XB350C - XB370C - XB570C

BLAST CHILLER - QUICK CHILL AND HOLD FUNCTION

Contents

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.
- The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor or to "SAE 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.

- Fit the probe where it is not accessible by the end user.
- 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 Features

The series XB has been created for fast chilling or freezing goods according to international food safety standards.

There are FOUR types of cycles:

- The CYCLES: Cy1, Cy2, Cy3, Cy4 are pre-set according to the most common cycles used in food - safety applications; the user can select one of them according to his own requirements and modify it as he wants.
- Any cycle can be manually terminated before the normal.

- Any cycle can use the third probe like an “insert probe”, it measures the internal temperature of the product.
- During the Cycle there are no defrosts and the fans are always on, a defrost cycle can be done before any freezing cycle.
- The cycle is divided up to 3 phases completely configurable by the user.
- Each instrument is provided with an output for remote display XR REP, which shows the temperature of cabinets or goods.
- The XB570C controller is provided with internal real time clock and can be connected to the XB05PR printer. This means that a report, which includes all the main features of cycle, can be printed: start and end of the cycle, length of the cycle, logging of the temperature of the cabinet and goods.

3. Mounting & Installation

Models XB350C, XB370C and XB570C are panel mounted, hole dims 29x71 mm, and fixed with the supplied clips. The ambient working temperature range should be between 0÷60°C. Avoid locations subject to heavy vibration, corrosive gases or excessive dirt. The same applies to the probes. Ensure ventilation around the instrument.

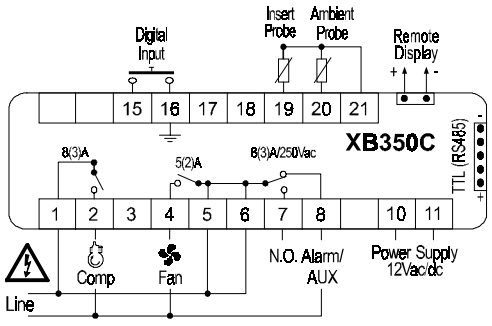
4. Electrical Connections

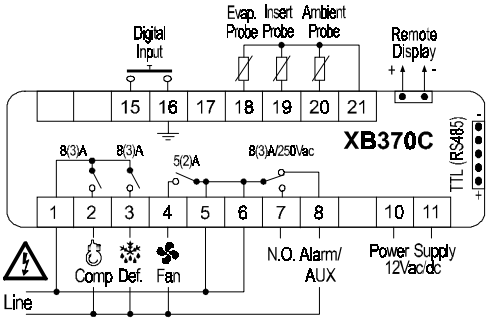
The instruments are provided with a screw terminal block to connect cables with a cross section up to 2,5 mm^2. Before connecting cables make sure the power supply complies with the instrument’s requirements. Separate the input connection cables from the power supply cables, from the outputs and the power connections. **Do not exceed the maximum current allowed on each relay**, in case of heavier loads use a suitable external relay.

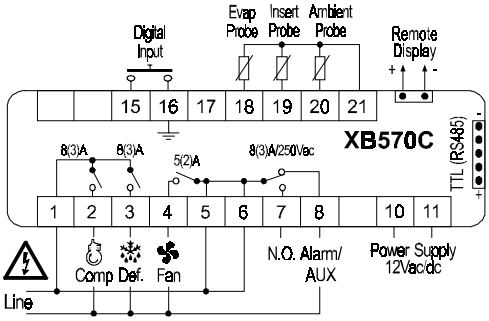
4.1 Probes connection

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 and from the warmest place during defrost, to prevent premature defrost termination.

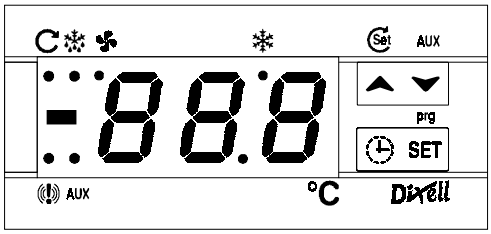
5. Connections







6. Frontal panel



6.1 Meaning of the LEDs’

A series of light points on the front panels is used to monitor the loads controlled by the instrument. Each LED function is described in the following table.

LED	MODE	ACTION
❄	ON	- Compressor enabled
❄	Flashing	- Programming Phase (flashing with LED 🌀) - Anti-short cycle delay enabled
🌀	ON	- Fans enabled
🌀	Flashing	- Programming Phase (flashing with LED ❄) - Activation delay active
❄	ON	- Defrost active
❄	Flashing	- Drip time active
C	ON	- Freezing cycle or hold mode active
C	Flashing	- Instrument temporarily stop
(!)	ON	- Alarm signalling - In “**Pr2**” indicates the parameter is also present in “Pr1”
AUX	ON	- IV relay enabled

7. Front Panel Commands

7.1 When a cycle is not active.

SET: TO DISPLAY SET POINT OF HOLD MODE:
by pressing and releasing this key when a freezing cycle is not active the set point of the "Hold mode" is displayed for 5s.
TO MODIFY SET POINT OF HOLD MODE: by holding the key pressed for at least 2s set point change mode is entered: the set point is displayed and the LEDs of the first and third digits blink. To change the value use the "**UP**" and "**DOWN**" keys. The new value can be stored either by pressing the **"SET"** key (the instrument restores temperature display) or by waiting the exit time-out to expire (15s).
TO CONFIRM A CYCLE: when the Selection Cycle Menu is entered, by pressing the SET key the displayed cycle is memorised.

(**UP**): **TO SELECT A CYCLE:** when a cycle is not active, by holding it pressed for 3s the Cycle Menu is entered.
In programming mode or in "**Function Menu**" it browses the parameter codes or increases the value of the displayed variable. Hold pressed for a faster change.

(**DOWN**): **TO ACTIVATE THE AUX RELAY:** by holding the key pressed for 3 s the AUX relay is activated. (The activation time depends on the related parameter)
In programming mode or in "**Function Menu**" it browses the parameter codes or decreases the value of the displayed variable. Hold pressed for a faster change.

TO START A CYCLE: by pressing it the shown cycle is started

KEY COMBINATIONS:

+ TO UNLOCK THE KEYBOARD: when held pressed for 3s the keyboard is unlocked (see "LOC" function).

SET + TO ENTER THE FUNCTION MENU OR TO GO BACK TO THE PREVIOUSLY MENU: when a cycle is not active, by holding these keys pressed for 3s the Function Menu is entered.
Once entered in the Function Menu or in some sub-menu, the same keys can be used to go to the previously menu.

7.2 When a cycle is active

SET: TO DISPLAY SET POINTS AND THE DURATION OF THE CURRENT PHASE:
by pressing and releasing this key when a cycle is active the message "rPS" **r**oom **P**robe **S**et is displayed followed by the flashing set point of the room. While the set point is flashing press again the key and the message "iPS" (insert Probe Set) will be displayed followed by the value of the end phase temperature. Press again the SET key and the remaining time of the phase will be displayed.

(**UP**): **TO DISPLAY THE CURRENT PHASE:** press and release the UP key, the message PH1 (phase 1), or PH2 or PH3 or HP (hold phase) will be displayed.

(**DOWN**): **TO ACTIVATE THE AUX RELAY:** by holding the key pressed for 3s the AUX relay is activated only if OAC=AA (anticondensation) or OAC= Li (light). (The activation time depends on the related parameter)

TO TEMPORARILY STOP THE RUNNING CYCLE: press and release this key, the running cycle will be stopped for the time set in the PAU parameter, and the "**Stb**" flashing message will be diplayed.

TO MANUALLY STOP THE RUNNING CYCLE: keep pressing the key until the "**End**" message will be displayed. The running cycle will be definitively stopped.

8. How To Select A Cycle.

Assure that none cycle is active: the LED of the symbol is OFF.

1. Hold press the UP key until the cycle Cy1 or Cy2 or Cy3 or Cy4 or HLd will be displayed.
2. Select one of the following cycle by means of the UP or DOWN keys:
    1. **Cy1:** for fast chilling and conservation of foods (hard +soft chill).
    2. **Cy2:** for chilling and fast freezing of foods (hard +soft + freezing cycle).
    3. **Cy3:** for direct fast freezing (only fast freezing cycle)
    4. **Cy4:** for fast freezing avoiding ice skin (hard chill + freezing cycle)
    5. **HLd:** hold mode function
    6. **dEF:** for starting a manual defrost
3. Confirm the selected cycle by pressing the SET key (the displayed cycle will flash for few seconds).

Now the cycle is memorised and can be activated.

9. How To Start The Selected Cycle.

1. Press the key, the memorised cycle will be displayed.
2. If it is the cycle you require, hold pressed the key until the LED lights up.

If you require another cycle, release the key, select the right cycle as described in the previous paragraph and then start it by hold press the key.

10. How to temporarily stop the running cycle.

1. Press and release the key.
2. The compressor and the fan will be stopped for the PAU time (see parameters list) and the flashing message "Stb" will be displayed.
3. To restart the cycle press and release the key, the cycle will restart from the some point at which it was interrupted.
4. In any case the cycle automatically restarts after the PAU time.

11. How to definitively stop the cycle.

1. Press the key, the cycle active will be displayed.
2. Hold pressed the key until "End" message will be displayed and the buzzer will be enabled.
3. The instrument is now placed in stand by mode.

12. How To Modify The Set Point Of The Hold Mode.

When a cycle is not active:
1. Hold the SET key pressed for at least 2s set point change mode is entered: the set point of the hold mode is displayed and the LEDs of the first and third digits blink.
2. To change the value use the "**UP**" and "**DOWN**" keys.
3. The new value can be stored either by pressing the **"SET"** key (the instrument restores temperature display) or by waiting the exit time-out to expire (15s).

13. How to start a manual defrost.

Assure that none cycle is active: the LED of the ↻ symbol is OFF.

1. Hold press the UP key until the cycle Cy1 or Cy2 or Cy3 or Cy4 will be displayed.
2. Select dEF label by means of the UP or DOWN keys.
3. Press the SET key and the defrost start.

NOTE: The defrost will not be done if the temperature detected by the evaporator probe is higher than EdF (stop defrost temperature) parameter.

14. How A Cycle Is Done.

1. Every programmable cycle Cy1, Cy2, Cy3 or Cy4 can be divided into up to 3 phases usually called:
   - **hard chill**
   - **soft chill**
   - **freezing cycle**
2. For each phase there are 3 parameters.
   iS1, (iS 2, iS 3): Set point related to the third probe (insert probe) that stops the current phase.
   rS1, (rS2, rS3): set point of the room temperature for each phase.
   Pd1, (Pd2, Pd3): the maximum duration time for each phase.
   Hds : set point of the hold phase at the end of the whole cycle.

There are also 2 parameters related to the defrost. These are **dbC =** defrost before cycle, **dbH =** defrost before holding (at the end of the cycle).

14.1 Configurable cycle parameters

dbc (yes/no) **Defrost before the cycle**
iS 1 (-50÷50°C;1°C/1°F) **Insert Probe Set point**: when the temperature measured by the third probe reaches this value the first phase is ended.
rS 1 (-50÷50°C; 1°C/1°F) Room probe Set point for the first phase: it prevents temperature from reaching a too low value during the hard cycle.
Pd1 (OFF÷4.0h;10 min)**Maximum time for first phase**
iS 2 (-50÷50°C; 1°C/1°F) **Insert probe set point** to end the second phase when the temperature measured by the third probe reaches this value the second phase is ended.
rS 2 (-50÷50°C; 1°C/1°F) **Room probe Set point** for the second phase: it prevents temperature from reaching a too low value during the second phase.
Pd2 OFF÷4.0h; 10 min **Maximum time for second phase.**
iS3 (-50÷50°C; 1°C/1°F) **Insert Probe Set point** to stop the third (and last) phase: when the temperature measured by the third probe reaches this value the whole cycle is ended.
Rs3 (-50÷50°C; 1°C/1°F) **Room probe Set point** for the third (and last) phase: it prevents temperature from reaching a too low value during the third (and last) phase.
Pd3 (OFF÷4.0h; 10 min) **Maximum time for the third phase.**
dbH (yes / no) **defrost before the hold phase**
HdS (-50÷50 - OFF; 1 °C / 1°F) **Set point of the holding phase**. With "OFF" the hold phase is disabled.

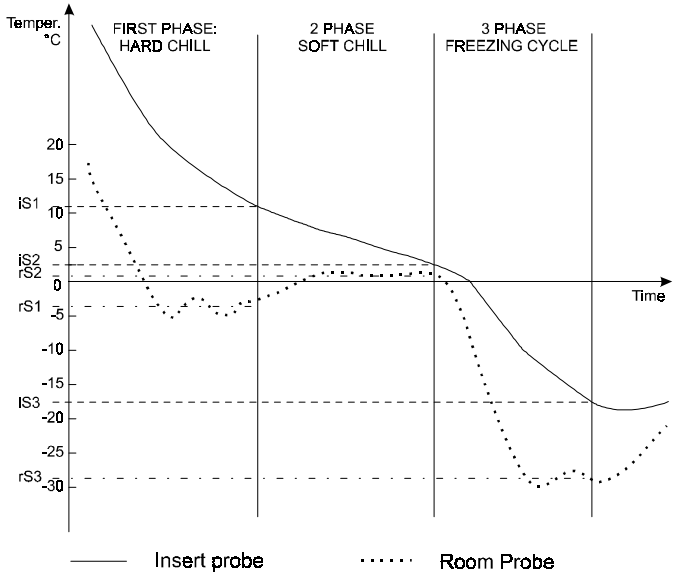
IMPORTANT NOTE: If the duration time of a phase is set at the OFF value, the corresponding phase is disabled. E.g. If **Pd3**= 0FF the third phase of the cycle is not active.

14.2 . How to use the insert probe.

By means the insert probe, the internal temperature of products can be checked. This measure is used to end the various phase of the cycle. A special internal function detect if the inset probe is not used, in this case the cycle is made by time

14.3 Example of a Blast Chiller cycle.

The following drawing explains how a Blast Chiller cycle can be done.



14.3.1 First phase: "Hard chill".

It is normally used to fast chill hot foods. E.g. from 80°C / 170°F to 20°C / 70°F
During "**Hard Chill**", both compressor and fan are always on until the **rS1** temperature is reached. At this point compressor is turned on end off so as to keep the temperature of the room at the **rS1** value. "Hard Chill" ends when the temperature measured by the third probe reaches the **iS1** value. Normally **rS1** is set at few degrees below zero.

14.3.2 Second phase: "Soft chill".

The **Soft Chill** starts when the Hard Chill ends. It is used to prevent thin layer of ice from forming on the product. The Soft Chill lasts until the temperature measured by the third probe reaches the set point **iS2** (usually 4 or 5°C).
During Soft Chill the temperature of the room is regulated by the ambient probe with the set point **rS2** (normally at 0 or 1 °C / 32 or 34°F). When the box temperature reaches the **rS2** value compressor is turned on end off so as to keep the temperature of the box at this value.

14.3.3 Third phase: "Freezing cycle".

Freezing Cycle: used to fast freeze foods.
The Freezing Cycle starts when the Soft Chill ends. During the "Freezing Cycle" both compressor and fan are always on until the **rS3** temperature is reached. At this point compressor and fans are turned on end off so as to keep the temperature of the room at the **rS3** value (normally some degrees below **iS3)**. Freezing Cycle ends when the temperature measured by the third probe reaches the **iS3** value (normally -18°C / 0°F), in any case it ends when the maximum time **Pd1 + Pd2 + Pd3** has expired.

14.3.4 End of the Blast Chill cycle and starting of the Hold Mode.

When the Blast Chiller cycle ends an alarm signal is generated: buzzer and alarm relay is turned ON, the display shows the message "End" alternating with the room temperature.
The alarm automatically stops after 30min or by pressing any key.
At the end of the Blast Chiller cycle the controller can start the "Hold mode" keeping the room temperature at the value set in HdS parameter. If HdS = OFF, the machine is turned OFF.

NOTE1: with **dbH = yES** a defrost is done before the holding phase.
NOTE2: If the end cycle temperature IS3 is not reached

15. Function And Parameter Programming Menu

15.1 Function menu

Includes all the main functions controlled by the instrument.

15.2 Access procedure:

1. Hold the **SET** and **DOWN** keys pressed for few seconds, until the label of the first function will be displayed.
2. The **UP** and **DOWN** keys are used to cycle backwards or forward in the menu.
3. By pressing the **SET** key the currently displayed function is enabled.
4. To go back to the previously Menu press the **SET** and **DOWN** keys together

15.3 List of functions

15.3.1 "Prb": probe display

It permits the user to display the temperatures measured by the probes.

- **rPr:** displays for 10s the temperature measured by the room probe.
- **EPr:** displays for 10s the temperature measured by the evaporator probe.
- **iPr:** displays for 10s the temperature measured by the insert probe.

NOTE1 If a key is pressed when a temperature is displayed, the instrument go back to show the label of the probe (rPr, EPr, iPr).
NOTE2: If the selected probe is broken, the follow alarm labels will be displayed: **rPF** for the room probe, **EPF** for the evaporator probe, **iPF** for the insert probe.

15.3.2 "Pr1": user parameters

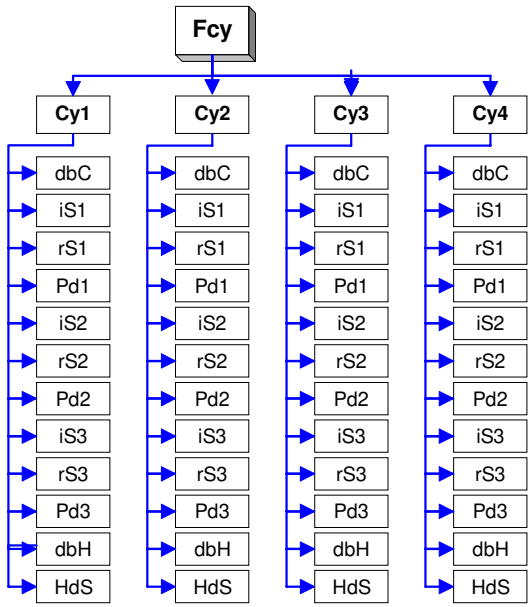
"Pr1" includes all user accessible parameters. If no parameter would be present in the menu, the label "Pr2" will be displayed.

15.3.3 "Pr2": installer parameters

"**Pr2**": includes all the instrument's parameters (at installer level). It can be accessed through a security code. Hence it is possible to modify all parameters and add or remove parameters from "Pr1" (user level) by pressing **"SET"** + **"UP"**. When a parameter is enabled at user level, LED (Alarm LED) is on.

15.3.4 "FCy": cycle management

The FCy menu contains the Cy1, Cy2, Cy3, Cy4 submenu. Each submenu contains all the configurable parameter of the cycle as shown in the following drawing:



15.3.5 "Sto": cycle length

The **Sto** menu records the real length of a cycle and the real length of each single phase. It contains the following sub-menu:
tCy: cycle duration, **tP1**: first phase duration; **tP2**: second phase duration; **tP3**: third phase duration.

15.3.6 "rtC": clock management (for XB570C only)

It contains the real time clock parameters:
SEC: seconds (00÷59);
Min: Minutes (00÷59);
Hou Current hour (1÷24)
7dY: **day of the week** (**Mon** = Monday, **tue** = Tuesday, **Wed** = Wednesday, **thu** = Thursday, **Fri** = Friday, **Sat** = Saturday, **Sun** = Sunday).
dAY: day of the month (1÷31)
Mon: number of the month (1÷12)
YEA: year (0÷99)

15.3.7 "ALr": alarms display

This function displays any alarm messages.

15.3.8 "Prt": printer management

This menu is used for the management of the printer. It contains the parameters:

PrP printer presence: (Yes/no) Enabling or disabling the printer

itP: printing interval: (0.0÷30.0 min) It sets the interval of printing.

PbP: Which probe print: (,**iP:** Only the Insert probe; **rP:** Only the room probe; **irP:** The Insert and the room probe; **irE:** All the probe)

PtH: (yes/no) it enables or disables the printing during the holding phase.

15.3.9 "tSt": it starts the instrument self test.

15.3.10 "Out": exits from menu.

16. Accessing "Pr2" and SECURITY CODE input

To access parameters in "**Pr2**" a security code is required.

1. Enter Function Menu, select label "**Pr2**" and press the "**SET**" key. The "PAS" flashing message is displayed, shortly followed by "0 _ _" with a flashing zero.
2. Use **"UP"** or **"DOWN"** to input the security code in the flashing digit;
3. Confirm the figure by pressing "**SET**".
4. Repeat operations 2 and 3 for the other digits.
5. If the security code is correct the access to "**Pr2**" is enabled by pressing "**SET**" on the last digit, otherwise the "rtC" menu is shown.

If no key is pressed for more than 15 seconds the instrument reverts to room temperature display mode.

SECURITY CODE is 321

NOTA1: the safety security code is **981**.

NOTE2: each parameter in "Pr2" can be removed or put into "Pr1" (user level) by pressing **"SET**+ ^**"**. In Pr2 when a parameter is present in "Pr1" or "rtC" LED is on.

17. List of parameters

REGULATION

Hy **Intervention differential for set point:** (0,1 ÷ 12,0 /0,1°C/1°F), always positive. Compressor cut IN is Set Point Plus Differential (Hy). Compressor cut OUT is when the temperature reaches the set point.

AC **Anti-short cycle delay**: (0÷30 min) minimum interval between the compressor stop and the following restart.

rPO **Thermostat probe calibration** (-12,0 ÷ 12,0; res. 0,1 °C /1°F)

EPP **Evaporator probe presence (not present in the XB350C):** (no / YES) **no:** not present (timed defrost); **YES:** present (end defrost)

EPO **Evaporator probe calibration (not present in the XB350C):** (-12,0 ÷ 12,0; res. 0,1 °C /1°F)

iPP **Insert probe presence (**no / YES) **no:** not present; **YES:** present.

iPO **Insert probe calibration** (-12,0 ÷ 12,0; res. 0,1 °C /1°F)

CF **Temperature measurement unit**: °C =Celsius; °F =Fahrenheit

rES **Resolution (for °C)**: **in**: integer; **de**: with decimal point

PAU **Time of stand by:** (0 ÷ 60min) after this time the controller restart the cycle

PFt **Maximum acceptable duration of power failure:** (0 ÷ 250 min) if power failure duration is less than PFt, the cycle restarts from the same point at which it was stopped otherwise the cycle restarts from the beginning of the current phase.

iPd **Temperature difference for the automatic recognition of the insert probe:** (0 ÷ 30; ris.1 °C/1°F) if the difference of temperature between the insert probe and the thermostat probe is less than iPd, the selected cycle is made by time.

iPt **Time delay for the automatic recognition of the insert probe:** (0÷255sec, with 0 only timed cycles are done) time between the start of a cycle and the comparison of the temperature of the thermostat probe and the insert probe to recognising if the insert probe is used.

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

diC **Digital input operating mode** (EAL, bAL, dor)
EAL: external alarm; **bAL:** serious alarm; **dor:** door open function

diP: digital input polarity: (OP÷CL)select if the digital input is activated by opening or closing the contact. OP= opening; CL=closing

did: **digital input delay** (0÷255 min) delay between digital input activation and his signalling for configurable or door opened alarm.

OAC **AUX output configuration:** (AL, Li, UL, Ip, AA, rE, dF)
AL: alarm output; **Li:** light of the cabinet; **UL:** for the ultra-violet light (It is actionable only when the controller is in OFF position); **Ip:** to extract the insert probe (It is actionable only when the controller is in OFF position); **AA:** anti - condensation; **rE:** the IV relay works as a thermostat, with direct action (cooling) (OAH>0), and inverse actions (heating) (OAH<0); **dF:** the IV relay is activated during the defrost, at the end of the defrost it remains ON for the OAt time.

OAP **AUX output polarity (**OP ÷ CL) **OP**= normally open; if it is ON the terminals 6-8 are closed. **CL**= normally closed; if it is ON the terminals 6-7 are closed.

OAt **AUX output timer**: (0÷255 min) time in which the AUX output stays ON. It is enabled when OAC = Li or UL or Ip or AA or dF.

OAS **Set point for AUX output** (-50÷50; ris.1 °C/ 1°F)

OAH **Differential for AUX output:** (-12.0÷12,0; ris.0,1°C/1°F, always ≠0) Intervention differential for the set point of the auxiliary, with OAH<0 the action is for heating, with OAH>0 it is for cooling. **COOLING:** AUX cut IN is OAS Plus Differential (OAH>0). AUX cut OUT is when the temperature reaches the set point OAS.
HEATING: AUX cut IN is OAS Plus Differential (OAH<0). AUX cut OUT is when the temperature reaches the set point OAS.

OAi **Probe selection for the AUX output (rP, EP, iP)** rP = thermostat probe, EP = evaporator probe; iP = insert probe

DEFROST

tdF **Defrost type (not present in the XB350C)**: (**rE**= electrical heater; **in** = hot gas).

dPO **Defrost before the holding: no**= no defrost; **YES**= defrost at the start of a holding cycle.

IdF **Interval between defrost cycles**: (0.1÷ 24.0; res. 10 min) Determines the time interval between the beginning of two defrost cycles. (with 0.0 the defrost is disabled)

dtE **Defrost termination temperature (not present in the XB350C)**: (-50÷50 °C/°F) Sets the temperature measured by the evaporator probe, which terminates the defrost.

MdF **Maximum length for defrost**: (0÷255 min) When EPP = no (timed defrost) it sets the defrost duration, when EPP = YES (defrost termination based on temperature) it sets the maximum length for defrost.

dFd **Temperature displayed during defrost**: (rt , it, SEt, dEF**) rt:** real temperature; **it:** temperature at the start of defrost; **SEt:** set point; **dEF:** "dEF" message

Fdt **Drip time (not present in the XB350C)**: (0 ÷ 60 min) Time interval between reaching defrost termination temperature and the restoring of the controllers' normal operation. This time allows the evaporator to eliminate water drops that might have formed during defrost.

FANS

FnC **Fan operating mode during the holding phase**: (CP; On) **CP=** with the compressor;
On: continuous mode: fans are on if the temperature detected by the evaporator probe is below FSt parameter.

FSt **Fan stop temperature**: (-50÷50°C/°F; res. 1°C/1°F) if the temperature, detected by the evaporator probe is above FSt fans are stopped. It serves to avoid blowing warm air around the room.

AFH **Differential for the stop temperature and for the alarm** (0.1 ÷ 25.0 °C; ris.0.1°C/1°F) Fans carry on working when the temperature reaches the FSt-AFH value, the temperature alarm recovers when the temperature is AFH degrees below the alarm set.

FOn **Fan ON time during defrost: (**0 ÷ 15min) with Fon=0 the fans are always OFF. With FOn=FOF=0 the fans are always OFF.

FOF **Fan OFF time during defrost (**0 ÷ 15min) with FOF=0 the fans are always ON.

Fnd **Fan delay after defrost:** (0 ÷ 255 min) The time interval between end of defrost and evaporator fans start.

ALARM

ALU **MAXIMUM temperature alarm**: (1 ÷ 50 °C/°F) When the "SET+ALU" temperature is reached the alarm is enabled, (possibly after the "Ald" delay time).

ALL **Minimum temperature alarm**: (1÷50°C/1°F) When the "SET-ALL" temperature is reached the alarm is enabled, (possibly after the "Ald" delay time).

ALd **Temperature alarm delay**: (0÷255 min) time interval between the detection of an alarm condition and alarm signalling.

EdA **Temperature 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 alarm signalling.

tbA **Silencing alarm relay:** (Yes= silencing buzzer and alarm relay, no= only buzzer silencing).

OTHER

Ad1 **Address 1 for RS485: (**0 ÷ 94)

Ad2 **Address 2 for RS485 (**0 ÷ 94)

Lod **Local display: (rP, EP, iP, nr)** select which probe is displayed by the instrument: **rP:** thermostat probe; **EP:** evaporator probe; **iP:** insert probe, **nr:** during a temperature cycle the insert probe is displayed, during the holding phase the room probe is displayed; if the cycle is made by time the time remaining is displayed (in minutes).

rEd **Remote display: (rP, EP, Ip)** select which probe is displayed by the XR REP. **rP:** thermostat probe; **EP:** evaporator probe; **iP:** insert probe.

Loc **Set point of the holding phase lock** (no - YES) It locks the set point of the holding phase.

PAS **Security code set up: (**0 ÷ 999)

tPb **Type of probe:** it displays the probe used by the controller (NTC or PTC)

rEL **Release code (readable only)**

Ptb **Parameter code (readable only)**

17.1 PARAMETERS RELATIONS

PARAMETER : EPP (no XB350C)		
Value	**Hide**	**Display**
no	EPO - dtE -FSt	
YES		EPO - dtE -FSt

PARAMETER: IPP		
Value	**Hide**	**Display**
no	iPO - iPd - iPt	
YES		iPO - iPd - iPt

PARAMETER: CF		
Value	**Hide**	**Display**
°C		rES
°F	Res	

PARAMETER: OAC		
Value	**Hide**	**Display**
AL	OAt - OAS - OAH - OAi	
Li	OAS - OAH - OAi	OAt
UL	OAS - OAH - OAi	OAt
iP	OAS - OAH - OAi	OAt
AA	OAS - OAH - OAi	OAt
rE	OAt	OAS - OAH - OAi
dF	OAS - OAH - OAi	OAt

18. Printer management (XB570C only)

The instrument XB570C can drive the **serial printer** XB05PR by means of the RS232 output. So temperatures measured during a freezing cycle can be printed. Time reference is provided by the internal Real Time clock of the instrument.
The "Prt" functions manages the printer by means of the following parameters:
Prt: printer presence: (Yes/no) it enables or disables the printer.
itP: printing interval: (0.0÷30.0 min).
PbP: which probe has to be printed: (**iP:** Only the insert probe; **rP:** Only the thermostat probe; **irP:** Insert and thermostat probes; **irE:** All the probes.
PtH: Printing during the holding phase (yES, no) **yES** = Printing enabled during the holding phase; **no**= Printing disabled during the holding phase.

19. IV configurable relay.

The relay can be used for

19.1.1 OAC=AL: for remote alarm

the IV relay is switched ON when an alarm happens.

19.1.2 OAC=Li: light

The light is switched on pressing the DOWN key or when the door is opened (if dIC=dor). It stays on for the OAt time. It can be switched off before the OAt time by pressing the DOWN key or by closing the door. NOTE: with OAt=0 it can be switched off only by pressing the DOWN key or by closing the door.

19.1.3 OAC=UL: UV light for a sterilisation cycle

It is used for a sterilisation cycle of the machine.
It can be enabled **ONLY WHEN THE CONTROLLER IS NOT WORKING** or when a manual defrost is running.
The ultra violet light stays on for the OAt time. It can be switched off before the OAt time by pressing the DOWN key.
NOTE: with OAt=0 it can be switched off only by pressing the DOWN key.

19.1.4 OAC=AA: to enable the resistor of anti condensation

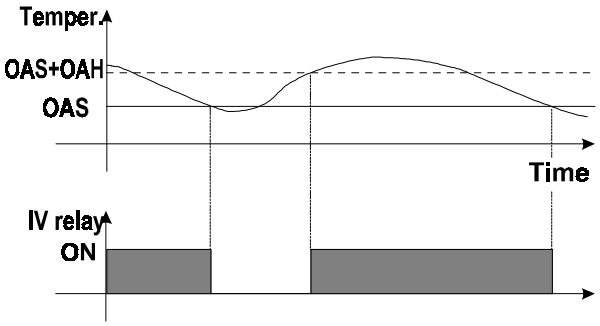
It can be enabled by pressing the DOWN key. The resistor stays on for the OAt time. It can be switched off before the OAt time by pressing the DOWN key.
NOTE: with OAt=0 it can be switched off only by pressing the DOWN key.

19.1.5 OAC=iP to extract the insert probe by means of a resistor heater

It can be enabled **ONLY WHEN THE CONTROLLER IS NOT WORKING**. To extract the insert probe press the DOWN key for few seconds. The resistor stays on for the OAt time. To switch it OFF before the OAt time, press the DOWN key for few seconds. NOTE: with OAt=0 it can be switched off only by pressing the DOWN key.

19.1.6 OAC=rE thermostat function

The IV relay works like a thermostat with the set point OAS and the differential OAH. The kind of action is selectable by means of the OAH parameter: with OAH<0, the action is for heating, with OAH>0 it is for cooling. In this case the probe used for the regulation is selected by means of the OAi parameter.
E.G. with OAi = rP; OAH>0



20. Digital configurable input.

The configurable input has 3 functions, selectable by means of the **dIC** parameter

- **dIC=EAL** Signal a **external alarm** (after the dId time)**:** buzzer enabled, "EA" message on the display.
- **dIC=bAL** Signal a **external serious alarm**(after the dId time)**:** buzzer enabled, all the loads are switched OFF and the cycle is stopped, "CA" message on the display. When the alarm recovers the controller is placed in stand by mode.
- **diC=dor**: "**door switch" input:** the compressor and the fans are stopped; if OAC=Li the light is switched on; after the **dId** time the buzzer is enabled and the **dA** message is displayed.

21. ALARM SIGNALS

Mess.	Cause	Outputs
"EE"	Data or memory failure	Alarm output ON; Other outputs unchanged
"rPF"	Thermostat Probe failure	Alarm output ON; Compressor output according to parameters "**COn**" and "**COF**"
"EPF"	Evaporator Probe failure	Alarm output ON; Defrost termination is timed; No temperature control on fans.
"iPF"	Insert probe failure	Alarm output ON; Other outputs unchanged; The cycle is made by time
"rtC"	Real Time Clock data lost	Alarm output ON; Other outputs unchanged;
"rtF"	Real Time Clock failure	Alarm output ON; Other outputs unchanged; The date and the duration of the cycle are not available.
"HA"	Maximum temperature alarm	Alarm output ON; Other outputs unchanged.
"LA"	Minimum temperature alarm	Alarm output ON; Other outputs unchanged.
"FF"	Fast freezing interrupted by short power failure	Alarm output ON; The freezing cycle restart from the same point at which was interrupted.
"PFA"	Fast freezing interrupted by long power failure	Alarm output ON; The freezing cycle restart from the current phase.
"OCF"	Max duration of the cycle is expired	Alarm output ON; Other outputs unchanged. In any case the cycle ends when the final temperature is reached
"EA"	External alarm	Alarm output ON; Other outputs unchanged.
"CA"	Serious external alarm	Alarm output ON; Other outputs OFF.
"dA"	Door open alarm	Alarm output ON; Other outputs unchanged.

22. Technical data

Housing: self extinguishing ABS.
Case: frontal 32x74 mm; depth 70mm;
Mounting: panel mounting in a 71x29mm panel cut-out
Frontal protection: IP65
Connections: Screw terminal block ≤ 2,5mm^2 wiring.
Power supply: 12Vac/dc, -10% +15%**.**
Power absorption: 3VA max.
Display: 3 digits, red LED, 14,2 mm high.
Inputs
XB350C: 2 PTC probes
XB370C, XB570C: 3 PTC probes
Relay outputs:
compressor
relay SPST 8(3)A, 250Vac
defrost
XB370C, XB570C: relay 8(3)A, 250Vac
fans
relay SPST 5(2)A, 250Vac
IV relay
relay SPDT 8(3)A, 250Vac
Serial output
XB350C, XB370C: TTL output
XB570C: RS232 serial output for XB05PR printer connection
Data storing: on the non-volatile memory (EEPROM).
Operating temperature: 0÷60 °C.
Storage temperature: -30÷85 °C.
Relative humidity: 20÷85% (no condensing)
Measuring range: -55÷50 °C
Resolution: 0,1 °C or 1 °F (selectable).
Accuracy of the controller at 25°C: ±0,3 °C ±1 digit

23. Standard Value of the cycles.

Cy1: for fast chilling and conservation of foods at positive temperature		
dbC = no	**iS2 =** 5°C (41°F)	**rS3**=-2°C (28°F)
iS1 = 20°C (68°F)	**rS2** =-2°C (28°F)	**Pd3** = OFF
rS1= -10°C (14°F)	**Pd2** = 2.0 h	**dbH** = yes
Pd1 = 2.0 h	**iS3** = 3°C (37°F)	**HdS** = 3°C (37°F)

Cy2: for chilling and fast freezing of foods with holding

dbC = no	**iS2** = 5°C (41°F)	**rS3**=-30°C (-22°F)
iS1 = 10°C (50°F)	**rS2**= -2°C (28°F)	**Pd3** = 2.0 h
rS1 = -10°C (14°F)	**Pd2** = 2.0 h	dbH = YES
Pd1 = 2.0 h	**iS3**=-18°C (0°F)	HdS =-18°C (0°F)

Cy3: direct fast freezing with holding		
dbC = no	**iS2**=-18°C (0°F)	**rS3**=-30°C (-22°F)
iS1 = -18°C (0°F)	**rS2**=-30°C(-22°F)	**Pd3** = OFF
rS1=-30°C (-22°F)	**Pd2** =OFF	dbH = yes
Pd1 = 4.0	**iS3** =-18°C (0°F)	HdS = -18°C (0°F)

Cy4: direct fast freezing without holding		
dbC = no	**iS2**=-18°C (0°F)	**rS3**=-30°C (-22°F)
iS1 =-18°C (0°F)	**rS2**=-30°C (-22°F)	**Pd3** = OFF
rS1=-30°C (-22°F)	**Pd2** =OFF	**dbH** = no
Pd1 = 4.0	**iS3**=-18°C (0°F)	**HdS** = OFF

24. Standard Values of the parameters.

Lab	Description	XB 350C °C/°F	XB 370C °C/°F	XB 570C °C/°F
		°C/°F	°C/°F	°C/°F
Regulation				
Hy	differential	2/4	2/4	2/4
AC	Anti-short cycle delay	1	1	1
rPO	Thermostat probe calibration	0	0	0
EPP	Evaporator probe presence	**--**	yes	yes
EPO	Evaporator probe calibration	**--**	0	0
iPP	Insert probe presence	y	y	y
iPO	Insert probe calibration	0	0	0
CF	Temperature measurement unit	°C/°F	°C/°F	°C/°F
rES	Resolution (for °C):	de	de	de
PAU	Time of stand by	0	0	0
PFt	Maximum acceptable duration of power failure	15	15	15
iPd	Temperature difference for the automatic recognition of the insert probe	3/6	3/6	3/6
iPt	Time delay for the automatic recognition of the insert probe	60	60	60
Con	Compressor ON time with faulty probe	15	15	15
COF	Compressor OFF time with faulty probe	10	10	10
diC	Digital input operating mode	EAL	EAL	EAL
diP	Digital input polarity	CL	CL	CL
did	Digital input delay	5	5	5
OAC	AUX output configuration	AL	AL	AL
OAP	AUX output polarity	CL	CL	CL
OAt	AUX output timer	0	0	0
OAS	Set point for AUX output	0/32	0/32	0/32
OAH	Differential for AUX output	2/4	2/4	2/4
OAi	Probe selection for the AUX output	rP	rP	rP
Defrost				
tdF	Defrost type	**--**	rE	rE
dPO	Defrost before holding cycle	no	no	no
IdF	Interval between defrost cycles	8.0	6.0	6.0
dtE	Defrost termination temperature	**--**	8/46	8/46
MdF	Maximum length for defrost	20	20	20
dFd	Temperature displayed during defrost	rt	rt	rt
Fdt	Drip time	**--**	**0**	**0**

Fans				
FnC	Fan operating mode	CP	CP	CP
FSt	Fan stop temperature	**--**	30	30
AFH	Differential for the stop temperature and for the alarm	2/4	2/4	2/4
Fon	Fan ON time during defrost	0	0	0
FoF	Fan OFF time during defrost	5	5	5
Fnd	Fan delay after defrost	**2**	**2**	**2**
Alarm				
ALU	MAXIMUM temperature alarm	30/60	30/60	30/60
ALL	Minimum temperature alarm	30/60	30/60	30/60
ALd	Temperature alarm delay	15	15	15
EdA	Alarm delay after defrost	30	30	30
tbA	Silencing alarm relay	y	y	y
Others				
Ad1	Address 1 for RS485:	0	0	0
Ad2	Address 2 for RS485	1	1	1
Lod	Local display	rP	rP	rP
rEd	Remote display	iP	iP	iP
LOC	Keypad LOCK	no	no	no
PAS	Security code set up	**321**	**321**	**321**
tPb	Type of probe	**PtC**	**PtC**	**PtC**
rEL	Release code (readable only)	--	--	--
Ptb	Parameter code (readable only)	**--**	**--**	**--**

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