL]^{\circ}C$  if ALL parameter is configured as a relative limit or  $S1 \geq ALL^{\circ}C$  if is configured as an absolute limit. Until the alarm is closed, the duration increase with one minute of resolution.

The last 8 alarms are saved with the following data:

- *START DATE / HOUR - ALARM TYPE - PEAK TEMPERATURE - DURATION in minutes*

## 13.4 HIGH TEMPERATURE ALARM FOR DOOR OPENING

### 13.41 PREALARM WARNING

A high temperature pre-alarm for door open is detected when  $S1 > [SPU + ALH]^{\circ}C$  if ALH parameter is configured as a relative limit or  $S1 > ALH^{\circ}C$  if ALH is configured as an absolute limit and furthermore, when this is established condition, the door is open or has been closed by no more than DXO second. In this condition the ALD time is counted.

### 13.42 ALARM NOTICE AND STORAGE

If after alarm delay time the temperature exceeding the limits, an alarm is given with buzzer active and the event is recorded in the ALARM LIST. Until the alarm is closed, the duration increase with one minute of resolution.

The last 8 alarms are saved with the following data:

- START DATE / HOUR - ALARM TYPE - PEAK TEMPERATURE - DURATION in minutes

### 13.43 ALARM END

The alarm is closed when probe S1 detects the condition  $S1 \leq [SPU + ALLH]^{\circ}C$  if ALH parameter is configured as a relative limit or  $S1 \geq ALH^{\circ}C$  if is configured as an absolute limit. Until the alarm is closed, the duration increase with one minute of resolution.

The last 8 alarms are saved with the following data:

- START DATE / HOUR - ALARM TYPE - PEAK TEMPERATURE - DURATION in minutes

## 13.5 BLACK-OUT TEMPERATURE ALARM

### 13.51 ALARM ENABLE/DISABLE

This kind of alarm can be enabled or disabled with reference at OS1 parameter.

### 13.52 LOGIC AND STORAGE

If the temperature read by the S1 probe at mains recovery meets the following conditions  $S1 > [SPU + ALH]^{\circ}C$  if ALH parameter is configured as a relative limit or  $S1 > ALH^{\circ}C$  if is configured as an absolute limit, black-out alarm is noticed and stored in ALARM LIST with the following records:

- DATE/HOUR [at mains recovery]
- ALARM TYPE [high temperature for mains failure]
- PEAK TEMPERATURE [at mains recovery]
- DURATA in minutes [not expected]

## 14.0 FSC ACCESSORY MODULE



FSC SPEED FAN 400VA accessory module [order code BT92401000] connected to CANBUS network controls evaporator fan speed or condenser fans speed automatically or manually [max 400VA].

### 14.1 MODES SELECTION

The LGH parameter defines the operating modes of the FSC module:

MANUAL - AUTOMATIC CONDENSER FANS - AUTOMATIC EVAPORATOR FANS

### 14.2 MANUAL MODE

Through a special menu [panels D1-D2-D3-D4] fan speed can be set manually in 5 levels:

LEVELS: 1 = 25% ; 2 = 45%; 3 = 65%; 4 = 85%; 5 = 99%.

Depending on the configuration of the condenser or evaporator, the enabling and disabling of the modulated output follows the criteria for the respective actions.

### 14.3 AUTOMATIC CONDENSER MODE

The module adjusts the speed according to the temperature as described in graph of fig.1, following the activation and deactivation criterion of the output foreseen for the condenser fan action.

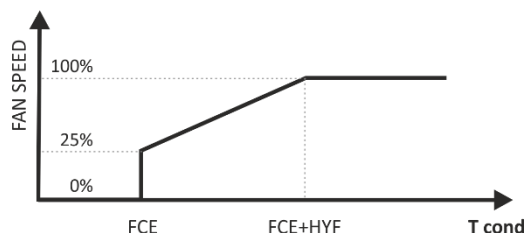


Fig. 1

### 14.4 AUTOMATIC EVAPORATOR MODE

The module adjusts the speed according to the temperature as described in graph of fig.2, following the activation and deactivation criterion of the output foreseen for the evaporator fan action.

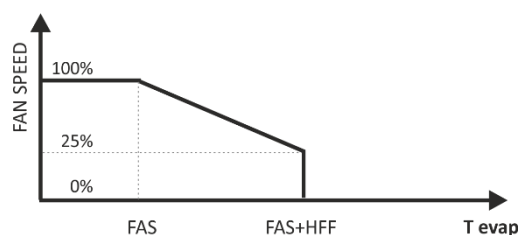


Fig. 2

## 15.0 SUPERPARAMETERS

EVO	DEFAULT	ACTIVE WITH WEIGHT
1	Single temperature cabinet	Double temperature cabinet
2	Door with no glass	Door with glass
4	Electric-key absent	Electric-key present
8	<i>disabled</i>	<i>disabled</i>
16	Wizard menu	No wizard menu (only D2)
32	<i>disabled</i>	<i>disabled</i>
64	Buzzer enabled	Buzzer disabled
128	MicroSD Card disabled	MicroSD Card enabled
256	Decimal display temperature	Integer display temperature (only D2)
512	Temperature unlocked in defrost phase	Temperature locked in defrost phase (only D2)
1024	Celsius	Fahrenheit

IS1	DEFAULT	ACTIVE WITH WEIGHT
1	S1 ntc probe input disabled	S1 ntc probe input enabled
2	S2 ntc probe input disabled	S2 ntc probe input enabled
4	S3 ntc probe input disabled	S3 ntc probe input enabled
8	D1 digital input disabled	D1 digital input enabled
16	D1 digital input n.o.	D1 digital input n.c.
32	Switch door failure disabled	Switch door failure enabled
64	D2 pressure digital input disabled	D2 pressure digital input enabled
128	D2 digital input n.o.	D2 digital input n.c.

IS2	DEFAULT	ACTIVE WITH WEIGHT
4	Relative alarm limit to setpoint	Absolute alarm limit
8	S3 ntc condenser probe	S3 ntc evaporator probe
16	S3 ntc input 2nd evaporator probe	S3 ntc input secondary evaporator
32	<i>disabled</i>	<i>disabled</i>
64	<i>disabled</i>	<i>disabled</i>
128	<i>disabled</i>	<i>disabled</i>
512	S2 ntc monitor probe/thermostat 2 disabled	S2 ntc monitor probe/thermostat 2 enabled
1024	S3 ntc monitor probe/thermostat 2 disabled	S3 ntc monitor probe/thermostat 2 enabled

OS1	DEFAULT	ACTIVE WITH WEIGHT
1	Prealarm notice disabled	Prealarm notice enabled
2	Alarm notice disabled	Alarm notice enabled
4	Black-out high temp. alarm notice disabled	Black-out high temp. alarm notice enabled
8	Ecomode disabled	Ecomode enabled
16	Economy disabled	Economy enabled
32	Thermal protection disabled	Thermal protection enabled
64	<i>disabled</i>	<i>disabled</i>
128	<i>disabled</i>	<i>disabled</i>

## 15.0 SUPERPARAMETERS

OS2	DEFAULT	ACTIVE WITH WEIGHT
1	Evaporator fan off in open door	Evaporator stabilization in open door
2	Compressor usage warning disabled	Compressor usage warning enabled
4	Defrost after setpoint increase disabled	Defrost after setpoint increase enabled
8	Humidity control without probe disabled	Humidity control without probe enabled
32	Simple shutdown	Shutdown with Off & Clean
128	Defrost time-out warning enabled	Defrost time-out warning disabled
1024	Evaporator fan off in heating action	Evaporator fan on in heating action

FOP	DEFAULT	ACTIVE WITH WEIGHT
1	Evaporator fan disabled	Evaporator fan enabled
2	Evaporator fan on/off with compressor	Evaporator fan independent
4	Evaporator fan off during defrost	Evaporator fan on during defrost
8	Evaporator fan not modulated in defrost	Evaporator fan modulated in defrost
16	Condenser fan off during defrost	Condenser fan on during defrost
32	Condenser fan not modulated in defrost	Condenser fan modulated in defrost
64	Thermostated fan condenser	Fan condenser off in 10 sec after compressor off
128	Absolute evaporator fan setpoint	Relative evaporator fan setpoint
256	Fan mode independent from setpoint	Fan mode according to setpoint

DOP	DEFAULT	ACTIVE WITH WEIGHT
1	Manual defrost disabled	Manual defrost enabled
2	Compressor off during defrost	Compressor on during defrost
4	Timer defrost disabled	Timer defrost enabled
8	Compressor hour defrost disabled	Compressor hour defrost enabled
16	RTC defrost disabled	RTC defrost enabled
32	Safety defrost disabled	Safety defrost enabled
64	Immediately start defrost	Start defrost at setpoint with time-out
128	Automatic defrost disabled	Automatic defrost enabled
256	Defrost inhibition enabled	Defrost inhibition disabled

LGH	DEFAULT	ACTIVE WITH WEIGHT
1	Switch-door lighting disabled	Switch-door lighting enabled
2	Lighting on disabled by display panel	Lighting on enabled by display panel
4	Lighting independent during EcoMode phase	Lighting off during EcoMode phase
8	<i>disabled</i>	<i>disabled</i>
16	<i>disabled</i>	<i>disabled</i>
32	FSC module disabled	FSC module enabled
64	FSC module in automatic mode	FSC module in manual mode
128	FSC module drive fan condenser	FSC module drive fan evaporator
256	Light on/off disabled in Standby (only FLEX panel)	Light on/off disabled in Standby (only FLEX panel)



**16.0 PARAMETERS [1-36]**

Nr	PAR	DESCRIPTION	MIN	MAX	UNIT	DEFAULT
1	<b>ADR</b>	Controller address	1	4	num	<b>1</b>
2	<b>EVO</b>	Display options	0	255	num	<b>0</b>
3	<b>IS1</b>	Inputs setup 1	0	255	num	<b>0</b>
4	<b>IS2</b>	Inputs setup 2	0	255	num	<b>0</b>
5	<b>OS1</b>	Outputs setup 1	0	255	num	<b>0</b>
6	<b>OS2</b>	Outputs setup 2	0	255	num	<b>0</b>
7	<b>FOP</b>	Fans setup	0	255	num	<b>0</b>
8	<b>DOP</b>	Defrost setup	0	255	num	<b>0</b>
9	<b>ALH</b>	High alarm limit	-50,0	50,0	°C	<b>6,0</b>
10	<b>ALL</b>	Low alarm limit	-50,0	50,0	°C	<b>-2,0</b>
11	<b>ALD</b>	Alarm delay	0	240	min	<b>10</b>
12	<b>ADS</b>	Alarm delay at power on	1	240	min	<b>120</b>
13	<b>ADF</b>	Alarm delay after defrost	1	240	min	<b>15</b>
14	<b>BUR</b>	Buzzer time replay	1	255	min	<b>20</b>
15	<b>BUF</b>	Buzzer time-out	1	255	min	<b>2</b>
16	<b>HYH</b>	Upper differential cooling action	0,0	9,9	°C	<b>0,0</b>
17	<b>HYL</b>	Lower differential cooling action	0,0	9,9	°C	<b>0,0</b>
18	<b>HYC</b>	Differential heating action	0,0	9,9	sec	<b>0,0</b>
19	<b>DAC</b>	Compressor off delay	1	30	sec	<b>4</b>
20	<b>ADL</b>	Anticycling	0	255	sec	<b>60</b>
21	<b>CDE</b>	Second compressor delay	0	90	sec	<b>55</b>
22	<b>ASS</b>	Compressor delay at power-on	0	255	min	<b>60</b>
23	<b>CON</b>	Compressor ON in probe failure	0	255	min	<b>6</b>
24	<b>COF</b>	Compressor OFF in probe failure	0	255	min	<b>2</b>
25	<b>CPH</b>	Max compressor usage in 24 hours	0	99	%	<b>90</b>
26	<b>FAS</b>	Evaporator fan setpoint	-50,0	50,0	°C	<b>8,0</b>
27	<b>HFF</b>	Differential evaporator fan	1,0	20,0	°C	<b>5,0</b>
28	<b>FAD</b>	Fan delay in S2 probe failure or uninstalled	0	255	sec	<b>30</b>
29	<b>FSD</b>	Fan stop temperature during defrost phase	-50,0	10,0	°C	<b>-2,0</b>
30	<b>LBT</b>	Lower evaporator temperature	-55,0	0,0	°C	<b>-12,0</b>
31	<b>DOO</b>	Door alarm time	1	255	sec	<b>40,0</b>
32	<b>FCE</b>	Condenser fan setpoint	0,0	60,0	°C	<b>25,0</b>
33	<b>HYF</b>	Differential condenser fan	1,0	20,0	°C	<b>5,0</b>
34	<b>MCT</b>	Higher condenser temperature	0,0	70,0	°C	<b>40,0</b>
35	<b>DCN</b>	Clogged condenser threshold	0,0	30,0	°C	<b>20,0</b>
36	<b>DCR</b>	Condenser differential recovery temperature	0,2	20,0	°C	<b>10,0</b>

**16.0 PARAMETERS [37-72]**

Nr	PAR	DESCRIPTION	MIN	MAX	UNIT	DEFAULT
37	<b>RMT</b>	Recovery time in high temperature condenser	1	30	min	<b>10</b>
38	<b>PMT</b>	Work pressure max number	1	255	num	<b>3</b>
39	<b>TPB</b>	Work pressure delay	1	255	min	<b>30</b>
40	<b>DE1</b>	Defrost temperature end	0,0	50,0	°C	<b>3,0</b>
41	<b>DT1</b>	Defrost time-out	1	60	min	<b>10</b>
42	<b>ITD</b>	Interval defrost	1	24	ore	<b>8</b>
43	<b>DRP</b>	Dripping time	0	240	sec	<b>0</b>
44	<b>DE2</b>	Defrost temperature end 2	0,0	50,0	°C	<b>3,0</b>
45	<b>DT2</b>	Defrost time-out 2	1	60	min	<b>10</b>
46	<b>DRE</b>	Defrost number before start second defrost	1	10	num	<b>3</b>
47	<b>DCD</b>	Defrost drain resistor time	0	240	min	<b>10</b>
48	<b>SDT</b>	Ice sensivity in automatic defrost	0,0	5,0	°C	<b>1,5</b>
49	<b>DPR</b>	Time defrost protection with tuning	0	255	min	<b>30</b>
50	<b>DPS</b>	Time defrost protection without tuning	0	255	min	<b>60</b>
51	<b>SD1</b>	1st daily defrost time	0	23	ore	<b>0</b>
52	<b>SD2</b>	2nd daily defrost time	0	23	ore	<b>0</b>
53	<b>SD3</b>	3rd daily defrost time	0	23	ore	<b>0</b>
54	<b>SD4</b>	4th daily defrost time	0	23	ore	<b>0</b>
55	HOF	<i>disabled</i>	-50	50	Rh_%	<b>0</b>
56	RHU	<i>disabled</i>	20	95	Rh_%	<b>75</b>
57	HRH	<i>disabled</i>	0	10	Rh_%	<b>0</b>
58	HRL	<i>disabled</i>	0	10	Rh_%	<b>0</b>
59	<b>CPM</b>	Maximum % compressor to start Ecomode	0	99	%	<b>80</b>
60	<b>AES</b>	Delay to start auto Ecomode	1	23	ore	<b>4</b>
61	<b>SPI</b>	Setpoint increase in Economy & Ecomode	0,0	5,0	°C	<b>0,0</b>
62	<b>NDS</b>	Ecomode start hour	0	23	ore	<b>0</b>
63	<b>CLO</b>	Public holiday	0	8	num	<b>0</b>
64	<b>NDD</b>	Ecomode duration	0	23	ore	<b>0</b>
65	<b>LGH</b>	Light mode/FSC mode/Electric-key mode setup	0	255	num	<b>0</b>
66	<b>SPX</b>	Door resistor setpoint	-10,0	10,0	°C	<b>3,0</b>
67	<b>SPU</b>	User setpoint	-40,0	40,0	°C	<b>4,0</b>
68	<b>OF1</b>	Probe S1 offset	-9,9	9,9	°C	<b>0,0</b>
69	<b>OF2</b>	Probe S3 offset	-9,9	9,9	°C	<b>0,0</b>
70	<b>OF3</b>	Probe S3 offset	-9,9	9,9	°C	<b>0,0</b>
71	<b>SLL</b>	Setpoint limit low	-99,0	2,0	°C	<b>-90,0</b>
72	<b>SLH</b>	Setpoint limit high	-80,0	40,0	°C	<b>12,0</b>

**16.0 PARAMETERS [73-92]**

Nr	PAR	DESCRIPTION	MIN	MAX	UNIT	DEFAULT
73	<b>RL1</b>	U1 relay action	0	1	num	<b>0</b>
74	<b>RL2</b>	U2 relay action	0	2	num	<b>0</b>
75	<b>RL3</b>	U3 relay action	0	20	num	<b>0</b>
76	<b>RL4</b>	U4 relay action	0	20	num	<b>0</b>
77	<b>RL5</b>	U5 relay action	0	20	num	<b>0</b>
78	<b>RL6</b>	U6 relay action	0	20	num	<b>0</b>
79	<b>DLT</b>	Timer luce vano; disabilitato per DLT=0	0	240	sec	<b>0</b>
80	<b>DXO</b>	Tempo di rilevazione alta temperatura per porta	0	20	min	<b>2</b>
81	<b>K1T</b>	Tempo di ritenuta elettropistone	0	60	sec	<b>10</b>
82	<b>OCD</b>	Tempo ventole in OFF&CLEAN prima dello stand-by	0	240	min	<b>10</b>
83	<b>TBO</b>	Temperatura massima scheda	0,0	90,0	°C	<b>55,0</b>
84	<b>SP2</b>	Setpoint 2	-40,0	90,0	°C	<b>4,0</b>
85	<b>SL2</b>	Setpoint 2 limit low	-40,0	80,0	°C	<b>-30,0</b>
86	<b>SH2</b>	Setpoint 2 limit high	-30,0	90,0	°C	<b>12,0</b>
87	<b>HH2</b>	Upper differential cooling action 2	0,0	9,9	°C	<b>0</b>
88	<b>HC2</b>	Lower differential heating action 2	0,0	9,9	°C	<b>0</b>
89	<b>AD2</b>	Anticycling 2	0	255	sec	<b>60</b>
90	<b>LOF</b>	Light off time (*)	0	24	hrs	<b>0</b>
91	<b>UST</b>	Power on time from Stand-by (*)	0	24	hrs	<b>0</b>
92	<b>PDD</b>	Temp. decrease compared to the set at start defrost	0	5.0	°C	<b>0,0</b>

(\*) only for FLEX panel



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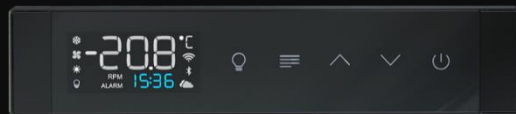
[www.betaelectronics.it](http://www.betaelectronics.it)

CODE	DESCRIPTION	VALUE	UNIT
ADR	ADDRESS	1	
EVO	DISPLAY OPTION	2	
IS1	INPUTS SETUP	31	
IS2	INPUTS SETUP	256	
OS1	OUTPUTS SETUP	0	
OS2	OUTPUTS SETUP	2	
FOP	FANS OPTIONS	64	
DOP	DEFROST OPTIONS	0	
ALH	HIGH ALARM LIMIT	10,0	°C
ALL	LOW ALARM LIMIT	-10,0	°C
ALD	ALARM DELAY	15	min
ADS	ALARM DELAY AT POWER-ON	120	min
ADF	ALARM DELAY AFTER DEFROST	30	min
BUR	TIME BUZZER REPLAY	20	min
BUF	TIME BUZZER OFF	2	min
HYH	UPPER DIFFERENTIAL COOLING ACTION	3,0	°C
HYL	LOWER DIFFERENTIAL COOLING ACTION	0,0	°C
HYC	DIFFERENTIAL HEATING ACTION	0,0	°C
DAC	COMPRESSOR OFF DELAY	4	sec
ADL	ANTICYCLING	60	sec
CDE	COMPRESSOR 2 DELAY AT POWER-ON	55	sec
ASS	COMPRESSOR DELAY AT POWER-ON	0	sec
CON	COMPRESSOR ON IN FAILURE PROBE	15	min
COF	COMPRESSOR OFF IN FAILURE PROBE	3	min
CPH	MAX COMPRESSOR USAGE	90	%
FAS	SET EVAPORATOR FANS	8,0	°C
HFF	DIFFERENTIAL FAN EVAPORATOR	5,0	°C
FAD	FAN DELAY IN FAILURE PROBE OR DISABLED	30	sec
FSD	FAN SETPOINT DURING DEFROST	-2,0	°C
LBT	MINIMUM EVAPORATOR TEMPERATURE	-30,0	°C
DOO	DOOR DELAY	40	sec
FCE	SET CONDENSER FANS	20,0	°C
HYF	DIFFERENTIAL FAN CONDENSER	5,0	°C
MCT	MAXIMUM CONDENSER TEMPERATURE	70,0	°C
DCN	CLOGGED CONDENSER THRESHOLD	18,0	°C
DCR	RECOVERY DIFFERENTIAL	5,0	°C
RMT	RECOVERY TIME	30	min
PMT	MAX NUMBER WORK PRESSURE	5	
TPB	DELAY WORK PRESSURE	1	min
DE1	DEFROST 1 TEMPERATURE END	3,0	°C
DT1	DEFROST 1 TIME-OUT	10	min
ITD	DEFROST INTERVAL	6	hrs
DRP	DRIPPING TIME	0	sec
DE2	DEFROST 2 TEMPERATURE END	3,0	°C
DT2	DEFROST 2 TIME-OUT	10	min
DRE	NR OF DEFROST BEFORE 2ND DEFROST	3	
DCD	DEFROST DRAIN RESISTOR TIME	10	min
SDT	ICE SENSITIVITY	1,5	°C
DPR	TIME DEFROST PROTECTION WITH TUNING	30	min
DPS	TIME DEFROST PROTECTION WITHOUT TUNING	60	min
SD1	1ST DAILY DEFROST TIME	0	hrs
SD2	2ND DAILY DEFROST TIME	0	hrs
SD3	3RD DAILY DEFROST TIME	0	hrs
SD4	4TH DAILY DEFROST TIME	0	hrs
HOF	HUMIDITY PROBE OFFSET	0	%
RHU	HUMIDITY SETPOINT	75	%
HRH	UPPER DIFFERENTIAL DRY ACTION	0	%
HRL	LOWER DIFFERENTIAL WARM ACTION	0	%
CPM	MAX % COMPRESSOR TO START AUTO ECOMODE	80	%
AES	DELAY TO START AUTO ECOMODE	4	hrs
SPI	SETPOINT INCREASE DURING ECOMODE	1,0	°C
NDS	ECOMODE START	0	hrs
CLO	PUBLIC HOLIDAY	0	
NDD	ECOMODE DURATION	0	hrs
LGH	LIGHT SETUP	2	
SPX	SET DOOR RESISTOR	3,0	°C
SPU	USER SETPOINT	-18,0	°C
OF1	PROBE S1 OFFSET	0,0	°C
OF2	PROBE S2 OFFSET	0,0	°C
OF3	PROBE S3 OFFSET	0,0	°C
SLL	SETPOINT LIMIT LOW	-19,0	°C
SLH	SETPOINT LIMIT HIGH	-10,0	°C
RL1	RELAIS U1 ACTION	1	
RL2	RELAIS U2 ACTION	0	
RL3	RELAIS U3 ACTION	0	
RL4	RELAIS U4 ACTION	4	
RL5	RELAIS U5 ACTION	5	
RL6	RELAIS U6 ACTION	0	
DLT	LIGHT TIMER	0	sec
DXO	ALARM TEMPERATURE DELAY FOR DOOR OPENED	2	min

K1T	ELECRTIC-KEY ON	10	sec
OCD	OFF&CLEAN	10	min
TBO	MAXIMUM BOARD TEMPERATURE	75	°C
SP2	USER SETPOINT 2	4,0	°C
SL2	SETPOINT 2 LIMIT LOW	-30,0	°C
SH2	SETPOINT 2 LIMIT HIGH	12,0	°C
HH2	UPPER DIFFERENTIAL COOLING ACTION 2	0,0	°C
HC2	DIFFERENTIAL HEATING ACTION 2	0,0	°C
AD2	ANTICYCLING 2	60	sec
LOF	LIGHT OFF	0	hrs
UST	UNIT START	0	hrs
PDD	PRE-DEFROST DIFFERENTIAL	0,0	°C

# ATEX | Flex panel

Manuale d'uso / User Manual







## 1.0 ARCHITETTURA

FLEX è un controllore di temperatura e umidità per frigoriferi industriali ad alto contenuto tecnologico. Espone un access point locale per la connettività verso l'applicazione CONNEX e simultaneamente verso un router per l'accesso al CLOUD. Il Data Logger interno permette oltre un mese di registrazione delle temperature.

- L'unità frigorifera si accende e si spegne con il tasto ON/OFF
- La tastiera si blocca/sblocca premendo contemporaneamente i tasti UP/DW
- In caso di insorgenza di un guasto o di un allarme lampeggia l'icona **ALARM** mentre il display inferiore indica la tipologia dell'evento con buzzer attivo. Si tacita premendo un qualsiasi tasto.
- La pressione del tasto LUCE espone a scorrimento il nome dell'access point generato dal pannello display

### ICONE LATO SX

- RAFFREDDAMENTO
- VENTILAZIONE
- RISCALDAM/DEFROST
- LUCE

### ICONE LATO DX

- UNITA' DI MISURA
- CONNESSO AL ROUTER
- Bluetooth (non attiva)
- CONNESSO AL CLOUD

### ICONE INFERIORI

- N° GIRI COMPRESSORE
- ALLARME IN CORSO



**DOPPIO  
DISPLAY**

**TASTI >**

LUCE

MENU

UP

DW

ON/OFF

Display **superiore** a led bianchi, display **inferiore** a led blu.

## 2.0 MENU

- Si accede ai menu tramite il tasto MENU
- I MENU si scorrono tramite i tasti UP/DW
- Si esce dai livelli MENU tramite il tasto ON/OFF

### M1 - COME IMPOSTARE IL SET DI TEMPERATURA

Dallo stato di funzionamento normale premere il tasto MENU: il display espone M1/SET. Premere nuovamente il tasto menu e tramite i tasti UP/DW impostare il nuovo valore. Confermare con il tasto menu; il display espone per 2 sec il nuovo valore, la label **done** e ritorna alla visualizzazione normale con il nuovo set impostato.

### M2 - COME AVVIARE UNO SBRINAMENTO

Dallo stato normale premere il tasto MENU e il tasto UP: il display espone M2/DEFR. La pressione del tasto menu conferma l'avvio dello sbrinamento. Se compare no non ci sono le condizioni per eseguirlo. Il dispositivo rifiuta il comando se le condizioni per sbrinare non sussistono e visualizza **not**.

### M3 - IMPOSTAZIONE DEL LIMITE DI ALTA TEMPERATURA

Dallo stato normale premere il tasto MENU e due volte il tasto UP: il display espone M3/HI. Premere nuovamente il tasto menu e tramite i tasti UP/DW impostare il nuovo valore. Confermare con il tasto menu.

### M4 - IMPOSTAZIONE DEL LIMITE DI BASSA TEMPERATURA

Dallo stato normale premere il tasto MENU e tre volte il tasto UP: il display espone M4/LO. Premere nuovamente il tasto menu e tramite i tasti UP/DW impostare il nuovo valore. Confermare con il tasto menu.

### **M5** - LETTURA LISTA EVENTI

Dallo stato normale premere il tasto MENU e più volte il tasto UP fino a quando il display espone M5/**LIST**. Premere MENU: il display superiore visualizza l'indice di allarme, quello inferiore il numero di eventi memorizzati. Se si tratta di un guasto premendo MENU il display superiore visualizza **l'indice di guasto**, quello inferiore **il tipo** di evento; se si tratta di un allarme il display superiore espone il picco di temperatura quello inferiore il tipo (vedi tabelle eventi a pagina 8) Premendo nuovamente MENU il display superiore visualizza **l'indice di guasto** o la **durata in minuti** per un allarme, il display inferiore espone in sequenza, l'ora, il giorno, il mese e l'anno di inizio evento.

### **M6** - LETTURA DEI VALORI DELLE SONDE

Dallo stato normale premere il tasto MENU e più volte il tasto UP fino a quando il display espone M6/**INFO**. Premere menu, il display superiore visualizza il valore, quello inferiore l'etichetta della variabile.

### **M7** - CONFIGURAZIONE DEL DISPLAY INFERIORE (BLU)

Dallo stato normale premere il tasto MENU e più volte il tasto UP fino a quando il display espone M7/**MODE**. Premere menu e selezionare le modalità da 1 a 6 tramite i tasti UP/DW. Confermare con menu. **1**: orario RTC; **2**: azione in corso (\*); **3**: rpm compress.; **4**: Rh% **5**: Temperatura sonda S2. **6**: Temperatura sonda S3. In alcuni modelli alcune funzioni potrebbero non essere disponibili. (\*) **LABELS AZIONI**: **COOL**=raffredda; **PAUS**=in pausa **DEFR**= sbrina; **HEAT**=riscalda; **DRY**=deumidifica; **WARM**; umidifica; **ECO**=stato di energy saving.

### **M8** - CANCELLAZIONE DELLA LISTA ALLARMI

Dallo stato normale premere il tasto MENU e più volte il tasto UP fino a quando espone M8/**ERAS**. La pressione del tasto menu conferma la cancellazione della lista eventi e ritorna alla visualizzazione normale.

I menu **PROG – DATE – PASS** sono dedicati all'assistenza tecnica.

### **M9 - PROGRAMMAZIONE PARAMETRI**

Dallo stato normale premere il tasto MENU e più volte il tasto UP fino a quando il display espone **M9/PROG**. Premendo il tasto MENU viene visualizzata la richiesta di password solo se è impostata diversa da zero. Impostare tramite i tasti UP/DW la password e confermare con il tasto MENU. Se la password è errata sul display superiore viene visualizzato ERR ed il display si riporta a livello MENU 9, diversamente presenta il primo parametro *EVO*; con i tasti UP/DW si selezionano i rimanenti. Scelto il parametro, per entrare in modalità di impostazione premere nuovamente il tasto MENU e modificare il valore con i tasti UP/DW; il nuovo valore viene confermato per pressione prolungata del tasto MENU. La lista completa dei parametri è disponibile sul manuale della scheda elettronica equipaggiata.

### **M10 – IMPOSTAZIONE OROLOGIO**

L'impostazione dell'orologio può essere eseguita anche tramite l'applicazione Connex. In ogni caso l'impostazione dell'orologio provoca **la cancellazione totale dei dati di termoregistrazione**

Dallo stato normale premere il tasto MENU e più volte il tasto UP fino a quando il display espone **M10/DATE**. Premere il tasto MENU: compare **l'ora** con l'unità di misura in alto a destra e l'etichetta *HOUR* sul display inferiore, modificare il valore tramite i tasti UP/DW e confermare con il tasto MENU; compaiono i **minuti** con l'unità di misura in alto a destra e l'etichetta *MIN* sul display inferiore, modificare il valore tramite i tasti UP/DW e confermare con il tasto MENU; compare **il giorno** con l'unità di misura in alto a destra e l'etichetta *DAY* sul display inferiore, modificare il valore tramite i tasti UP/DW e confermare con il tasto MENU;

compare **il mese** con l'unità di misura in alto a destra e l'etichetta *MON* sul display inferiore, modificare il valore tramite i tasti UP/DW e confermare con il tasto MENU; compare **l'anno** con l'unità di misura in alto a destra e l'etichetta *YEAR* sul display inferiore, modificare il valore tramite i tasti UP/DW e confermare con il tasto MENU.

### **M11 - IMPOSTAZIONE PASSWORD SERVICE**

Dallo stato normale premere il tasto MENU e più volte il tasto UP fino a quando il display espone **M11/PASS**. Premere il tasto MENU: se la password è nulla sul display superiore compare la label *SET* mentre su quello inferiore la label *PASS*. Impostare la propria password e confermare con la pressione del tasto MENU.

Se invece la password è diversa da zero sul display superiore compare la cifra 000 e su quello inferiore la label *PASS*. Pertanto per modificare una password esistente sarà necessario impostare tramite i tasti UP/DW il suo valore e confermare con il tasto MENU; se è stata impostata correttamente sul display superiore compare la label *SET* mentre su quello inferiore la label *PASS*; confermare con menu, viene visualizzata la password precedente e impostare la nuova come spiegato. Se è errata restituisce *ERR* e si riporta a livello di MENU 11.

### **M12 - PARAMETRI DI RETE**

Dallo stato normale premere il tasto MENU e più volte il tasto UP fino a quando il display espone **M12/AP**. Premere il tasto MENU: il display superiore espone il MAC-ADDRESS con scorrimento dei caratteri.

Premendo nuovamente il tasto MENU il display superiore visualizza il canale di trasmissione wifi sul quale il controllore è sintonizzato, su quello inferiore **CH**. Tramite i tasti UP/DW è possibile cambiare canale di trasmissione solo se il dispositivo non è connesso ad un router. Si conferma il canale premendo il tasto MENU. Premendo nuovamente il tasto MENU il display superiore visualizza **RST/PSW**. La pressione successiva del tasto MENU cancella la password wifi della rete locale. Si esce con tasto ON/OFF.

### **M13 - ORARIO DI SPEGNIMENTO LUCE**

Dallo stato normale premere il tasto MENU e più volte il tasto UP fino a quando il display espone **M13/LOF**. Premere nuovamente MENU, il display superiore visualizza OFF (solo se non è mai stato impostato un orario di spegnimento) quello inferiore rimane spento. Premere nuovamente MENU. Tramite i tasti UP/DW impostare l'ora di spegnimento (OFF=mai, 1h -24h) della luce vano che compare sul display superiore e confermare con MENU. Dopo il messaggio DONE Il display torna nella visualizzazione normale.

#### **M14 - ORARIO DI AVVIAMENTO UNITA' FRIGORIFERA**

Questo menu consente di impostare un orario di accensione dell'unità frigorifera se alimentata e in stato di Stand-by. Dallo stato normale premere il tasto MENU e più volte il tasto UP fino a quando il display espone **M14/COOL**. Premere nuovamente MENU, il display superiore visualizza OFF (solo se non è mai stato impostato un orario di accensione) quello inferiore rimane spento. Premere nuovamente MENU. Tramite i tasti UP/DW impostare l'ora di accensione (OFF=mai, 1h -24h) dell'unità frigorifera che compare sul display superiore e confermare con MENU. Dopo il messaggio DONE Il display torna nella visualizzazione normale.

#### **M15 - COME IMPOSTARE IL SET DI UMIDITA'**

Questo menù compare solo se la funzione di umidità è prevista nell'unità di conservazione. Dallo stato di funzionamento normale premere il tasto MENU e più volte il tasto UP: quando il display espone **M15/RH** premere nuovamente il tasto menu e tramite i tasti UP/DW impostare il nuovo set di umidità. Confermare con il tasto menu; il display espone per 2 sec il nuovo valore, la label *done* e ritorna alla visualizzazione normale con il nuovo set impostato.

#### **M16 - COME IMPOSTARE IL SET DI TEMPERATURA DI UNA SECONDA ZONA**

Questo menù compare solo se la funzione è prevista nell'unità di conservazione. Dallo stato di funzionamento normale premere il tasto MENU e più volte il tasto UP: quando il display espone **M16/SET2** premere nuovamente il tasto menu e tramite i tasti UP/DW impostare il nuovo set di temperatura. Confermare con il tasto menu; il display espone per 2 sec il nuovo valore, la label *done* e ritorna alla visualizzazione normale con il nuovo set impostato.

TABELLA EVENTI **IN CORSO**

DISP SUP	<b>-12.9°</b>	Temperatura vano
DISP INF	<b>Hi</b>	<b>Alta temperatura</b>
<b>Hi</b> non lampegg. =		preallarme di alta temperatura
<b>Hi</b> lampeggiante =		allarme di alta temp. in corso
DISP SUP	<b>-27.9°</b>	Temperatura vano
DISP INF	<b>Lo</b>	<b>Bassa temperatura</b>
<b>Lo</b> non lampegg. =		preallarme di alta temperatura
<b>Lo</b> lampeggiante =		allarme di bassa temp. in corso
DISP SUP	<b>-12.9°</b>	Temperatura vano
DISP INF	<b>Fail</b>	<b>Guasto in corso</b>
DISP SUP	<b>-12.9°</b>	Temperatura vano
DISP INF	<b>DEFR</b>	<b>Time-out di sbrinamento</b>

CODIFICA EVENTI **REGISTRATI CON INVERTER**

Nelle installazioni con inverter il TIPO DI EVENTO è riportato con <b>F32, F33..F37</b>	<b>F32</b> VSC_COMM
	<b>F33</b> VSC_OVERLOAD
	<b>F34</b> VSC_EXTREME_OVERLOAD
	<b>F35</b> VSC_START
	<b>F36</b> VSC_SHORTCIRCUIT
	<b>F37</b> VSC_ROTOR

TABELLA EVENTI **REGISTRATI**

DISP SUP	<b>Pr1-4</b>	Sonda NTC S1, S2, S3, S4
DISP INF	<b>PROB</b>	<b>Guasto Sonda</b>
DISP SUP	<b>NTC</b>	Sonda vano tecnico
DISP INF	<b>PROB</b>	<b>Guasto Sonda</b>
DISP SUP	<b>45°</b>	Temperatura vano tecnico
DISP INF	<b>TBO</b>	<b>Alta temperatura vano tecnico</b>
DISP SUP	<b>58.6°</b>	Temp. di condensazione
DISP INF	<b>HICN</b>	<b>Alta temp. di condensazione</b>
DISP SUP	<b>-23.8°</b>	Temp. di evaporazione
DISP INF	<b>LOEV</b>	<b>Bassa temp. di evaporazione</b>
DISP SUP	<b>HP1</b>	Intervento pressostato di alta
DISP INF	<b>HP</b>	<b>Alta pressione</b>
DISP SUP	<b>12'</b>	Tempo di sbrinamento
DISP INF	<b>DEFR</b>	<b>Time-out di sbrinamento</b>
DISP SUP	<b>D1</b>	Ingresso digitale D1
DISP INF	<b>DOOR</b>	<b>Time-out porta aperta</b>
DISP SUP	<b>12.8°</b>	Picco di temperatura
DISP INF	<b>Hi</b>	<b>Allarme di alta temperatura</b>
DISP SUP	<b>-2.4°</b>	Picco di temperatura
DISP INF	<b>Lo</b>	<b>Allarme di bassa temperatura</b>

### 3.0 CONNETTIVITA' LOCALE - APPLICAZIONE CONNEX

L'applicazione CONNEX scaricabile gratuitamente da PlayStore o Apple store, permette il governo ed il monitoraggio dell'unità frigorifera tramite collegamento diretto wifi. Di seguito l'home page con i menu di accesso al termostato.

LEGGE LA TEMPERATURA  
IMPOSTA IL SETPOINT  
L'ORA DI ACCENSIONE UNITA'  
L'ORA DI SPEGNIMENTO LUCI

ESPONE LA LISTA  
ALLARMI E GUASTI

IMPOSTA IL FUNZIONAMENTO  
PER IL RISPARMIO ENERGETICO

RICONFIGURA IL CONTROLLORE

IMPOSTA I LIMITI DI ALLARME  
IMPOSTA L'OROLOGIO

LEGGE I GRAFICI  
DI TEMPERATURA E UMIDITA'

LEGGE LE VARIABILI  
IN TEMPO REALE

MENU PER LA REGISTRAZIONE  
SUL CLOUD E PAGINA DI RECOVERY  
IMPOSTA LE RETI WIFI

CONDIVIDE LA CONFIGURAZIONE  
E I DATI DEL CONTROLLORE

LEGGE I DATI IDENTIFICATIVI  
DEI DISPOSITIVI  
APRE IL MANUALE D'USO






## 4.0 IMPOSTAZIONI WIFI E REGISTRAZIONE UTENTE

Da menu WEB &WIFI a scorrimento pagina verticale eseguire le seguenti azioni. La conferma dell'avvenuto accesso al router accende l'icona wifi situata alla destra del display. La conferma dell'avvenuta connessione al Cloud accende l'icona nuvola situata alla destra del display.

The screenshot shows a vertical menu titled 'WEB & WIFI' with a status bar at the top displaying 'MODEL' and '23.12.2018 10:52'. The menu is divided into three sections:

- ROUTER:** Includes fields for 'Network' and 'Password', and a 'CONNECT' button.
- THERMOSTAT PASSWORD:** Includes fields for 'AP Name' and 'Password', and a 'CONFIRM' button.
- WEB REGISTRATION:** Includes fields for 'Company Name', 'Address', 'City', and 'Mail address', and a 'SEND' button.

1. Selezionare il nome della rete wifi su cui connettersi
2. Digitare la password di rete
3. Premere il tasto CONNECT
4. Digitare la password per l'accesso al controllore
5. Nominare la specifica unità (Gelateria, Pasticceria, ecc)
6. Premere il tasto CONFIRM
7. Editare il nome dell'esercizio
8. Editare l'indirizzo
9. Editare la città
10. Editare l'indirizzo mail per ricevere i report
11. Premere il tasto SEND

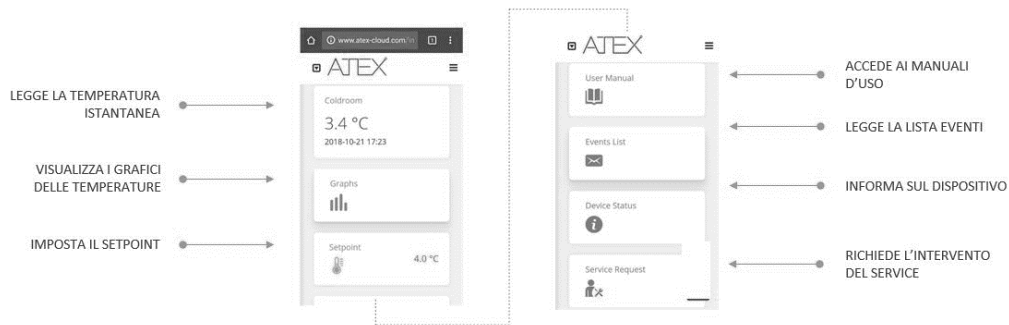
### MULTIUTENZA

In caso di più controllori presenti la registrazione dovrà essere ripetuta per ogni dispositivo fermi restando i punti **7-8-9-10**

Entro pochi minuti viene recapitata la mail di avvenuta registrazione con le credenziali di accesso alle pagine web

## 5.0 CONNETTIVITA' REMOTA – WEB PAGES

L'utente una volta registrato, ed in possesso delle credenziali di accesso al web, potrà connettersi al dispositivo da qualsiasi postazione internet consultando le WEB PAGES. Inoltre settimanalmente riceverà tramite mail il report HACCP con i grafici giornalieri e gli eventuali *alerts* in tempo reale.



### SERVIZI GRATUITI

MAIL  
DI ALERT

MAIL DI CHIUSURA  
ALERT

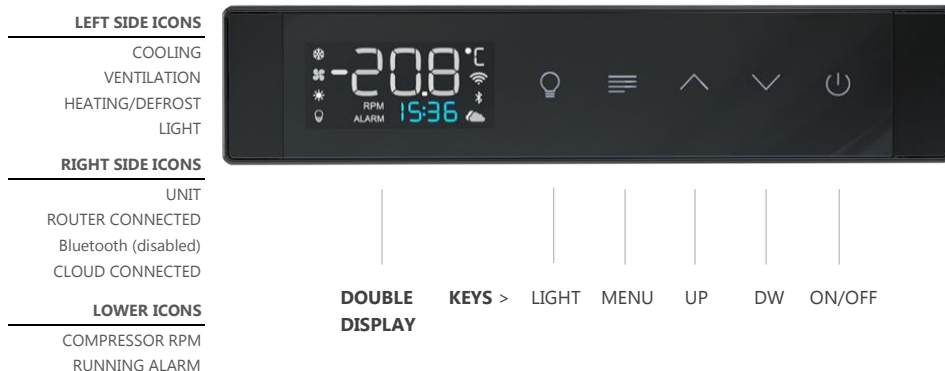
RICEZIONE SETTIMANALE TRAMITE MAIL  
DEL REPORT GRAFICO IN FORMATO PDF



## 1.0 ARCHITECTURE

FLEX is a temperature and humidity controller for high-tech industrial refrigerators. It exposes a local access point for connectivity to the CONNEX application and simultaneously to a router for accessing the CLOUD. The internal Data Logger allows over a month of temperature recording.

- The refrigeration unit turns on and off with the ON/OFF key
- The keyboard locks/unlocks by pressing the UP/DW keys simultaneously
- In the event of a fault or an alarm, the ALARM icon will flash and the lower display will indicate the type of event with the buzzer active. It is silenced by pressing any key.
- Pressing the LIGHT key scrolls the name of the access point generated by the display panel



## 2.0 MENU

- The menus are accessed via MENU key
- MENUS scroll through the UP/DOWN keys
- Exit the MENU levels using the ON/OFF key

### M1 - HOW TO SET THE TEMPERATURE

From the normal operating status press the MENU key: the display shows M1/**SET**. Press the menu key again and use the UP/DW keys to set the new value. Confirm with the MENU key; the display shows the new value for 2 sec, the *done* label and returns to the home level with the new set.

### M2 – HOW TO START DEFROST

From the home level press the MENU key and the UP key: the display shows M2/**DEFR**. Pressing the menu key confirms the defrost start. If appears *no*, there are no conditions to execute it. The device refuses the command if the conditions for defrosting do not exist.

### M3 – HOW TO SET HIGH TEMPERATURE LIMIT

From the home level press the MENU key and the UP key twice: the display shows M3/**HI**. Press the menu key again and use the UP/DW keys to set the new value. Confirm with the menu key.

### M4 - HOW TO SET LOW TEMPERATURE LIMIT

From the home level press the MENU key and the UP key twice: the display shows M4/**LO**. Press the menu key again and use the UP/DW keys to set the new value. Confirm with the menu key.

### **M5 – EVENT LIST**

From the home level, press the MENU key and the UP key several times until the display shows M5/**LIST**. Press MENU: the upper display shows the alarm index, the lower one shows the number of stored events. If it is a fault by pressing MENU the upper display shows the fault index, the lower one shows the type of event; if it is an alarm the upper display exposes the temperature peak the lower one the type (see event tables on page 8). By pressing MENU again the upper display shows the fault index or the duration in minutes for an alarm, the lower display shows the time, day, month and year of the event in sequence.

### **M6 – PROBE VALUES**

From the home level, press the MENU key and the UP key several times until the display shows M6/**INFO**. Press menu, the upper display shows the value, the lower one displays the variable label.

### **M7 – LOWER DISPLAY SETTINGS**

From the home level, press the MENU key and the UP key several times until the display shows M7/**MODE**. Premere menu e selezionare le modalità da 1 a 6 tramite i tasti UP/DW. Confermare con menu. **1**: RTC time; **2**: action running (\*); **3**: rpm compress.; **4**: Rh% **5**: S2 probe value. **6**: S3 probe value. In some models some functions may not be available. (\*) **ACTION LABELS**: **COOL**=cooling; **PAUS**=pause **DEFR**= defrost; **HEAT**=heating; **DRY**=dehumidification.; **WARM**; humidification; **ECO**=Energy Saving status.

### **M8 - EVENT LIST CANCELLATION**

From the home level, press the MENU key and the UP key several times until the display shows M8/**ERAS**. Pressing the menu key confirms the cancellation of the event list and returns to home level. Menus **PROG – DATE – PASS** are dedicated to service assistance.

### **M9 – PARAMETERS SETTINGS**

From the home level, press the MENU key and the UP key several times until the display shows M9/**PROG**. Pressing the MENU key displays the password request only if it is set other than zero. Use the UP/DW keys to set the password and confirm with the MENU key. If the password is invalid, the upper display shows ERR and the display returns to MENU level 9, otherwise it presents the first parameter (EVO); use the UP/DW keys to select the remaining ones. Once the parameter has been selected, to enter the setting mode press the MENU key again and change the value with the UP/DW keys; the new value is confirmed by a long press of the MENU key. The complete list of parameters is available in the service manual.

### **M10 – DATE/HOUR PRESET**

The clock setting can also be performed via the Connex application. In any case the setting of the clock causes the total erase of recording data. From the home level press the MENU key and the UP key several times until the display shows M10/**DATE**. Press the MENU key: the time appears with the unit of measurement at the top right and the HOUR label on the lower display, change the value using the UP/DW keys and confirm with the MENU key; the minutes appear with the unit of measurement at the top right and the label MIN on the lower display, change the value using the UP/DW keys and confirm with the MENU key; the day appears with the unit of measurement at the top right and the label DAY on the lower display, change the value using the UP/DW keys and confirm with the MENU key; the month appears with the unit of measurement at the top right and the label MON on the lower display, change the value using the UP/DW keys and confirm with the MENU key; the year appears with the unit of measurement at the top right and the label YEAR on the lower display, change the value using the UP/DW keys and confirm with the MENU key.

### **M11 – SET SERVICE PASSWORD**

From the home level, press the MENU key and the UP key several times until the display shows M11/**PASS**. Press the MENU key: if the password is null, the SET label appears on the upper display while the PASS label appears on the lower display. Set your password and confirm by pressing the MENU key.

If, on the other hand, the password is different from zero, the upper display shows the digit 000 and on the lower one the label PASS. Therefore, to change an existing password, use the UP/DW keys to set its value and confirm with the MENU key; if it has been set correctly, the SET label appears on the upper display while the label PASS on the lower display; confirm with menu, the previous password is displayed and set the new one as explained. If it is incorrect it returns ERR and returns to MENU level 11.

### **M12 – LAN PARAMETERS**

From the home level, press the MENU key and the UP key several times until the display shows M12/**AP**. Press the MENU key: the upper display shows the MAC-ADRESS with scrolling characters. Pressing the MENU key again, the upper display shows the wifi transmission channel on which the controller is tuned, on the lower CH. Using the UP/DW keys it is possible to change the transmission channel only if the device is not connected to a router. The channel is confirmed by pressing the MENU key. Pressing the MENU key again the upper display shows RST/PSW. The next press of the MENU key deletes the wifi password of the local network. Exit with the ON/OFF key.

### **M13 – LIGHT OFF HOUR**

From the home level, press the MENU key and the UP key several times until the display shows M13/**LOF**. Press MENU again, the upper display shows OFF (only if a switch-off time has never been set) the lower one remains off. Press MENU again. Use the UP/DW keys to set the switch-off time (OFF = never, 1h-24h) of the compartment light that appears on the upper display and confirm with MENU. After the message DONE The display returns to home level.

**M14 – UNIT START HOUR**

This menu allows to set a switch-on time for the refrigeration unit if it is powered and in Stand-by status. From the home level, press the MENU key and the UP key several times until the display shows M14/**COOL**. Press MENU key again, the upper display shows OFF (only if a switch-on time has never been set) the lower one remains off. Press MENU key again. Use the UP/DW keys to set the switch-on time (OFF = never, 1h-24h) of the refrigeration unit that appears on the upper display and confirm with MENU key. After the message DONE The display returns to home level.

**M15 – HOW TO SET HUMIDITY**

This menu appears only if the humidity function is foreseen in the refrigeration unit. From the normal operating status press the MENU key and the UP key several times: when the display shows M15/**RH** press the menu key again and use the UP/DW keys to set the new humidity set. Confirm with the menu button; the display shows the new value for 2 sec, the done label and returns to the home level with the new set.

**M16 - HOW TO SET 2nd ROOM TEMPERATURE**

This menu appears only if the function is foreseen in the refrigeration unit. From the normal operating status press the MENU key and the UP key several times: when the display shows M16/**SET2** press the menu key again and use the UP/DW keys to set the new temperature set. Confirm with the menu button; the display shows the new value for 2 sec, the done label and returns to the home level with the new set.



### RUNNING EVENTS TABLE

UPPER DISPLAY	<b>-12.9°</b>	Coldroom temperature
LOWER DISPLAY	<b>Hi</b>	<b>High temperature</b>
<b>Hi</b> not blinking	->	high temperature pre-alarm
<b>Hi</b> blinking	->	high temperature alarm running
UPPER DISPLAY	<b>-26.5°</b>	Coldroom temperature
LOWER DISPLAY	<b>Lo</b>	<b>Low temperature</b>
<b>Lo</b> not blinking	->	low temperature pre-alarm
<b>Lo</b> blinking	->	low temperature alarm running
UPPER DISPLAY	<b>-12.9°</b>	Coldroom temperature
LOWER DISPLAY	<b>Fail</b>	<b>Fail running</b>
UPPER DISPLAY	<b>-12.9°</b>	Coldroom temperature
LOWER DISPLAY	<b>DEFR</b>	<b>Defrost Time-out</b>

### INVERTER EVENTS CODE

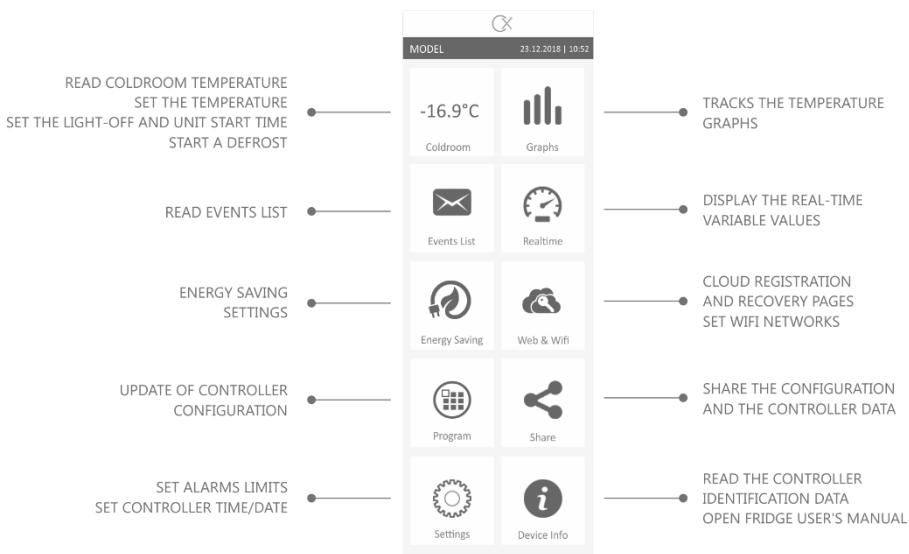
For compressors with inverters, fail status event is shown with <b>Fxx</b>	<b>F32</b>	VSC_COMM
	<b>F33</b>	VSC_OVERLOAD
	<b>F34</b>	VSC_EXTREME_OVERLOAD
	<b>F35</b>	VSC_START
	<b>F36</b>	VSC_SHORTCIRCUIT
	<b>F37</b>	VSC_ROTOR

### RECORDED EVENTS TABLE

UPPER DISP.	<b>Pr1-4</b>	Probe NTC S1, S2, S3, S4
LOWER DISP.	<b>PROB</b>	<b>Probe Fail</b>
UPPER DISP.	<b>NTC</b>	PCB probe
LOWER DISP.	<b>PROB</b>	<b>Probe Fail</b>
UPPER DISP.	<b>45°</b>	Technical room temperature
LOWER DISP.	<b>TBO</b>	<b>Technical room high temp.</b>
UPPER DISP.	<b>58.6°</b>	Condenser temperature
LOWER DISP.	<b>HICN</b>	<b>Condenser high temperature</b>
UPPER DISP.	<b>-23.8°</b>	Evaporator temperature
LOWER DISP.	<b>LOEV</b>	<b>Low temperature evaporator</b>
UPPER DISP.	<b>HP1</b>	High pressure switch intervention
LOWER DISP.	<b>HP</b>	<b>High Pressure</b>
UPPER DISP.	<b>12'</b>	Defrost timer
LOWER DISP.	<b>DEFR</b>	<b>Defrost time-out</b>
UPPER DISP.	<b>D1</b>	Digital input
LOWER DISP.	<b>DOOR</b>	<b>Opened door time-out</b>
UPPER DISP.	<b>12.8°</b>	Temperature peak
LOWER DISP.	<b>Hi</b>	<b>High temperature alarm</b>
UPPER DISP.	<b>-2.4°</b>	Temperature peak
LOWER DISP.	<b>Lo</b>	<b>Low temperature alarm</b>

### 3.0 LOCAL CONNECTIVITY - CONNEX APPLICATION

The CONNEX application can be downloaded for free from PlayStore or Apple store, allows the management and monitoring of the refrigeration unit via WiFi connection. Below is displayed the home page.



## 4.0 WIFI SETTINGS AND USER REGISTRATION

From the vertical page scrolling WEB&WIFI menu perform the following actions. The confirmation of successful access to the router, turns on the wifi icon located to the right of the display. Confirmation of successful connection to the Cloud, turns on the cloud icon located to the right of the display.

The screenshot shows a mobile application interface with the following sections:

- ROUTER**: Includes fields for 'Network' and 'Password', and a 'CONNECT' button.
- THERMOSTAT PASSWORD**: Includes fields for 'AP Name' and 'Password', and a 'CONFIRM' button.
- WIFI REGISTRATION**: Includes fields for 'Company Name', 'Address', 'City', and 'Mail address', and a 'SEND' button.

1. Select the name of the wifi network to connect
2. Enter the network password
3. Press CONNECT key
4. Enter the password for controller access
5. Name specific unit (Icecream, Pastry, etc)
6. Press CONFIRM key
7. Edit location name
8. Edit location address
9. Edit city name
10. Edit the email address to receive the reports
11. Press SEND key

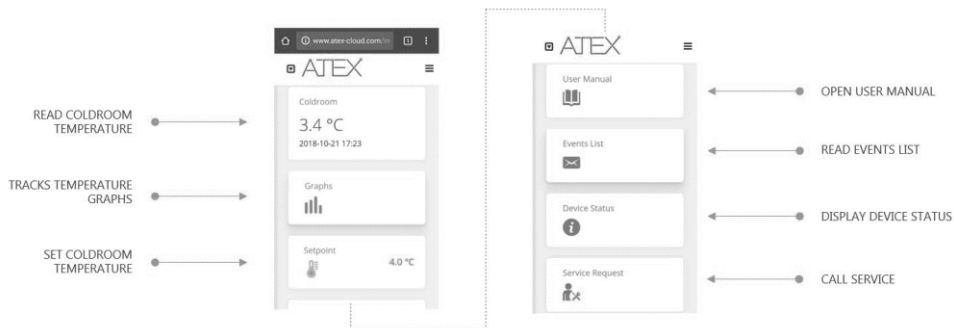
### MULTIUSER

In case of several controllers present, the registration must be repeated for each device without prejudice to points 7-8-9-10.

Within few minutes registration e-mail will be delivered with the credentials to access the web pages

## 5.0 REMOTE CONNECTIVITY – WEB PAGES

Once registered, with the web access credentials, user can connect to the device from any Internet point by consulting the WEB PAGES. Also weekly will receive via email the HACCP report with daily charts and any alerts in real time.



### FREE SERVICES

ALERT  
MAILING

END ALERT  
NOTICE

WEEKLY DELIVERY BY EMAIL OF A  
GRAPHICAL REPORT IN PDF FORMAT





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