DIGITAL CONTROLLER WITH ADVANCED ENERGY SAVING MANAGEMENT AND BLUETOOTH CONNECTIVITY

XRB60CHC

1 GENERAL WARNINGS

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

1.2 SAFETY PRECAUTIONS

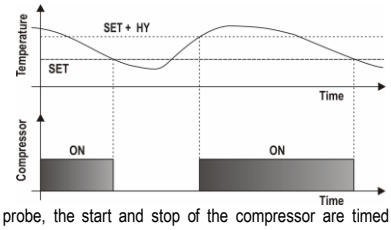
- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning: disconnect all electrical 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

The **XRB60CHC**, **32x74x60mm format**, is a microprocessor based controller suitable for applications on medium or low temperature ventilated refrigeration units. It has 3 relay outputs to control compressor, fans, light and defrost or auxiliary output. The device is also provided with up to 4 NTC probe inputs: the first one for temperature control, the second one to be located onto the evaporator to control the defrost termination temperature and to manage the fan and the third, optional and located on the HOT-KEY port, used to control the condenser temperature. There is also a configurable digital input. By using the **HOT-KEY** it is possible to program the instrument in a quick and easy way.
The controller has Bluetooth 4.2 connectivity.

3 REGULATION

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 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**.

4 ENERGY REDUCTION ALGORITHM

4.1 DESCRIPTION

The device permits to set different temperature to be used during normal and reduced power use. 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 side, when the ES status is active a different SET-POINT (**SET_ES**), higher than the standard one, will be used. The parameter **HES** will have to be set to change the regulation temperature 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.

The device uses special **E**nergy **r**eduction **A**lgorithm (**ErA** algorithm from Dixell) to optimize loads activation during the day. It is possible to set two different algorithms (**ErA=bAS** or **Aut).** They differ for the used sensor and for the total length of the interval of time involved.

4.2 BASIC ENERGY SAVING ALGORITHM – ErA=bAS

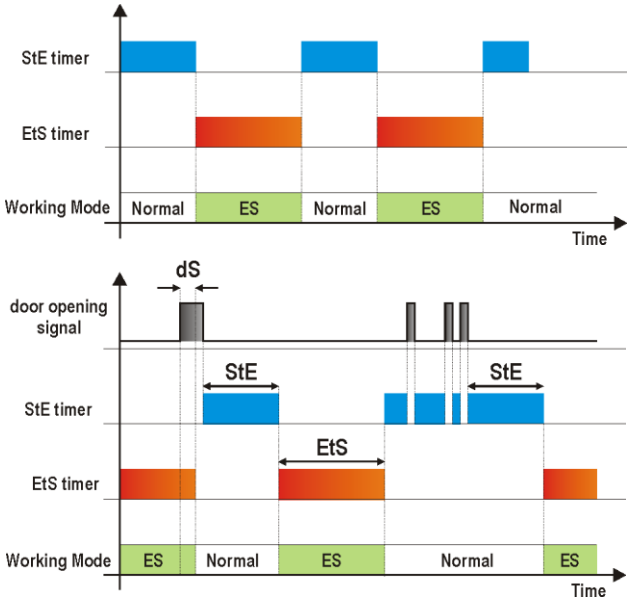
This will be used when **ErA=bAS**. The energy saving status will be always saved in the internal memory to resume previous operation if a power failure occurs. It needs the presence of a door switch to work (**i1F=dor**).

4.2.1 Parameter involved and suggested values:

- **ErA=bAS**
- **i1F=dor**
- **StE=4.0 hours**
- **EtS=6.0 hours**
- **HES=4.0 to 5.0 °C**
- **HYE=3 to 4°C**
- **dS=5 to 10 sec**
- **LdE=Y**

FROM	TO	CHANGED BY
Normal mode	Energy Saving	- Push the **DOWN** button for 3 sec (if enabled). - Door continuously closed for the **StE** time.
Energy Saving	Normal mode	- Push the **DOWN** button for 3 sec (if enabled). - Controller in ES mode for the **EtS** time. - If the controller is in ES mode, it returns in Standard mode (normal set-point) after opening the door more than **dS** time.

NOTE: the cycling mode (ES - Normal mode - ES - etc.) works if **i1F=dor** and **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 ES button or by setting **i1F=ES**. See the below diagrams where the status changing is depicted:



4.3 AUTOMATIC ENERGY SAVING ALGORITHM

This will be used when **ErA=Aut**. The operations are controlled by using the **Aid** parameter. After powering on the device, it automatically starts to analyze the temperature behavior by using the only room temperature probe. In this way it can build the best energy saving model according to the application. The device uses temperature behavior information of the previous **Aid** interval to manage the loads during the current period. When **Aid** is set to use long periods (**Aid>1**), a day-by-day model will be used during the first interval of time.

4.3.1 Parameter involved and suggested values:

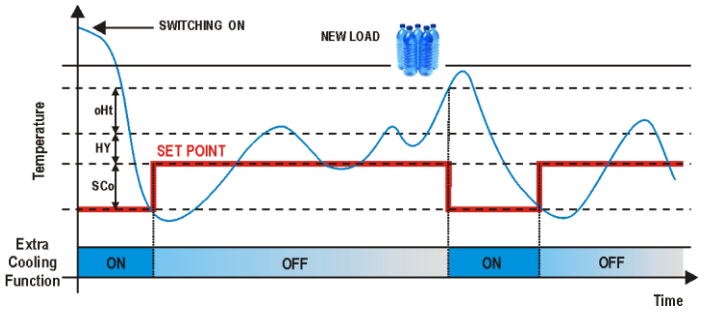
- **ErA=Aut**
- **HES= 3.0 to 5.0°C**
- **LdE=Y**
- **Aid=1 or 7**
- **nCE=4**
- **nCC=8**
- **Pdt=2**
- **HYE=3 to 4°C**
- **PPU=P1**
- **tun=depends on the regulation probe placement**

NOTES:

1. In case of any blackout, the calculated energy saving model will be reset.
2. **ErA** can exclusively drive the light output by using the **LdE** parameter. When **LdE=YES**, the light output status will change according to the energy saving (ES) status:
   a. OFF if ES is active
   b. ON if ES is not active
3. It is always possible to override the light output status by using the frontal button. Anyway, this modification will have a temporary impact on the lights if **LdE=YES**. In fact, **ErA** will take the control after the next ES status change.
4. **ErA <u>does not</u> need any door switch input to work**.
5. Be sure to place the room temperature probe in near the upper zone of the cabinet: this gives the best results in terms of temperature variation analysis.
6. The **Aid** parameter indicates the interval of analysis as "number of days". The suggested values for it are 1 or 7, depending on the particular application.

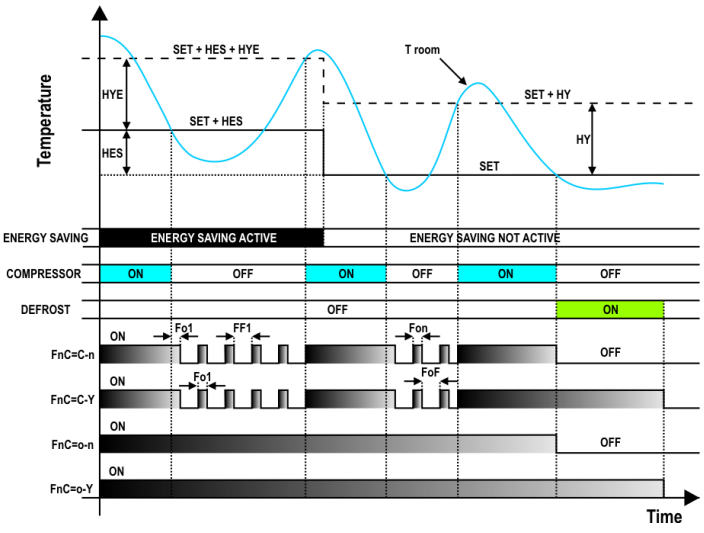
7. When **Aid=1**, the first day will be used to analyze the temperature behavior and to build the model to apply to the second day. The model will be updated every day in order to better match the working conditions.
8. When **Aid=7**, the first 7 days will be used to analyze the temperature behavior and to build the model to apply to the next 7 days. The model will be updated every 7 days in order to better match the working conditions.
9. When **Aid=7**, the first 7 days after power on will use a sub analysis base on 1-day model.
10. **nCE** is used to define the minimum duration of an energy saving interval of time
11. **nCC** is used to move the SET-POINT value from normal mode value to the energy saving mode value by steps (1 step = 1°C or 1°F, starting from the **SET** value and increasing it every 30 min till reaching the **SET_ES** value)
12. **Pdt** is used to anticipate the end of the energy saving mode in order to decrease the temperature of the bottles before starting the normal mode interval
13. **PPU** select the probe used for automatic energy saving algorithm
14. **tun** is used to change the sensibility of the automatic energy saving algorithm. **tun=H** (high) is used for cabinet with regulation probe installed near the evaporator air outlet flow. **tun=L** (low) is used for cabinet with regulation probe installed far away from the evaporator air outlet flow.

5 EXTRA COOLING FUNCTION



The extra cooling function (named Pull Down) is active when the room temperature measured from the probe 1 goes over the **SET+oHt+HY** value. In this case, a special set-point value, lower than the normal **SET** value, will be enabled. As soon as the room temperature reaches the **SET+CCS** value, the compressor will be stopped and the normal regulation will restart. **N.B.:** 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. **NOTE:** in case of energy saving mode active, the used values will be: **SET_ES=SET+HES, oHE** and **CCS.**

6 EVAPORATOR FANS



With **FnC** parameter it can be selected the fans functioning:

- **FnC=C-n** → fans will switch ON and OFF with the compressor and **not run** during defrost; when compressor is OFF, fans will enter a duty-cycle working mode (see **FoF**, **Fon**, **FF1** and **Fo1** parameters).
- **FnC=o-n** → fans will run even if the compressor is off, and not run during defrost;
- **FnC=C-Y** → fans will switch ON and OFF with the compressor and **run** during defrost; when compressor is OFF all fans will enter a duty-cycle working mode (see **FoF**, **Fon**, **FF1** and **Fo1** parameters).
- **FnC=o-Y** → fans will run continuously also during defrost.

After defrost, there is a timed fan delay allowing for drip time, set by means of the **Fnd** parameter.
An additional parameter **FSt** provides the setting of temperature, detected by the evaporator probe, above which the fans are always OFF. By using this parameter it is possible to assure air circulation only if air temperature is lower than **FSt** value.

6.1 EVAPORATOR FAN AND DIGITAL INPUT

When the digital input is configured as door switch (**i1F=dor**), fans and compressor status will depend on the **odC** parameter value:

- **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 will restart after a door open alarm.

7 DEFROST

7.1 DEFROST MODE

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.
- **EdF=Aut**: automatic management, in this case the controller will start a new defrost any time a change from normal to energy saving mode will occur (valid if **ErA=Aut**).

7.2 TIMED OR PROBE CONTROLLED MODE

Two defrost modes are available: timed or controlled by the evaporator's probe. A couple of parameters is used to control the interval between defrost cycles (**idF**) and its maximum length (**MdF**). During the defrost cycle is possible to select some different display indications by using the **dFd** parameter. These modes are available with any kind of defrost type:

- **tdF=EL**: electric heater defrost
- **tdF=in**: hot gas defrost.

7.3 AUTOMATIC DURATION DETECTION

When a defrost operation is performed by compressor stop (means by stopping the compressor and by activating the internal ventilators), it will be possible to use an automatic defrost mode by setting **od2=ALt**. In this case the device will use the evaporator probe (which MUST to be present and properly mounted on the evaporator surface) to detect the end of the actual defrost phase. In any case, a maximum period of time (**MdF**) and an upper evaporator temperature value will be used to stop the current defrost phase. If **ErA=Aut**, the automatic defrost mode will activate a defrost at the beginning of any energy saving mode period. In this case the **idF** delay is used as safety function. It forces the controller to activate a defrost operation when **idF** runs. **NOTE:** during the defrost phase the loads (compressor and evaporator fans) will be controlled from the defrost algorithm.

8 INTERNAL COUNTERS

The next table shows the implemented load and function of total counters.

n1H	Number of relay output 1 activation (thousands of)
n1L	Number of relay output 1 activation (hundreds of)
n2H	Number of relay output 2 activation (thousands of)
n2L	Number of relay output 2 activation (hundreds of)
n3H	Number of relay output 3 activation (thousands of)
n3L	Number of relay output 3 activation (hundreds of)
n4H	Number of relay output 4 activation (thousands of)
n4L	Number of relay output 4 activation (hundreds of)
n5H	Number of digital input 1 activation (thousands of)
n5L	Number of digital input 1 activation (hundreds of)
n6H	Number of digital input 2 activation (thousands of)
n6L	Number of digital input 2 activation (hundreds of)
oCH	Compressor working hours (thousands of)
oCL	Compressor working hours (hundreds of)

In this way it is possible to monitor the application and discovering bad functioning that could lead to damages. They are updated in EEPROM every hour. It is not possible to reset them.
NOTE: the compressor activation counters take into account also defrost in case of inversion (hot gas) mode.

8.1 AUX RELAY CONFIGURATION (PAR. oAX)

An auxiliary relay can be set by the **oAx** parameters, according to the kind of application. In the following paragraph the possible settings.

8.1.1 Light relay

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

8.1.2 Auxiliary relay

a. **Relay activation by digital input 1 or digital input 2 (oAx=AUS, i1F or i2F=AUS):** with **oAx=AUS** and **i1F, i2F=AUS** the AUX relay is switched on and off by digital inputs.
b. **Auxiliary thermostat:** anti condensing heater with the possibility of switching it on and off also by using the frontal keyboard.
Parameters involved:
   - **ACH:** kind of regulation for the auxiliary relay: **Ht** = heating; **CL** = cooling.
   - **SAA:** set point for auxiliary relay.
   - **SHy:** differential for auxiliary relay.
   - **ArP:** probe for auxiliary relay.
   - **Sdd:** auxiliary output off during defrost.
   - **Ao1:** output active when in energy saving mode
   - **AF1:** output not active when in energy saving mode

The differential threshold value is set by the **SHY** parameter.

NOTE:
if **oAx=AUS** and **ArP=nP** (no probe for auxiliary output) the AUX relay can be activated

- by digital input if **i1F=AUS** or **i2F=AUS**
- by auxiliary button (if set as **AUS**)
- by serial command (Modbus protocol)
- by fixed interval of time if **Ao1>0** and **AF1>0** (if **Ao1=0** or **AF1=0** the auxiliary output is disabled)

8.1.3 On/off relay (oAx = onF)

When **oAx=onF**, the AUX relay is activated when the controller is turned on and de-activated when the controller is turned off.

8.1.4 Neutral zone regulation

With **oAx=db** the AUX relay can control a heater element to perform a neutral zone action.

- **oA1** cut in = **SET-HY**
- **oA1** cut out = **SET**

8.1.5 Alarm relay

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

8.1.6 Activation during energy saving cycles

With **oAx=HES,** the AUX relay is energised when the energy saving cycle is activated.

9 FRONT PANEL COMMANDS

SET	Press to display target set point and the real set point. When in programming mode it selects a parameter or confirms an operation
ECO	(**ECO**) To switch on and off the Energy Saving mode or the light output. Other functions related to par. **LGC** and **LG2**
∧	(**UP**) In programming mode it browses the parameter codes or increases the displayed value. Other functions related to par. **UPC** and **UP2**
∨	(**DOWN**) In programming mode it browses the parameter codes or decreases the displayed value. Other functions related to the par. **dnC** and **dn2**
⏻	(**ONOFF**) Keep it pressed for 3 sec to switch on and off the device

KEYS COMBINATION	
∨ + ∧	To lock or unlock the keyboard
SET + ∨	To enter in programming mode
SET + ∧	To return to room temperature display

ICON	MODE	MEANING
❄	**On**	Compressor enabled
	Flashing	Anti-short cycle delay enabled (**AC** parameter)
☼	**On**	Light output enabled
✣	**On**	Ventilator output enabled
	Flashing	Ventilator delay after defrost
°C, °F	**On**	Measurement unit
	Flashing	Programming mode
ECO	**On**	Energy saving mode active
(!)	**On**	An alarm condition is present
	Flashing	Start-up operations are pending
AUX	**On**	Auxiliary output is activated

NOTE: start-up operations lasts about 30 sec after powering on the device. At the end of this phase, the alarm icon will switch off if no alarm is active.

9.1 SET POINT MENU

The **SET** key gives access to a quick menu where it is possible to see:
- the set point value
- the real set point value (**rSE**)

Push and release the **SET** key five times or wait for 60 sec to return to normal visualisation.

9.2 CHANGE THE SETPOINT

1. Push the **SET** key for more than 2 sec to change the Set point value;
2. The value of the set point will be displayed and the "°C" LED starts blinking;
3. To change the Set value push the **UP** or **DOWN** button.
4. To memorise the new set point value push the **SET** key again or wait for 60 sec.

9.3 START A MANUAL DEFROST

Push the **DEFROST** button for more than 2 sec to start a manual defrost.

9.4 CHANGE A PARAMETER VALUE

To change the parameter values operate as follows:
1. Enter the Programming mode by pressing the **SET+DOWN** buttons for 3 sec ("**°C**" LED starts blinking).
2. Select the required parameter. Press the **SET** button to display its value
3. Use **UP** or **DOWN** buttons to change its value.
4. Press **SET** to store the new value and move to the following parameter.

To exit: Press **SET+UP** buttons or waits for 15 sec without pressing any key.

NOTE: the set value is stored even when the procedure is exited by waiting the time-out to expire.

9.5 ENTERING THE HIDDEN MENU

The hidden menu includes all the parameters of the instrument.

ENTER THE HIDDEN MENU

1. Enter the Programming mode by pressing **SET+DOWN** buttons for 3 sec ("**°C**" or "**°F**" LED starts blinking).
2. Released the keys and then push again **SET+DOWN** buttons for more than 7 sec. The "**L2**" label will be displayed immediately followed from the **HY** parameter.
   NOW YOU ARE IN THE HIDDEN MENU.
3. Select the required parameter.
4. Press the **SET** key to display its value
5. Use **UP** or **DOWN** to change its value.
6. Press **SET** to store the new value and move to the following parameter.

To exit: Press **SET+UP** or wait for 15 sec without pressing any key.

NOTE1: if there are no parameters in L1, after 3 sec the "**nP**" label will be displayed. Keep the keys pushed till the "**L2**" message will be displayed.

NOTE2: the previous set value will be stored even if the programming mode is exited by waiting for the time-out to expire.

MOVE PARAMETERS FROM THE HIDDEN MENU TO THE FIRST LEVEL AND VICEVERSA.

Each parameter present in the HIDDEN MENU can be removed or put into "THE FIRST LEVEL" (user level) by pressing **SET+DOWN**. If a parameter is visible also in the First Level, in the HIDDEN MENU the decimal point will be lit.

9.6 LOCK THE KEYBOARD

1. Keep both **UP** and **DOWN** buttons pressed for more than 3 sec.
2. The "**oFF**" label will be displayed and the keyboard will be locked. If any button is pressed more than 3 sec, the "**oFF**" message will be displayed.

9.7 UNLOCK THE KEYBOARD

Keep both **UP** and **DOWN** buttons pressed together for more than 3 sec till the "on" message will be displayed.

9.8 THE ON/OFF FUNCTION

⏻	If **onF = oFF**, the instrument will be switched off by pushing the **ON/OFF** button. The "**OFF**" message will appear on the display. In this configuration the regulation is disabled. To switch the instrument on, push again the **ON/OFF** button.

WARNING: any load connected to the normally closed contacts of the relays is always supplied from the main voltage, even if the instrument is in standby mode.

10 PARAMETERS

REGULATION

Set	**Regulation Set Point:** LS to US
LS	**Minimum SET POINT:** (-55.0°C to SET; -67°F to SET) sets the minimum value for the set point.
US	**Maximum SET POINT:** (SET to 150.0°C; SET to 302°F) set the maximum value for set point.
HY	**Differential in normal mode (energy saving mode not active):** (0.1 to 25.0°C; 1 to 45°F) differential for set point. Compressor Cut-IN is **[SET-POINT + HY]**. Compressor Cut-OUT is when the temperature reaches the set point.
HYE	**Differential when energy saving mode is active:** (0.1 to 25.0°C; 1 to 45°F) differential for set point. Compressor Cut-IN is **[SET-POINT + HES + HYE]**. Compressor Cut-OUT is when the temperature reaches the **[SET-POINT + HES]**.
odS	**Outputs delay activation after power on:** (0 to 255 min) this function is enabled after the power-on of the instrument and inhibits any output activation for the period of time set in the parameter.
AC	**Anti-short cycle delay:** (0 to 50 min) minimum interval between a compressor stop and the following restart.
Rtr	**P1-P2 percentage for regulation:** 100=P1 only; 0=P2 only
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	**Differential for pull down:** (-12.0 to 12.0°C; -21 to 21°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	**Overheating before activating the pull down function (when in normal mode):** (1.0 to 12.0°C; 1 to 21°F) this is the upper threshold limit used to activate the super cooling function.
oHE	**Overheating before activating the pull down function (when in energy saving mode):** (1.0 to 12.0°C; 1 to 21°F) this is the upper threshold 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.

PROBE SETUP

ot	**Thermostat probe calibration:** (-12.0 to 12.0°C; -21 to 21°F) allows to adjust any possible offset of the first probe.
P2P	**Evaporator probe presence: n** = not present; **Y** = the defrost stops by temperature.

oE	**Evaporator probe calibration:** -12.0 to 12.0°C; -21 to 21°F) allows to adjust any possible offset of the third probe.
P3P	**Third probe presence: n** = not present; **Y** = the defrost stops by temperature.
o3	**Third probe calibration:** -12.0 to 12.0°C; -21 to 21°F) allows to adjust any possible offset of the third probe.
P4P	**Fourth probe presence: n** = not present; **Y** = the condenser temperature alarm is managed.
o4	**Fourth probe calibration:** (-12.0 to 12.0°C; -21 to 21°F) allows to adjust any possible offset of the condenser probe.

DISPLAY

iCo	**Enabling icon visualisation:** (n; Y) the icons can be hidden during normal functioning
CF	**Temperature measurement unit:** (°C; °F) **°C** = Celsius; **°F** = Fahrenheit.
rES	**Resolution (only for °C):** (dE; in) **dE** = decimal; **in** = integer.
Lod	**Probe displayed:** (P1; P2; P3; P4; SEt; dtr; USr) **Px**=probe "x"; **SEt**=set point; **dtr**=do not use it; **USr**=do not use it.
dLY	**Temperature visualization 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	**P1-P2 percentage for display**

DEFROST

tdF	**Defrost type: EL**=electrical heaters; **in**=hot gas; **ALt**=uses only for compressor stop defrost.
dFP	**Probe selection for defrost control: nP**=no probe; **P1**=thermostat probe; **P2**=evaporator probe; **P3**=third probe (do not use it); **P4**=Probe on Hot Key plug.
dtE	**Defrost termination temperature for defrost control:** (-55 to 50°C; -67 to 122°F) it sets the temperature measured by the evaporator probe (**dFP**), which causes the end of defrost.
idF	**Interval between two consecutive defrost cycles:** (0 to 255 hours) determines the time interval between the beginnings of two defrosting cycles.
MdF	**Maximum length for defrost:** (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 defrost.
dSd	**Start defrost delay:** (0 to 255 min) delay in defrost activation.
StC	**Compressor stop time before starting any defrost:** (0 to 900 sec) interval with compressor stopped before activating hot gas cycle
dFd	**Display during defrost:** (rt; it; SP; dF) **rt** = real temperature; **it** = start defrost temperature; **SP** = SET-POINT; **dF** = label "**dF**".
dAd	**Max delay for updating display after any defrost:** (0 to 255 min) delay before updating the temperature on the display after finishing any defrost.
Fdt	**Draining time:** (0 to 255 min)
dPo	**First defrost after start-up:** (n; Y) to enable defrost at power on.
dAF	**Defrost delay after freezing:** (0.0 to 24h00min, res. 10 min) delay before activating a defrost.
od1	**Automatic defrost (at the beginning of any energy saving mode):** (n; Y) **n**=function disabled; **Y**=function enabled
od2	**Optimized defrost function:** (n; Alt) **n**=function disabled; **Alt**=function enabled

FAN

FAP	**Probe selection for evaporator fan management: nP**=no probe; **P1**=thermostat probe; **P2**=evaporator probe; **P3**=do not use it; **P4**=Probe on Hot Key plug.
FSt	**Evaporator fan stop temperature:** (-55 to 50°C; -67 to 122°F) setting of temperature, detected by evaporator probe. Over this value of temperature fans are always OFF. **NOTE: it works only for the evaporator fan, NOT for the condenser fan.**
HYF	**Differential for evaporator fan:** (0.1 to 25.5°C; 1 to 45°F) differential for evaporator ventilator regulator
FnC	**Evaporator fan mode operation:** (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	**Fan delay after defrost:** (0 to 255 min) delay before fan activation after any defrosts.
FCt	**Differential of temperature for forced activation of fans**
Ft	**Ventilators controlled during any defrost**
Fon	**Fan on time when the compressor is off:** (0 to 255 min) used when energy saving status is not active.
FoF	**Fan off time when the compressor is off:** (0 to 255 min) used when energy saving status is not active.
Fo1	**Fan on time with compressor off in Energy Saving mode:** (0 to 255 min) used when energy saving status is active.
FF1	**Fan off time with compressor off in Energy Saving mode:** (0 to 255 min) used when energy saving status is active.
FAC	**Probe selection for condenser fan management: nP**=no probe; **P1**=probe Pb1; **P2**=probe Pb2; **P3**=probe Pb3; **P4**=probe Pb4 on Hot Key plug.
St2	**Condenser fan stop temperature:** (-55 to 50°C; -67 to 122°F) setting of temperature, detected by evaporator probe. Over this value of temperature fans are always OFF.
HY2	**Differential for condenser fan:** (0.1 to 25.5°C; 1 to 45°F) differential for evaporator ventilator regulator
FCC	**Condenser fan mode operation:** (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

AUXILIARY OUTPUT MANAGEMENT

ACH	**Kind of regulation for auxiliary relay:** (Ht; CL) **Ht** = heating; **CL** = cooling.
SAA	**Set Point for auxiliary relay:** (-55.0 to 150.0°C; -67 to 302°F) it defines the room temperature set point to switch auxiliary relay.
SHY	**Differential for auxiliary relay:** (0.1 to 25.5°C; 1 to 45°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 relay:** (nP; P1; P2; P3; P4) **nP** = no probe, the auxiliary relay is switched only by the digital input; **P1** = Probe 1 (Thermostat probe); **P2** = Probe 2 (evaporator probe); **P3** = do not use it; **P4** = Probe 4.
Sdd	**Auxiliary relay switched off during defrost:** (n; Y) **n** = the auxiliary relay operates during defrost. **Y** = the auxiliary relay is switched off during defrost.
btA	**Base Time for timed activation of auxiliary output:** (SEC; Min) SEC=base time is in second
Ato	**AUX output in ON state:** 0 to 255 (base time defined in par. **btA**)
AtF	**AUX output in OFF state:** 0 to 255 (base time defined in par. **btA**)

ALARMS

ALP	**Temperature alarms probe selection:** (P1, P2, P3, P4)
ALC	**Temperature alarms configuration:** (Ab, rE) **Ab** = absolute; **rE** = relative.
ALU	**Maximum 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	**Minimum temperature alarm:** when this temperature is reached, the alarm is enabled after the **Ad** delay time. • If **ALC=Ab** → -55.0°C to ALU or -67°F to ALU. • If **ALC=rE** → 0.0 to 50.0°C or 0 to 90°F.
AFH	**Differential for temperature alarm recovery:** (0.1 to 25.0°C; 1 to 45°F) differential for alarms.
ALd	**Temperature alarm delay:** (0 to 255 min) delay time between the detection of an alarm condition and the relative alarm signalling.
dot	**Delay of temperature alarm with door open:** (0.0 to 24h00min, res. 10 min) delay time between the detection of a temperature alarm condition and the relative alarm signalling, after powering on the instrument.
dAo	**Delay of temperature alarm 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 powering on the instrument.

CONDENSER TEMPERATURE ALARM

AP2	**Probe selection for second temperature alarms:** (nP; P1; P2; P3; P4) **nP**=no probe; **P1**=thermostat probe; **P2**=evaporator probe; **P3**=do not use it; **P4**=Probe on Hot Key plug
AU1	**Second high temperature pre-alarm:** (-55.0 to 150.0°C; -67 to 302°F)
AH1	**Differential for second temperature pre-alarm recovery:** (0.1 to 25.0°C; 1 to 45°F)
Ad1	**Second 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 signaling.
AL2	**Second low temperature alarm:** (-55.0 to 150.0°C; -67 to 302°F)
AU2	**Second high temperature alarm:** (-55.0 to 150.0°C; -67 to 302°F)
AH2	**Differential for second temperature alarm recovery:** (0.1 to 25.0°C; 1 to 45°F)
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 signaling.
dA2	**Delay for second temperature alarm at start up:** (0.0 to 24h00min, res. 10 min)
bLL	**Compressor off because of second low temperature alarm:** (n; Y) **n** = no, compressor keeps on working; **Y** = yes, compressor is switched off till the alarm is present, in any case regulation restarts after **AC** time at minimum.
AC2	**Compressor off because of second high temperature alarm:** (n; Y) **n** = no, compressor keeps on working; **Y** = yes, compressor is switched off till the alarm is present, in any case regulation restarts after **AC** time at minimum.

DIGITAL OUTPUT MANAGEMENT

tbA	**Alarm muting:** (n; Y) to disable the (optional) buzzer and the output configured as alarm.
oA1	**First relay configuration:** (nu; CP1; dEF; FAn; ALr; LiG; AUS; db; onF; HES; Cnd) **nu**=not used; **CP1**=compressor; **dEF**=defrost; **FAn**=ventilators; **ALr**=alarm; **LiG**=light; **AUS**=Auxiliary relay; **onF**=always on with instrument on; **db**=neutral zone; **HES**=night blind; **Cnd**=not select it.
oA2	**Second relay configuration:** (nu; CP1; dEF; FAn; ALr; LiG; AUS; db; onF; HES; Cnd) **nu**=not used; **CP1**=compressor; **dEF**=defrost; **FAn**=ventilators; **ALr**=alarm; **LiG**=light; **AUS**=Auxiliary relay; **onF**=always on with instrument on; **db**=neutral zone; **HES**=night blind; **Cnd**=not select it.
oA3	**Third relay configuration:** (nu; CP1; dEF; FAn; ALr; LiG; AUS; db; onF; HES; Cnd) **nu**=not used; **CP1**=compressor; **dEF**=defrost; **FAn**=ventilators; **ALr**=alarm; **LiG**=light; **AUS**=Auxiliary relay; **onF**=always on with instrument on; **db**=neutral zone; **HES**=night blind; **Cnd**=not select it.
oA4	**Fourth relay configuration:** (nu; CP1; dEF; FAn; ALr; LiG; AUS; db; onF; HES; Cnd) **nu**=not used; **CP1**=compressor; **dEF**=defrost; **FAn**=ventilators; **ALr**=alarm; **LiG**=light; **AUS**=Auxiliary relay; **onF**=always on with instrument on; **db**=neutral zone; **HES**=night blind; **Cnd**=not select it.
AoP	**Alarm relay polarity:** (oP; CL) **oP** = alarm activated by closing the contact; **CL** = alarm activated by opening the contact

DIGITAL INPUT

ibt	**Base time for digital inputs:** (SEC; Min) **SEC** = seconds; **Min** = minutes. Delay for 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; MS; EAL; bAL; PAL; HdF; onF) • **nu**=not used • **dor** = door switch function • **dEF** = defrost activation • **AUS** = auxiliary output • **ES** = energy saving mode activation • **MS** = motion sensor • **EAL** = external warning alarm • **bAL** = external lock alarm • **PAL** = external pressure alarm • **HdF** = holiday defrost • **onF** = ON/OFF status change
Did	**Digital inputs 1 alarm delay:** (0 to 255) it is the delay between the detection of an external event and the activation of the relative function.
i2P	**Digital input 2 polarity (if d.i.2 present):** (oP; CL) **oP** = activated by closing the contact; **CL** = activated by opening the contact.
i2F	**Digital input 2 configuration:** (nu; dor; dEF; AUS; ES; MS; EAL; bAL; PAL; HdF; onF) • **nu**=not used • **dor** = door switch function • **dEF** = defrost activation • **AUS** = auxiliary output • **ES** = energy saving mode activation • **MS** = motion sensor • **EAL** = external warning alarm • **bAL** = external lock alarm • **PAL** = external pressure alarm • **HdF** = holiday defrost • **onF** = ON/OFF status change

d2d	**Digital inputs 2 alarm delay:** (0 to 255) it is the delay between the detection of an external event and the activation of the relative function.
nPS	**Number of external pressure 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** = Fans OFF; **CPr** = Compressor OFF; **F-C** = Compressor and fans OFF.
rrd	**Regulation restart after door open alarm:** (n; Y) **n** = no regulation if door is opened; **Y** = when **did** is elapsed, regulation restarts even if a door open alarm is present.
LCi	**Light output controlled by digital input:** (0 to 255)

ENERGY SAVING

ErA	**Energy reduction algorithm used:** (nu; bAS; Aut) **nu**=no energy saving algorithm used; **bAS**=basic energy saving algorithm; **Aut**=automatic energy saving algorithm.
nbo	**Threshold for mode change (normal mode to energy saving mode):** (0 to 10)
HES	**Differential for energy saving mode:** (-30.0 to 30.0°C; -54 to 54°F) it sets the increasing value of the set point during the Energy Saving cycle.
LdE	**Energy saving mode controls the lights (lights off when energy saving goes active):** (n; Y) the light status depends on the energy saving mode and is managed from **ErA**.
Aid	**Period of analysis for ErA (valid if ErA=Aut):** (1 to 20 days) set the interval of time for temperature variation analysis.
nCA	**Number of contiguous cells to activate Energy Saving (valid if ErA=Aut):** (1 to 20) minimum pattern (1 cell = 30 min) without activity for energy saving activation
nCC	**Number of contiguous cells with energy saving for Set-Point variation (valid if ErA=Aut):** (1 to 12) minimum interval of time for SET-POINT variation by steps (1°C or 1°F every 30 minutes)
Pdt	**Automatic Pull Down after energy saving:** (0 to nCC) energy saving mode is deactivated in advance (0=0min, 1=30 min)
tun	**System tuning: L**=low sensibility; **H**=high sensibility
PPv	**Temperature probe used for temperature variation analysis:** (P1, P2, P3, P4) which probe is used from Energy Reduction Algorithm
FEn	**Force status change from energy saving mode to normal mode (valid if ErA=Aut):** number of intervals with activity for mode changing
FnE	**Force status change from normal mode to energy saving mode (valid if ErA=Aut):** number of intervals without activity for mode changing
StE	**Period of time to switch from normal mode to energy saving mode (valid if ErA=bAS):** (0.0 to 24h00min, res. 10 min) if door stay closed for **StE** time, the energy saving mode will be activated. NOTE: this will require a door switch to work.
EtS	**Period of time to switch from energy saving mode to normal mode (valid if ErA=bAS):** (0.0 to 24h00min, res. 10 min) maximum time for energy saving mode. NOTE: this will require a door switch to work.
dS	**Door open time to switch from EtS to StE (valid if ErA=bAS):** (0 to 999 sec) the energy saving mode will be immediately deactivated as soon as the door stay open more than the **dS** time. NOTE: this will require a door switch to work.

TOTAL COUNTERS

n1H	**Number of relay output 1 activations (thousands of) (read only)**
n1L	**Number of relay output 1 activations (hundreds of) (read only)**
n2H	**Number of relay output 2 activations (thousands of) (read only)**
n2L	**Number of relay output 2 activations (hundreds of) (read only)**
n3H	**Number of relay output 3 activations (hundreds of) (read only)**
n3L	**Number of relay output 3 activations (hundreds of) (read only)**
n4H	**Number of relay output 4 activations (thousands of) (read only)**
n4L	**Number of relay output 4 activations (hundreds of) (read only)**
n5H	**Number of digital input 1 activations (thousands of) (read only)**
n5L	**Number of digital input 1 activations (hundreds of) (read only)**
n6H	**Number of digital input 2 activations (thousands of) (read only)**
n6L	**Number of digital input 2 activations (hundreds of) (read only)**
n7H	**Number of digital input 3 activations (thousands of) (read only)**
n7L	**Number of digital input 3 activations (hundreds of) (read only)**
n8H	**Number of digital input 4 activations (thousands of) (read only)**
n8L	**Number of digital input 4 activations (hundreds of) (read only)**
F1H	**Number of working hours for relay output oA1 (thousands of) (read only)**
F1L	**Number of working hours for relay output oA1 (hundreads of) (read only)**
F2H	**Number of working hours for relay output oA2 (thousands of) (read only)**
F2L	**Number of working hours for relay output oA2 (hundreads of) (read only)**
F3H	**Number of working hours for relay output oA3 (thousands of) (read only)**
F3L	**Number of working hours for relay output oA3 (hundreads of) (read only)**
F4H	**Number of working hours for relay output oA4 (thousands of) (read only)**
F4L	**Number of working hours for relay output oA4 (hundreads of) (read only)**

BLUETOOTH

rPS	**Reset owner password:** (n;Y) select and confirm YES for reset Owner Password and come back to default factory configuration. NOTE: remember to cancel the device also from the Cloud database (click on "Delete" link present on the right of the appliance card present on the "Permissions" webpage.

OTHER

Adr	**Serial address for Modbus communication:** 1 to 247
bAU	**Baudrate:** (9.6; 19.2; 38.4; 57.6) select the correct baudrate for serial communication (wired)
LGC	**Light button configuration: nu**=not used; **ES**=change working mode from normal to energy saving mode and vice-versa; **LiG**=light output control; **AUS**=auxiliary output control; **dEF**=defrost control; **Pb2**=probe 2 value visualization
LG2	**Light button configuration (timed, 3 sec): nu**=not used; **ES**=change working mode from normal to energy saving mode and vice-versa; **LiG**=light output control; **AUS**=auxiliary output control; **dEF**=defrost control; **Pb2**=probe 2 value visualization; **ErA**=reset of Energy Reduction Algorithm pattern
dnC	**Down button configuration: nu**=not used; **ES**=change working mode from normal to energy saving mode and vice-versa; **oFF**=device ON/OFF control; **Cnt**=counter menu
dn2	**Down button configuration (timed 3 sec): nu**=not used; **ES**=change working mode from normal to energy saving mode and vice-versa; **oFF**=device ON/OFF control; **Cnt**=counter menù
uPC	**UP button configuration: nu**=not used; **AUS**=auxiliary output control; **dEF**=defrost control; **Cnt**=counter menu
uP2	**UP button configuration (timed 3 sec): nu**=not used; **ES**=change working mode from normal to energy saving mode and vice-versa; **CC**=do not select it
d1	**Probe P1 value visualization (read only)**
d2	**Probe P2 value visualization (read only)**
d3	**Probe P3 value visualization (read only)**
d4	**Probe P4 value visualization (read only)**
rSE	**Real Set point (SET + ES + oHx)**
FdY	**Firmware release: day (read only)**
FMt	**Firmware release: month (read only)**
FYr	**Firmware release: year (read only)**
rEL	**Firmware Release (read only)**
Ptb	**Parameter code table (read only)**

11 DIGITAL INPUT

The free voltage digital input is programmable in different configurations by the **i1F** and **i2F**.

DOOR SWITCH (ixF=dor)

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 **did**, the door alarm is enabled, the display shows the message **"dA"** and **the regulation restarts if rrd = Y.** The alarm stops as soon as the external digital input is disabled again. With the door open, the high and low temperature alarms are disabled.

START DEFROST (ixF=dEF)

It starts a defrost if there are the right conditions. After finishing any 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.

ENERGY SAVING (ixF=ES)

The energy saving mode will be enabled / disabled with the digital input.

MOTION SENSOR (ixF=MS)

The external motion sensor activation is counted.

AUXILIARY OUTPUT (ixF=AUS)

The AUX output (if present and configured) will be enabled / disabled with the digital input.

EXTERNAL WARNING ALARM (ixF=EAL)

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

EXTERNAL LOCK ALARM (ixF=bAL)

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

EXTERNAL PRESSURE ALARM (ixF=PAL)

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

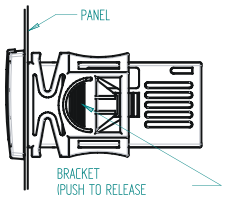
REMOTE HOLYDAY MODE (ixF=HdF)

It is used to force the holyday mode.

REMOTE ONOFF (ixF=onF)

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

12 INSTALLATION AND MOUNTING



Instrument **XRB60CHC** 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 -20 to 60°C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let air circulate by the cooling holes.

13 OPTIONAL FEATURES

The **MDP/CX** rear cover can be used to increase the protection from water and dust.

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 BLU serial interface converts the TTL output into an RS485 signal that can be used to connect the unit to the controlling and supervising system. Please note that standard version of this converter does not work with XR-CHC devices.

14 ELECTRICAL CONNECTIONS

The instrument is provided with screw terminal block to connect cables with a cross section up to 2.5mm^2. 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.

14.1 PROBES

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.

15 USE THE HOT KEY

15.1 SAVE PARAMETERS IN A HOT KEY (UPLOAD FROM INSTRUMENT)

1. Program one controller with the front keypad.
2. When the controller is ON, insert the "**HOT-KEY**" and push **UP** button; the "**UP**" message appears followed a by flashing "**End**"
3. Push "**SET**" key and the "**End**" will stop flashing.
4. Turn OFF the instrument and then remove the "**HOT-KEY**". At the end turn the instrument ON again.

NOTE: the "**Err**" message appears in case of a failed programming operation. In this case push again the **UP** button if you want to restart the upload again or remove the "**HOT-KEY**" to abort the operation.

15.2 COPY PARAMETERS FROM A HOT KEY (DOWNLOAD PARAMETER VALUES)

1. Turn OFF the instrument.
2. Insert a **programmed "HOT-KEY" into the 5-PIN receptacle** and then turn the Controller ON.
3. Automatically the parameter list of the "**HOT-KEY**" is downloaded into the Controller memory, the "**do**" message is blinking followed a by flashing "**End**".
4. After 10 seconds the instrument will restart working with the new parameters.
5. Remove the "**HOT-KEY**".

NOTE: the message "**Err**" is displayed 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.

16 ALARM SIGNALLING

Label	Cause	Outputs
"oFF"	Keyboard locked	Outputs unchanged
"on"	Keyboard unlocked	Outputs unchanged
"P1"	Room probe failure	Compressor output according to **Con** e **CoF**
"P2"	Evaporator probe failure	Defrost end is timed
"P3"	Third probe failure	Depends on the alarms
"P4"	Fourth probe failure	Linked temperature alarm is not managed
"HA"	Maximum temperature alarm	Outputs unchanged
"LA"	Minimum temperature alarm	Outputs unchanged
"H2"	Maximum temperature for second temperature alarm	Outputs unchanged
"L2"	Minimum temperature for second temperature alarm	Outputs unchanged
"dA"	Door open more than **dxd** time	Compressor and fans restarts
"EA"	External alarm	Outputs unchanged
"CA"	Serious external alarm	Outputs disabled
"EE"	EEPROM alarm	Outputs unchanged

16.1 ALARM RECOVERY

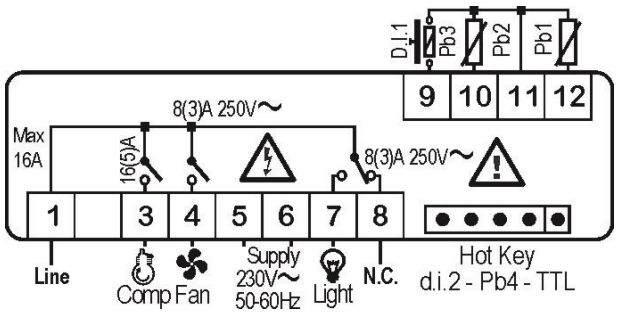
Probe alarms "**P1**", "**P2**", "**P3**" and "**P4**" start some seconds after the fault in the related probe; they automatically stop some seconds after the probe restarts normal operation. Check connections before replacing the probe. Temperature alarms "**HA**", "**LA**", "**H2**" and "**L2**" automatically stop as soon as the temperature returns to normal values. It is possible to reset the "**EE**" alarm by pressing any button.
The alarms "EA", "CA" and "dA" will automatically stop as soon as the digital input is disabled.
The optional buzzer can be muted by pressing any key if parameter **tbA=Y**.

17 TECHNICAL DATA

Housing: self-extinguishing PC-ABS
Case: frontal 32x74 mm; depth 60mm
Mounting: panel mounting in a 71x29mm panel cut-out
Body Protection: IP20
Frontal protection: IP65
Connections: Screw terminal block ≤ 2.5 mm² wiring
Power supply: (according to the model) 230Vac ±10%, 50/60Hz; 110Vac ±10%, 50/60Hz
Power absorption: 3.5VA max
Display: 3 digits red LED, 14.2 mm high
Inputs: up to 4 NTC probes
Digital input: free voltage contact
Relay outputs: **Compressor** SPST 16(5)A or 20(8)A, 250VAC
Light: SPDT 5(2)A, 250VAC
Fans: SPST 8(3)A, 250VAC
Data storing: 8 Kbytes (EEPROM)
Kind of action: 1B
Pollution degree: 2
Software class: A
Rated impulsive voltage: 2500V; **Overvoltage Category**: II
Operating temperature: -20 to 60°C (32 to 140°F)
Storage temperature: -25 to 60°C (-13 to 140°F)
Relative humidity: 20 to 85% (no condensing)
Measuring and regulation range:
NTC -40 to 110°C (-40 to 230°F)
Resolution: 0.1°C or 1°C (selectable)
Accuracy (ambient temp. 25°C): ±0.1°C ±1 digit.

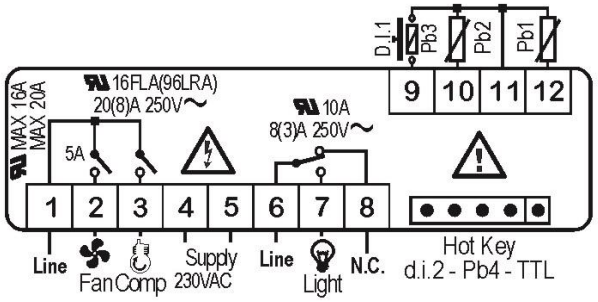
18 WIRINGS

18.1 XRB60CHC, 16+8+8A



Power Supply:
110 or 230 Vac @50 or 60Hz

18.2 XRB60CHC, 20+8+5A

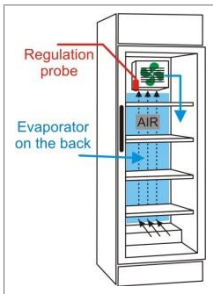


Power Supply:
110 or 230 Vac @50 or 60Hz

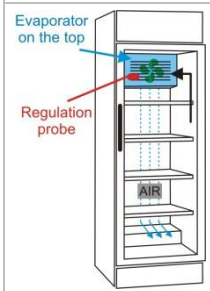
19 APPLICATION NOTES

Pay attention to the positioning of the regulation probe. In fact, the XR60CHC can obtain the best performances of the system under control when the regulation probe is placed by following these guidelines.

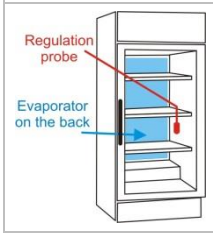
NOTE: it is possible to change the sensibility of the energy reduction algorithm (**ErA=Aut**) by using the parameter **tun** (tuning). In case of different temperature probe placement (respect to the ones depicted in the following table), try to change **tun** value from **H** to **L**.



Ventilated applications – Evaporator placed on the back of the refrigerated zone, ventilator placed above the evaporator
- The regulation probe is normally placed in the outlet air flow from the evaporator
- The regulation probe can be placed both inside or outside the ventilator pack, paying attention to avoid positions too near to the motor of the ventilator
- Sensibility for **ErA=Aut** algorithm to be set to **tun=H**



Ventilated applications – Evaporator placed on the top side of the refrigerated zone, ventilator placed on the outlet air flow from the evaporator
- The regulation probe is normally placed in the inlet air flow to the evaporator
- The regulation probe has to be installed outside the evaporator, avoiding any contact with the metallic parts of the evaporator itself
- Sensibility for **ErA=Aut** algorithm to be set to **tun=H**



Static applications – Coolers without ventilators:
- The regulation probe is normally placed at the side-wall of the refrigerated zone, approximately from 30% to 50% (of the internal height) from the bottom and 20% to 30% (of the internal width) from the back
- Sensibility for **ErA=Aut** algorithm to be set to **tun=H**

20 BLUETOOTH COMMUNICATION

The controller implements a complete Bluetooth 4.2 communication embedded module. This gives the possibility to create a wireless communication channel with external devices (for example with a mobile APP able to recognize and decode the device). All controllers use a proper MAC-ADDRESS which is used both for unique identification and communication. The maximum communication range is about 5 m. Over this distance

it is possible to suffer continuous interruption at the communication channel. When discovered, a pairing secure code will be required for connection. Please follow the APP instruction for more information.

20.1 FIRST INSTALLATION

After connecting and powering-up the controller, it will be possible to manage it by using the Emerson mobile APP. Il will be required to:

- Install the Emerson mobile APP on your mobile device (smartphone or tablet)
- Create a new user account (email and password for accessing to the APP)

The owner is the only account that is able to:

- Manage the controller via Bluetooth
- Extend right of access to a particular appliance to other users

A Cloud portal has to be used for:

- Extend right of access to a particular appliance to other users
- Select the permission level for any new user

The link for opening the Cloud webpage is on the left side menu of the mobile APP (slide right the screen of the APP when on the scan page and follow the "Cloud management" link. Please note that the login and password for the Cloud webpage is the same of the ones used for the mobile APP.

20.2 RESETTING AN APPLIANCE

In case you need to reset an installation, please follow this operations:

- Access to the Cloud webpage and select the appliance you want to reset (search for name and MAC-ADDRESS)
- Click on the "DELETE" link, the appliance will be removed from the list of owned appliances
- Go to the device controller (with the same MAC-ADDRESS)
- Enter the programming mode
- Go to the "BLE" menu
- Select the par. rPS (reset device ownership)
- Select "Y" and confirm with SET button
- Exit from the programming menu
- Logout and login from the mobile APP

Doing this, the controller will be reset to factory default configuration and it will be ready for a new association (means a new Owner)

The XRB60CHC is compliant with the following standards:
ETSI EN 300 328 V2.1.1 (2016-11)
IEC EN 60730-2-9: 2008 (Third Edition) and Am.1:2011 in conjunction with IEC 60730-1:2010 (Fourth Edition)
UL 60730-1 Fourth Edition and CAN/CSA-E60730-1:02 Third Edition along with its Amendment 1 dated February 2007, the Standards for Automatic electrical controls for household and similar use – Part 1: General requirements.

Hereby, Dixell S.r.l. declares that the radio equipment type XRB60CHC is in compliance with Directive 2014/53/EU.
The full text of the EU declaration of conformity is available at the following internet address: EmersonClimate.com/Dixell

It therefore meets the essential requirements of the following Directives:
Radio equipment Directive 2014/53/EU
Electromagnetic compatibility 2014/30/EU
Low Voltage equipment 2014/35/EU

The XRB60CHC is compliant with the following standards:
FCC 15.247

The XRB60CHC is compliant to Part 15 of the FCC Rules:
Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation."

This device has been designed and complies with the safety requirements for portable (<20cm) RF exposure in accordance with FCC rule part 2.1093 and KDB 447498 D01 as demonstrated in the RF exposure analysis. Installers must ensure that this device must not be co-located or operated in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

Unauthorized repairs, changes or modifications could result in permanent damage to the equipment and void your warranty and your authority to operate this device under Part 15 of the FCC Rules.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The XRB60CHC is compliant to RSS 102
Cet XRB60CHC instrument répond aux normes RSS 102

The Dixell XRB60CHC complies with the safety requirements for RF exposure in accordance with RSS-102 Issue 5 for portable
use conditions
This device complies with ISED's license-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device
This device complies with the safety requirements for RF exposure in accordance with RSS-102 Issue 5 for portable use conditions.

Dixell 01XRCHC est conforme aux exigences de sécurité pour l'exposition RF conformément aux CNR d'Industrie Canada applicables aux appareils radio RSS-210 5e edition.
Le présent appareil est conforme aux RSS exempts de licence d'ISDE. Le fonctionnement de l'appareil est sujet aux deux conditions suivantes:
(1) Ce dispositif ne doit pas produire de brouillage préjudiciable, et
(2) Ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Le présent appareil est conforme aux limites d'exposition aux RF conformément au norme CNR-102 émission 5 pour conditions d'utilisation portable.