GEM R4

GELATO/ICE CREAM

E

Maintenance

And Use Manual

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1. INTRODUCTION

PRESENTATION

Dear Client,

Oscartek is pleased to number you among its customers and relies the bought machine will match your expectation. In order to get the best performances of the machine, we recommend you to follow all suggestions and instructions, which are included in this manual.

1.2. HOW TO USE THE MACHINE

- *PERMITTED USES*

This refrigerated display cabinet has been manufactured for **ice cream** presentation and sell.

- *NOT PERMITTED USES*

It is absolutely forbidden the use of the refrigerated display cabinet for **pharmaceutical products**.

1.3. RESPECTED NORMS

The refrigerated display cabinet has been manufactured in respect of the safety issues relevant to the following norm:

- **Machinery Directive** N° 2006/42/CE : CE marking for machinery
- **Directive** N° 2006/95/CE : Low tension
- **Directive** N° 2004/108/CE : Electro-magnetic Compatibility
- **Directive** N° 97/23/EC (P.E.D.) : European Pressure Equipment
- **Norm** CEI 17-13/1 (EN 60439/1) : Realization of Electric Installations
- **Norm** CEI EN 60335-1 (CEI 61-150) : Safety of household and similar electrical appliances
- **Norm** CEI EN 60335-2-24 (CEI 61-56) : Special norms for refrigerators, freezers and ice machines

1.4. RESPONSIBILITY

Oscartek declines any responsibility relevant to damages on persons, animals and/or products in case of:

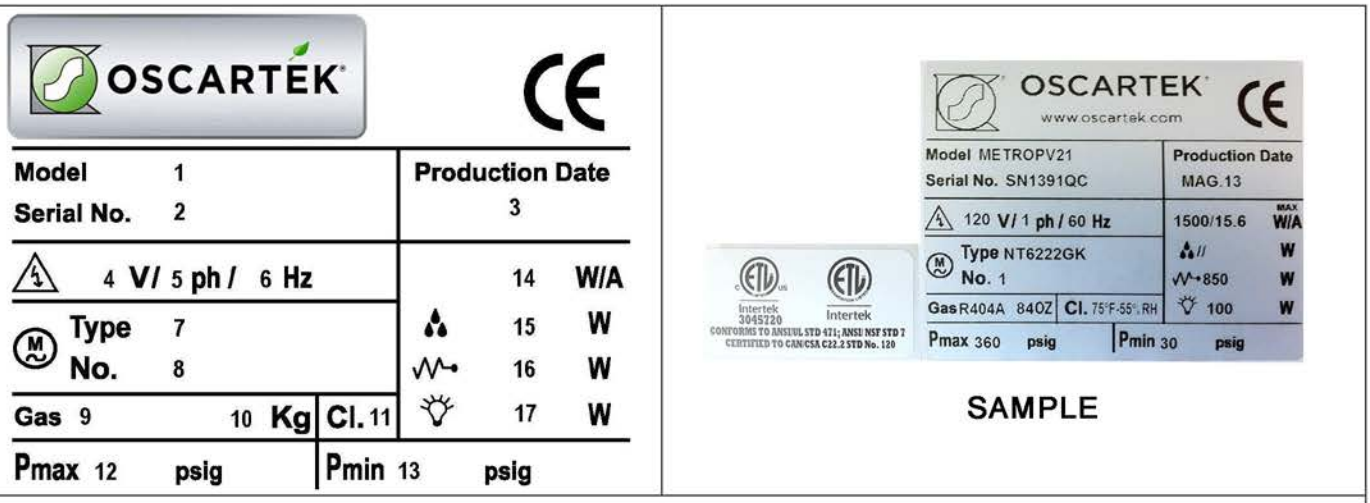
- No respect of in force norms
- Installation, which is not conform to the instructions manual
- No observance of all maintenance operations, which are suggested in this manual
- No previously agreed change operations with the manufacturer
- No proper use of the refrigerated display cabinet, for which the machine has been produced.

1.5. WARNING

Anytime Oscartek reserves the right to up-date the content of this manual and/or to modify the product in order to improve its quality and performance, without any previous notice and/or communication.

2. DISPLAY CASE DATA PLATE

2.1. DATA PLATE CONTENT



1. Commercial name of the unit
2. Identification number
3. Production date
4. Voltage
5. Phases
6. Frequency
7. Compressor type
8. Number of compressor
9. Refrigerant type
10. Refrigerant weight
11. Climatic rate (Cl.3 = +25°C/60% U.R.; Cl. 4 = +30°C/55% U.R.)
12. Test pressure – system high pressure side
13. Test pressure – system low pressure side
14. Nominal power/current absorbed during defrost
15. Max. power absorbed during defrost
16. Nominal power absorbed by heating elements (only if higher than 100W)
17. Lighting nominal power

3. INSTALLATION

3.1. MACHINE HANDLING

- The ice cream display cabinet handling, from the truck to the final place, has to be made by any truck-lift, which is proper to its weight. The display cabinet shall be always balanced in order to ensure personnel integrity and machine functionality

- The cabinet can be shipped with or without wood packaging, in case wood crate will be used, will have a pallet base for an easy fork-lift handling. The pallet, however should be handle in the central position

- During the shipment, it is necessary to avoid any crash or/and shake of the display cabinet in order to not damage its frame, especially its glasses.

- Do not drag the display cabinet on the floor and do not push it on the upper glasses.

3.2 STOCK OF THE DISPLAY CABINET

- Whenever the cabinet has to be stoked, follow carefully what suggested before.
- Environmental temperature during the cabinet stock can have following range -15°C and + 55°C and humidity between 30% and 90%.
- The display cabinet has always to be protected by sunrays and raining.
- In case the display cabinet has to remain in stock quite long time before its use, keep it with its packaging in order to maintain its protection.

3.3. PACKAGING REMOVE

Before getting the display cabinet from the forwarding agent, check its conditions. In case it will be some damages, inform the driver and sign it on shipping documents. **Eventual damages relevant to the shipment and/or to the wrong stock, have not to be ascribed to the manufacturer.**

3.4. DISPLAY CABINET POSITION

The refrigerated display cabinet needs particular environmental conditions in order to offer the right performance, so that the area where it will be used has to respect following indications

- Floor has to be levelled perfectly, on the contrary keep the display cabinet on the horizontal position in order to guarantee a perfect defrosting water drain and avoid boring compressor noises.

- The display cabinet has to not be under the sun-rays in order to have its better refrigeration performance, has to remain inside the local or to be sheltered by window curtain. If what described above is not observed, it can determinate an increase of temperature of displayed product and an increasing power consume.

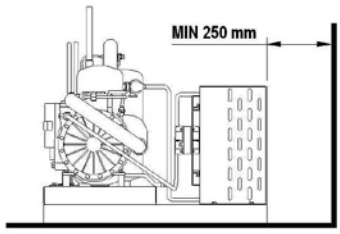
- The display cabinet has not to be under air currents due to open doors or windows, or under roof ventilators or under air condition outlets.
  In case will be not respected the above suggestions it can arise an increasing of temperature of the displayed product and/or an increasing ice phenomena on the evaporator and internal fans, which compromise the correct cold air circulation and product consistence.

- The display cabinet has not to be placed close any heat source as heaters, ovens, etc

- The display cabinet has to have a sufficient place in order to ensure a correct custom service, to make an easy maintenance operation, to guarantee the right air flow necessary to make cold the condenser. Besides the warm air which flows out has to no have any obstacle or to invest other equipments in order to not reduce the correct functions.

3.5. REMOTE CONDENSING UNIT PLACING

- According to the model of ice cream display cabinet you have No.1 or No.2 internal, or remote, condensing units.
- The remote condensing unit has to be checked by specialised technicians and according to the required refrigerating power and their position respect the cabinet. The condensing unit has to be placed following these points:
- The condensing unit has to be located at least 250 mm from any eventual wall. **(pic.3.5)**
- Air flow direction has to be from the eventual wall towards compressor.
- The local, in case will be closed, has to be with enough air circulation.
- By the condenser has to be guaranteed in any case as much as possible cold air.
- In case will be necessary it has to be foreseen a forced air exchange by any fan according to the air flow of condenser.
- The condensing units of display cabinets have to be fixed properly.
- The generated noise has not exceed the admitted noise levels relevant to the public places, especially in case of domestic buildings.
- It is always necessary a sufficient place along the four sides of the display cabinet in order to make easy any type of check and maintenance operations.
- When the condensing units are external will be necessary a frame holder that has to be fixed in a proper way and eventually added with amortising elements. Besides this frame has to be closet with no-water protection grid and sufficient opening holes for ventilation.



pic.3.5

3.6 PIPING CONNECTION BETWEEN DISPLAY CABINET AND REMOTE CONDENSING UNITS.

- The liquid and suction piping exit from the base of the display cabinet. The choice of piping diameter and insulation thickness has to be taken by specialised technical personnel, who know specific parameters.
- The choice of piping diameter and insulation thickness has to be taken by specialised technical personnel, who know specific parameters.
- The piping length has to be as short as possible.
- The piping arrangement has to be made on purpose by qualified personnel in order to guarantee the main functionalities as the right inclination, to have some siphons on the base of suction piping on the way up, and eventually on the intermediate elevation.

WARNING! A wrong connection may occur serious damages on the display cabinet, especially on the compressor. The display cabinet manufacturer cannot be responsible of any damage, which can arise from a wrong connection made by third parties.

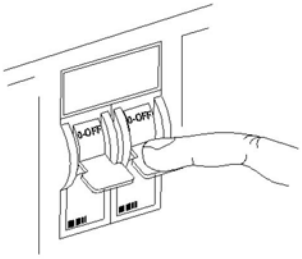
3.7 ELECTRICAL CONNECTION

- Before proceeding with electrical connection, be sure that the available electric power and tension are what is required on technical label of the cabinet.
- The electric connection has to be made by qualified personnel and following manufacturer's instructions taking into
- consideration the relevant norms in force.

- The display cabinet has already a general switch, however it is necessary an omni polar switch, with a minimum distance among the contacts of 3mm.
- It is obligatory that the display cabinet will be connected properly with an efficient ground socket.

WARNING! A wrong connection may occur always to persons, animals and things, where the manufacturer cannot be considered as responsible.

WARNING!
The display cabinet has no main switch breaking all the phases.
Before any maintenance operation disconnect the electrical supply of the display cabinet (see label on the rear of the display cabinet). (pic.3.7).



pic.3.7

3.8 ELECTRICAL CONNECTION – REMOTE CONDENSING UNIT

In case the display cabinet has a remote condensing unit, the electric control panel is supplied separately; in case the display cabinet is without condensing unit, the machine can be supplied without external control panel. However the electrical connection has to be made connecting all terminals; they are numbered and represent:

1-2 Electrical supply
3-4 Compressor switch
5-6 Defrosting switch
Ground connecting terminal

3.9. IDRAULIC CONNECTION

- In case the display cabinet has an internal condensing unit by air, it is not necessary any water system connection.
- In case the display cabinet has a dipper well, it is necessary make the connection of its water outlet with the main water drain outlet; besides it is necessary set a load water tube to the dipper well, to the operator side, to the right or to the left, according to customer's choice.
- In case the display cabinet has condensing unit working fully or partially by water, it is necessary to connect the load water tube (this is the tube with thermo insulation) with the unload water tube(this is the tube without thermo insulation), of condenser working by water, to the water line

3.10. IDRAULIC CONNECTION - REMOTE CONDENSING UNIT

- In the case then display cabinet has a remote condensing unit, it is necessary make the connection of defrosting water outlet with the main water drain outlet. There is a female pipe-fitting with a rapid receptacle for a tube Ø 32 mm

4. WORKING WITH DIXELL XW271L

4.1. PRELIMINARY STEPS

- Model with built-in system. Before delivery to customer, it is very important that technicians will verify the correct functioning of the unit, so to obtain best possible efficiency
- Model with remote condensing unit. Please proceed as per previous point and carry out the following operations with accuracy:

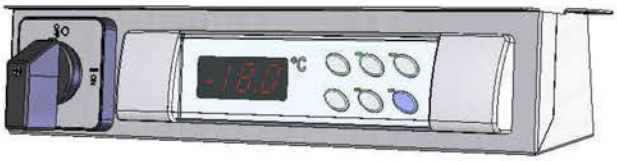
- Verify, when the unit is out, that no leak of refrigerant is observed (systems are generally tested with reference to their wet seal)
- Verify through the liquid-gauge that the refrigerant charge is appropriate
- Regulate the condensing pressure control system
- Regulate the expansion valve properly, after you have completely opened the valve that controls the compressor's carter pressure
- Regulation of the above control valve can only be done during defrost cycle
- Regulate high and low pressure valves
- Verify that water does not leak from the insulated pipes or from the joints

4.2. SET INTO OPERATION

In order to set the unit into operation please operate on the following buttons:

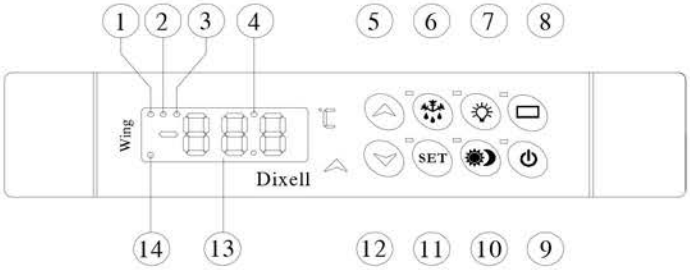
- Main switch
- ON-OFF button on the control panel **(pic.4.2)**.
- Light button on the control panel
- Electronic control, on the control panel, for temperature setting.

pic.4.2

CONTROL PANEL	

4.3. ELECTRONIC CONTROLLER

Refer to **pic.4.3**



pic.4.3

- **ON-OFF FUNCTION.**
  Press the ON-OFF button **(9)** for 3 seconds to turn on or to turn off the displlay cabinet;
  After the start of the display cabinet , the electronic controller is working when the temperature is displayed.
  After a power failure , the electronic controller will again work as before.
- **HOW TO LOCK-UNLOCK THE KEYBOARD.**
  Press together the buttons **(5)** and **(12)** for more 3 seconds for locking the keyboard : the **"POF"** message will be displayed. It is only possible to see the temperature displayed. Press together the buttons **(5)** and **(12)** for more 3 seconds for unlocking the keyboard : the **"POn"** message will be displayed.
- **HOW TO SWITCH ON-OFF THE LIGHT.**
  Press the button **(7)**.
- **HOW TO SEE AND MODIFY THE SET POINT.**
  Press and immediately release the button **"SET"(11)**. The SET led starts blinking. To change the Set value press the buttons **(5)** or **(12)** within 10 seconds. To memorize the new set point value press the button **"SET"(11)**.
- **HOW TO START A MANUAL DEFROSTING.**
  Press the button **(6)** for more than 2 seconds. The programmed interval to the next defrosting cycle will be automatically reset. Due a power failure during a manual defrosting cycle , this cycle will be breacked and the programmed interval to the next defrosting cycle will be automatically reset.
- **BUTTON (8).**
  In the present electronic controller the button **(8)** is disabled.

➢ HOW TO SEE AND MODIFY THE PARAMETERS VALUES.

- Press the button **(12)** and at the same time press the button **"SET"(11)** for 3 seconds : the "HY" flashing message will be displayed.
- Press the button **(5)** to reach the message **"PR2"**.
- Press the button **"SET"(11)**, **"0 - -"** will be displayed with **"0"** flashing , after input the password **"321"** as follows.
- Press the button **(5)** three times to reach "3" and confirm with the button **"SET"(11)** ; "0" will be displayed flashing.
- Press the button **(5)** two times to reach "2" and confirm with the button **"SET"(11)** ; "0" will be displayed flashing.
- Press the button **(5)** one time to reach "1" and confirm with the button **"SET"(11)** .
- Now it is possible to see and/or modify the parameters values.
- Remember to press the button **"SET"(11)** to memorize the new values.
- Wait a few seconds without pressing any button.

➢ HOW TO SEE THE PROBES VALUES.

- Enter in **"PR2"** level.
- Select **"Prd"** parameter and press the button **"SET"(11)** todisplay **"Pb1"** label alternate with Pb1 value.
- Use the buttons **(5)** and **(12)** to display the other probes values.

➢ ALARMS.

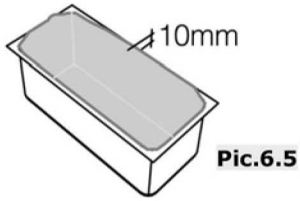
Message	Cause	Outputs	
"P1"	Thermostat probe failure	Compressor output according to parameters "Con" and "Cof"	The alarm message is displayed until the alarm condition is recovery. All the alarm messages are showed alternating with the cabinet temperature except for the "P1" which is flashing. To reset the "EE" alarm and restart the normal functioning press any key ; the "rSt" message is displayed for about 3 seconds.
"P2"	Evaporator probe failure	Unchanged , only message	
"P3"	Auxiliary probe failure	Unchanged , only message	
"HA"	Maximum temperature alarm	Unchanged , only message	
"LA"	Minimum temperature alarm	Unchanged , only message	
"EE"	Data or memory failure	Unchanged , only message	
"dA"	Defrost timeout alarm	Unchanged , only message	
"EAL"	External alarm	Unchanged , only message	
"BAL"	Serious external alarm	Other outputs OFF	
"PAL"	Pressure switch alarm	Other outputs OFF	

ALARM RECOVERY

- Probe alarms **"P1"** , **"P2"** and **"P3"** automatically stop 10 seconds after the probe restarts normal operation; check connections before replacing the probe.
- Temperature alarms **"HA"** and **"LA"** automatically stop as soon as the thermostat temperature returns to normal values or when the defrost starts.

4.4. PRODUCT LOADING

- Beore loading the product inside the display cabinet, wait until the unit reaches the pre-set temperature and the compressor starts its cycle.
- Load the produt only if it already has the correct storage temperature.
- Always check that the cold air inlet and outlet are not completely or partially obstructed by the product.
- The product doesn't exceed the load limit represented in **Pic.6.5.**



Pic.6.5

4.5. SUGGESTED TEMPERATURES

The average storage temperatures for each kind of the refrigerated products are the following :

- Ice cream -13 ÷ -18 °C
- Granita -8 ÷ -12 °C
- Cake, industrial ice cream -20 ÷ -22 °C

4.6. AUTOMATIC DEFROSTING

The present refrigerated display cabinet has an automatic defrosting to eliminate the ice and snow on the evaporator.
All the parameters are pre-set by the customer , nevertheless their values can be changed by qualified technical personnel to adapt the working of the display cabinet to the particular ambient conditions. RECOMMEND CASE BE TURNED OFF ONCE A WEEK FOR A OVERNIGHT DEFRSOT (10-12HRS).

4.7. USE OF THE CURTAIN AND THE SLIDING PANELS

In order to guarantee the correct working of the display cabinet and whenever the sales allows it, the curtain must always be rolled down or , if present, the sliding panels must be closed.

4.8. STOPPING THE UNIT

If you wish to stop the display cabinet use the main switch that simultaneously will stop the display cabinet , the condensing unit and the control panel.

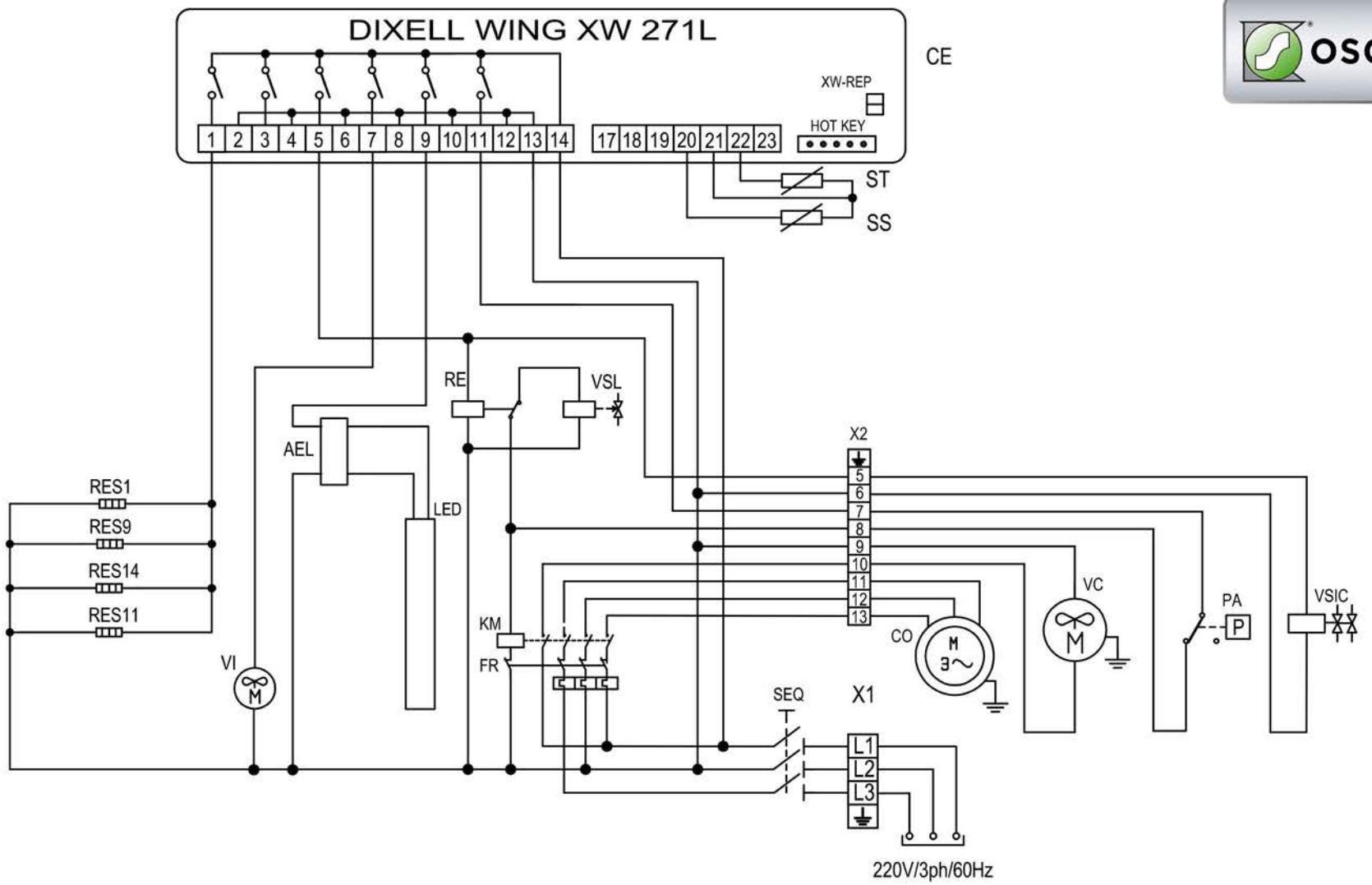
5. DEFECTS AND REMEDIES

DEFECT	PROBABLE CAUSES	POSSIBLE REMEDIES
The unit does not work	Automatic switch released due to absorption overload	Re-start the automatic switch
	Main switch off	Turn the main switch on
	Refrigeration switch off	Turn the refrigeration switch on
	Electrical black-out in the building	If the black-out does not end in a reasonable time frame, it become necessary to move the displayed product in another refrigerator
The temperature inside the display area does not get enough cold	The evaporator(s) is blocked by ice forming	Operate a complete defrost cycle after having displaced the products in another refrigerator.Do not put the product back in the cabinet until the real defect has been identified
	The internal fans are damaged or not working	Replace the damaged fans. If the fans are not damaged, an electrical defect must be identified. If the fans are replaced, the blades' inclination have to be maintained unchanged
	Excess of internal ventilation	Replace the fans and make sure that blades' inclination is kept unchanged
	The pre-set temperature of the digital control panel is wrong	Set the correct temperature
	The digital control is not working	Replace the slave module or the temperature sensor, after you made clear which one is faulty
	The display area is crossed by draught or exposed to direct/reflected sunbeams	Eliminate draughts and try to avoid sunbeams interference in any way
	Air condenser is clogged by dust or dirt	Clean the condenser with accuracy
	The cooling air flow of the condenser is not sufficient	Remove everything that might obstacle the air flow through the condenser
	Refrigerant gas not sufficient inside the cooling system	Find and remove the leak inside the system. Refill the system with the refrigerant
	The cooling water flow of the water condenser is not sufficient	Check that water supply is operating. In case it is, just regulate (or replace) the regulation valve
The product gets too hard next to air outlet and too soft next to air intake	Front evaporator blocked by frost	Verify the efficiency of the gasket seal (relatively to the glass superstructure). Verify that the display area is not crossed by draughts. Verify that backsliders (or night blind) are always closed, peak hours excepted. Verify that internal ventilation is sufficient and that the product does not exceed 10mm above the pans level. Act accordingly
	Front evaporator blocked by ice	All the a.m. checks are required Verify, in addition, the defrost cycle efficiency
	Back evaporator blocked by ice	Verify that the refrigerating and electric systems of the unit are working properly
	Internal fans are not efficient	Restore the efficiency of the fans by replacing the damaged ones
	The basket seal of the glass superstructure is not sufficient	Verify the seriousness of the defect and make sure the draughts are minimized
Some of the products tend to soften, while some other keep the right consistence	The temperature inside the display area is not fit for the products that get too soft	Since the storage temperature cannot be appropriate for any gelato product, based on different flavours and compositions, it is suggested to display only similar products together
The compressor does not start or it does not hold operating	There is no electrical supply	Verify there is no black-out in progress. Turn all the power switches on.
	The supply tension is too low	Verify that nominal tension at connecting clamps is 208 or 230V; a tension between 200V and 240V will be acceptable. If the tension does not reach 198V, the compressor might have problems in starting. Verify the efficiency of electric installation including the connecting clamps to the compressor
	The pre-set temperature on the thermostat is too high	If the preset temperature is higher than in the display area, the compressor is not going to work. Change the settings if you verify that the preset temperature is not enough low
	The intervention of the max pressure valve (where present)	Identify the probable cause among the following: The air condenser is blocked - The cooling fan of the air condenser is not working - The room temperature is too high - Lack of cooling water in the water condenser - The pressure valve is broken - Remove the cause

DEFECT	PROBABLE CAUSES	POSSIBLE REMEDIES
The compressor works constantly or for too long periods	The temperature inside the room is too high	The compressor can only work constantly if there is no chance of decreasing room temperature (for instance with a.c. system)
	The temperature of the compressors' room is too high (remote comp.)	See above
	The air condenser is blocked	Clean the condenser carefully
	Cooling air flow of the water condenser is not sufficient	Check the efficiency of the regulation valve and make sure that taps are turned on
	Lack of refrigerant	Identify the eventual leak and refill with refrigerant
	Internal ventilation is not sufficient	Restore a proper ventilation by replacing the faulty fans or by removing the eventual obstacle
	Evaporators are extremely clogged	Operate a complete defrost cycle
	The temperature set on the thermostat is too low	Adjust temperature settings
Temperature is not displayed on the digital panel	Flat battery	Replace battery
	Sensor does not work properly	Replace digital thermostat
	Faulty electronics	Replace digital thermostat
Defrost water missing	Water drain pipes are blocked	Remove the obstacle
	Defrost cycle is not efficient	Verify the efficiency of control panel (slave module, sensor, solenoid valve..) and the position of the end cycle sensor
Lighting is not working	The switch is off	Turn the switch on
	The neon lamp is not properly fitted in its case	Ad just the lamp by rolling it
	Exhausted lamp	Replace the lamp
	Ballasts or starter are not efficient	Replace faulty components
The unit is too noisy	Vibrations of internal plates	Tighten all the fixing screws
	Internal fans are not fixed well	See above
	Fans' blades are not fixed well	Replace faulty fans. If there is friction between the blades and some ice formation, then act on defrost cycle settings
	Pipes are in contact with other parts of equipment	Avoid any contact between pipes and other parts; a constant rubbing might wear the pipes out and give way to refrigerant leaking
	The unit is not well levelled	Adjust the levelling
Condensation water forming on the glasses	Transformer is not working	Check that the transformer is correctly supplied - Verify the correct functioning of the transformer fuse - Replace the transformer
	Heating circuit interrupted	Replace the glasses

REFRIGERATION AND ELECTRICAL SYSTEM CABLE CONNECTION GUIDE

AGD	DIGITAL FLAVOURS DISPLAY FEEDER
AEL	ELECTRONIC BALLAST
AP	SERVICE VALVE
CA	SUPPLY CABLE
CAR	AIR CONDENSER
CE	ELECTRONIC CONTROL
CN	MULTIPOLAR CONNECTOR
CO	COMPRESSOR
D	DIOD
DEV	SHUNT
DR	REMOTE DISPLAY
EM	PHOTOCELL EMITTER
EV	EVAPORATOR
F	FUSE
FD	FILTER DRIER
FLU	WATER FLOW SWITCH
FR	COMPRESSOR THERMAL PROTECTION
HL	COMPRESSOR ALARM LIGHT
I	GENERIC SWITCH
IEC	WATER EVAPORATION BIN SWITCH
IGD	DIGITAL FLAVOURS DISPLAY
II	LIGHTING SWITCH
IL	SIGHT GLASS
IMC	WARM SHELF SWITCH
INV	INVERTER
IR	REFRIGERATION SWITCH
IRP	LIGHT REFRIGERATION SWITCH
IV	INTERNAL FAN SWITCH
KM	CONTACTOR
LF	FRONT LIGHTING
LI	INTERNAL UPPER LIGHTING
LIA	FRONT LIGHTING
LIG	FLAVOURS DISPLAY LIGHTING
LIP	REAR LIGHTING
MDIG	DIGITAL MODULE FOR FLAVOURS DISPLAY
MM	SPINNING SHELVES ELECTRIC MOTOR
MUC	CONDENSING UNIT ELECTRIC CONNECTIONS
PA	HIGH PRESSURE CONTROL
PD	HIGH-LOW PRESSURE CONTROL
PO	WATER PUMP
QE	EXTERNAL ELECTRIC PANEL
QF	MAGNETIC-THERMIC SWITCH
R	LIGHTING BALLAST
RADD	RECTIFIER
RE	GENERIC RELAY
REL	ELECTRONIC BALLAST
REP	ELECTRONIC CONTROL TEMPERATURE REPEATER
RES1	COLD AIR DISCHERGE HEATING ELEMENT
RES2	FRONT PROFILE HEATING ELEMENT
RES3	RIGHT/LEFT GLASS HEATING ELEMENT
RES4	FRONT GLASS HEATING ELEMENT
RES5	DEFROST HEATING ELEMENT
RES6	WATER EVAPORATION HATING ELEMENT
RES7	TOP LIGHTING FIXTURE HEATING ELEMENT
RES8	LATERAL GLASS SUPPORT HEATING ELEMENT
RES9	FRONT BAND HEATING ELEMENT
RES10	COUPLING BAND HEATING ELEMENT
RES11	SERVICE TOP HEATING ELEMENT
RES12	UPPER BAND/DOOR FRAME HEATING ELEMENT
RES13	HOT DRY/BAIN MARIE DISPLAY HEATING ELEMENT
RES14	ANTI-FOG SUCTION AIR BAND HEATING ELEMENT
RES15	WARM SHELF HEATING ELEMENT
RES16	SIDE BANDS/ FRONT GLASS HINGE HEATING ELEMENT
RES17	DEHUMIDIFICATION HEATING ELEMENT
RES18	DEFROSTING WATER DRAIN HEATING ELEMENT
RES19	RING FRAME HEATING ELEMENT
RES20	SIDE BAND HEATING ELEMENT
RES21	SUCTION AIR GLASS HEATING ELEMENT
RES22	OUTLET AIR HEATING ELEMENT
RES23	REAR GLASS HEATING ELEMENT
RES24	INTERNAL GLASS HEATING ELEMENT
RES25	FRONT GLASS UPPER FRAME HEATING ELEMENT
RES26	FRONT GLASS LATERAL/LOWER FRAME HEATING ELEMENT
RES27	FRONT GLASS LATERAL FRAME HEATING ELEMENT
RES28	FRONT GLASS LOWER FRAME HEATING ELEMENT
RES29	FRONT GLASSES COUPLING PROFILE HEATING ELEMENT
RES30	DOORS FRAME MIDDLE POST HEATING ELEMENT
RES31	GLASSES PERIMETRAL FRAME HEATING ELEMENT
RES32	HEATED DOORS HEATING ELEMENTS
RES33	WATER DRAIN HEATING ELEMENT
RES34	DOORS FRAME HEATING ELEMENT
RES35	COMPRESSOR CRANKCASE HEATING ELEMENT
RES36	FRONT GLASS FRAME HEATING ELEMENT
REV	CONDENSER FAN SPEED CONTROL
REVC	CONDENSER FAN RELAY
RI	REFRIGERANT TAP
RIC	COMPRESSOR DELAYER
RICV	PHOTOCELL RECEIVER
RIS	RESERVE , ANTI-FOG HEATER ELEMENT
RL	LIQUID RECEIVER
RLA	WATER LEVEL ELECTRONIC CONTROL
RO	OIL HEATER ELEMENT
SAA	ABSENCE OF WATER LIGHT
SC	CONDENSER PROBE
SD	TERMINAL BOX
SDC	COMPRESSOR TERMINAL BOX
SE	PROXIMITY SENSOR
SEC	MAIN SWITCH
SFV	TANK BOTTOM HEATING COIL
SIDG	FLAVOURS DISPLAY DIGITAL SYSTEM
SL	LIQUID SEPARATOR
SLA	WATER LEVER PROBE
SPC	COMPRESSOR LIGHT
SPMC	WARM SHELF LIGHT
SPR	ELECTRIC SUPPLY LIGHT
SPS	DEFROSTING LIGHT
SS	DEFROSTING PROBE
ST	TEMPERATURE PROBE
STR	LIGHTING STARTER
SU	HUMIDITY PROBE
T	TEMPERATURE CONTROL
TI	WINTER THERMOSTAT
TC	CAPILLARY TUBE
TE	TIMER
TER	THERMOMETER
TF	FUSIBLE PLUG
TMC	WARM SHELF THERMOSTAT
TP	LIGHTING FIXTURES REGRIGERATOR THERMOSTAT
TRA	TRANSFORMER
TRC	ELECTRONIC CONTROL TRANSFORMER
TREV	WATER EVAPORATION HEATER ELEMENT THERMOSTAT
TS	SECURITY THERMOSTAT
TVC	CONDENSER FAN THERMOSTAT
V	COMPRESSOR FAN / GENERAL USE
VC	CONDENSER FAN
VEC	WATER EVAPORATION BIN
VES	EXPANSION VALVE
VI	INTERNAL FAN
VPA	CONDENSING PRESSURE CONTROL WATER VALVE
VR	CHECK VALVE
VRA	SUCTION PRESSURE REGULATION VALVE
VRE	EVAPOTATING PRESSURE REGUTATION VALVE
VS	GENERAL USE SOLENOID VALVE
VSA	SOLENOID WATER VALVE
VSAB	BY-PASS SOLENOID WATER VALVE
VSIC	REVERSING CYCLE SOLENOID VALVE
VSL	LIQUID SOLENOID VALVE
VSS	DEFROSTING SOLENOID VALVE
VT	POWER REGULATOR
VV	GLASS FAN
X1	CABINET CONNECTIONS
X2	EXTERNAL ELECTRIC PANEL CONNECTIONS
X3	CONDENSING UNIT CONNECTIONS



OSCARTEK

REV.	DATA	DESCRIZIONE
0	24/04/08	EMISSIONE

Rugosità - Ra 3,2

QUOTE SENZA INDICAZIONE DI TOLLERANZA - Grado di precisione medio UNI 5307

0÷6 ±0,06	6÷30 ±0,1	30÷120 ±0,15	120÷315 ±0,2	315÷1000 ±0,3	1000÷ 2000 ±0,5	3÷6 ±1°	6÷30 e 30'	30÷120 e 20'	oltre 120 e 10'	Smussi e Raggi 0,3÷0,8

TRATT. SUPERFICIALE

Togliere Bavature
Toll. generali vedi tabella

VERIFICA	APPROVAZIONE

DENOMINAZIONE: Wiring diagram

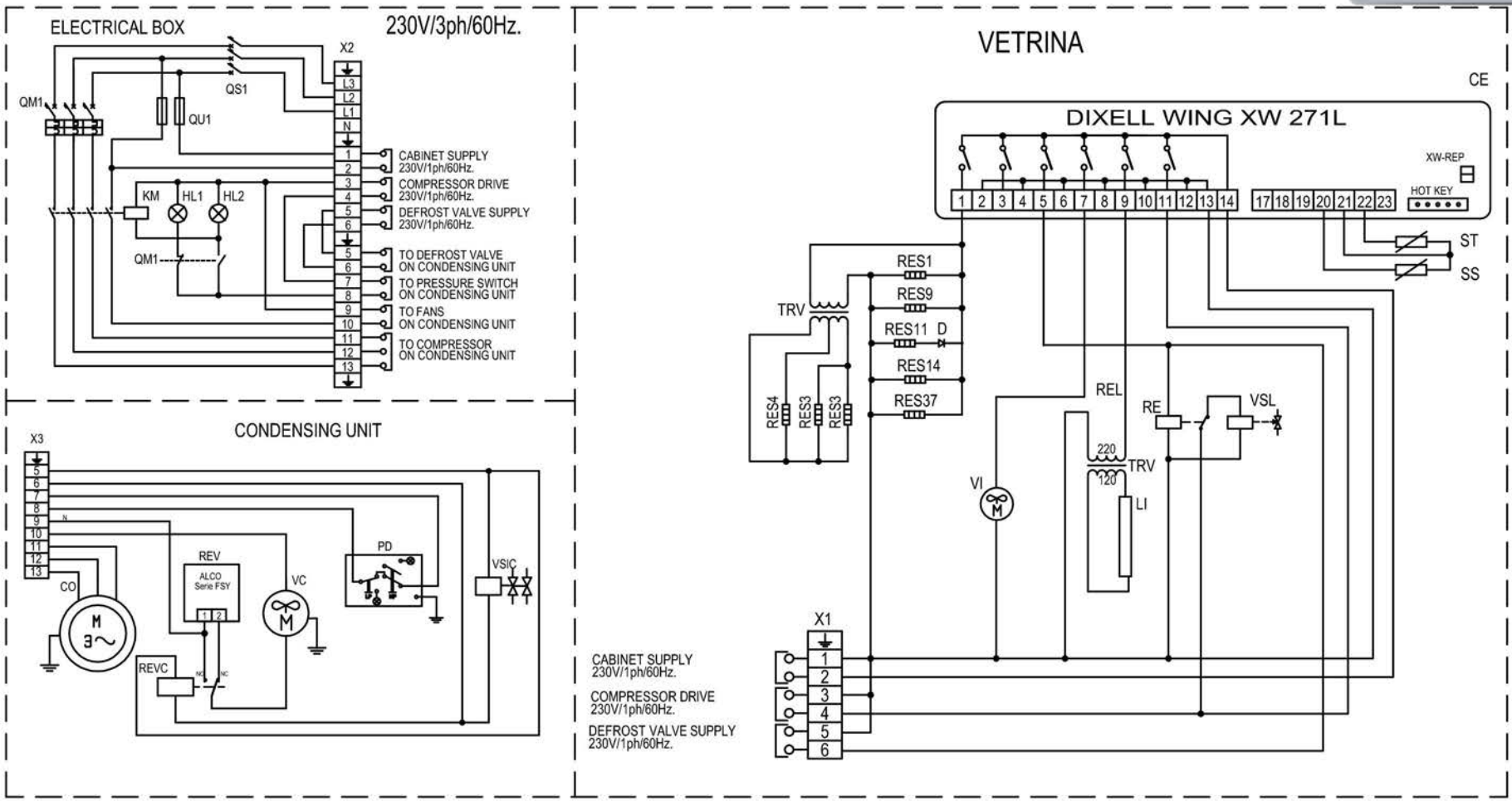
SCALA

MATERIALE	Q.tà
FINITURA	Peso (Kg)

DATA: 24 / 04 / 08

P / N: SEF 324-08_ETL

FOGLIO



OSCARTEK

Rugosità - Ra 3,2

QUOTE SENZA INDICAZIONE DI TOLLERANZA - Grado di precisione medio UNI 5307

0÷6	6÷30	30÷120	120÷315	315÷1000	1000÷ 2000	3÷6	6÷30	30÷120	oltre 120	Smussi e Raggi
±0,06	±0,1	±0,15	±0,2	±0,3	±0,5	±1°	e 30'	e 20'	e 10'	0,3÷0,8

TRATT. SUPERFICIALE
Togliere Bavature
Toll. generali vedi tabella

REV.	DATA	DESCRIZIONE	VERIFICA	APPROVAZIONE
0	28/09/11	EMISSIONE		

DENOMINAZIONE: Electrical wiring diagram

SCALA

MATERIALE | Q.tà

FINITURA | Peso (Kg)

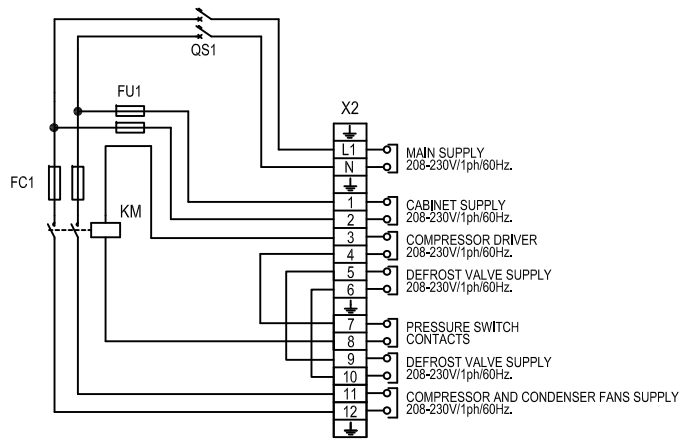
DATA 29/09/11

P / N SEF 397-11

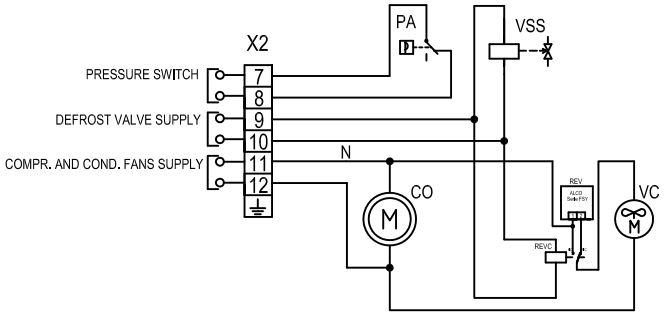
FOGLIO

Certified Quality System ISO 9001:2000

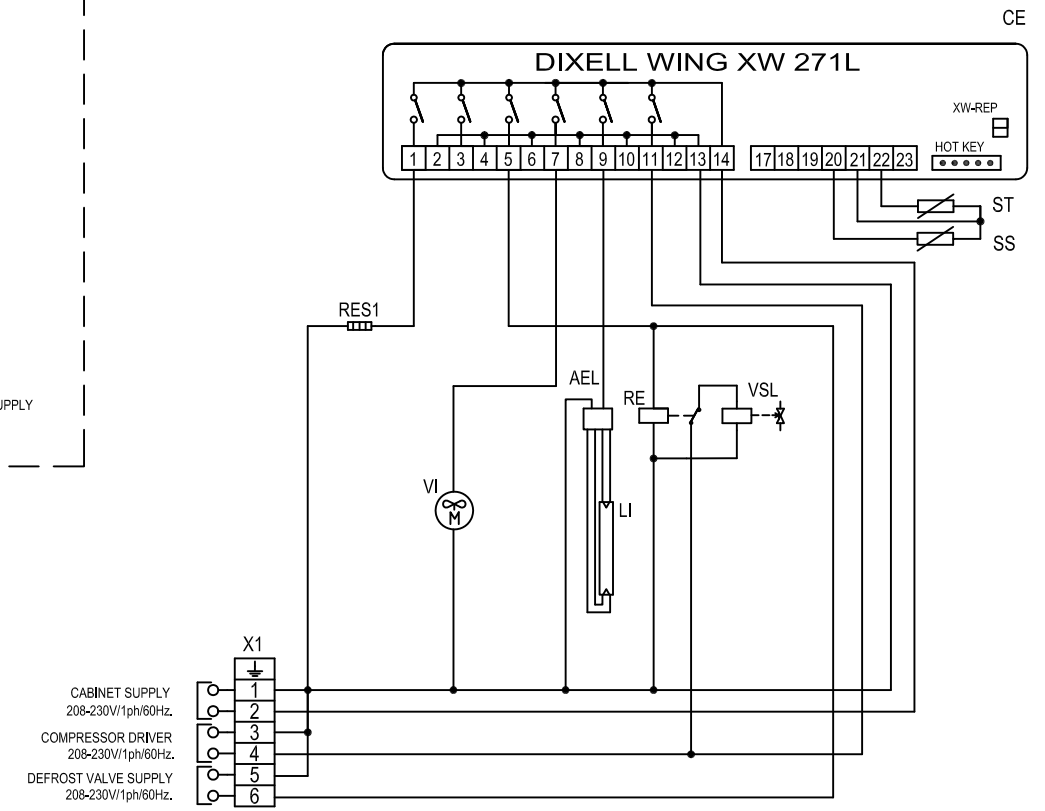
EXTERNAL ELECTRICAL BOX



CONDENSING UNIT



CABINET



OSCARTEK

Rugosità - Ra 3,2

QUOTE SENZA INDICAZIONE DI TOLLERANZA - Grado di precisione medio UNI 5307

0÷6	6÷30	30÷120	120÷315	315÷1000	1000÷ 2000	3÷6	6÷30	30÷120	oltre 120	Smussi e Raggi
±0,06	±0,1	±0,15	±0,2	±0,3	±0,5	±1°	e 30'	e 20'	e 10'	0,3÷0,8

TRATT. SUPERFICIALE
Togliere Bavature
Toll. generali vedi tabella

REV.	DATA	DESCRIZIONE	VERIFICA	APPROVAZIONE
0	12/06/14	EMISSION		

DENOMINAZIONE: Electrical Wiring Diagram
GELATO
External single-phase condensing unit

SCALA

MATERIALE | Q.tà

FINITURA | Peso (Kg)

DESIGNER: Pascolini Ascanio

DATA: 12/06/2014

P / N: SEF V9GEL-INV-UCE MONO-ETL

FOGLIO

Certified Quality System ISO 9001:2008

WING

XW270L - XW271L

1. GENERAL WARNING

1.1 PLEASE READ BEFORE USING THIS MANUAL

- This manual is part of the product and should be kept near the instrument for easy and quick reference.
- The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
- Check the application limits before proceeding.

1.2 SAFETY PRECAUTIONS

- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning: disconnect all electrical connections before any kind of maintenance.
- Fit the probe where it is not accessible by the End User. The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor or to "Dixell s.r.l." (see address) with a detailed description of the fault.
- Consider the maximum current which can be applied to each relay (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining.
- In case of applications in industrial environments, the use of mains filters (our mod. FT1) in parallel with inductive loads could be useful.

2. GENERAL DESCRIPTION

Models **XW270L** and **XW271L**, **38x185** mm format, are microprocessor based controllers suitable for applications on medium or low temperature refrigerating units. They are provided with six relay outputs to control compressor, defrost - which can be either electrical or hot gas - the evaporator fans, the lights, the alarm and an auxiliary output. In **XW271L** the auxiliary output is configured as anti-condensing heater.
They are also provided with three NTC probe inputs, one for temperature control, one to control the defrost end temperature of the evaporator and the third, optional, for the display. There are two digital inputs (free contact) for the door switch and configurable by parameter.
The standard TTL output allows the user to connect, by means of a TTL/RS485 external module, a **ModBUS-RTU** compatible monitoring system and to programme the parameter list with the **"Hot Key".**
An optional output for remote display **"XW-REP"** is available.

3. CONTROLLING LOADS

3.1 THE COMPRESSOR

The regulation is performed according to the temperature measured by the thermostat probe with a positive differential from the set point: if the temperature increases and reaches set point plus differential the compressor is started and then turned off when the temperature reaches the set point value again.
In case of fault in the thermostat probe the start and stop of the compressor are timed through parameters "**COn**" and "**COF**".

3.2 FAST FREEZING

When defrost is not in progress, it can be activated the keypad by holding the ▲ key pressed for about 3 seconds. The compressor operates in continuous mode for the time set through the "**CCt**" parameter. The cycle can be terminated before the end of the set time using the same activation key, ▲ for about 3 seconds.

3.3 DEFROST

Three defrost modes are available through the "**tdF**" parameter: defrost with electrical heater, hot gas or thermostatic defrost. The defrost interval is control by means of parameter "**EdF**": (EdF=in) the defrost is made every "**IdF**" time, (EdF=Sd) the interval "IdF" is calculate through Smart Defrost algorithm (only when the compressor is ON and the evaporator temperature is bigger than "SdF" parameter).
At the end of defrost the drip time is controlled through the "**Fdt**" parameter.

3.4 CONTROL OF EVAPORATOR FANS

The fan control mode is selected by means of the "**FnC**" parameter:
FnC=C-n fans will switch ON and OFF with the compressor and **not run** during defrost:;
FnC=C-y fans will run continuously, but not during defrost
After defrost, there is a timed fan delay allowing for drip time, set by means of the "Fnd" parameter.
FnC=O-n fans will switch ON and OFF with the compressor and **run** during defrost;
FnC=O-y fans will run continuously also during defrost

An additional parameter "FSt" provides the setting of temperature, detected by the evaporator probe, above which the fans are always OFF. This can be used to make sure circulation of air only if his temperature is lower than set in "FSt".

3.5 AUXILIARY OUTPUT

The auxiliary output is switch ON and OFF by means of the corresponding button on the keyboard.
The auxiliary output of the **XW271L** model controls the anti-condensing heater and it is automatically activated if the room temperature is lower than the **"SAA"** parameter.

4. KEYBOARD

set — To display and modify target set point; in programming mode it selects a parameter or confirm an operation.
By holding it pressed for 3s when max or min temperature is displayed it will be erased.

▲ — To see the max. stored temperature; in programming mode it browses the parameter codes or increases the displayed value. By holding it pressed for 3s the fast freezing cycle is started.

▼ — To see the min stored temperature; in programming mode it browses the parameter codes or decreases the displayed value.

By holding it pressed for 3s the defrost is started.

Switch ON and OFF the cold room light.

By holding it pressed for 3s Energy Saving function is started or stopped.

aux — For XW270L model. Switch ON and OFF the auxiliary output.

For XW271L model. Switch ON and OFF the anti-condensing heater output.

Switch ON and OFF the instrument.

KEY COMBINATIONS

▲ + ▼ — To lock and unlock the keyboard.

set + ▼ — To enter the programming mode.

set + ▲ — To exit the programming mode.

4.1 USE OF LEDS

Each LED function is described in the following table.

LED	MODE	Function
❄	ON	The compressor is running
❄	FLASHING	- Programming Phase (flashing with LED 🌀) - Anti-short cycle delay enabled
🌀	ON	The fan is running
🌀	FLASHING	Programming Phase (flashing with LED ❄)
❄	ON	The defrost is enabled
❄	FLASHING	Drip time in progress
❄	ON	The Fast Freezing cycle is enabled
(((●)))	ON	- ALARM signal - In "Pr2" indicates that the parameter is also present in "Pr1"
▭	ON	(Present only in 'XW271L) The Anti-condensing heater relay (Aux) is ON.

Function of the LEDs placed on the left top side of buttons:

BUTTON	MODE	FUNCTION
SET	FLASHING	The Set point is displayed and it can be modified
SET	FAST FLASHING	The Energy Saving is enabled
DEFROST	ON	The Manual Defrost is activated
ENERGY SAVING	ON	The Energy Saving is enabled
LIGHT	ON	The Light is ON
AUX	ON	The Auxiliary output is ON (XW270L)
HEATER	ON	The Anti-condensing heater is ON (XW271L)
ON/OFF	ON	The instrument is OFF

4.2 HOW TO SEE THE MIN TEMPERATURE

1. Press and release the ▼ key.
2. The "Lo" message will be displayed followed by the minimum temperature recorded.
3. By pressing the ▼ key or waiting for 5s the normal display will be restored.

4.3 HOW TO SEE THE MAX TEMPERATURE

1. Press and release the ▲ key.
2. The "Hi" message will be displayed followed by the maximum temperature recorded.
3. By pressing the ▲ key or waiting for 5s the normal display will be restored.

4.4 HOW TO RESET THE MAX AND MIN TEMPERATURE RECORDED

To reset the stored temperature, when max or min temperature is displayed :
1. Press SET key until "rST" label starts blinking.

N.B. After the installation RESET the temperature stored .

HOW TO SEE AND MODIFY THE SET POINT

1. Push and immediately release the **SET** key: the display will show the Set point value;
2. The SET LED start blinking;
3. To change the Set value push the ▲ or ▼ arrows within 10s.
4. To memorise the new set point value push the **SET** key again or wait 10s.

TO START A MANUAL DEFROST

1. Push the **DEF** key for more than 2 seconds and a manual defrost will start.

TO ENTER IN PARAMETERS LIST "PR1"

To enter the parameter list "Pr1" (user accessible parameters) operate as follows:

1. Enter the Programming mode by pressing the Set and DOWN key for few seconds (and start blinking).
2. The instrument will show the first parameter present in "Pr1"

TO ENTER IN PARAMETERS LIST "PR2"

To access parameters in "**Pr2**":

1. Enter the "Pr1" level.
2. Select "Pr2" parameter and press the "**SET**" key.
3. The "PAS" flashing message is displayed, shortly followed by "0 - -" with a flashing zero.
4. Use ▲ or ▼ to input the security code in the flashing digit; confirm the figure by pressing "**SET**". The security code is "321".
5. If the security code is correct the access to "Pr2" is enabled by pressing "**SET**" on the last digit.

Another possibility is the following: after switching ON the instrument the user can push Set and DOWN keys within 30 seconds.

NOTE: each parameter in "Pr2" can be removed or put into "Pr1" (user level) by pressing **"SET"** + ▼. When a parameter is present in "Pr1" LED is on.

HOW TO CHANGE THE PARAMETER VALUE

1. Enter the Programming mode.
2. Select the required parameter with ▲ or ▼.
3. Press the "**SET**" key to display its value (and LED starts blinking).
4. Use ▲ or ▼ to change its value.
5. Press "**SET**" to store the new value and move to the following parameter.

To exit: Press **SET + UP** or wait 15s without pressing a key.
NOTE: the new programming is stored even when the procedure is exited by waiting the time-out.

HOW TO LOCK THE KEYBOARD

1. Keep the ▲ and ▼ keys pressed together for more than 3 s the ▲ and ▼ keys.
2. The "POF" message will be displayed and the keyboard is locked. At this point it is only possible the viewing of the set point or the MAX o Min temperature stored and to switch ON and OFF the light, the auxiliary output and the instrument.

TO UNLOCK THE KEYBOARD

Keep the ▲ and ▼ keys pressed together for more than 3s.

ON/OFF FUNCTION

By pushing the **ON/OFF** key, the instrument shows "OFF" for 5 sec. and the ON/OFF LED is switched ON.
During the OFF status, all the relays are switched OFF and the regulations are stopped; if a monitoring system is connected, it does not record the instrument data and alarms.
N.B. During the OFF status the Light and AUX buttons are active.

TO SEE THE PROBE VALUES

1. Enter in "**Pr2**" level.
2. Select "**Prd**" parameter with ▲ or ▼.
3. Press the "**SET**" key to display "**Pb1"** label alternate with Pb1 value.
4. Use ▲ and ▼ keys to display the other probe values.
5. Press "**SET**" to move to the following parameter.

PARAMETER LIST

REGULATION

Hy **Differential:** (0,1÷25,5°C; 1÷45°F): Intervention differential for set point, always positive. Compressor Cut IN is Set Point Plus Differential (Hy). Compressor Cut OUT is when the temperature reaches the set point.
LS **Minimum set point limit:** (-50,0°C÷SET; -58°F÷SET) Sets the minimum acceptable value for the set point.
US **Maximum set point limit:** (SET÷110°C; SET÷230°F) Set the maximum acceptable value for set point.
OdS **Outputs activation delay at start up:** (0÷255 min) This function is enabled at the initial start up of the instrument and inhibits any output activation for the period of time set in the parameter. (AUX and Light can work)
AC **Anti-short cycle delay:** (0÷30 min) interval between the compressor stop and the following restart.
CCt **Thermostat override:** (0min ÷23h 50min) allows to set the length of the continuous cycle. Can be used, for instance, when the room is filled with new products.
Con Compressor ON time with faulty probe: (0÷255 min) time during which the compressor is active in case of faulty thermostat probe. With COn=0 compressor is always OFF.
COF Compressor OFF time with faulty probe: (0÷255 min) time during which the compressor is off in case of faulty thermostat probe. With COF=0 compressor is always active.

DISPLAY

CF **Temperature measurement unit:** °C = Celsius; °F = Fahrenheit . When the measurement unit is changed the SET point and the values of the regulation parameters have to be modified
rES **Resolution (for °C)**: (in = 1°C; de = 0,1°C) allows decimal point display.
de = 0,1°C
in = 1 °C
Lod **Local display :** select which probe is displayed by the instrument:
P1 = Thermostat probe
P2 = Evaporator probe
P3 = auxiliary probe
1r2 = difference between P1 and P2 (P1-P2)
Red **Remote display :** select which probe is displayed by the remote display (XW-REP)
P1 = Thermostat probe
P2 = Evaporator probe
P3 = auxiliary probe
1r2 = difference between P1 and P2 (P1-P2)

DEFROST

tdF **Defrost type:**
rE = electrical heater (Compressor OFF)
rT = thermostat defrost. During the defrost time "MdF", the heater switches On and OFF depending on the evaporator temperature and "dtE" value.
in = hot gas (Compressor and defrost relays ON)
EdF **Defrost mode:**
in = **interval mode**. The defrost starts when the time "**Idf**" is expired.
Sd = **Smartfrost mode**. The time Idf (interval between defrosts) is increased only when the compressor is running (even non consecutively) and only if the evaporator temperature is less than the value in "**SdF**" (set point for SMARTFROST).
SdF **Set point for SMARTFROST**: (-30÷30 °C/ -22÷86 °F) evaporator temperature which allows the Idf counting (interval between defrosts) in SMARTFROST mode.
dtE **Defrost termination temperature:** (-50,0÷110,0°C; -58÷230°F) (Enabled only when the evaporator probe is present) sets the temperature measured by the evaporator probe which causes the end of defrost.
Idf **Interval between defrosts:** (1÷120h) Determines the time interval between the beginning of two defrost cycles.
MdF **(Maximum) duration of defrost:** (0÷255 min) When **P2P = n**, no evaporator probe, it sets the defrost duration, when **P2P = y**, defrost end based on temperature, it sets the maximum length for defrost.
dFd **Display during defrost:**
rt = real temperature;
it = temperature reading at the defrost start;
Set = set point;
dEF = "dEF" label;
dEG = "dEG" label;
dAd **Defrost display time out:** (0÷255 min) Sets the maximum time between the end of defrost and the restarting of the real room temperature display.
Fdt **Drain down time:** (0÷60 min.) time interval between reaching defrost termination temperature and the restoring of the control's normal operation. This time allows the evaporator to eliminate water drops that might have formed due to defrost.
dPO **First defrost after start-up:**
y = Immediately;
n = after the Idf time
dAF **Defrost delay after fast freezing:** (0min÷23h 50min) after a Fast Freezing cycle, the first defrost will be delayed for this time.

FANS

FnC **Fan operating mode:**
C-n = running with the compressor, OFF during the defrost;
C-y = running with the compressor, ON during the defrost;
O-n = continuous mode, OFF during the defrost;
O-y = continuous mode, ON during the defrost;
Fnd **Fan delay after defrost:** (0÷255 min) The time interval between the defrost end and evaporator fans start.
FSt **Fan stop temperature:** (-50÷110°C; -58÷230°F) setting of temperature, detected by evaporator probe, above which the fan is always OFF.

ALARMS

ALC **Temperature alarm configuration**
rE = High and Low alarms related to Set Point
Ab = High and low alarms related to the absolute temperature.
ALU **High temperature alarm setting:**
ALC= rE, 0 ÷ 50°C or 90°F
ALC= Ab, ALL ÷ 110°C or 230°F
when this temperature is reached and after the ALd delay time the HA alarm is enabled.
ALL **Low temperature alarm setting:**
ALC = rE , 0 ÷ 50 °C or 90°F
ALC = Ab , - 50°C or -58°F ÷ ALU
when this temperature is reached and after the ALd delay time, the LA alarm is enabled,.
AFH **Temperature alarm and fan differential:** (0,1÷25,5°C; 1÷45°F) Intervention differential for temperature alarm set point and fan regulation set point, always positive.
ALd **Temperature alarm delay:** (0÷255 min) time interval between the detection of an alarm condition and the corresponding alarm signalling.
dAO **Delay of temperature alarm at start-up:** (0min÷23h 50min) time interval between the detection of the temperature alarm condition after the instrument power on and the alarm signalling.
EdA **Alarm delay at the end of defrost:** (0÷255 min) Time interval between the detection of the temperature alarm condition at the end of defrost and the alarm signalling.
dot **Delay of temperature alarm after closing the door :** (0÷255 min) Time delay to signal the temperature alarm condition after closing the door.
doA **Open door alarm delay:**(0÷255 min) delay between the detection of the open door condition and its alarm signalling: the flashing message "**dA**" is displayed.
tbA **Buzzer and alarm relay silencing:** by pushing one of the keypad buttons.
n= Only the Buzzer is silenced;
y= Buzzer and relay are silenced.
nPS **Pressure switch number:** (0 ÷15) Number of activation of the pressure switch, during the "**did**" interval, before signalling the alarm event (I2F= PAL).

PROBE INPUTS

Ot **Thermostat probe calibration:** (-12.0÷12.0°C/ -21÷21°F) allows to adjust possible offset of the thermostat probe.
OE **Evaporator probe calibration:** (-12.0÷12.0°C/ -21÷21°F) allows to adjust possible offsets of the evaporator probe.

O3 **Auxiliary probe calibration:** (-12.0÷12.0°C/ -21÷21°F) allows to adjust possible offsets of the evaporator probe.

P2P **Evaporator probe presence:**
n= not present: the defrost stops only by time; **y**= present: the defrost stops by temperature and time.

P3P **Auxiliary probe presence: n**= not present; **y**= present.

HES **Temperature increase during the Energy Saving cycle :** (-30,0°C ÷ 30,0°C / -22÷86°F) sets the increasing value of the set point during the Energy Saving cycle.

DIGITAL INPUTS

odc **Compressor and fan status when open door:**
no = normal;
Fan = Fan OFF;
CPr = Compressor OFF;
F_C = Compressor and fan OFF.

I1P **Door switch input polarity:**
CL : the digital input is activated by closing the contact;
OP : the digital input is activated by opening the contact.

I2P **Configurable digital input polarity:**
CL : the digital input is activated by closing the contact;
OP : the digital input is activated by opening the contact

I2F **Digital input operating mode:** configure the digital input function:
EAL = generic alarm;
bAL = serious alarm mode;
PAL = Pressure switch;
dFr = Start defrost;
AUS = Relay AUX actuation;
Es = Energy Saving;
onF = remote On/OFF.

did **Time interval/delay for digital input alarm:**(0÷255 min.) Time interval to calculate the number of the pressure switch activation when I2F=PAL. If I2F=EAL or bAL (external alarms), "did" parameter defines the time delay between the detection and the the successive signalling of the alarm.

SAA **Set Point for anti-condensing heater:** (-50,0÷110,0°C; -58÷230°F) defines the room temperature setpoint to switch on the anti-condensing heater.

OTHER

Adr **RS485 serial address** (1÷247)**:** Identifies the instrument address when connected to a ModBUS compatible monitoring system.

Rel **Release software:** (read only) Software version of the microprocessor.

Ptb **Parameter table:** (read only) it shows the original code of the **dixell** parameter map.

Prd **Probes display:** (read only) display the temperature values of the evaporator probe Pb2 and the auxiliary probe Pb3.

Pr2 **Access to the protected parameter list** (read only).

DIGITAL INPUTS

The Wing series can support up to 2 free contact digital inputs. One is always configured as door switch, the second is programmable in seven different configurations by the "**I2F**" parameter.

DOOR SWITCH INPUT

It signals the door status and the corresponding relay output status through the "**odc**" parameter:
no = normal (any change);
Fan = Fan OFF;
CPr = Compressor OFF;
F_C = Compressor and fan OFF.
Since the door is opened, after the delay time set through parameter "**dOA**", the alarm output is enabled and the display shows the message "**dA**". The alarm stops as soon as the external digital input is disabled again. During this time and then for the delay "**dot**" after closing the door, the high and low temperature alarms are disabled.

CONFIGURABLE INPUT - GENERIC ALARM (EAL)

As soon as the digital input is activated the unit will wait for "**did**" time delay before signalling the "**EAL**" alarm message. The outputs status don't change. The alarm stops just after the digital input is de-activated.

CONFIGURABLE INPUT - SERIOUS ALARM MODE (BAL)

When the digital input is activated, the unit will wait for "**did**" delay before signalling the "**BAL**" alarm message. The relay outputs are switched OFF. The alarm will stop as soon as the digital input is de-activated.

CONFIGURABLE INPUT - PRESSURE SWITCH (PAL)

If during the interval time set by "**did**" parameter, the pressure switch has reached the number of activation of the "**nPS**" parameter, the "**PAL**" pressure alarm message will be displayed. The compressor and the regulation are stopped. When the digital input is ON the compressor is always OFF.

CONFIGURABLE INPUT - START DEFROST (DFR)

It executes a defrost if there are the right conditions. After the defrost is finished, the normal regulation will restart only if the digital input is disabled otherwise the instrument will wait until the "Mdf" safety time is expired.

CONFIGURABLE INPUT - RELAY AUX ACTUATION (AUS)

This function allows to turn ON and OFF the auxiliary relay by using the digital input as external switch.

CONFIGURABLE INPUT - ENERGY SAVING (ES)

The Energy Saving function allows to change the set point value as the result of the SET+ HES (parameter) sum. This function is enabled until the digital input is activated.

CONFIGURABLE INPUT - REMOTE ON/OFF (ONF)

This function allows to switch ON and OFF the instrument.

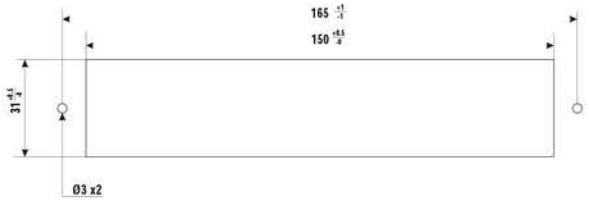
DIGITAL INPUTS POLARITY

The digital inputs polarity depends on "**I1P**" and "**I2P**" parameters.
CL : the digital input is activated by closing the contact.
OP : the digital input is activated by opening the contact

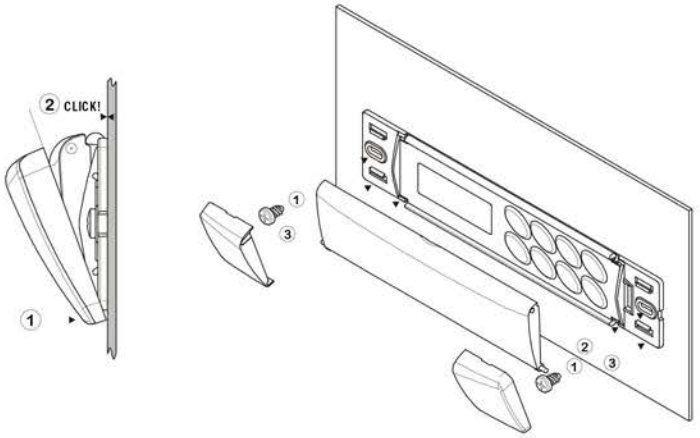
INSTALLATION AND MOUNTING

Instruments **XW270L**, **XW271L** shall be mounted on vertical panel, in a 150x31 mm hole, and fixed using two screws ∅ 3 x 2mm. To obtain an IP65 protection grade use the front panel rubber gasket (mod. RG-L). The temperature range allowed for correct operation is 0 - 60 °C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let the air circulate by the cooling holes.

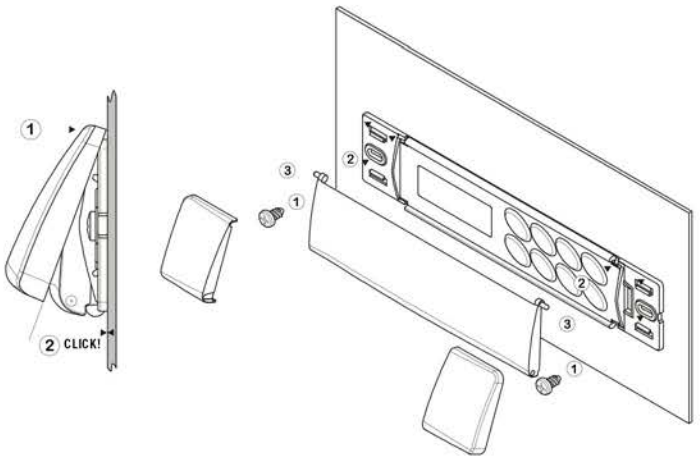
CUT OUT



MOUNTING WITH KEYBOARD COVER OPENING DOWNWARD



MOUNTING WITH KEYBOARD COVER OPENING UPWARD



ELECTRICAL CONNECTIONS

The instruments are provided with screw terminal block to connect cables with a cross section up to 2,5 mm² for the digital and analogue inputs. Relays and power supply have a Faston connection (6,3mm). Heat-resistant cables have to be used. Before connecting cables make sure the power supply complies with the instrument's requirements. Separate the probe cables from the power supply cables, from the outputs and the power connections. Do not exceed the maximum current allowed on each relay, in case of heavier loads use a suitable external relay.
N.B. Maximum current allowed for all the loads is 20A.

PROBE CONNECTIONS

The probes shall be mounted with the bulb upwards to prevent damages due to casual liquid infiltration. It is recommended to place the thermostat probe away from air streams to correctly measure the average room temperature. Place the defrost termination probe among the evaporator fins in the coldest place, where most ice is formed, far from heaters or from the warmest place during defrost, to prevent premature defrost termination.

TTL SERIAL LINE

The TTL connector allows, by means of the external module TTL/RS485, to connect the unit to a network line **ModBUS-RTU** compatible as the **dixell** monitoring system XJ500 (Version 3.0).
The same TTL connector is used to upload and download the parameter list of the "**HOT KEY**".

USE OF THE PROGRAMMING "HOT KEY "

The Wing units can UPLOAD or DOWNLOAD the parameter list from its own E2 internal memory to the **"Hot Key"** and vice-versa.

DOWNLOAD (FROM THE "HOT KEY" TO THE INSTRUMENT)

1. Turn OFF the instrument by means of the ON/OFF key, remove the TTL serial cable if present, insert the **"Hot Key"** and then turn the Wing ON.
2. Automatically the parameter list of the **"Hot Key"** is downloaded into the Wing memory, the "**DoL**" message is blinking. After 10 seconds the instrument will restart working with the new parameters.
3. Turn OFF the instrument remove the **"Hot Key",** plug in the TTL serial cable, then turn it ON again.

At the end of the data transfer phase the instrument displays the following messages:
"**end** " for right programming. The instrument starts regularly with the new programming.
"**err**" for failed programming. In this case turn the unit off and then on if you want to restart the download again or remove the "**Hot key**" to abort the operation.

UPLOAD (FROM THE INSTRUMENT TO THE "HOT KEY")

1. Turn OFF the instrument by means of the ON/OFF key and remove the TTL serial cable if present; then turn it ON again.
2. When the Wing unit is ON, insert the "**Hot key**" and push ▲ key; the **"uPL"** message appears.
3. Push "**SET**" key to start the UPLOAD; the "**uPL**" message is blinking.
4. Turn OFF the instrument remove the **"Hot Key",** plug in the TTL serial cable, then turn it ON again.

At the end of the data transfer phase the instrument displays the following messages:
"**end** " for right programming.
"**err**" for failed programming. In this case push "SET" key if you want to restart the programming again or remove the not programmed "**Hot key**".

ALARM SIGNALS

Message	Cause	Outputs
"P1"	Thermostat probe failure	Alarm output ON; Compressor output according to parameters "COn" and "COF"
"P2"	Evaporator probe failure	Alarm output ON; Other outputs unchanged
"P3"	Auxiliary probe failure	Alarm output ON; Other outputs unchanged
"HA"	Maximum temperature alarm	Alarm output ON; Other outputs unchanged
"LA"	Minimum temperature alarm	Alarm output ON; Other outputs unchanged
"EE"	Data or memory failure	Alarm output ON; Other outputs unchanged
"dA"	Defrost timeout alarm	Alarm output ON; Other outputs unchanged
"dAL"	Door switch alarm	Alarm output ON; Other outputs unchanged
"EAL"	External alarm	Alarm output ON; Other outputs unchanged
"BAL"	Serious external alarm	Alarm output ON; Other outputs OFF
"PAL"	Pressure switch alarm	Alarm output ON; Other outputs OFF

The alarm message is displayed until the alarm condition is recovery.
All the alarm messages are showed alternating with the room temperature except for the "P1" which is flashing.
To reset the "EE" alarm and restart the normal functioning press any key, the "**rSt**" message is displayed for about 3s.

SILENCING BUZZER / ALARM RELAY OUTPUT

If "**tbA = y**", once the alarm signal is detected the buzzer and the relay are is silenced by pressing any key.
If "**tbA = n**", only the buzzer is silenced while the alarm relay is on until the alarm condition recovers.

"EE" ALARM

The **dixell** instruments are provided with an internal check for the data integrity. Alarm "EE" flashes when a failure in the memory data occurs. In such cases the alarm output is enabled.

ALARM RECOVERY

Probe alarms : "**P1**" (probe1 faulty), "**P2**" and "**P3**"; they automatically stop 10s after the probe restarts normal operation. Check connections before replacing the probe.
Temperature alarms "**HA**" and "**LA**" automatically stop as soon as the thermostat temperature returns to normal values or when the defrost starts.
Door switch alarm "**dA**" stop as soon as the door is closed.
External alarms "**EAL**", "**BAL**" stop as soon as the external digital input is disabled "**PAL**" alarm is recovered by switching OFF the instrument.

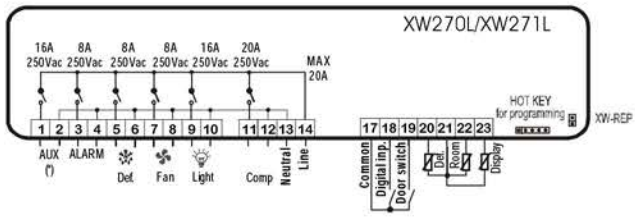
TECHNICAL DATA

Housing: self extinguishing ABS.
Case: facia 38x185 mm; depth 76mm
Mounting : panel mounting in a 150x31 mm panel cut-out with two screws. ∅ 3 x 2mm.
Distance between the holes 165mm
Protection: IP20.
Frontal protection: IP65 with frontal gasket mod RG-L. (optional)
Connections: Screw terminal block ≤ 2,5 mm² heat-resistant wiring and 6,3mm Faston
Power supply: 230Vac or. 110Vac ± 10%
Power absorption: 7VA max.
Display: 3 digits, red LED, 14,2 mm high.
Inputs: 3 NTC probes
Digital inputs: 2 free voltage
Relay outputs: ***Total current on loads MAX. 20A***
compressor: relay SPST 20(8) A, 250Vac
light: relay SPST 16(3) A, 250Vac
fans: relay SPST 8(3) A, 250Vac
defrost: relay SPST 8(3) A, 250Vac
alarm: SPST relay 8(3) A, 250Vac
auxiliary: SPST relay 16(3) A, 250Vac
Other output : alarm buzzer
Serial output : TTL standard
Communication protocol: Modbus - RTU
Data storing: on the non-volatile memory (EEPROM).
Kind of action: 1B.
Pollution grade: normal
Software class: A.
Operating temperature: 0÷60 °C.
Storage temperature: -25÷60 °C.
Relative humidity: 20÷85% (no condensing)
Measuring and regulation range: NTC probe: -40÷110°C (-58÷230°F)
Resolution: 0,1 °C or 1°C or 1 °F (selectable).
Accuracy (ambient temp. 25°C): ±0,5 °C ±1 digit

CONNECTIONS

XW270L/XW271L

(*) In XW271L, AUX is an anticondensing heater



DEFAULT SETTING VALUES

Label	Name	Range	Default	Level	
	REGULATION		°C/°F	XW270L	XW271L
Set	Set point	LS÷US	-5	Pr1	Pr1
Hy	Differential	0,1÷25,5 °C / 1÷45°F	2	Pr1	Pr1
LS	Minimum set point	-50,0°C÷SET / -58°F÷SET	-30	Pr2	Pr2
US	Maximum set point	SET ÷ 110°C / SET ÷ 230°F	20	Pr2	Pr2
OdS	Outputs activation delay at start up	0÷255 min.	1	Pr2	Pr2
AC	Anti-short cycle delay	0÷30 min.	1	Pr1	Pr1
CCt	Compressor ON time during fast freezing	0 ÷ 23h 50 min.	0	Pr2	Pr2
COn	Compressor ON time with faulty probe	0÷255 min.	15	Pr2	Pr2
COF	Compressor OFF time with faulty probe	0÷255 min.	30	Pr2	Pr2
	DISPLAY				
CF	Temperature measurement unit	°C ÷ °F	°C	Pr2	Pr2
rES	Resolution (integer/decimal point)	in ÷ de	de	Pr1	Pr1
Lod	Local display	P1 ÷ 1r2	P1	Pr2	Pr2
Red	Remote display	P1 ÷ 1r2	P1	Pr2	Pr2
	DEFROST				
tdF	Defrost type	rE, rT, in	rE	Pr1	Pr1
EdF	Defrost mode	In, Sd	In	Pr2	Pr2
SdF	Set point for SMART DEFROST	-30 ÷ +30°C / -22÷+86°F	0	Pr2	Pr2
dtE	Defrost termination temperature (1°Evaporator)	-50,0÷110°C/ -58÷230°F	8	Pr1	Pr1
IdF	Interval between defrost cycles	1÷120h	6	Pr1	Pr1
MdF	(Maximum) length for 1° defrost	0÷255 min.	30	Pr1	Pr1
dFd	Displaying during defrost	rt, it, SEt, dEF, dEG	it	Pr2	Pr2
dAd	MAX display delay after defrost	0÷255 min.	30	Pr2	Pr2
Fdt	Draining time	0÷60 min.	0	Pr2	Pr2
dPO	First defrost after start up	n ÷ y	n	Pr2	Pr2
dAF	Defrost delay after fast freezing	0 ÷ 23h 50 min.	2	Pr2	Pr2
	FANS				
FnC	Fans operating mode	C-n, C-y, O-n, O-y	O-n	Pr2	Pr2
Fnd	Fans delay after defrost	0÷255 min.	10	Pr2	Pr2
FSt	Fans stop temperature	-50,0÷110°C/ -58÷230°F	2	Pr2	Pr2
	ALARMS				
ALC	Temperature alarms configuration	rE÷Ab	rE	Pr2	Pr2
ALU	MAXIMUM temperature alarm	-50,0÷110°C/ -58÷230°F	10	Pr1	Pr1
ALL	minimum temperature alarm	-50,0÷110°C/ -58÷230°F	10	Pr1	Pr1
AFH	Temperature alarm and fan differential	0,1÷25,5 °C / 1÷45°F	2		
ALd	Temperature alarm delay	0÷255 min.	15	Pr2	Pr2
dAO	Delay of temperature alarm at start up	0 ÷ 23h 50 min.	1,3	Pr2	Pr2
EdA	Alarm delay at the end of defrost	0÷255 min.	30	Pr2	Pr2
dot	Delay of temperature alarm after closing the door	0÷255 min.	15	Pr2	Pr2
dOA	Open door alarm delay	0÷255 min.	15	Pr2	Pr2
tBA	Alarm relay silencing	y ÷ n	y	Pr2	Pr2
nPS	Pressure switch activation number	0÷15	0	Pr2	Pr2
	ANALOGUE INPUTS				
Ot	Thermostat probe calibration	-12,0÷12,0°C / -21÷21°F	0	Pr1	Pr1
OE	Evaporator probe calibration	-12,0÷12,0°C / -21÷21°F	0	Pr2	Pr2
O3	Auxiliary probe calibration	-12,0÷12,0°C / -21÷21°F	0	Pr2	Pr2
P2P	Evaporator probe presence	n ÷ y	y	Pr2	Pr2
P3P	Auxiliary probe presence	n ÷ y	n	Pr2	Pr2
HES	Temperature increase during the Energy Saving cycle	-30÷30°C / -22÷86°F	0	Pr2	Pr2
	DIGITAL INPUTS				
Odc	Open door control	no, Fan, CPr, F_C	Fan	Pr2	Pr2
I1P	Door switch polarity	CL÷OP	CL	Pr2	Pr2
I2P	Configurable digital input polarity	CL÷OP	CL	Pr2	Pr2
i2F	Digital input configuration	EAL, bAL, PAL, dFr, AUS, ES, OnF	EAL	Pr2	Pr2
dId	Digital input alarm delay	0÷255 min.	5	Pr2	Pr2
SAA	Set point for anti-condensing heater	-50,0÷110°C/ -58÷230°F	-20.0	- - -	Pr2
	OTHER				
Adr	Serial address	0÷247	1	Pr1	Pr1
rEL	Software release	- - -	1.0	Pr2	Pr2
Ptb	Map code	- - -	- - -	Pr2	Pr2
Prd	Probes display	Pb1÷Pb3	- - -	Pr2	Pr2
Pr2	Access parameter list	- - -	- - -	Pr2	Pr2

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XH78T

Temperature & Humidity Controller

(V. 1.0)

INDEX

1. IMPORTANT USER INFORMATION

- The  symbol is intended to alert the user of a non-insultated voltage soruce within the product area that is sufficiently high to constitute a risk of electric shock to persons.

- The  symbol is intended to alert the user of important operating and maintenance (servicing) instructions.

- Dixell Srl reserves the right to modify this user's manual at any time without prior notice. The documentation can be downloaded from the website ***www.fulltouch.info*** even prior to purchase.

- This manual is an integral part of the product and must always be kept near the device for easy and quick reference. The product cannot be used as a safety device. Please read this manual very carfully be sure you understand the information provided before using the device.

- Verify that the power supply voltage is correct before connecting the device. Do not expose it to water or humidity: use the controller only within the operating limits, avoiding sudden temperature changes and high atmospheric humidity in order to prevent condensation from forming. Recommendations: disconnect all the electrical connections before performing any maintenance task; insert the probe where it cannot be reached by the End User; the device must not be opened; consider the maximum current that can be applied to each relay; make sure that the wires of the probes, of the loads and the electical power supply cables are sufficiently separated from each other, without crossing or intertwining. In case of applications in industrial environments, it may be useful to use the main filters as well as the inductive loads.

- The customer shall bear full responsibility and risk for product configuration in order to achieve the the final installation of the equipment/system. Upon the customer's request and following a specific agreement, Dixell Srl may be present during the start-up of the final machine/application, as a consultant, however, under no circumstances can the company be held responsible for the correct operation of the final equipment/system.

- Since Dixell products are part of a high-level technology, a qualification and a configuration/programming/commissioning stage is required to best use them. Otherwise, these products may malfunction and Dixell cannot be held responsible. The product must not be used in any way that differs from that stipulated in the documentation.

- The device must always be installed inside an electrical panel that can only be accessed by authorised personnel. For safety purposes, the keyboard must be the only part that can be reached.

- The electrical wiring connections must never be modify while the device is being used.

- It is good practice to bear in mind the following indications for all Dixell products:
    - Prevent the electronic circuits from getting wet as contact made with water, humidity or any other type of liquid can damage them. Comply with the temperature and humidity limits specified in the manual in order to store the product correctly.
    - The device must not be installed in particularly hot environments as high temperatures can damage the electronic circuits and/or plastic components forming part of the casing. Comply with the temperature and humidity limits specified in the manual in order to store the product correctly.
    - Under no circumstances is the device to be opened – the user does not need any internal component. Please contact qualified service personnel for any assistance.
    - Prevent the device from being dropped, knocked or shaken as either can cause irreparable damage.
    - Do not clean the device with corrosive chemical products, solvents or aggressive detergents.
    - The device must not be used in applications that differ from that specified in the following document.

- ***Separate the power supply of the device from the rest of the electrical devices connected inside the electrical panel. The secondary of the transformer must never be connected to the earth.***

- Dixell Srl reserves the right to change the components of its products, even without notice, ensuring the same and unchanged functionality."

2. PRODUCT DISPOSAL (WEEE)

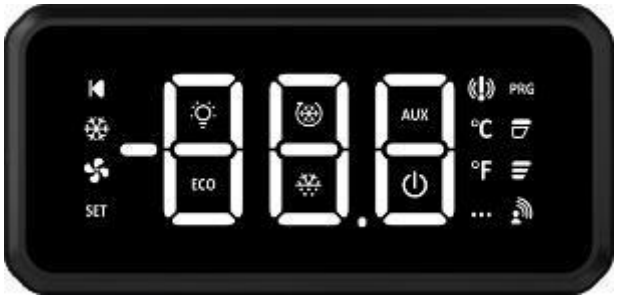
In compliance with the Directive 2002/96/EC of the European Parliament and of the Council of January 27th 2003 and to the relative national legislation, please note that:

- There lies the obligation not to dispose of electrical and electronic waste as municipal waste but to separate the waste.
- Public or private collection points must be used to dispose of the goods in accordance with local laws. Furthermore, at the end of the product's life, it is also possible to return this to the retailer when a new purchase is made.
- This equipment may contain hazardous substances. Improper use or incorrect disposal can have adverse effects on human health and the environment.
- The symbol shown on the product or the package indicates that the product has been placed on the market after August 13th 2005 and must be disposed of as separated waste.
- Should the product be disposed of incorrectly, sanctions may be applied as stipulated in applicable local regulations regarding waste disposal.

3. GENERALITIES

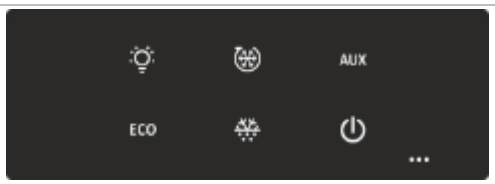
The **XH78T** is a microprocessor-based controller suitable for applications on medium or low temperature ventilated refrigeration units with control humidity and where variable speed compressor or ventilators can be used. It has 4 relay outputs to control fans, light, defrost or auxiliary outputs. The device is also provided with up to 4 NTC, PTC or PT1000 probe inputs. There are up to 2 configurable digital inputs. Probe P4 can be configured as an analogue input probe (4-20mA). By using the **HOT-KEY** it is possible to program the device quickly and easily. The controller implements Full Touch technology.

4. USER INTERFACE



XH78T has a capacitive user interface with Full Touch technology. The whole display area is used to interact with the device. Specific gestures are used to enable or disable functions, browse through screens and operational modes and modify the configuration of the device.

4.1 SCREENS

SCREEN	DESCRIPTION
	**Home:** this screen shows temperature value, measurement unit and active alarms only. This is the first screen after power on or after exit from other status
	**Virtual Keyboard:** this screen shows available functions. Activated function will blink when this screen is visualized.
	**Info:** This screen shows activated functions and regulation outputs (compressor, ventilators).
	**Programming Mode:** This screen enables the modification of the Set point or parameters.
	**Setpoint Menu:** This screen enables the modification of the Set Point value.
	**Parameter Menu:** These screens enable the modification of all parameter values.

	**Stand-By:** in this condition all outputs are deactivated.
	**HotKey Download:** “PRG” blinks during download operations (copy from HotKey to the internal memory)
	**HotKey Upload:** “PRG” blinks during upload operations (copy from internal memory to the HotKey)
	**X9:** it is possible to create the label of the parameter to be visualized or modified.

4.2 ICONS

	DESCRIPTION	MODE	FUNCTION
	**LIGHT**	**OFF**	Function not available
		FLASH	When in the **Virtual Keyboard** screen: light output ON
		ON	When in the **Virtual Keyboard** screen: light output OFF
	**COMPRESSOR**	**OFF**	When in the **Loads Info** screen: compressor output OFF
		FLASH	Anti short cycle delay is running
		ON	When in the **Loads Info** screen: compressor output ON
	**FAN**	**OFF**	When in the **Loads Info** screen: evaporator fan output OFF
		FLASH	Activation delay is running
		ON	When in the **Loads Info** screen: evaporator fan output ON
	**DEFROST**	**OFF**	Function not available
		FLASH	When in the **Virtual Keyboard** screen: defrost ON
		ON	When in the **Virtual Keyboard** screen: defrost OFF
AUX	**AUX**	**OFF**	Function not available
		FLASH	When in the **Virtual Keyboard** screen: AUX output ON
		ON	When in the **Virtual Keyboard** screen: AUX output OFF
ECO	**ENERGY SAVING**	**OFF**	Function not available
		FLASH	When in the **Virtual Keyboard** screen: energy saving ON
		ON	When in the **Virtual Keyboard** screen: energy saving OFF
	**PULL DOWN**	**OFF**	Function not available
		FLASH	When in the **Virtual Keyboard** screen: pull down ON
		ON	When in the **Virtual Keyboard** screen: pull down OFF
	**ALARM**	**OFF**	No alarm is active
		FLASH	
		ON	Some alarm is active

°C	**Celsius Degree**	**OFF**	Not used
		FLASH	Not used
		ON	Measurement units: Celsius degree
°F	**Fahrenheit Degree**	**OFF**	Not used
		FLASH	Not used
		ON	Measurement units: Fahrenheit degree
	ONOFF	**OFF**	
		FLASH	
		ON	Only and always ON icon when the device is in standby mode
	PROG LEVEL 1	**OFF**	
		FLASH	PROG LEVEL 1 and PROG LEVEL 2 icons toggle when the visualized value is editable
		ON	First level (parameter groups) of the parameter menu is visualized
	PROG LEVEL 2	**OFF**	
		FLASH	PROG LEVEL 2 and PROG LEVEL 1 icons toggle when the visualized value is editable
		ON	Second level (parameter labels) of the parameter menu is visualized
	RADIO ON	**OFF**	Not used
		FLASH	Not used
		ON	Not used
PRG	**PROGRAMMING MODE**	**OFF**	**Programming mode** disabled
		FLASH	
		ON	**Programming mode** enabled
	BACK	**OFF**	
		FLASH	
		ON	Used to go back to previous levels on the menu tree
SET	**ENTER**	**OFF**	**Set point** menu disabled
		FLASH	
		ON	**Set point** menu enabled
...	**BROWSING**	**OFF**	No other (lateral) screens available
		FLASH	
		ON	Other (lateral) screens available

4.3 GESTURES

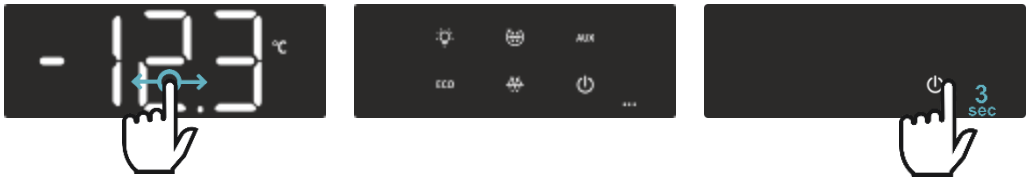
GESTURE	NAME	HOW-TO	DESCRIPTION
	**ONE TAP**	Press a specific area of the screen with a finger for 1 sec	**Switch ON / Switch OFF:** when in Virtual Keyboard, use this to turn on/off a specific function. When in Programming mode, use this to select a parameter or a parameter value.
	**TAP and HOLD**	Press any place of the screen with a finger for 3 sec	**Enter / Save:** use this to enter Programming mode or Parameter menu and to save modifications. When in Virtual Keyboard, use this on the “ONOFF” to switch OFF and ON the device.
	**H-SWIPE**	Drag a finger across the screen, from left to right or from right to left	**Browse:** use horizontal swipe (right to left or left to right) to browse through HOME, Virtual Keyboard and Info View. When in programming mode: use horizontal swipe to browse through parameter menu.

	**V-SWIPE**	Drag a finger across the screen, from top to bottom or from bottom to top (overlapping only one of the digits)	**Modify:** use vertical swipe (from top to bottom or bottom to top) to change a parameter value.

4.4 HOME BROWSING

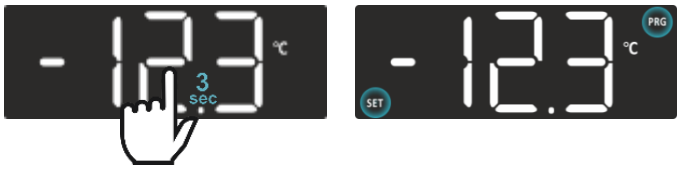
Use H-SWIPE to move through the screens. The logic implements a circular browsing: H-SWIPE to left or to right is possible. A programmable timeout is implemented to return **HOME** from any lateral screen.

4.5 STAND-BY MODE



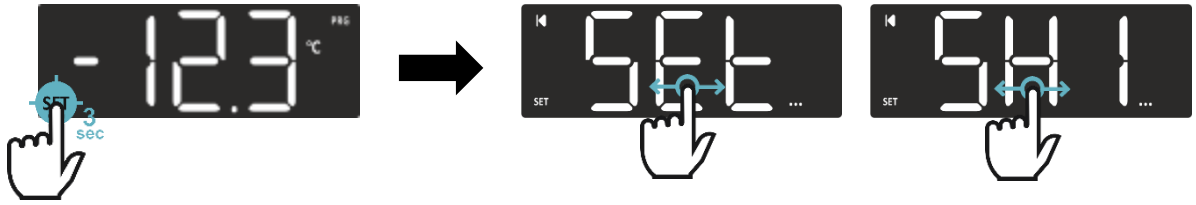
When in **HOME** screen, H-swipe to go to the Virtual Keyboard screen and then touch the **OFF** icon for 3 sec. All outputs and alarms are deactivated in Stand-by mode.

4.6 PROGRAMMING MENU



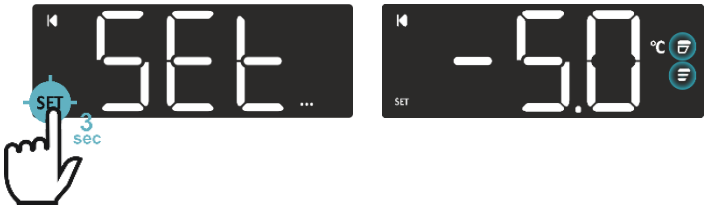
It is possible to unlock the programming menu by touching any area of the display for 3 sec. Both **SET** and **PRG** icons will blink until the programming menu is unlocked.

4.7 SETPOINT MENU



When in **Programming Menu**, it is possible to enter the **Setpoint Menu** by touching the **SET** icon for 3 sec. Both **SET** and **PRG** icons will blink until the **Setpoint Menu** is unlocked. The label **SEt** indicates that temperature set point is unlocked. Use H-swipe to move between temperature and humidity **Setpoint Menu**. Press the **BACK** icon to exit (come back to the **Programming Menu**).

4.7.1 TEMPERATURE SET POINT MODIFICATION



When in **Setpoint Menu SEt**, it is possible to enter the **Temperature Setpoint Menu** by touching the **SET** icon for 3 sec. Only the **SET** icon will blink until the **Temperature Setpoint Menu** is unlocked. Both **PROG**

LEVEL icons start toggling to indicate that the visualized value is editable. Press the **BACK** icon to exit (come back to the **Programming Menu**) without saving.

4.7.2 HUMIDITY SET POINT MODIFICATION

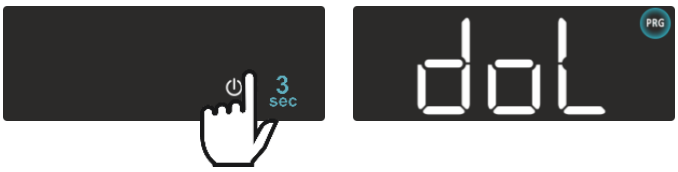
When in **Setpoint Menu SH1**, it is possible to enter the **Humidity Setpoint Menu** by touching the **SET** icon for 3 sec. Only the **SET** icon will blink until the **Humidity Setpoint Menu** is unlocked. Both **PROG LEVEL** icons start toggling to indicate that the visualized value is editable. Press the **BACK** icon to exit (come back to the **Programming Menu**) without saving.

4.8 HOTKEY – UPLOAD

When in **Programming Menu**, it is possible to activate the **HotKey Upload Menu** function to save the current device configuration (parameter values) into the external memory. To do this, follow these instructions:

1. H-swipe to go on the **UPL** screen
2. Insert the HotKey (on the 5-pin ports on the back of the device)
3. Touch the **PRG** icon for 3 sec
4. The copying procedure will start and the **PRG** icon will blink during the copy operations
5. At the end of the copying procedure, a message will notify the user that the operation has been competed successfully:
    a. **End**: all parameters have been copied
    b. **Err**: some error occours during copying operations

4.9 HOTKEY – DOWNLOAD



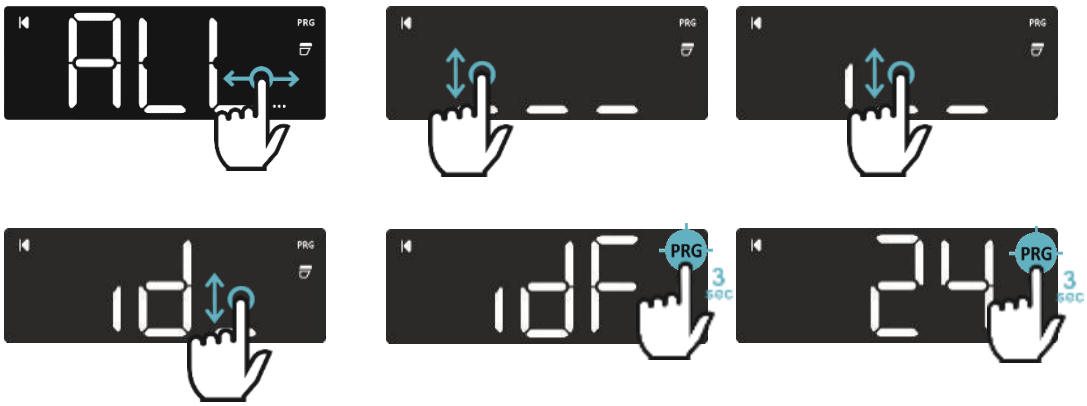
When in **Power-off** or in **Stand-by** mode, it is possible to activate the **HotKey Download Menu** function to copy a new configuration (parameter values) into the current device memory. To do this, follow these instructions:

1. Insert the HotKey (on the 5-pin ports on the back of the device)
2. Touch the **OFF** icon for 3 sec
3. After power-on, the copying procedure will start automatically and the **PRG** icon will blink during the copy operations
4. At the end of the copying procedure, a message will notify the user that the operation has been competed successfully:
    a. **End**: all parameters have been copied
    b. **Err**: some error occours during copying operations

4.10 X9

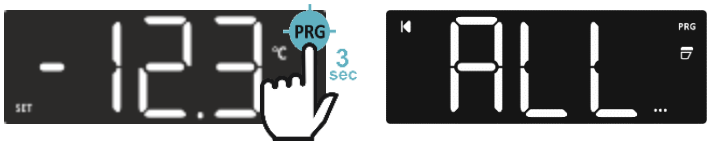
Every parameter is normally identified by a unique label that can have two or three alphanumeric characters. When in the "**X9**" Screen, it is possible to create the parameter label by swiping-up every single part of the label itself (first, second and third char). The system is able to drive the user through the available symbols, showing only the available ones to speed up the creation of the label.
For example, if a modification of the "interval between defrosts" parameters is required (label "idF"), these are the steps to follow:

- Enter the **X9** screen
- Swipe-up or down the first char position (lower segment on the left) until char “i” (lowercase) appears
- Move to the second char position (segment in the middle) and swipe-up or down until char “d” appears
- Move on the third char position (segment on the right) and swipe-up or down until char “F” appears
- Enter the par. value by touching the **PRG** icon for 3 sec.



NOTE: pay attention to the upper or lower case when browsing through the available characters.
For simplicity, here is the complete list of available characters: A, b, C, d, E, F, G, H, i, L, M, n, o, P, q, r, S, t, u, V, Y, 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9.

4.11 PARAMETER MENU



When in **Programmin Menu**, it is possible to enter the **Parameter Menu** touching the **PRG** icon for 3 sec.
The **Prog Level 1** icon will indicate the first level of the programming menu (group labels).
The **Browsing** icon will indicate that there are other groups of parameters.

When in **PROG LEVEL 1**, it is possible to browse through the available groups of parameters by using the H-swipe gesture. The circular construction of this menu permits to move left or right through the groups.
Here are the available groups:

Group Label	Description
ALL	All parameters menu
rEG	Main regulation parameters
Prb	Probe configuration parameters
diS	Visualization parameters
dEF	Defrost configuration parameters
FAn	Evaporator and condenser fan configuration parameters
AUS	Auxiliary regulator parameters
ALr	Alarm configuration parameters
oUt	Digital and analogue output configuration parameters
inP	Digital input configuration parameters
ES	Energy saving configuration parameters

Cnt	Counters, read only values
rtC	Real Time Clock configuration parameters
E2	Memory storage management
CoM	Serial Communication port configuration parameters
Ui	User Interface configuration parameters
inF	Information, read only parameters
PAS	Password for entering protected menu parameters
_ _ _	X9 Menu

NOTE: depending on the configuration, some parameters or entire groups of them could not be available. Here below the complete list of available parameters, with their own descriptions, is reported.

4.12 PASSWORD MENU

When in the **PAS** group, it is possible to set the password value by touching the **PRG** icon for 3 sec.
V-swipe on a single digit to modify the value, then confirm the password value by touching the **PRG** icon for 3 sec.

The new value will blink and after 2 sec the display will show:

- **Pr2** if the password is correct
- **Err** if the password value is wrong

After 2 sec the display will show the first group label (**rEG**) with a blinking **PRG** icon to indicate that protected parameters now are editable.

5. PARAMETER TABLE

Here are the descriptions of the device parameters.
Note: Some of these parameters below may not be present in this version; please see the configuration parameter paragraph.

5.1 PARAMETER DESCRIPTION

5.1.1 Main regulation parameters - rEG

SEt	**Set Point:** range from LS to US
LS	**Minimum Set Point:** (-100.0°C to SET; -148°F to SET) fix the minimum value for the set point.
US	**Maximum Set Point:** (SET to 150.0°C; SET to 302°F) fix the maximum value for the set point.
HY	**Compressor regulation differential in normal mode:** (0.1 to 25.0°C; 0.1 to 45.0°F) set point differential. Compressor Cut-IN is **T > SET + HY**. Compressor Cut-OUT is **T<=SET**.
HYE	**Compressor regulation differential in energy saving mode:** (0.1 to 25.0°C; 0.1 to 45.0°F) set point differential. Compressor Cut-IN is **T > SET + HES + HYE**. Compressor Cut-OUT is **T<= SET + HES**.
HY1	**Proportional regulation differential in normal mode:** (0.1 to 25.0°C; 0.1 to 45.0°F) used when a second onoff compressor or a variable speed compressor is configured.
HYS	**Proportional regulation differential in energy saving mode:** (0.1 to 25.0°C; 0.1 to 45.0°F) used when a second onoff compressor or a variable speed compressor is configured.
HYd	**Deadband output regulation (oAx=db) differential:** (0.1 to 25.0°C; 0.1 to 45.0°F) output **oAx=db** is activated when **T<SET-HYd**.
SH1	**Humidity Set Point:** range from LSH to USH

LSH	**Minimum humidity Set Point:** (1LC to SH1) fix the minimum value for the humidity set point.
USH	**Maximum humidity Set Point:** (SH1 to 1UC) fix the maximum value for the humidity set point.
HHA	**Positive humidity regulation differential (SEH+HHA):** (0.1 to 50.0%)
HHb	**Negative humidity regulation differential (SEH-HHB):** (0.1 to 50.0%)
rAr	**Delay between compressor and db output (oAx=db) activation and vice versa:** (0 to 255 min)
odS	**Output activation delay at start-up:** (0 to 255 min) this function is enabled after the instrument power-on and delays the output activations.
AC	**Anti-short cycle delay:** (0 to 50 min) minimum interval between a compressor stop and the following restart.
AC1	**Anti-short cycle delay (2nd compressor):** (0 to 255 sec) delay activation for second onoff compressor
2CC	**Activation mode for 2nd compressor:** (FUL; HAF) **FUL**=delayed; **HAF**=step logic
rCC	**Enable compressor rotation:** (n; Y) **n**=compressor 1 is activated always as first; **Y**= toggle compressor 1 and compressor 2 activation.
MCo	**Maximum time with compressor on:** (0 to 255min) define maximum running time for onoff compressors. 0=disabled.
rtr	**Regulation percentage=F(P1; P2) (100=P1; 0=P2):** weighted coefficient for double probe regulation R=**P1***(**rtr**/100)+**P2***(1-**rtr**/100). If rtr=100: only **P1** value is used. If rtr=0: only **P2** value is used.
CCt	**Maximum duration for Pull Down:** (0.0 to 23h50min, res. 10min) after elapsing this interval of time, the super cooling function is immediately stopped
CCS	**Pull Down phase differential (SET+CCS or SET+HES+CCS):** (-12.0 to 12.0°C; -21.6 to 21.6°F) during any super cooling phase the regulation SETPOINT is moved to **SET+CCS** (in normal mode) or to **SET+HES+CCS** (in energy saving mode)
oHt	**Threshold for automatic activation of Pull Down in normal mode (SET+HY+oHt):** (0.0 to 25.0°C; 0.0 to 45.0°F) this is the upper limit used to activate the super cooling function.
oHE	**Threshold for automatic activation of Pull Down in energy saving mode (SET+HES+HYE+oHE):** (0.0 to 25.0°C; 0.0 to 45.0°F) this is the upper limit used to activate the super cooling function.
Con	**Compressor ON time with faulty probe:** (0 to 255 min) time during which the compressor is active in case of faulty thermostat probe. With **CY=0** compressor is always OFF.
CoF	**Compressor OFF time with faulty probe:** (0 to 255 min) time during which the compressor is OFF in case of faulty thermostat probe. With **Cn=0** compressor is always active.
CHt	**Type of regulation:** (CL; Ht; db) **Ht**=heating; **CL**=cooling; **db**=dead band
tHU	**Type of humidity regulation:** (nu; t1; t2; t3; t4; t5) • **nu**=not used • **t1**=humidification (oAx=HUM), dehumidification by cooling action (oAy=CP1) • **t2**=humidification (oAx=HUM), dehumidification by heating (oAy=db) and cooling action (oAz=CP1) • **t3**=dehumidification only by coolin action (oAx=CP1) and dehumidificator (oAy=dEH) • **t4**= dehumidification only by heating (oAx=db) and cooling action (oAy=CP1) • **t5**=humidification (oAx=HUM) and dehumidification (oAy=dEH) with dead band activation logic
rH1	**Delay before activating heating output for dehumidification:** (0 to 999 sec).

5.1.2 Probe configuration parameters – Prb

P4C	**Probe P4 selection:** (ntC; Pt1; PtC; Cur) **ntC**= NTC probe; **Pt1**= PT1000 probe; **Cur**=4-20mA probe.
ot	**Probe P1 calibration:** (-12.0 to 12.0°C; -21.6 to 21.6°F) allows to adjust any possible offset of the first probe.
P2P	**Probe P2 presence: n** = not present; **Y** = present.
oE	**Probe P2 calibration:** -12.0 to 12.0°C; -21.6 to 21.6°F) allows to adjust any possible offset of the second probe.
P3P	**Probe P3 presence: n** = not present; **Y** = the defrost present.
o3	**Probe P3 calibration:** (-12.0 to 12.0°C; -21.6 to 21.6°F) allows to adjust any possible offset of the third probe.
P4P	**Probe P4 presence: n** = not present; **Y** = present.

o4	**Probe P4 calibration:** (-12.0 to 12.0°C; -21.6 to 21.6°F; -12.0% to 12.0%) allows to adjust any possible offset of the fourth probe.
1UA	**Upper limit for analogue input Ai1:** (1LA to 20.0mA) Maximum value for analogue sensor input.
1LA	**Lower limit for analogue input Ai1:** (4.0mA to 1UA) Minimum value for analogue sensor input.
1UC	**Upper limit for analogue scaling factor:** (1LC to 100.0%) Maximum value for analogue conversion.
1LC	**Lower limit for analogue scaling factor:** (0.0% to 1UC) Minimum value for analogue conversion.

5.1.3 Visualization parameters – diS

CF	**Temperature measurement unit:** (°C; °F) **°C** = Celsius; **°F** = Fahrenheit.
rES	**Temperature resolution:** (dE; in) **dE** = decimal; **in** = integer.
rEH	**Humidity resolution:** (dE; in) **dE** = decimal; **in** = integer.
Lod	**Probe default displayed:** (P1; P2; P3; P4; Set; dtr) **Px**=probe “x”; **Set**=set point; **dtr**=probe visualization percentage.
rEd	**Remote probe displayed (for XH-REP):** (P1; P2; P3; P4; Set; dtr) **Px**=probe “x”; **Set**=set point; **dtr**=probe visualization percentage.
dLY	**Temperature display delay:** (0.0 to 20min00sec, res. 10 sec) when the temperature increases, the display is updated of 1°C or 1°F after this time.
dtr	**Probe visualization percentage, F(P1; P2):** (0 to 100) with **dtr=1** the display will show this value **VALUE=0.01*P1+0.99*P2**
dt	**Temperature value visualisation time:** (0 to 255 sec)
dH	**Humidity value visualisation time:** (0 to 255 sec)

5.1.4 Defrost configuration parameters – dEF

EdF	**Defrost mode: in**=fixed intervals; **rtC**=following real time clock
tdF	**Defrost type: EL**=electrical heaters; **in**=hot gas
dFP	**Probe selection for defrost control:** (nP; P1; P2; P3; P4) **nP**=no probe; **Px**=probe “x”. Note: **P4**=Probe on Hot Key plug.
dtE	**End defrost temperature:** (-50 to 50°C; -58.0 to 122.0°F) sets the temperature measured by the evaporator probe (**dFP**), which causes the end of defrost cycle.
idF	**Interval between two successive defrost cycles:** (0 to 120 hours) determines the time interval between the beginning of two defrosting cycles.
MdF	**Maximum length of defrost cycle:** (0 to 255 min; 0 means no defrost) when **P2P=n** (no evaporator probe presence) it sets the defrost duration, when **P2P=Y** (defrost end based on evaporator temperature) it sets the maximum length for the defrost cycle.
dSd	**Start defrost delay:** (0 to 999 sec) delay in defrost activation.
StC	**Compressor stop before starting any defrost:** (0 to 255 sec) interval with compressor OFF before activating hot gas cycle
dFd	**Display during defrost:** (rt; it; Set; dEF; Coo) **rt** = real temperature; **it** = start defrost temperature; **SEt** = Setpoint value; **dEF** = label “dEF”; **Coo** = label “dEF” during defrost, label “Coo” after defrost and draining and until **T>SET+HY**.
dFr	**Remote display visualization during any defrost:** (rt; it; Set; dEF; Coo) **rt** = real temperature; **it** = start defrost temperature; **SEt** = Setpoint value; **dEF** = label “dEF”; **Coo** = label “dEF” during defrost, label “Coo” after defrost and draining and until **T>SET+HY**.
dAd	**Temperature display delay after any defrost cycle:** (0 to 255 min) delay before updating the temperature on the display after the end of any defrost.
Fdt	**Draining time:** (0 to 255 min) regulation delay after finishing a defrost phase
Hon	**Drain heater enabled after draining time (par. Fdt):** (0 to 255 min) the relative output will stay on after draining time.
dPo	**Defrost cycle enebled at stat-up:** (n; Y) enables defrost at power on.
HYP	**Differential temperature during any pre-defrost phase:** (n; Y) move the regulation setpoint to **SET-HYP** value during **dAF** interval.
Pd2	**Defrost output deactivation delay:** (0 to 255 sec) delay defrost output deactivation.
dAF	**Pre-defrost time:** (0 to 255 min) interval for pre-defrost function.
od1	**Automatic defrost (at the beginning of any energy saving mode):** (n; Y) **n**=function disabled; **Y**=function enabled
od2	**Optimized defrost:** (n; Y) **n**=function disabled; **Y**=function enabled
dSt	**Temperature sampling time during an optimized defrost (valid only if od2=yes):** (1 to 255 sec) timed control of the evaporator temperature. Used only with **od2=Y**.

SYd	**Tipe of synchronized defrost:** (nu; SYn; nSY) **nu**=not used; **Syn**=synchronized defrost; **nSY**=desynchronized defrost.
dt1	**Differential temperature for latent heating control:** (0.1 to 1.0°C) timed control of the evaporator temperature. Used only with **od2=Y**.
ErS	**Restart regulation after dripping (valid only if Syd = nSY):** (n; Y) **n**=the controller waits for all controllers to finish their defrost operations before restart regulation. **Y**=the controller restart regulation after dripping phase, without waiting for the others to finish their defrost operations.
HUd	**Humidity regulation active during any defrost phase:** (n; Y)

5.1.5 Evaporator and condenser fan configuration parameters – Fan

FAP	**Probe selection for evaporator fan:** (nP; P1; P2; P3; P4) **nP**=no probe; **Px**=probe "x". Note: **P4**=Probe on Hot Key plug.
FSt	**Evaporator fan stop temperature:** (-50.0 to 50.0°C; -58.0 to 122.0°F) setting of temperature, detected by evaporator probe. Above this temperature value fans are always OFF. **NOTE: it works only for the evaporator fan, NOT for the condenser fan.**
HYF	**Evaporator fan regulator differential:** (0.1 to 25.5°C; 0.1 to 45.0°F) evaporator fan will stop when the measured temperature (from FAP) is T<FSt-HYF.
oFE	**Offset for evaporator fan activation and deactivation:** (0.1 to 25.5°C; 0.1 to 45.0°F)
FnC	**Evaporator fan operating mode:** (Cn; on; CY; oY) • **Cn** = runs with the compressor, duty-cycle when compressor is OFF (see **FoF**, **Fon**, **FF1** and **Fo1** parameters) and OFF during defrost • **on** = continuous mode, OFF during defrost • **CY** = runs with the compressor, duty-cycle when compressor is OFF (see **FoF**, **Fon**, **FF1** and **Fo1** parameters) and ON during defrost • **oY** = continuous mode, ON during defrost
Fnd	**Evaporator fan delay after defrost cycle:** (0 to 255 min) delay before fan activation after any defrosts.
Ft	**Evaporator fan controlled during any defrost:** (n; Y)
FCt	**Differential for cyclic activation of evaporator fans:** (0 to 50°C)
FSU	**Evaporator fan operating mode:** (Std; Fon; FoF) **Std** = standard mode, evaporator fan uses par **FnC**; **Fon** = evaporator Fan always on; **FoF** = evaporator fan always off.
Ft	**Evaporator fan controlled during defrost:** (n; Y) **n** = evaporator fan uses par. **FnC** during any defrost; **Y** = evaporator fan regulator is active during any defrost.
Fon	**Evaporator fan ON time in normal mode (with compressor OFF):** (0 to 255 min) used when energy saving status is not active.
FoF	**Evaporator fan OFF time in normal mode (with compressor OFF):** (0 to 255 min) used when energy saving status is not active.
Fo1	**Evaporator fan ON time in energy saving (with compressor OFF)** (0 to 255 min) used when energy saving status is active.
FF1	**Evaporator fan OFF time in energy saving (with compressor OFF):** (0 to 255 min) used when energy saving status is active.
Fd1	**Evaporator fan delay:** (0 to 255 sec) delay before activating evaporator fan
Fd2	**Evaporator fan delay after closing door:** (0 to 255 sec) delay before activating evaporator fan and after closing the door
Fnu	**Number of motion detections before forcing evaporator fans at FMr:** (0 to 10) evaporator fan speed reduction **Fnu** motion detections.
FMr	**Evaporator fan speed after Fnu motion detections:** (0 to 100%) evaporator fan speed after **Fnu** motion detections.
Fti	**Evaporator fans operating at FMr:** (0 to 255 min) time with evaporator fan speed at **FMr**
LA1	**Maintenance interval for evaporator fans (tens of hours):** (0 to 999) a maintenance message "LA1" will appear on the display after **LA1***10 hours
rS1	**Evaporator fan maintenance function reset:** (n; Y) select Y and confirm to reset the maintenance message.
FAC	**Probe selection for condenser fan:** (nP; P1; P2; P3; P4) **nP**=no probe; **Px**=probe "x". Note: **P4**=Probe on Hot Key plug.
St2	**Set Point 2 regulation (for condenser fan):** (-100 to 150°C; -148 to 302°F) setting of temperature detected by evaporator probe. Above this value of temperature fans are always OFF.
HY2	**Set Point 2 differential (for condenser fan):** (0.1 to 25.5°C; 0.1 to 45.0°F) differential for evaporator ventilator regulator
oFC	**Offset for condenser fan activation and deactivation:** (0.0 to 25.0°C; 0.0 to 45.0°F) offset used for proportional control (condenser fan controlled through analogue output).

FCC	**Condenser fan operating mode:** (Cn; on; CY; oY) • **Cn** = runs with the compressor and OFF during defrost • **on** = continuous mode, OFF during defrost • **CY** = runs with the compressor and ON during defrost • **oY** = continuous mode, ON during defrost
Fd3	**Condenser fan activation delay:** (0 to 255 sec) delay before activating condenser fan
Fd4	**Condenser fan deactivation delay:** (0 to 255 sec) delay before deactivating condenser fan
LA2	**Maintenance interval for condenser fans (tens of hours):** (0 to 999)
rS2	**Condenser fan maintenance function reset:** (n; Y)
iAE	**Interval between air extraction fan activation:** (0.0 to 24h00min, res 10 min)
tAE	**Air extraction fan running time:** (0 to 999 min)

5.1.6 Auxiliary regulator parameters – AUS

ACH	**Type of control for auxiliary regulator:** (CL; Ht) **CL** = cooling; **Ht** = heating.
SAA	**Set point for auxiliary regulator:** (-100.0 to 150.0°C; -148 to 302°F) it defines the room temperature set point to switch auxiliary relay.
SHY	**Auxiliary regulator differential:** (0.1 to 25.0°C; 0.1 to 45.0°F) differential for auxiliary output set point. • **ACH=CL**, AUX Cut in is [**SAA+SHY**]; AUX Cut out is **SAA**. • **ACH=Ht**, AUX Cut in is [**SAA–SHY]**; AUX Cut out is **SAA**.
ArP	**Probe selection for auxiliary regulator:** (nP; P1; P2; P3; P4) **nP** = no probe, the auxiliary relay is switched only by the digital input; **Px**=probe "x". Note: **P4**=Probe on Hot Key plug.
Sdd	**Auxiliary regulator disabled during any defrost cycle:** (n; Y) **n** = the auxiliary relay operates during defrost. **Y** = the auxiliary relay is switched off during defrost.
btA	**Base time for parameters Ato and AtF:** (SEC; Min) **SEC** = base time is in second; Min = base time is in minutes.
Ato	**Interval of time with auxiliary output ON:** (0 to 255) ON time with base time defined by par. **btA.**
AtF	**Interval of time with auxiliary output OFF:** (0 to 255) OFF time with base time defined by par. **btA.**

5.1.7 Alarm configuration parameters

ALP	**Probe selection for temperature alarms:** (nP; P1; P2; P3; P4) **nP**=no probe; **Px**=probe "x". Note: **P4**=Probe on Hot Key plug.
ALC	**Temperature alarms configuration:** (Ab, rE) **Ab** = absolute; **rE** = relative.
ALU	**High temperature alarm:** when this temperature is reached, the alarm is enabled after the **Ad** delay time. • If **ALC=Ab** → ALL to 150.0°C or ALL to 302°F. • If **ALC=rE** → 0.0 to 50.0°C or 0 to 90°F.
ALL	**Low temperature alarm:** when this temperature is reached, the alarm is enabled after the **Ad** delay time. • If **ALC=Ab** → -100.0°C to ALU or -148°F to ALU. • If **ALC=rE** → 0.0 to 50.0°C or 0 to 90°F.
AFH	**Temperature alarm differential:** (0.1 to 25.0°C; 1 to 45°F) alarm differential.
ALd	**Temperature alarm delay:** (0 to 255 min) delay time between the detection of an alarm condition and the relative alarm signalling.
dot	**Temperature alarm delay when door open:** (0.0 to 24h00min, res. 10 min) delay time between the detection of a door open condition and the relative alarm signaling.
dAo	**Temperature alarm delay at start-up:** (0.0 to 24h00min, res. 10 min) delay time between the detection of a temperature alarm condition and the relative alarm signalling, after starting up the instrument.
AP2	**Probe selection for second temperature alarm:** (nP; P1; P2; P3; P4) **nP**=no probe; **Px**=probe "x". Note: **P4**=Probe on Hot Key plug.
AU1	**Pre-alarm threshold for second temperature alarm (absolute value):** (-100.0 to 150.0°C; -148 to 302°F) warning alarm threshold with message "AU1" on the display.
AH1	**Second high temperature pre-alarm differential:** (0.1 to 25.0°C; 0.1 to 45.0°F) differential for pre-alarm deactivation.
Ad1	**Second high temperature pre-alarm delay:** (0 to 255 min; 255 = not used) delay time between the detection of a condenser pre-alarm condition and the relative alarm signalling.
AL2	**Second low temperature alarm:** (-100.0 to 150.0°C; -148 to 302°F) lower threshold for second temperature alarm.

AU2	**Second high temperature alarm:** (-100.0 to 150.0°C; -148 to 302°F) upper threshold for second temperature alarm.
AH2	**Second temperature alarm differential:** (0.1 to 25.0°C; 0.1 to 45.0°F) differential for second alarm deactivation.
Ad2	**Second temperature alarm delay:** (0 to 255 min; 255 = not used) delay time between the detection of a condenser alarm condition and the relative alarm signalling.
dA2	**Second temperature alarm delay at start-up:** (0.0 to 24h00min, res. 10 min)
bLL	**Compressor off due to second low temperature alarm:** (n; Y; MAn) **n** = no, the compressor continues to work; **Y** = yes, the compressor is switched off while the alarm is ON; in any case, the regulation restarts after **AC** time at minimum; **MAn**=a device reset (cycle power or stand-by) is required to cancel this alarm.
AC2	**Compressor off due to second high temperature alarm:** (n; Y; MAn) **n** = no, the compressor continues to work; **Y** = yes, the compressor is switched off while the alarm is ON; in any case, the regulation restarts after **AC** time at minimum; **MAn**=a device reset (cycle power or stand-by) is required to cancel this alarm.
SAF	**Differential for anti-freezing control:** (-12.0 to 12.0°C; -21.6 to 21.6°F) the regulation stops if **T<SET+SAF**
tbA	**Alarm relay deactivation:** (n; Y) **n** = it is not possible to deactivate neither the buzzer nor any digital output set as an alarm; **Y** = it is possible to deactivate both the buzzer and the digital output set as an alarm.
AHC	**Humidity alarm configuration:** (rE; Ab) **Ab** = absolute; **rE** = relative.
AHL	**Low humidity alarm:** when this humidity value is reached, the alarm is enabled after the **AHd** delay time. • If **AHC=Ab** → 0.0°C to AHU. • If **AHC=rE** → 0.0 to 50.0%.
AHU	**High humidity alarm:** when this humidity value is reached, the alarm is enabled after the **AHd** delay time. • If **AHC=Ab** → AHL to 100.0%. • If **AHC=rE** → 0.0 to 50.0%.
AHH	**Humidity alarm differential:** (0.5% to 25.5%)
AHd	**Humidity alarm delay:** (0 to 999 sec) delay time between the detection of an alarm condition and the relative alarm signalling.
dHo	**Humidity alarm delay at start-up:** (0.0 to 23h50min, res. 10 min) delay time between the detection of a humidity alarm condition and the relative alarm signalling, after starting up the instrument.
doH	**Humidity alarm delay when door open:** (0 to 999 min) delay time between the detection of a door open condition and the relative alarm signaling.
EdA	**Temperature alarm inhibition after any defrost:** (0 to 255 min) all temperature alarms are disabled for interval **EdA** after any defrost.
iSn	**Interval between sanitizations:** (0.0 to 24h00min) cyclic activation of sanitization output.
tSn	**Sanitization time:** (0.0 to 24h00min) duration for sanitization function.

5.1.8 Digital output configuration parameters - out

oAx (x=1, 2)	**Relay output oAx configuration:** (nu; CP1; dEF; Fan; Alr; LiG; AUS; db; onF; HES; Cnd; CP2; dF2; HEt; inV; dEH; HUM; SAn; EFn) **nu**=not used; **CP1**=onoff compressor 1; **dEF**=defrost; **Fan**=ventilators; **Alr**=alarm; **LiG**=light; **AUS**=auxiliary relay; **onF**=always ON with instrument ON; **db**=neutral zone; **HES**=night blinds; **Cnd**=condenser fan; **CP2**=second onoff compressor; **dF2**=second defrost; **Het**=heater control; **inV**=inverter output; **dEH**=dehumidifier; **HUM**=humidifier; **SAn**=sanitization; **EFn**=air extraction fan.
AoP	**Alarm relay polarity:** (oP; CL) **oP** = alarm activated by closing the contact; **CL** = alarm activated by opening the contact
LoF	**Light output OFF when in stand-by:** (n; Y) **n**=light output status unchanged after stand-by. **Y**=light output switched off after stand-by.
LAU	**Light output ON after power-on:** (n; Y) **n**=light output unchanged; **Y**=light output forced ON.

5.1.9 Analogue output configuration parameters - AoU

1Ao	**Analogue output 1 configuration:** (nu; FrE; FAn) **nu**=not used; **FrE**=frequency output with fixed duty cycle (50%) and variable frequency. This is used for variable speed compressors. **FAn**=PWM ouput for evaporator fan speed modulation. This will use a phase-cut modulation.
1oL	**Minimum value for analogue output 1:** (0 to 100%) minimum value for 0-10Vdc output
1oH	**Maximum value for analogue output 1** (0 to 100%) maximum value for 0-10Vdc output
1At	**Interval with analogue output 1 at maximum value** (0 to 255 sec) analogue output is forced at 100%, after any activation, for 1**At** seconds.
2Ao	**Analogue output 2 configuration:** (nu; tiM; FAn; AUS; ALr; Cnd; LiG; vAL; SAn; EFn) **nu** = not used; **tiM** = timed, the output will change between min and MAX value following **Ato** and **AtF** value respectively; **FAn** = analogue output depends on the evaporator fan regulator; **AUS** = analogue output depends on the auxiliary regulator; **ALr** = analogue output activated in case of any alarm condition; **Cnd** = analogue output depends on the condenser fan regulator; **LiG** = to modify the light intensity; **vAL**=fixed output value; **SAn**=sanitization; **EFn**=air extraction fan.
2oL	**Minimum value for analogue output 2:** (0 to 100%) minimum value for 0-10Vdc output
2oH	**Maximum value for analogue output 2** (0 to 100%) maximum value for 0-10Vdc output
2At	**Interval with analogue output 2 at maximum value** (0 to 255 sec) analogue output is forced at 100%, after any activation, for **2At** seconds.
MA2	**Working mode for analogue output 2:** (Std; StP) **Std**=standard; **StP**=fixed steps, defined by **LLx** parameters, in cycling mode. If **2Ao=LiG**, the light output value will change between **LL1** and **LL4** by pressing the **LiG** button.
2on	**Analogue output 2 ON (valid if 2Ao=tiM):** (0 to 999 sec) timed activation for **2on** sec.
2oF	**Analogue output 2 OFF (valid if 2Ao=tiM):** (0 to 999 sec) timed deactivation for **2oF** sec.
2AS	**Fixed value for analogue output 2 (valid if 2Ao=vAL):** (0.0 to 100.0%) output value stays at **2AS** value until controller is ON.
LL1	**Level 1 for analogue output 2:** (0.0 to 100.0%) fixed value for level 1
LL2	**Level 2 for analogue output 2:** (0.0 to 100.0%) fixed value for level 2
LL3	**Level 3 for analogue output 2:** (0.0 to 100.0%) fixed value for level 3
LL4	**Level 4 for analogue output 2:** (0.0 to 100.0%) fixed value for level 4

5.1.10 Digital input configuration parameters - inP

ibt	**Base time for digital inputs:** (SEC; Min) **SEC** = seconds; **Min** = minutes. Delay in activating the function linked to the digital inputs.
i1P	**Digital input 1 polarity:** (oP; CL) **oP** = activated by closing the contact; **CL** = activated by opening the contact.
i1F	**Digital input 1 configuration:** (nu; dor; dEF; AUS; ES; EAL; bAL; PAL; FAn; HdF; onF; LiG; CC; EMt; MAP; SAn; EFn) • **nu**=not used • **dor** = door switch function • **dEF** = defrost activation • **AUS** = auxiliary output • **ES** = energy saving mode activation • **EAL** = external warning alarm • **bAL** = external lock alarm • **PAL** = external pressure alarm • **FAn** = evaporator fan control • **HdF** = holiday defrost • **onF** = ON/OFF status change • **LiG** = light output control • **CC** = pull down activation • **EMt** = X-MOD motion detection sensor • **MAP** = reload factory default configuration (for the used parameter map) • **SAn** = Sanitization • **EFn** = Air extraction fan activation
did	**Digital inputs 1 alarm delay (base time depends on par. ibt):** (0 to 255) delay between the detection of an external event and the activation of the relative function.
i2P	**Digital input 2 polarity:** (oP; CL) oP = activated by closing the contact; CL = activated by opening the contact.

i2F	**Digital input 2 configuration: :** (nu; dor; dEF; AUS; ES; EAL; bAL; PAL; FAn; HdF; onF; LiG; CC; EMt; MAP; SAn; EFn) • **nu**=not used • **dor** = door switch function • **dEF** = defrost activation • **AUS** = auxiliary output • **ES** = energy saving mode activation • **EAL** = external warning alarm • **bAL** = external lock alarm • **PAL** = external pressure alarm • **FAn** = evaporator fan control • **HdF** = holiday defrost • **onF** = ON/OFF status change • **LiG** = light output control • **CC** = pull down activation • **EMt** = X-MOD motion detection sensor • **MAP** = reload factory default configuration (for the used parameter map) • **SAn** = Sanitization • **EFn** = Air extraction fan activation
d2d	**Digital inputs 2 alarm delay (base time depends on par. ibt):** (0 to 255) delay between the detection of an external event and the activation of the relative function.
i3P	**Digital input 3 polarity:** (oP; CL) **oP** = activated by closing the contact; **CL** = activated by opening the contact.
i3F	**Digital input 3 configuration: :** (nu; dor; dEF; AUS; ES; EAL; bAL; PAL; FAn; HdF; onF; LiG; CC; EMt; MAP; SAn; EFn) • **nu**=not used • **dor** = door switch function • **dEF** = defrost activation • **AUS** = auxiliary output • **ES** = energy saving mode activation • **EAL** = external warning alarm • **bAL** = external lock alarm • **PAL** = external pressure alarm • **FAn** = evaporator fan control • **HdF** = holiday defrost • **onF** = ON/OFF status change • **LiG** = light output control • **CC** = pull down activation • **EMt** = X-MOD motion detection sensor • **MAP** = reload factory default configuration (for the used parameter map) • **SAn** = Sanitization • **EFn** = Air extraction fan activation
d3d	**Digital inputs 3 alarm delay (base time depends on par. ibt):** (0 to 255) delay between the detection of an external event and the activation of the relative function.
nPS	**Number of external pressure switch alarms before stopping the regulation:** (0 to 15) after reaching nPS events in the digital input alarm delay (par. dxd), the regulation will be stopped and a manual restart (ON/OFF, power OFF and power ON) will be required
odC	**Compressor and fan status after door opening:** (no; FAn; CPr; F-C): **no** = normal; **FAn** = Fan OFF; **CPr** = Compressor OFF; **F-C** = Compressor and fan OFF.
rrd	**Regulation restart after door alarm:** (n; Y) **n** = no regulation if the door is open; **Y** = when the rrd timer elapses, the regulation restarts even if a door open alarm is ON.
CLi	**Light output activation from door input:** (n; Y) **n**=light output unchanged after door opening; **Y**=light output activation after door opening.
LCi	**Time with light output forced ON (0=function disabled):** (0 to 255 min) interval with light output ON. 0=function disabled.
n01	**Number of motion detections before activating light output (valid if ixF=EMt):** (0 to 10) amount of motion detection events before activating light outputs.
t01	**Time with light output forced ON after motion detection:** (0 to 255 min) interval with light output ON. 0=function disabled.

EMF	**Motion sensor stop reading interval after switching off the light output by button or serial command (valid if ixF=EMt):** (0 to 255 min) temporary disabling of the light output activation from motion detection.

5.1.11 Energy saving configuration parameters - ES

ErA	**Energy saving algorithm:** (nu; bAS) **nu**=disabled, the energy saving mode activation is by button, real time clock or digital input; **bAS**=basic algorithm, the energy saving mode activation depends on the the digital input.
HES	**Energy saving mode temperature differential:** (-30.0 to 30.0°C; -54.0 to 54.0°F) sets the increasing value of the set point during the Energy Saving cycle.
LdE	**Energy saving controls the lights (lights OFF when energy saving is active):** (n; Y) lights off when energy saving mode is active
StE	**Period to switch from normal mode to energy saving mode:** (0.0 to 24h00min, res. 10 min) if the door stay closed for **StE** time, the energy saving mode will be activated. NOTE: this will require a door switch to work.
EtS	**Period to switch from energy saving mode to normal mode:** (0.0 to 24h00min, res. 10 min) maximum time for energy saving mode. NOTE: this will require a door switch to work.
dS	**Door opening time to switch from EtS to StE:** (0 to 999 sec) the energy saving mode will be immediately deactivated as soon as the door stays open more than the **dS** time. NOTE: this will require a door switch to work.
nES	**Number of motion detections before disabling energy saving (valid if ixF=EMt):** (0 to 255) energy saving deactivation through X-MOD motion detection sensor.

5.1.12 Counters, read only values - Cnt

n1H	**Number of activations for relay output oA1 (thousands of)**
n1L	**Number of activations for relay output oA1 (units of)**
n2H	**Number of activations for relay output oA2 (thousands of)**
n2L	**Number of activations for relay output oA2 (units of)**
n3H	**Number of activations for relay output oA3 (thousands of)**
n3L	**Number of activations for relay output oA3 (units of)**
n4H	**Number of activations for relay output oA4 (thousands of)**
n4L	**Number of activations for relay output oA4 (units of)**
n5H	**Number of total activation of digital input 1 (thousand of)**
n5L	**Number of total activation of digital input 1 (units of)**
n6H	**Number of total activation of digital input 2 (thousand of)**
n7L	**Number of total activation of digital input 2 (units of)**
n7H	**Number of total activation of digital input 3 (thousand of)**
n6L	**Number of total activation of digital input 3 (units of)**
F1H	**Number of working hours for relay output oA1 (thousands of)**
F1L	**Number of working hours for relay output oA1 (units of)**
F2H	**Number of working hours for relay output oA2 (thousands of)**
F2L	**Number of working hours for relay output oA2 (units of)**
F3H	**Number of working hours for relay output oA3 (thousands of)**
F3L	**Number of working hours for relay output oA3 (units of)**
F4H	**Number of working hours for relay output oA4 (thousands of)**
F4L	**Number of working hours for relay output oA4 (units of)**
rSC	**Total counters reset:** (n;Y) select Y and confirm to reset all the internal counters.

5.1.13 Real Time Clock configuration parameters – rtC

Hur	**Hours:** 0 to 23 hours
Min	**Minutes:** 0 to 59 minutes
dAY	**Day of the week:** Sun to Sat
dYM	**Day of the month:** 1 to 31
Mon	**Month:** 1 to 12
YAr	**Year:** 00 to 99
Hd1	**First day of weekend:** (Sun to Sat; nu) setting for the first day of the weekend.
Hd2	**Second day of weekend:** (Sun to Sat; nu) setting for the second day of the weekend.

iLE	**Energy saving cycle start time on working days:** (00h00min to 23h50min) during the Energy Saving cycle, the set point is increased by the value in HES so that the operation set point is **SET+HES**.
dLE	**Energy saving cycle duration on working days:** (00h00min to 24h00min) sets the duration of the Energy Saving cycle on working days.
iSE	**Energy saving cycle start time on weekends:** 00h00min to 23h50min
dSE	**Energy saving cycle duration on weekends:** 00h00min to 24h00min
tSA	**Sanitization cycle starting time on working days:** 00h00min to 23h50min
dSA	**Sanitization cycle duration on working days:** 00h00min to 24h00min
HSt	**Sanitization cycle starting time on weekends:** 00h00min to 23h50min
HSd	**Sanitization cycle duration on weekends:** 00h00min to 24h00min
ddx	**Daily defrost enabled:** (n; Y) to enable the **Ld1 to Ld6** defrost operations for any day of the week. • **dd1** = Sunday defrost • **dd2** = Monday defrost • **dd3** = Tuesday defrost • **dd4** = Wednesday defrost • **dd5** = Thursday defrost • **dd6** = Friday defrost • **dd7** = Sunday defrost
Ldx	**Defrost start time:** (00h00min to 23h50min) these parameters set the beginning of the programmable defrost cycles during any **ddx** day. Example: when **Ld2=12.4,** the second defrost starts at 12:40 am during working days.

5.1.14 Memory storage management – E2

MAP	**Current configuration:** (C-1; C-2) to change configuration (parameter map) used.
LdM	**Restore default factory settings:** (n;Y) select Y and confirm to reload factory default values for the configuration currently used.
rHA	**Reset HACCP values:** (n; Y) select Y and confirm to reset the memorized min and MAX temperature values (HACCP function must be enabled).
bCC	**Auxiliary button is used to change configuration:** (nu; b03) **nu**=not used; **b03**=AUX button set as “parameter map change” (AUX output is not affected).

5.1.15 Serial Communication port configuration parameters - CoM

Adr	**Serial address:** (1 to 247) device address for Modbus communication
bAU	**Baudrate:** (9.6; 19.2; 38.4; 57.6) select the correct baudrate for serial communication
PAr	**Parity control:** (no; odd; EvE) no=no parity control; odd=odd parity control; EvE=even parity control

5.1.16 User Interface configuration parameters - Ui

b2C	**Virtual button 2 configuration (up-center):** (nu; Pdn; MAP; SAn; EFn) **nu**=not used; **Pdn**=pull down activation; **MAP**=configuration change; **SAn**=sanitizazion; **EFn**=air extraction fan.
b3C	**Virtual button 3 configuration (up-right):** (nu; AUS; MAP; SAn; EFn) **nu**=not used; **AUS**=auxiliary output control; **MAP**=configuration change; **SAn**=sanitizazion; **EFn**=air extraction fan.
b1F	**Virtual button 1 enabled in stand-by (up-left):** (n; Y)
b2F	**Virtual button 2 enabled in stand-by (up-center):** (n; Y)
b3F	**Virtual button 3 enabled in stand-by (up-right):** (n; Y)
SCS	**User interface timeout:** (1 to 255 sec) timeout before coming back to **Home Screen** or to **Programming Menu**
bS	**Sound Level:** (0 to 5) select the sound level of the gestures
PSU	**Password for protected level Pr2:** (000 to 999) insert a value to protect all the parameters set on the level Pr2 from modification

5.1.17 Information, read only parameters - inF

dP1	**Probe P1 value visualization**
dP2	**Probe P2 value visualization**
dP3	**Probe P3 value visualization**
dP4	**Probe P4 value visualization**

rSE	**Real regulation Set Point**
FdY	**Firmware release date: day**
FMt	**Firmware release date: month**
FYr	**Firmware release date: year**
rEL	**Firmware release: progressive number**
Sub	**Firmware sub release: progressive number**
Ptb	**Parameter map version**

5.2 PARAMETER CONFIGURATION

Factory default values for parameter map

Group	Parameter	Description	Value	Level
rEG	**SEt**	Set Point	10.0	Pr1
rEG	**LS**	Minimum Set point	-100.0	Pr1
rEG	**US**	Maximum Set point	150.0	Pr1
rEG	**HY**	Compressor regulation differential in normal mode	2.0	Pr1
rEG	**HYE**	Compressor regulation differential in energy saving mode	2.0	Pr1
rEG	**HY1**	Proportional regulation differential in normal mode	2.0	Pr1
rEG	**HYS**	Proportional regulation differential in energy saving mode	2.0	Pr1
rEG	**HYd**	Deadband output regulation (oAx=db) differential	2.0	Pr1
rEG	**SH1**	Humidity Set Point	60	Pr1
rEG	**LSH**	Minimum humidity Set Point	30	Pr1
rEG	**USH**	Maximum humidity Set Point	80	Pr1
rEG	**HHA**	Positive humidity regulation differential (SEH+HHA)	10	Pr1
rEG	**HHb**	Negative humidity regulation differential (SEH-HHB)	10	Pr1
rEG	**rAr**	Delay between compressor and db output (oAx=db) activation and vice versa	1	Pr1
rEG	**odS**	Output activation delay at start-up	30	Pr1
rEG	**AC**	Anti-short cycle delay	1	Pr1
rEG	**AC1**	Anti-short cycle delay (2nd compressor)	0	Pr1
rEG	**2CC**	Activation mode for 2nd compressor: HAF=step logic; FUL=delayed	FUL	Pr2
rEG	**rCC**	Enable compressor rotation	no	Pr2
rEG	**MCo**	Maximum time with compressor on (0=disabled)	0	Pr2
rEG	**rtr**	Regulation percentage=F(P1; P2) (100=P1; 0=P2)	100	Pr1
rEG	**CCt**	Maximum duration for Pull Down	00:00	Pr1
rEG	**CCS**	Pull Down phase differential (SET+CCS or SET+HES+CCS)	0.0	Pr1
rEG	**oHt**	Threshold for automatic activation of Pull Down in normal mode (SET+HY+oHt)	0.0	Pr1
rEG	**oHE**	Threshold for automatic activation of Pull Down in energy saving mode (SET+HES+HYE+oHE)	0.0	Pr1
rEG	**Con**	Compressor ON time with faulty probe	20	Pr1
rEG	**CoF**	Compressor OFF time with faulty probe	10	Pr1
rEG	**CHt**	Type of regulation: Ht=heating; CL=cooling; db=dead band	CL	Pr1
rEG	**tHU**	Type of humidity regulation	t4	Pr1
rEG	**rH1**	Delay before activating heating output for dehumidification	60	Pr1
Prb	**P1C**	Probe P1 selection	ntC	Pr2
Prb	**P2C**	Probe P2 selection	ntC	Pr2
Prb	**P3C**	Probe P3 selection	ntC	Pr2
Prb	**P4C**	Probe P4 selection	Cur	Pr2
Prb	**ot**	Probe P1 calibration	0.0	Pr2

Prb	**P2P**	Probe P2 presence	yes	Pr2
Prb	**oE**	Probe P2 calibration	0.0	Pr2
Prb	**P3P**	Probe P3 presence	no	Pr2
Prb	**o3**	Probe P3 calibration	0.0	Pr2
Prb	**P4P**	Probe P4 presence	yes	Pr2
Prb	**o4**	Probe P4 calibration	0	Pr2
Prb	**1Ai**	Type of analogue input 1	rH	Pr2
Prb	**1UA**	Upper limit for analogue input Ai1	20.0	Pr2
Prb	**1LA**	Lower limit for analogue input Ai1	4.0	Pr2
Prb	**1UC**	Upper limit for analogue scaling factor	100	Pr2
Prb	**1LC**	Lower limit for analogue scaling factor	0	Pr2
diS	**CF**	Temperature measurement unit: Celsius; Fahrenheit	°C	Pr1
diS	**rES**	Temperature resolution: decimal, integer	dE	Pr1
diS	**rEH**	Humidity resolution: decimal, integer	in	Pr1
diS	**Lod**	Probe default displayed	P1	Pr1
diS	**rEd**	Remote probe displayed (for XH-REP)	P1	Pr1
diS	**dLy**	Temperature display delay (resolution 10 sec)	00:00	Pr1
diS	**dtr**	Probe visualization percentage=F(P1;P2) (ex: dtr=1 means VALUE=0.01*P1+0.99*P2)	99	Pr1
diS	**dt**	Temperature value visualisation time	5	Pr1
diS	**dH**	Humidity value visualisation time	5	Pr1
dEF	**EdF**	Defrost mode	in	Pr1
dEF	**tdF**	Defrost type: electric heating, hot gas	EL	Pr1
dEF	**dFP**	Probe selection for defrost control	nP	Pr1
dEF	**dSP**	Probe selection for 2nd defrost control	nP	Pr1
dEF	**dtE**	End defrost temperature	8.0	Pr1
dEF	**dtS**	End 2nd defrost temperature	8.0	Pr2
dEF	**idF**	Interval between two successive defrost cycles	12	Pr1
dEF	**MdF**	Maximum length of defrost cycle	30	Pr1
dEF	**MdS**	Maximum length of 2nd defrost cycle	0	Pr2
dEF	**dSd**	Start defrost delay	0	Pr1
dEF	**StC**	Compressor off-cycle before starting any defrost	0	Pr1
dEF	**dFd**	Displaying during defrost	dEF	Pr1
dEF	**dFr**	Remote display visualization during any defrost	rt	Pr1
dEF	**dAd**	Temperature display delay after any defrost cycle	2	Pr1
dEF	**Fdt**	Draining time	1	Pr1
dEF	**Hon**	Drain heater enabled after draining time (par. Fdt)	0	Pr1
dEF	**dPo**	Defrost cycle enebled at stat-up	no	Pr1
dEF	**HYP**	Differential temperature during any pre-defrost phase	0.0	Pr1
dEF	**Pd2**	Defrost output deactivation delay	0	Pr1
dEF	**dAF**	Pre-defrost time	0	Pr1
dEF	**od1**	Automatic defrost (at the beginning of any energy saving)	no	Pr1
dEF	**od2**	Optimized defrost	no	Pr2
dEF	**dSt**	Temperature sampling time during an optimized defrost (valid only if od2=yes)	30	Pr2
dEF	**SYd**	Tipe of synchronized defrost	nU	Pr2

dEF	**dt1**	Differential temperature for latent heating control	0.5	Pr2
dEF	**ErS**	Restart regulation after dripping (valid only if Syd = nSY)	no	Pr1
dEF	**HUd**	Humidity regulation active during any defrost phase	no	Pr1
FAn	**FAP**	Probe selection for evaporator fan	nP	Pr1
FAn	**FSt**	Evaporator fan stop temperature	10.0	Pr1
FAn	**HYF**	Evaporator fan regulator differential	2.0	Pr1
FAn	**oFE**	Offset for evaporator fan activation and deactivation	0.0	Pr1
FAn	**FnC**	Evaporator fan operating mode	C_n	Pr1
FAn	**Fnd**	Evaporator fan delay after defrost cycle	0	Pr1
FAn	**FCt**	Differential temperature for cyclic activation of evaporator fans (o=disabled)	0	Pr1
FAn	**FSU**	Evaporator fan operating mode	Std	Pr1
FAn	**Ft**	Evaporator fan controlled during any defrost	no	Pr1
FAn	**Fon**	Evaporator fan ON time in normal mode (with compressor OFF)	1	Pr1
FAn	**FoF**	Evaporator fan OFF time in normal mode (with compressor OFF)	2	Pr1
FAn	**Fo1**	Evaporator fan ON time in energy saving (with compressor OFF)	2	Pr1
FAn	**FF1**	Evaporator fan OFF time in energy saving (with compressor OFF)	3	Pr1
FAn	**Fd1**	Evaporator fan delay	0	Pr1
FAn	**Fd2**	Evaporator fan delay after closing door	0	Pr1
FAn	**Fnu**	Number of motion detections before forcing evaporator fans at FMr	0	Pr1
FAn	**FMr**	Evaporator fan speed after Fnu motion detections	0	Pr1
FAn	**Fti**	Evaporator fans operating at FMr	0	Pr1
FAn	**LA1**	Maintenance interval for evaporator fans (tens of hours)	0	Pr1
FAn	**rS1**	Evaporator fan maintenance function reset	no	Pr1
FAn	**FAC**	Probe selection for condenser fan	nP	Pr1
FAn	**St2**	Set Point 2 Regulation (for condenser fan)	20.0	Pr1
FAn	**Hy2**	Set Point 2 differential (for condenser fan)	10.0	Pr1
FAn	**oFC**	Offset for condenser fan activation and deactivation	0.0	Pr1
FAn	**FCC**	Condenser fan operating mode	C_n	Pr1
FAn	**Fd3**	Condenser fan activation delay	0	Pr1
FAn	**Fd4**	Condenser fan deactivation delay	0	Pr1
FAn	**LA2**	Maintenance interval for condenser fans (tens of hours)	0	Pr1
FAn	**rS2**	Condenser fan maintenance function reset	no	Pr1
FAn	**iAE**	Interval between air extraction fan activation	00:00	Pr1
FAn	**tAE**	Air extraction fan running time	0	Pr1
AUS	**ACH**	Type of control for auxiliary regulator	CL	Pr1
AUS	**SAA**	Set point for auxiliary regulator	0.0	Pr1
AUS	**SHy**	Auxiliary regulator differential	0.1	Pr1
AUS	**ArP**	Probe selection for auxiliary regulator	nP	Pr1
AUS	**Sdd**	Auxiliary regulator disabled during any defrost cycle	no	Pr1
AUS	**btA**	Base time for parameters Ato and AtF	Sec	Pr1
AUS	**Ato**	Interval of time with auxiliary output ON	0	Pr1
AUS	**AtF**	Interval of time with auxiliary output OFF	0	Pr1
dYn	**dSi**	Reference probe for dynamic Set Point	nP	Pr2
dYn	**dSS**	Dynamic Set Point value	0.0	Pr2

dYn	**dSb**	Range dynamic Set Point	10.0	Pr2
dYn	**dSH**	Dynamic Set Point differential	5.0	Pr2
ALr	**ALP**	Probe selection for temperature alarms	nP	Pr1
ALr	**ALC**	Temperature alarms configuration: relative, absolute	Ab	Pr1
ALr	**ALU**	High temperature alarm	150.0	Pr1
ALr	**ALL**	Low temperature alarm	-100.0	Pr1
ALr	**AFH**	Temperature alarm differential	2.0	Pr1
ALr	**ALd**	Temperature alarm delay	0	Pr1
ALr	**dot**	Temperature alarm delay with open door	00:00	Pr1
ALr	**dAo**	Temperature alarm delay at start-up	00:00	Pr1
ALr	**AP2**	Probe selection for 2nd temperature alarm	nP	Pr1
ALr	**AU1**	Pre-alarm threshold for 2nd temperature alarm (absolute value)	100.0	Pr1
ALr	**AH1**	2nd high temperature pre-alarm differential	5.0	Pr1
ALr	**Ad1**	2nd high temperature pre-alarm delay	0	Pr1
ALr	**AL2**	2nd low temperature alarm	-100.0	Pr1
ALr	**AU2**	2nd high temperature alarm	150.0	Pr1
ALr	**AH2**	2nd temperature alarm differential	5.0	Pr1
ALr	**Ad2**	2nd temperature alarm delay	0	Pr1
ALr	**dA2**	2nd temperature alarm delay at start-up	00:00	Pr1
ALr	**bLL**	Compressor OFF due to 2nd low temperature alarm	n	Pr1
ALr	**AC2**	Compressor OFF due to 2nd high temperature alarm	n	Pr1
ALr	**SAF**	Differential for anti-freezing control	0.0	Pr1
ALr	**tbA**	Alarm relay deactivation	no	Pr1
ALr	**AHC**	Humidity alarm configuration	Ab	Pr1
ALr	**AHL**	Low humidity alarm	0	Pr1
ALr	**AHU**	High humidity alarm	100	Pr1
ALr	**AHH**	Humidity alarm differential	5	Pr1
ALr	**AHd**	Humidity alarm delay	0	Pr1
ALr	**dHo**	Humidity alarm delay at start-up	00:00	Pr1
ALr	**doH**	Humidity alarm delay with door open	0	Pr1
ALr	**EdA**	Temperature alarms inhibiton after any defrost	0	Pr1
ALr	**iSn**	Interval between sanitizations	00:00	Pr1
ALr	**tSn**	Sanitization time	00:00	Pr1
oUt	**oA1**	Relay output oA1 configuration	CP1	Pr2
oUt	**oA2**	Relay output oA2 configuration	FAn	Pr2
oUt	**oA3**	Relay output oA3 configuration	dEF	Pr2
oUt	**oA4**	Relay output oA4 configuration	LiG	Pr2
oUt	**AOP**	Alarm relay polarity	CL	Pr2
oUt	**LoF**	Light output OFF when in stand-by	no	Pr2
oUt	**LAU**	Light output ON after power-on	no	Pr2
AoU	**2Ao**	Analogue output 2 configuration	nU	Pr2
AoU	**2oL**	Minimum value for analogue output 2	0	Pr2
AoU	**2oH**	Maximum value for analogue output 2	100	Pr2
AoU	**2At**	Interval with analogue output 2 at maximum value	5	Pr2

AoU	**MA2**	Working mode for analogue output 2	Std	Pr2
AoU	**2on**	Analogue output 2 ON (valid if 2Ao=tiM)	0	Pr2
AoU	**2oF**	Analogue output 2 OFF (valid if 2Ao=tiM)	0	Pr2
AoU	**2AS**	Fixed value for analogue output 2 (valid if 2Ao=vAL)	50	Pr2
AoU	**LL1**	Level 1 for analogue output 2	0	Pr2
AoU	**LL2**	Level 2 for analogue output 2	30	Pr2
AoU	**LL3**	Level 3 for analogue output 2	60	Pr2
AoU	**LL4**	Level 4 for analogue output 2	100	Pr2
inP	**ibt**	Base times for digital inputs	Sec	Pr1
inP	**i1P**	Digital input 1 polarity	CL	Pr1
inP	**i1F**	Digital input 1 configuration	nU	Pr1
inP	**did**	Digital inputs 1 alarm delay (base time depends on par. ibt)	0	Pr1
inP	**i2P**	Digital input 2 polarity	CL	Pr1
inP	**i2F**	Digital input 2 configuration	nU	Pr1
inP	**d2d**	Digital inputs 2 alarm delay (base time depends on par. ibt)	0	Pr1
inP	**i3P**	Digital input 3 polarity	CL	Pr2
inP	**i3F**	Digital input 3 configuration	nU	Pr2
inP	**d3d**	Digital inputs 3 alarm delay (base time depends on par. ibt)	0	Pr2
inP	**nPS**	Number of external pressure switch alarms before stopping the regulation	0	Pr1
inP	**OdC**	Compressor and fan status after door opening	FAn	Pr1
inP	**rrd**	Regulation restart after door alarm	no	Pr1
inP	**CLi**	Light output activation from door input	no	Pr1
inP	**LCi**	Time with light output forced ON (0=function disabled)	0	Pr1
inP	**n01**	Number of motion detections before activating light output (valid if ixF=EMt)	0	Pr1
inP	**t01**	Time with light output forced ON after motion detection	0	Pr1
inP	**EMF**	Motion sensor stop reading interval after switching off the light output by button or serial command (valid if ixF=EMt)	0	Pr1
ES	**ErA**	Energy saving algorithm	nu	Pr1
ES	**HES**	Energy saving mode temperature differential	0.0	Pr1
ES	**LdE**	ErA controls the lights in energy saving mode (lights OFF when energy saving goes active)	no	Pr1
ES	**StE**	Period to switch from normal mode to energy saving mode (valid if ErA=bAS)	00:00	Pr1
ES	**EtS**	Period to switch from energy saving mode to normal mode (valid if ErA=bAS)	00:00	Pr1
ES	**dS**	Open door time to switch from EtS to StE (valid if ErA=bAS)	5	Pr1
ES	**nES**	Number of motion detections before disabling energy saving (valid if ixF=EMt)	0	Pr1
Cnt	**n1H**	Number of activations for relay output oA1 (thousands of)		Pr1
Cnt	**n1L**	Number of activations for relay output oA1 (units of)		Pr1
Cnt	**n2H**	Number of activations for relay output oA2 (thousands of)		Pr1
Cnt	**n2L**	Number of activations for relay output oA2 (units of)		Pr1
Cnt	**n3H**	Number of activations for relay output oA3 (thousands of)		Pr1
Cnt	**n3L**	Number of activations for relay output oA3 (units of)		Pr1
Cnt	**n4H**	Number of activations for relay output oA4 (thousands of)		Pr1
Cnt	**n4L**	Number of activations for relay output oA4 (units of)		Pr1
Cnt	**n5H**	Number of total activations of digital input 1 (thousands of)		Pr1
Cnt	**n5L**	Number of total activations of digital input 1 (units of)		Pr1
Cnt	**n6H**	Number of total activations of digital input 2 (thousands of)		Pr1

Cnt	**n6L**	Number of total activations of digital input 2 (units of)		Pr1
Cnt	**n7H**	Number of total activations of digital input 3 (thousands of)		Pr1
Cnt	**n7L**	Number of total activations of digital input 3 (units of)		Pr1
Cnt	**F1H**	Number of working hours for relay output oA1 (thousands of)		Pr1
Cnt	**F1L**	Number of working hours for relay output oA1 (units of)		Pr1
Cnt	**F2H**	Number of working hours for relay output oA2 (thousands of)		Pr1
Cnt	**F2L**	Number of working hours for relay output oA2 (units of)		Pr1
Cnt	**F3H**	Number of working hours for relay output oA3 (thousands of)		Pr1
Cnt	**F3L**	Number of working hours for relay output oA3 (units of)		Pr1
Cnt	**F4H**	Number of working hours for relay output oA4 (thousands of)		Pr1
Cnt	**F4L**	Number of working hours for relay output oA4 (units of)		Pr1
Cnt	**rSC**	Total counters reset	no	Pr1
rtC	**Hur**	Hours		Pr1
rtC	**Min**	Minutes		Pr1
rtC	**dAY**	Day of the week		Pr1
rtC	**dYM**	Day of the month		Pr1
rtC	**Mon**	Month		Pr1
rtC	**YAr**	Year		Pr1
rtC	**Hd1**	First day of weekend	nu	Pr1
rtC	**Hd2**	2nd day of weekend	nu	Pr1
rtC	**iLE**	Energy saving cycle starting time on working days	00:00	Pr1
rtC	**dLE**	Energy saving cycle duration on working days	00:00	Pr1
rtC	**iSE**	Energy saving cycle starting time on weekends	00:00	Pr1
rtC	**dSE**	Energy saving cycle duration on weekends	00:00	Pr1
rtC	**tSA**	Sanitization cycle starting time on working days	nu	Pr1
rtC	**dSA**	Sanitization cycle duration on working days	00:00	Pr1
rtC	**HSt**	Sanitization cycle starting time on weekends	nu	Pr1
rtC	**HSd**	Sanitization cycle duration on weekends	00:00	Pr1
rtC	**dd1**	Sunday defrost	no	Pr1
rtC	**dd2**	Monday defrost	no	Pr1
rtC	**dd3**	Tuesday defrost	no	Pr1
rtC	**dd4**	Wednesday defrost	no	Pr1
rtC	**dd5**	Thursday defrost	no	Pr1
rtC	**dd6**	Friday defrost	no	Pr1
rtC	**dd7**	Saturday defrost	no	Pr1
rtC	**Ld1**	1st defrost starting time	nu	Pr1
rtC	**Ld2**	2nd defrost starting time	nu	Pr1
rtC	**Ld3**	3rd defrost starting time	nu	Pr1
rtC	**Ld4**	4th defrost starting time	nu	Pr1
rtC	**Ld5**	5th defrost starting time	nu	Pr1
rtC	**Ld6**	6th defrost starting time	nu	Pr1
E2	**MAP**	Current configuration		Pr2
E2	**LdM**	Restore default factory settings		Pr2
E2	**rHA**	MAX and Min values reset for HACCP functions (valid if .eMiMa=1)		Pr2

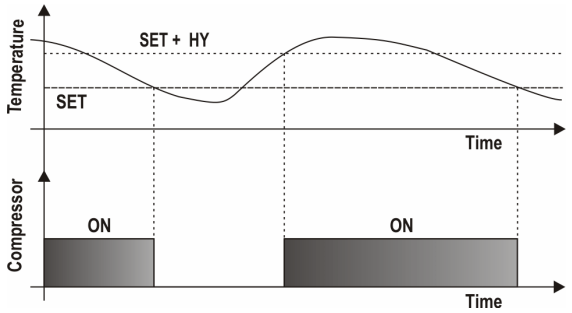
CoM	**Adr**	Serial address for COM1	1	Pr1
CoM	**bAU**	Baudrate for COM1	9.6	Pr1
CoM	**PAr**	Parity control for COM1	no	Pr1
Ui	**b2C**	Button 2 configuration	nU	Pr2
Ui	**b3C**	Button 3 configuration	SAn	Pr2
Ui	**b1F**	Button 1 enabled in stand-by	yes	Pr2
Ui	**SCS**	User interface timeout	60	Pr2
Ui	**bS**	Sound Level	3	Pr1
Ui	**PSU**	Password for level Pr2	0	Pr2
inF	**dP1**	Probe P1 value visualization	0	Pr1
inF	**dP2**	Probe P2 value visualization	0	Pr1
inF	**dP3**	Probe P3 value visualization	0	Pr1
inF	**dP4**	Probe P4 value visualization	0	Pr1
inF	**SPd**	Instantaneous compressor speed (RPM * 10)		Pr1
inF	**rSE**	Real regulation Set Point (SET + HES + SETd)	0	Pr1
inF	**FdY**	Firmware release date: day		Pr1
inF	**FMn**	Firmware release date: month		Pr1
inF	**FYr**	Firmware release date: year		Pr1
inF	**rEL**	Firmware release		Pr1
inF	**SUb**	Firmware sub release		Pr1
inF	**Ptb**	Parameter map version	2	Pr1

6. REGULATION

The controller is able to drive both ONOFF or variable speed compressors.

6.1 ONOFF COMPRESSOR

The regulation is based on the temperature measured by the thermostat probe (P1) with a positive differential respect to the set point: if the temperature increases and reaches the set point plus differential, the compressor will start. The compressor will stop when the temperature reaches the set point value again. In case of fault because of the thermostat probe, the start and stop of the compressor are timed through parameters **CoF** and **Con**.



6.2 HUMIDITY REGULATION

The humidity regulation is based on the humidity probe (P4C = Cur), which must be present and configured appropriately, on the humidity set **SH1** and on the regulation bands defined by parameters **HHA** and **HHb**. Based on the type of regulation (see par. **tHU**), the outputs are activated to humidify or dehumidify following the list below:

- **tHU = nu**: humidity regulation deactivated. The device works only as temperature control.
- **tHU = t1:** both humidification (**oAx=HUM**) and dehumidification by cooling action (**oAy=CP1)**.
- **tHU = t2:** both humidification (**oAx=HUM**) and dehumidification by cooling (**oAy=CP1)** and heating (**oAz=db**) action.
- **tHU = t3:** dehumidification only by cooling (**oAx=CP1**) and dehumidifier (**oAy=dEH**). Heating output (**oAz=db**), if configured, is activated with **rH1** delay respect dehumidifier activation and only if humidity set point is not reached yet.
- **tHU = t4:** dehumidification only by cooling (**oAx=CP1**) and heating (**oAy=db**) action.

- **tHU = t5:** both humidification and dehumidification, with dead band logic by humidifier (**oAx=HUM**) and dehumidifier (**oAy=dEH**).

NOTES:

- Temperature regulation has priority over humidity regulation. If there is a simultaneous request of cooling and dehumidification, the cooling output (compressor) will always have priority and will be activated first.

6.2.1 HUMIDITY VISUALISATION

The visualisation of the humidity value is possible only if the humidity probe is present and properly configured. The main display alternates the measurement value of temperature with the measurement value of humidity. This kind of view is active only on the HOME screen. The following parameters are used (with base time in seconds):

- **dt**: temperature visualisation time on HOME screen
- **dH**: humidity visualisation time on HOME screen

NOTES:

- If **dt=0**: only the humidity value is visualised.
- If **dH=0**: only the temperature value is visualised.
- If **dt=0** e **dH=0**: only the temperature value is visualised.
- Humidity visualisation uses no special icons as unit of measurement and follows par. **rEH**. The internal resolution for humidity measurement is always 0.1 RH%.

7. ENERGY SAVING

The standard SET-POINT (**SET**) is used to maintain the temperature at a certain value when the energy saving status (ES) is not active. On the other hand, when the ES status is active a different SET-POINT (**SET_ES**), higher than the standard one, will be used. The parameter **HES** defines the energy setpoint according to the following formula: **SET_ES = SET + HES**
There are also two different differential values for **SET** and **SET_ES**, which are used for compressor cut-in and cut-out: when ES status is active, the **HYE** parameter will be used instead of the **HY** parameter.

7.1 BASIC ENERGY SAVING ALGORITHM

The energy saving status will be always saved in the internal memory to resume previous operation if a power failure occurs. The presence of a door switch to work properly (for example: **i1F=dor**) is required.

7.1.1 PARAMETERS INVOLVED

- **ErA:** energy saving algorithm
- **i1F or i2F:** set as door input to monitor the appliance usage
- **StE:** interval to switch from normal to energy saving mode
- **EtS:** interval to switch from energy saving to normal mode
- **HES:** SETPOINT differential when energy saving mode active
- **HYE:** regulation differential when energy saving mode is active
- **dS:** interval for door opening detection
- **LdE:** light output controlled by energy saving (OFF when energy saving mode is active)

FROM	TO	MODE
Normal mode	Energy Saving	Activate the ECO function from Virtual Keyboard screen. Door continuously closed for time **StE**.
Energy Saving	Normal mode	Activate the ECO function from Virtual Keyboard screen. Controller in ES mode for time **EtS**. If the controller is in ES mode, it returns in Standard mode when the door stays open more than time **dS**.

NOTE: the cycling mode (ES - Normal mode - ES - etc.) works if **i1F=dor**, **EtS** and **StE** are different from zero. If **EtS=0** or **StE=0,** the controller will not change the operating mode, and it will be possible to change from the normal mode to the energy saving mode by using the ES button or by setting **i1F=ES**.

8. PULL DOWN FUNCTION

The Pull Down is automatically activated:
- After any defrost cycle
- After power-on if **T>SET+CCS**
- When the regulation probe temperature **T** is:
    - **T>SET+HY+oHt** value in normal mode
    - **T>SET+HES+HYE+oHE** value in energy saving mode

In these cases, a different set-point value (**SET+CCS**) will be used. As soon as the room temperature reaches the **SET+CCS** value, the compressor will stop and the normal regulation will restart.

NOTE:
- Pull Down function is disabled when **CCS=0** or **CCt=0**.
- The **CCt** parameter sets the maximum activation time for any pull down. When **CCt** expires, the Pull Down will be immediately stopped and the standard SET-POINT will be restored

9. DEFROST OPERATIONS

Any defrost operation can be controlled in the following way:
- **EdF=rtC**: by using an internal real-time clock (only for models equipped with RTC)
- **EdF=in**: timed defrost, in this case a new defrost will start as soon as the idF timer elapses

9.1 DEFROST MODE

Two defrost modes are available: timed or controlled by a temperature probe. A couple of parameters are required to control intervals between defrost cycles (**idF**) and maximum duration (**MdF**). During a defrost cycle it is possible to select some different visualizations by using the par. **dFd**. Available defrost types are:
- **tdF=EL**: with an electric heater
- **tdF=in**: by using hot gas cycle

9.2 TIMED OR INTERVAL DEFROST

The defrost interval depends on the presence of the RTC (optional). The internal RTC is controlled by means of the **EdF** parameter:
- **EdF=in:** the defrost is made every **idF** time – standard way for controller without RTC.
- **EdF=rtC:** the defrost is real time controlled, depending on the day enabled in the parameters **dd1**…**dd7** and the hours set in the parameters **Ld1...Ld6**.

Other parameters are used to control defrosting cycles: the maximum length (**MdF**) and defrosting modes: timed or controlled by the evaporator's probe (**P2P**).
At the end of defrost dripping time is started, its length is set in the **Fdt** parameter. With **Fdt=0** the dripping time is disabled.

9.3 AUTOMATIC DEFROST

It is possible to automatically start a defrost as soon as the energy saving mode is activated. To do this, set par. **od1=Y**.

10. EVAPORATOR FAN

To enable the evaporator fan management it is required to set an evaporator probe (par. **FAP**). Here are the involved parameters:
- **FAP**: to select the control probe
- **FSt**: to select the deactivation setpoint
- **HYF**: differential
- **FnC**: to define the working mode:
    - **C-n:** in parallel with compressor output and stopped during any defrost. When compressor is OFF, they will start a duty-cycle mode (see **FoF**, **Fon**, **FF1** and **Fo1** parameters)
    - **O-n:** always on, stopped during any defrost
    - **C-Y:** in parallel with compressor output and always on during any defrost. When compressor is OFF, they will start a duty-cycle mode (see **FoF**, **Fon**, **FF1** and **Fo1** parameters)
    - **o-Y:** always on
- **Fnd:** activation delay after any defrost

10.1 EVAPORATOR FAN AND DIGITAL INPUT

When a digital input is configured as a door switch (**ixF=dor**) and this digital input is active, evaporator fan and compressor status will depend on par. **odC**:

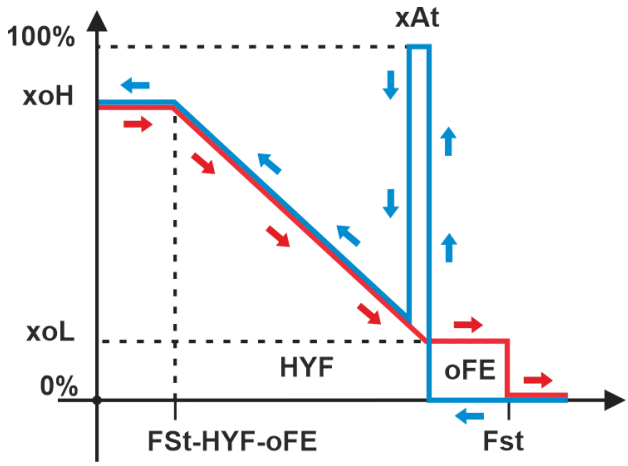
- **odC=no**: normal regulation
- **odC=FAn**: evaporator fan OFF
- **odC=CPr**: compressor OFF
- **odC=F-C**: compressor and evaporator fan OFF

When **rrd=Y**, the regulation restarts after **d1d** or **d2d** time.

10.2 EVAPORATOR FAN CONTROL WITH ANALOGUE OUTPUT

The analogue output **xAo (x=1, 2)** can be controlled by the evaporator fan regulator. In this case the regulation is proportional within the regulation band, excluding the first **xAt (x=1, 2)** seconds where it is activated at the maximum value **xoH (x=1, 2)**.

- With **T > FSt**: analogue output is OFF (0%)
- With **FST-oFE < T <= FSt**:
  - During any activation (temperature is decreasing) the analogue output stays OFF (0%)
  - During any deactivation (temperature is increasing) the analogue output stays at **xoL**
- With **FSt-HYF-oFE < T <= FSt-oFE**:
  - During any activation (temperature is decreasing) the analogue output will change proportionally in the range [**xoL** to **xoH**] (excluding the first **xAt** sec where the fixed value **xoH** is used)
  - During any deactivation (temperature is increasing) the analogue output will change proportionally in the range [**xoL** to **xoH**]
- With **T <= FSt-HYF-oFE**: analogue output stays at **xoH**



10.2.1 SPECIAL CONDITIONS

CONDITION	Output level
Output enabled and **FAP=nu**	**1oH or 2oH**
Output not enabled and **FAP=nu**	0%
Stand-by	0%
Error probe	**1oH or 2oH**
Output disabled through door open (**ixF=dor, odC=FAn or F-C**)	0%
Restart after door open alarm disabled (**ixF=dor, odC=FAn or F-C, rrd=n**)	0%
Restart after door open alarm enabled (**ixF=dor, odC=FAn or F-C, rrd=Y**)	**1oH or 2oH**
FnC=C-n or **C-Y** and at least a compressor ON	Controlled by evaporator fan regulator
FnC=C-n or **C-Y** and no compressor ON	During **Fon:** Controlled by evaporator fan regulator. During **FoF:** 0%
FnC=O-n or **O-Y**	Controlled by evaporator fan regulator

Defrost	**FnC=C-n**: 0% **FnC=O-n**: 0% **FnC=C-Y**: - **Ft=Y**: Controlled by evaporator fan regulator. - **Ft=n: 1oH or 2oH** **FnC=O-Y**: - **Ft=Y**: Controlled by evaporator fan regulator. - **Ft=n**: **1oH or 2oH**
Draining	Controlled by evaporator fan regulator
Lockout alarm	0%
Motion detection	After motion detection: output at **FMr** for **Fti.** Without motion detection: controlled by evaporator fan regulator
Anti short cycle (par. **FCt**)	Evaporator fan control disabled.

10.3 EVAPORATOR FAN MAINTENANCE FUNCTION

Par. **LA1** enables a threshold with the meaning of (tens of) hours of operation before maintenance. The counter will be increased when any evaporator fan output is ON.

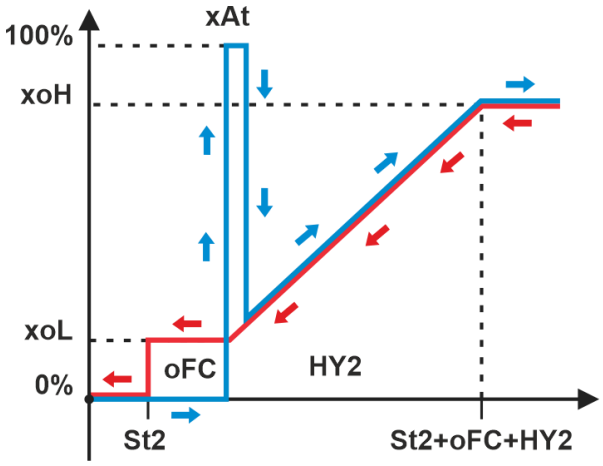
If **LA1 = 0** the maintenance function is disabled (for all types of evaporator fans).
After reaching the value indicated in par. **LA1**:
- The label relating to the maintenance alarm will appear on the display (**"FSr"**: condenser fan service).
- The buzzer, if present, will not be activated.
- The alarm relay, if present, will not be activated.
- The modbus alarm status will be set.

To reset this maintenance alarm:
- Enter programming mode, access par. **rS1** and set it to **"Y"** and confirm with the SET button.
- Send the reset command via Modbus.

After the counter reset:
- The maintenance alarm will be deactivated (label and modbus status reset).
- The counter relating to the maintenance alarm will be reloaded.

11. CONDENSER FAN

To enable the condenser fan management it is required to set a condenser probe (par. **FAC**). Here are the involved parameters:
- **FAC**: to select the control probe
- **St2**: to select the deactivation setpoint
- **HY2**: differential
- **FCC**: to define the working mode:
    - **C-n:** in parallel with compressor output and stopped during any defrost. When compressor is OFF, they will start a duty-cycle mode (see **FoF**, **Fon**, **FF1** and **Fo1** parameters)
    - **o-n:** always on, stopped during any defrost
    - **C-Y:** in parallel with compressor output and always on during any defrost. When compressor is OFF, they will start a duty-cycle mode (see **FoF**, **Fon**, **FF1** and **Fo1** parameters)
    - **o-Y:** always on



11.1 CONDENSER FAN CONTROL WITH ANALOGUE OUTPUT

The analogue output 2 can be controlled by the condenser fan regulator. In this case the regulation is proportional within the regulation band, excluding the first **2At** seconds where it is activated at the maximum value (**100%**).

- With **T < St2**: analogue output is OFF (0%)
- With **St2 <= T < St2+oFC**:
  - During any activation (temperature is increasing) the analogue output stays OFF (0%)
  - During any deactivation (temperature is decreasing) the analogue output stays at **2oL**
- With **St2+oFC <= T < St2+oFC+HY2**:
  - During any activation (temperature is increasing) the analogue output will change proportionally in the range [**2oL** to **2oH**] (excluding the first **2At** sec where the fixed value **2oH** is used)
  - During any deactivation (temperature is decreasing) the analogue output will change proportionally in the range [**2oL** to **2oH**]
- With **T > St2+HYF+oFE**: analogue output stays at **2oH**

11.2 CONDENSER FAN MAINTENANCE FUNCTION

Par. **LA2** enables a threshold with the meaning of (tens of) hours of operation before maintenance. The counter will be increased when any evaporator fan output is ON.

If **LA2 = 0** the maintenance function is disabled (for all types of evaporator fans).
After reaching the value indicated in par. **LA2**:

- The label relating to the maintenance alarm will appear on the display (**"CSr"**: condenser fan service).
- The buzzer, if present, will not be activated.
- The alarm relay, if present, will not be activated.
- The modbus alarm status will be set.

To reset this maintenance alarm:

- Enter programming mode, access par. **rS2** and set it to **"Y"** and confirm with the SET button.
- Send the reset command via Modbus.

After the counter reset:

- The maintenance alarm will be deactivated (label and modbus status reset).
- The counter relating to the maintenance alarm will be reloaded.

12. AUXILIARY REGULATOR

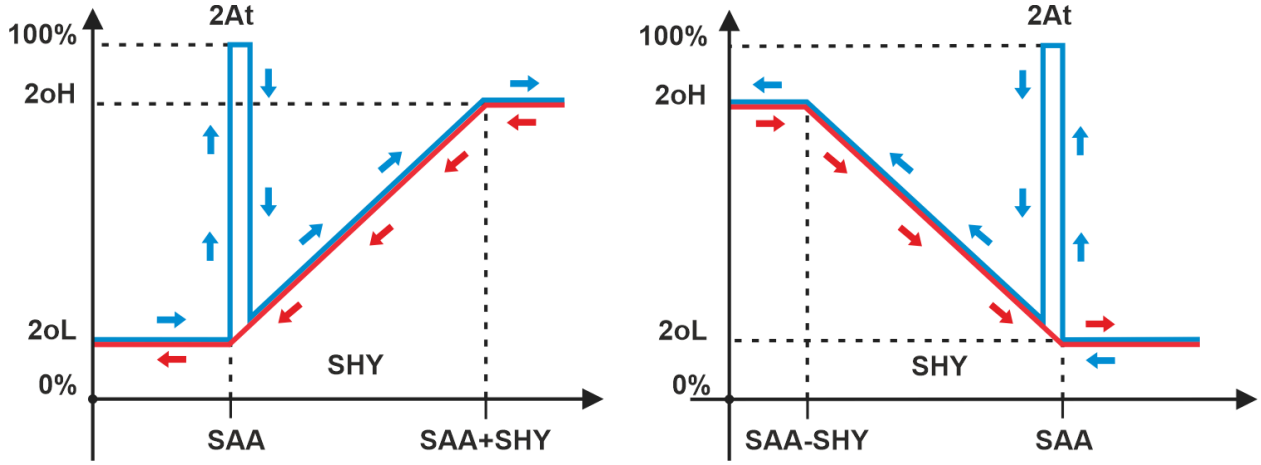
The auxiliary output can be managed by digital inputs (**oAx=AUS**, **ixF=AUS**): the output is switched on and off following the relative digital input status.

12.1 AUXILIARY REGULATOR

The auxiliary regulator can be used to manage the auxiliary output. Here are the involved parameters:

- **ACH:** type of regulation for the auxiliary output: **Ht**=inversely proportional (heating); **CL**=directly proportional (cooling).

- **SAA:** set point for regulation band.
- **SHY:** differential for regulation band.
- **ArP:** probe for auxiliary regulator.
- **Sdd:** auxiliary output OFF during any defrost.
- **2At:** start-up interval at max.



12.2 TIMED ACTIVATION

The following parameters can be used to define fixed activation and deactivation intervals.

- **btA:** base time for auxiliary output activation and deactivation intervals.
- **Ato:** auxiliary activation interval.
- **AtF:** auxiliary deactivation interval.

12.3 GENERAL NOTES

if **oAx=AUS** and **ArP=nP** (no probe for auxiliary digital output) the auxiliary output can be managed by:

- Digital input if **ixF=AUS.**
- Auxiliary button (if set as **AUS**).
- Serial command (Modbus protocol).
- Fixed interval of time if **Ato>0** and **AtF>0** (if **Ato=0** or **AtF=0** the auxiliary output is disabled).

12.3.1 SPECIAL CONDITIONS

Device status	Probe condition	Command type	Relay output	Analogue output
ON	Available	Button Digital input Modbus command	Activation: output forced ON Deactivation: output forced OFF, after that the auxiliary regulator regains control.	Activation: output forced ON Deactivation: output forced OFF, after that the auxiliary regulator regains control.
ON	Error	Button Digital input Modbus command	Cyclic activation following par. **Ato** and **AtF.** Activation or deactivation by button, digital input oe Modbus command will force the output ON or OFF.	Cyclic activation following par. **Ato** and **AtF.** Activation or deactivation by button, digital input or Modbus command will force the output at **2oH** or **2oL**.
ON	Not available, **ArP=nu**	Button Digital input Modbus command	Cyclic activation following par. **Ato** and **AtF.** Activation or deactivation by button, digital input oe Modbus command will force the output ON or OFF.	Cyclic activation following par. **Ato** and **AtF.** Activation or deactivation by button, digital input oe Modbus command will force the output at **2oH** or **2oL**.
OFF	Available	Button Digital input Modbus command	Activation: output forced ON Deactivation: output forced OFF	Activation: output forced at **2oH** Deactivation: output forced at 0%

OFF	Error	Button Digital input Modbus command	Activation: output forced ON Deactivation: output forced OFF	Activation: output forced at **2oH** Deactivation: output forced at 0%
OFF	Not available, **ArP=nu**	Button Digital input Modbus command	Activation: output forced ON Deactivation: output forced OFF	Activation: output forced at **2oH** Deactivation: output forced at 0%

13. LIGHT OUTPUTS

The light output can be managed by:
- Device ON, if **LAU=Y**
- Door input, if **ixF=dor** and **CLi=Y**
- Button, if set as **bxC=LiG**
- Digital inputs, if set as **ixF=LiG**
- Energy saving, if **LdE=Y**
- Motion sensor, if **ixF=EMt**
- Modbus command

13.1 ACTIVATION WHEN DEVICE GOES ON

If par. **LAU=Y**, every power on will activate the light output.
If par. **LoF=Y**, light output will be switched off after power off or in stand-by.

13.2 ACTIVATION BY DOOR INPUT

If par. **ixF=dor (x=1,2,3)** and **CLi=Y**, the light output:
- Will be activated after door opening event
- Will be deactivated after door closing event

13.3 ACTIVATION BY DIGITAL INPUT

When par. **ixF=LiG (x=1,2,3),** the light output:
- Stays ON until receiving next OFF command if par. **LCi=0**.
- Stays ON until timer **LCi** expire if par. **LCi>0**.

NOTE: if another available digital input is set as **ixF=dor**, this function is automatically disabled.

13.4 ACTIVATION BY ENERGY SAVING

The energy saving mode can modify the light output status as follow:
- **LdE=Y**: light output OFF when energy saving ON and light output ON when energy saving OFF.
- **LdE=n**: light output not affected by energy saving status.

13.5 ACTIVATION BY MOTION SENSOR

When par. **ixF=EMt (x=1,2,3)** the light output status will be modified by external motion sensor (model X-MOD). The logic follows.
- The light output will be activated after detecting **n01** motion events.
- The light output will stay ON for **t01** min.

13.6 ACTIVATION BY MODBUS COMMAND

The light outputs can be activated or deactivated by modbus command.

13.7 ACTIVATION BY ANALOGUE OUTPUT (2Ao=LiG)

The analogue output can be used to vary the level of light intensity. The operation mode is defined by the following parameters:
- **MA2** = standard mode (**Std**), variation with predefined levels (**StP**)
    - If **MA2=Std**: analogue output 2 is activated (forced to value **2oH**) and deactivated (forced to value **2oL**) by using the **LiG** button.
    - If **MA2=StP**: analogue output 2 will assume one of the values par. **LL1...LL4**. Every pressure on the **LiG** button will change the value from **LLx** (current one) to **LLy** (next one). A sound will inform the user about the selected level (1 bip for **LL1**, 2 bips for **LL2** and so on).

- **LLx** = these parameters are used to define 4 fixed values for the analogue output 2. Any pressure of the **LiG** button will change the value of the analogue output, selecting the next available level in a cyclic manner (**LL1**, **LL2**, **LL3**, **LL4**, **LL1**, …).

NOTES:
- The current level **LLx** is saved into memory in case of power off or stand-by. At start-up the saved value will be used to set the light output level.
- If **MA2=StP**, the **2oL** and **2oH** evalues and the interval **2At** will not considered.

13.7.1 SPECIAL CONDITIONS

Condition	Output level
Stand-by with par. **MAx=Std**	If **LoF=Y**: 0% If **LoF=n**: previous value.
Stand-by with par. **MAx=StP**	If **LoF=Y**: 0% If **LoF=n**: previous level **LLx**
Power-on or exit from stand-by, par. **MAx=Std**	If **LAU=Y**: **2oH** If **LAU=n**: 0%
Power-on or exit from stand-by, par. **MAx=StP**	If **LAU=Y**: previous saved level **LLx**. If **LAU=n**: 0%
Output toggle by button, with device ON and par. **MAx=Std**	ON = **2oH** OFF = 0%
Output toggle by modbus command, with device ON and par. **MAx=Std**	ON = **2oH** OFF = 0%
Output toggle by digital input, with device ON and par. **MAx=Std**	ON = **2oH** OFF = 0%
Output toggle by button, with device ON and par. **MAx=StP**	Move through levels**: LL1→LL2→LL3→LL4→LL1→**…
Output toggle by modbus command, with device ON and par.**MAx=StP**	Set level **LLx**
Output toggle by digital input, with device ON and par. **MAx=StP**	Output unchanged, digital input disabled.
Output toggle by button, with device OFF and par. **MAx=Std**	ON = **2oH** OFF = 0%
Output toggle by modbus command, with device OFF and par. **MAx=Std**	ON = **2oH** OFF = 0%
Output toggle by digital input, with device OFF and par. **MAx=Std**	ON = **2oH** OFF = 0%
Output toggle by button, with device OFF and par. **MAx=StP**	**LL1→LL2→LL3→LL4→LL1→**… If output value=0% after going in stand-by, first button press will set level **LL1**.
Output toggle by modbus command, with device OFF and par. **MAx=StP**	Set level **LLx**
Output toggle by digital input, with device OFF and par. **MAx=StP**	Output unchanged, digital input disabled.
Lockout alarm	Output unchanged.

14. SANITIZATION

The sanitization output is controlled by:
- Button, if set as **bxC=SAn**
- Digital inputs, if set as **ixF=SAn**
- Modbus command
- Fixed intervals, par. **iSn** and **tSn** (set **iSn>tSn** for optimal operation)
- Pre-programmed intervals (only with real time clock), par. **dSA**, **dSH**, **HSt** and **HSt**.

NOTES:
- After power-off, stand-by or in case of any blackout the running sanitization task is stopped and reset. Sanitization status is never saved in memory.
- Pre-programmed activations (RTC enabled) inhibit fixed intervals.

- Manual activations (by button, digital inputs or modbus commands):
    - Have no priority. Every command changes the current sanitization status.
    - Work also in stand-by mode.
    - Work with fixed or pre-programmed intervals.

14.1 SAFETIES

The sanitization can be:
- Disabled in case of door open event and if par. **ixF=dor (x=1,2,3)**
- Enabled and disabled by button, if par. **bxC=SAn (x=2,3,4)**
- Enabled and disabled by modbus command

NOTES:
- Any sanitization activation received during a door open condition will be postponed after the next door closed event.
- Any lockout alarm immediately stops the sanitization.

14.2 ACTIVATION BY ANALOGUE OUTPUT (2Ao=SAn)

Condition	Output level
Sanitization enabled	**2oH**
Sanitization disabled	0%
Stand-by	0%
Lockout alarm	0%

15. AIR EXTRACTION FAN

The air extraction fan output is controlled by:
- Button, if set as **bxC=EFn (x=2,3)**
- Digital input, if set as **ixF=EFn (x=1,2,3)**
- Modbus command
- Fixed intervals, par. **iAE** and **tAE** (set **iAE>tAE** for optimal operation)

15.1 ACTIVATION BY ANALOGUE OUTPUT (2Ao=EFn)

The analogue output can be used to change the ventilator speed. The operation mode is defined by the following parameters:
- If **MA2=Std**: analogue output 2 is activated (forced to value **2oH**) and deactivated (forced to value **0%**).
- If **MA2=StP**: analogue output 2 will assume one of the values par. **LL1...LL4**. Every pressure of the **bxC=EFn (x=2,3)** button will change the value from **LLx** (current one) to **LLy** (next one). A sound will inform the user about the selected level (1 bip for **LL1**, 2 bips for **LL2** and so on).

NOTES:
- The current level **LLx** is saved into memory in case of power off or stand-by. At start-up the saved value will be used to set the light output level.
- If **MA2=StP**, the **2oL** and **2oH** evalues and the interval **2At** will not considered.

15.1.1 SPECIAL CONDITIONS

Condition	Output level
Output enabled	**2oH**
Output disabled	0%
Stand-by	0%
Output toggle by button, with device ON and par. **MAx=Std**	ON = **2oH** OFF = 0%
Output toggle by modbus command, with device ON and par.**MAx=Std**	ON = **2oH** OFF = 0%
Output toggle by digital input, with device ON and par. **MAx=Std**	ON = **2oH** OFF = 0%
Output toggle by button, with device ON and par. **MAx=StP**	**LL1→LL2→LL3→LL4→LL1→**…

Output toggle by modbus command, with device ON and par.**MAx=StP**	Set level **LLx**
Output toggle by digital input, with device ON and par. **MAx=StP**	Output unchanged, digital input disabled.
Output toggle by button, with device OFF and par. **MAx=Std**	ON = **2oH** OFF = 0%
Output toggle by modbus command, with device OFF and par.**MAx=Std**	ON = **2oH** OFF = 0%
Output toggle by digital input, with device OFF and par. **MAx=Std**	ON = **2oH** OFF = 0%
Output toggle by button, with device OFF and par. **MAx=StP**	**LL1→LL2→LL3→LL4→LL1→**… If output value=0% after going in stand-by, first button press will set level **LL1**.
Output toggle by modbus command, with device OFF and par. **MAx=StP**	Set level **LLx**
Output toggle by button, with device OFF and par. **MAx=StP**	Output unchanged, digital input disabled.
Lockout alarm	Output unchanged.

16. DIGITAL OUTPUTS

Depending on the model, one or more digital outputs (relays) can be configurated with one of the following functionalities.

16.1 COMPRESSOR OUTPUT (oAx = CP1)

With **oAx=CP1** the relay operates as the main regulation output.

16.2 DEFROST OUTPUT (oAx = dEF)

With **oAx=dEF** the relay operates as a defrost output.

16.3 EVAPORATOR FAN OUTPUT (oAx = FAn)

With **oAx=FAn** the relay operates as an evaporator fan output.

16.4 ALARM OUTPUT (oAx = ALr)

With **oAx=ALr** the output operates as an alarm output. It is activated every time an alarm happens. Its status depends on the **tbA** parameter: if **tbA=Y**, the output is deactivated by pressing any key.
If **tbA=n**, the alarm output stays on until the alarm condition recovers.

16.5 LIGHT OUTPUT (oAx = LiG)

With **oAx=LiG** the relay operates as a light output.

16.6 AUXILIARY OUTPUT (oAx = AUS)

See the AUXILIARY REGULATOR paragraph for furter information.

16.7 DEAD BAND REGULATION (oAx = db)

With **oAx=db** the output can be used to control, for example, a heater element. It is used to implement a dead band regulation. If so:

- **oAx=db** cut in is **SET-HYd**
- **oAx=db** cut out is **SET**

16.8 ON/OFF OUTPUT (oAx = onF)

When **oAx=onF**, the output is activated when the controller is switched on and deactivated when the controller is switched off.

16.9 ENERGY SAVING OUTPUT (oAx = HES)

When **oAx=HES**, the output is activated when the energy saving mode is active and vice-versa.

16.10 CONDENSER FAN OUTPUT (oAx = Cnd)

With **oAx=Cnd** the relay operates as a condenser fan output.

16.11 SECOND COMPRESSOR OUTPUT (oAx = CP2)

With **oAx=CP2** the relay operates as a second regulation output. This function is available only for special models and normally must be not selected.

16.12 SECOND DEFROST OUTPUT (oAx = dF2)

With **oAx=dF2** the relay operates as second defrost output. This function is available only for special models and normally must be not selected.

16.13 HEATER OUTPUT (oAx = HEt)

With **oAx=HEt** the relay operates as a heater output. In this case, it will be used during and after any defrost cycle. The par. **Hon** defines the time the relative output will stay active after the end of a defrost operation.

16.14 INVERTER OUTPUT (oAx = inV)

The output is enabled when the inverter (variable speed compressor) is ON.

16.15 DEHUMIDIFIER (oAx=dEH)

With **oAx=dEH** the relay operates as a dehumidifier output. Check the type of humidity regulation, par. **tHU**, for more information.

16.16 HUMIDIFIER (oAx=HUM)

With **oAx=HUM** the relay operates as a humidifier output. Check the type of humidity regulation, par. **tHU**, for more information.

16.17 SANITIZATION (oAx=San)

With **oAx=SAn** the relay operates as a sanitization output. See the relative paragraph for more information.

16.18 AIR EXTRACTION FAN

With **oAx=EFn** the relay operates as an air extraction fan output. See the relative paragraph for more information.

17. DIGITAL INPUTS

The digital inputs are programmable by using par. **i1F**, **i2F** and **i3F**.

- **i1F**: available only if **P3P=n**.
- **i2F**: always available
- **i3F**: available only if **P4P=n**.

17.1 DOOR SWITCH (ixF=dor)

It signals the door status. Some relay outputs can be toggled depending on the **odC** parameter:

- **odC = no** no change
- **odC = FAn** evaporator fan will be switched off
- **odC = CPr** compressor will be switched off
- **odC = F-C** both compressor and evaporator fan will be switched off

Since the door is opened:

- the door alarm is enabled
- the display shows the message “dA”
- the regulation restarts only if **rrd = Y**.

The alarm stops as soon as the external digital input is disabled again. During door open conditions, the high and low temperature alarms are disabled.

17.2 START DEFROST (ixF=dEF)

It starts a defrost if all conditions are fulfilled (temperature, delays, etc.). After finishing a defrost, the normal regulation will restart only if the digital input is disabled, otherwise the instrument will wait until the **MdF** safety time is expired.

17.3 AUXILIARY OUTPUT (ixF=AUS)

The AUX output (if present and configured) will be enabled / disabled following the status of the relative digital input.

17.4 ENERGY SAVING (ixF=ES)

The energy saving mode will be enabled / disabled following the status of the relative digital input.

17.5 EXTERNAL WARNING ALARM (ixF=EAL)

It is used to detect an external alarm. It does not lock the regulation.

17.6 EXTERNAL LOCK ALARM (ixF=bAL)

It is used to detect any critical external alarm. It locks immediately the regulation.

17.7 EXTERNAL PRESSURE ALARM (ixF=PAL)

It is used to detect any pressure external alarm. This signal locks the regulation after detecting **nPS** events in the interval **dxd**.

17.8 EVAPORATOR FAN MODE (ixF=FAn)

It is used to control the evaporator fan.

17.9 REMOTE HOLIDAY MODE (ixF=HdF)

It is used to force the holiday mode.

17.10 REMOTE ONOFF (ixF=onF)

It is used to switch ON and OFF the device remotely.

17.11 LIGHT OUTPUT (ixF=LiG)

It is used to control the light output.

17.12 PULL DOWN (ixF=CC)

It is used to activate the pull down.

17.13 MOTION SENSOR DETECTOR (ixF=EMt)

It is used to connect an X-MOD motion sensor. Please note that motion sensor can be connected only to the HOTKEY port, so digital input 2 must be properly configured.

17.14 CHANGE PARAMETER MAP (ixF=MAP)

Change the parameter map between C-1 and C-2.

17.15 SANITIZATION (ixF=SAn)

It is used to activate the sanitization function.

17.16 AIR EXTRACTION FAN (ixF=EFn)

It is used to activate the air extraction function.

18. ANALOGUE OUTPUTS

The controller is equipped with:

- A PWM configurable analogue output (par. **1Ao**). NOTE: this output has no synchronization with power supply.
- A 0-10Vdc configurable analogue output (par. **2Ao**)

18.1 ANALOGUE OUTPUT CONFIGURATION

The following parameters are used to set up the analogue outputs:

- **1oL, 2oL** = minimum value
- **1oH, 2oH** = maximum value
- **1At, 2At** = interval with analogue output at maximum value after activation

The following functions can be used with the analogue outputs 1:

- **nu** = output disabled.
- **FrE** = frequency output. In this case the output value is calculated from variable speed compressor regulator. Par. **1oL**, **1oH** and **1At** are not considered at all.
- **FAn** = the evaporator fan regulator defines the output value.

The following functions can be used with the analogue outputs 2:

- **nu** = output disabled.
- **tiM** = timed activation.
- **FAn** = the evaporator fan regulator defines the output value.
- **AUS** = the auxiliary regulator defines the output value.
- **ALr** = output at maximum value in case of any alarm condition. Output at minimum value in all other cases.
- **Cnd** = the condenser fan regulator defines the output value.
- **LiG** = the output value will change accordingly to par. **MA2** and **LLx**.
- **vAL** = fixed value
- **SAn** = sanitization
- **EFn** = air extraction fan

18.2 TIMED ACTIVATION

In this case the analogue output will stay at **2oL** during **AtF** time and at **2oH** during **Ato** time.
NOTE: in stand-by the analogue output stays at 0%.

18.3 FIXED VALUE

In this case the analogue output will stay at value **2AS**.
NOTES:

- Values **2oL** and **2oH** are not considered.
- In stand-by the analogue output stays at 0%.

18.4 SANITIZATION

See the sanitization paragraph for furter information.

18.5 AIR EXTRACTION FAN

See the air extraction fan paragraph for furter information.

19. ALARM SIGNALLING

Label	Cause	Outputs
P1	P1 probe failure	Compressor output according to **Con** e **CoF**
P2	P2 probe failure	Depends on the relative function
P3	P3 probe failure	Depends on the relative function
P4	P4 probe failure	Depends on the relative function
HA	High temperature alarm	Outputs unchanged
LA	Low temperature alarm	Outputs unchanged
H2	Second high temperature alarm	Compressor output according to **AC2**
L2	Second low temperature alarm	Compressor output according to **bLL**
HHA	High humudity alarm	Outputs unchanged
HLA	Low humidity alarm	Outputs unchanged
dA	Door open alarm	Compressor and fan follows par. **odC**
EA	Warning external alarm	Outputs unchanged
CA	Lock external alarm	Outputs disabled
EE	Internal memory alarm	Outputs unchanged
rtC	Real time clock not properly set	Outputs unchanged
rtF	Real time clock failure (HW problem)	Outputs unchanged
SAn	Sanification output active	Other outputs unchanged

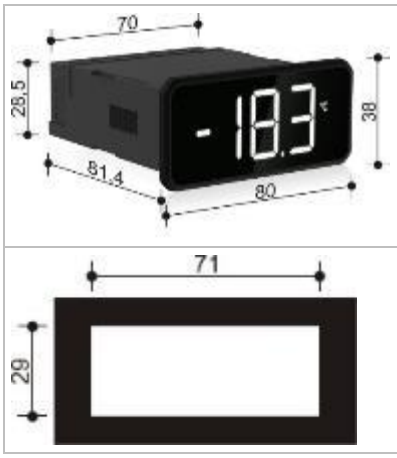
19.1 ALARM RECOVERY

Probe alarms **P1**, **P2**, **P3** and **P4** are activated some seconds after detecting a fault condition in the relative probe. These alarms are automatically reset some seconds after the relative probe restarts normal operations. Always check the connections (probe – device terminals) before replacing the probe.
Temperature alarms **HA**, **LA**, **H2** and **L2** are automatically reset as soon as the temperature is within the normal working range.
Memory alarm **EE** can be reset by pressing any button.
The alarms **EA**, **CA** and **dA** are automatically reset as soon as the relative digital input is disabled.
The internal buzzer can be muted by touching any area of the display and only if parameter **tbA=Y**.

20. SERIAL COMMUNICATION

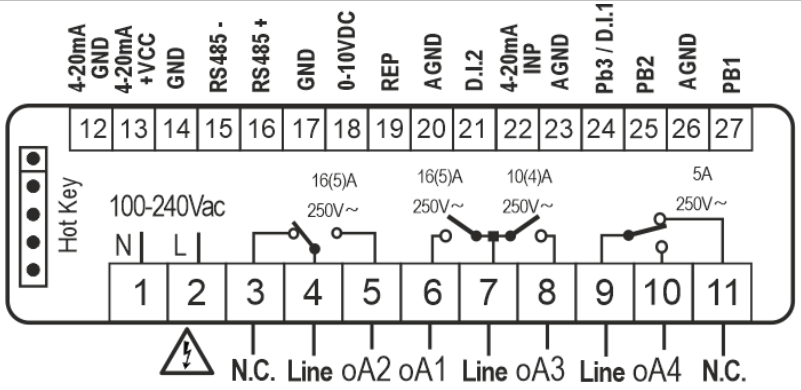
The device supports different baudrates (par. **bAU**) and parity control (par. **PAr**). Please check the serial network to adapt them according to the other devices.

21. INSTALLATION AND MOUNTING



Instrument **XH78T** shall be mounted on vertical panel, in a 29x71 mm hole, and fixed using the special bracket supplied. The temperature range allowed for correct operation is 0 to 60°C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let air circulate through the cooling holes.

22. WIRING DIAGRAM



Power Supply: 100-240VAC, 50-60Hz

PIN	Label	Description
12	4-20mA GND	Ground for 4-20mA sensor
13	4-20mA +VCC	Power supply for 4-20mA sensor
14	GND	Ground for RS485 serial port
15	RS485-	Negative terminal for RS485 (-) serial port
16	RS485+	Positive terminal for RS485 (+) serial port
17	GND	Ground for analogue output 0-10Vdc
18	0-10VDC	Analogue output 0-10Vdc
19	REP	Remote display
20	AGND	Ground for digital inputs and remote display
21	D.I.2	Digital input 2
22	4-20mA INP	Analogue input for 4-20mA sensor
23	AGND	Ground for analogue and digital inputs
24	Pb3/D.I.1	Analogue input 3 (temperature only) / Digital input 1
25	Pb2	Analogue input 2 (temperature only)
26	AGND	Ground for analogue and digital inputs
27	Pb1	Analogue input 1 (temperature only)

23. TECHNICAL SPECIFICATIONS

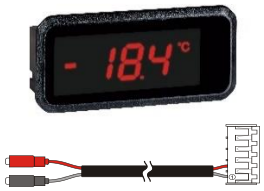
FEATURES	DESCRIPTION			
Housing	Self-extinguishing PC			
Dimensions	Front 38x80 mm; case depth 81mm			
Mounting device	Panel, 71x29mm panel cut-out			
Degree of Protection	**NEMA – UL 50e**	Indoor use only, type 1 enclosure		
	IP-IEC/EN 60529	Front panel: IP66	Rear Housing: IP20	
Power Supply	100 to 240VAC±10%, 50/60Hz			
Overvoltage Category	II			
Rated Power	100-240VAC: 3VA			
Rated Impulse Voltage	2500V			
Display	White display, LED type, 3 digits with decimal point and multi-function icons			
Buzzer	Internal, always present			
Software Class	A			
Terminal blocks / Terminal Connections	Plug-in or screw terminal block, wire section between 0,5 and 2,5 mm2 Max tightening force: 0.3 N/m for 3,5mm pitch, 0.4 N/m for 5,0mm pitch			
Data Storing	**Real Time Clock:** Data maintenance up to 6 months with lithium battery. **Other parameters:** internal flash.			
Type of Action	1.B			
Pollution Degree	2, non-condensing humidity			
Ambient Operating Temperature and Humidity	**IEC/EN**	0T55°C; 20-85 rH% (non-condensing humidity)		
	UL-CAN/CSA	-20T55°C; 20-85 rH% (non-condensing humidity)		
Shipping and storage temperature	-40T85°C; 20-85 rH% (non-condensing humidity)			
Resistance to Heat	UL 94 V-0			
Measurement range	**NTC:** -40T110°C, resolution 0.1°C or 1°C (selectable); **PT1000:** -100T150°C, resolution 0.1°C or 1°C (selectable); **PTC:** -50T150°C, resolution 0.1°C or 1°C (selectable) *4-20mA: 0.0 to 100.0% RH; resolution 0.5% RH with Dixell probe models "XH20P"*			
Accuracy	NTC, PTC, PT1000: ±1% compared to the full scale 4-20mA: ±1% compared to the full scale			
Inputs	Up to 4 NTC, PTC or PT1000 (configurable); Up to 2 voltage free contacts			
	A 3-wire analogue input 4-20mA with onboard power supply; Terminal 2: max supply voltage = 12Vdc; max supply current = 25mA			
Relay Outputs		**Nominal**	**UL**	**IEC**
	oA1	SPST 16A, 250VAC	Resistive load 11A (NO), 240Vac, 30k cycles; Motor load 10FLA/60LRA (NO), 240Vac, 30k cycles; Pilot Duty B300 (NO), 6k cycles	10(4)A (NO), 240Vac, 100k cycles
	oA2	SPDT 16A, 250VAC	Resistive load 11A (NO), 240Vac, 30k cycles; Motor load 10FLA/60LRA (NO), 240Vac, 30k cycles; Pilot Duty B300 (NO), 6k cycles	10(4)A (NO), 240Vac, 100k cycles
	oA3	SPST 10A, 250VAC	Resistive load 4A (NO), 230Vac, 100k cycles; Pilot Duty C300 (NO), 100k cycles	4A (NO), 240Vac, 25k cycles
	oA4	SPDT 5A, 250VAC	Resistive load 5A (NO), 230Vac, 100k cycles; Motor load 4FLA/4LRA (NO), 100k cycles	5A (NO/NC), 240Vac, 100k cycles
Optional	**oA4**	SPST 5A, 250VAC	Resistive load 4A (NO), 240Vac, 100k cycles; Motor load 1/8HP (NO), 120/240Vac, 30k cycles; Pilot duty C300 (NO), 100k cycles	5A (NO), 240Vac, 100k cycles; 1(1)A (NO), 240Vac, 100k cycles
	oA4	SPDT 7A, 250Vac	Resistive load 5A (NO), 240Vac, 100k cycles; Motor load 4FLA/4LRA (NO), 240Vac, 100k cycles	5A (NC), 240Vac, 100K cycles; 5A (NO), 240Vac, 20K cycles
	oA1	SPST 16A inrush, 250VAC	Resistive load 11A, 240Vac, 50k cycles;	11A, 240Vac, 30k cycles

FEATURES	DESCRIPTION			
	oA2	SPDT 16A inrush, 250VAC	Resistive load 11A, 240Vac, 50k cycles;	11A, 240Vac, 30k cycles
Maximum ampacity on terminal 7	9A (COM oA1 oA3)			
Analogue Outputs	**1Ao**	Frequency output; Supply max voltage=12Vdc; Max supply current=2mA; duty cycle 50%; 0 to 166 Hz Accuracy: ±1Hz compared to the full scale		A3: Freq A4: GND
	2Ao	0-10Vdc; Max supply current=5mA Accuracy: ±1% compared to the full scale		A1: V+ A2: GND
Remote Display	**XH-REP**	Max cable length: 10 m; Do not connect third party devices.		
I/O port	HOT-KEY: MAX voltage allowed is 5 VDC. DO NOT CONNECT ANY EXTERNAL POWER SUPPLY.			
Purpose of control	Operating control			
Construction of control	Built-in control, intended to be used in Class I or Class II equipment			
Approvals	R290/R600a: relays tested according to IEC EN60079:0 and IEC EN60079:15 IEC 60730-1; IEC 60730-2-9 UL 60730-1; UL 60730-2-9 CAN/CSA E60730-1; CAN/CSA E60730-2-9			

24. APPENDIX

24.1 TOOLS

24.1.1 XH-REP



The XH-REP remote display enables the visualization of a second temperature value. A special cable must be used to connect an XH-REP to the controller (code DD200002 00). The remote display usage will disable the serial communication.

24.1.2 X-MOD

The **X-MOD** is a motion detection sensor that allows to detect the proximity of customers or service staff. 5Vdc power supply version must be used. The X_MOD usage will disable the serial communication.

24.1.3 WIZMATE

WIZMATE software, used in combination with the XJ485USB, allows to manage the configuration of the controller.

24.1.4 HOTKEY

The **HOT-KEY** is used for a quick and easy upload (from device to **HOT-KEY**) or download (from **HOT-KEY** to device) of the parameter map. The 64K version must be used (code **DK00000300**).

24.1.5 USB TO RS485 CONVERTER

XJ485USB is an optically isolated converter with 2.5kV maximum voltage isolation on data channels. It has a small plastic box with 2 indication LEDs, RX and TX, to quickly monitor the network communication. Power supply directly from USB port.

24.2 EXAMPLE OF MENU NAVIGATION AND PARAMETER MODIFICATION

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