COPELAND

DIGITAL CONTROLLER WITH BLUETOOTH CONNECTIVITY

XR70CHC

82 rel. 1.0.1

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.
- Copeland Controls S.r.l. reserves the right to change the composition of its products, even without notice, ensuring the same and unchanged functionality.

1.2 SAFETY PRECAUTIONS

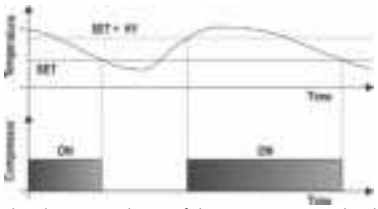
- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning: disconnect all electrical 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 "Copeland Controls 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 **XR70CHC**, **32x74x60mm format**, is a microprocessor-based controller suitable for applications on medium or low temperature ventilated refrigeration units. It has 4 relay outputs to control compressor, fans, light and defrost or auxiliary output. The device is also provided with up to 4 NTC, PTC or PT1000 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 SAVING 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.

4.2 BASIC ENERGY SAVING ALGORITHM

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

4.2.1 PARAMETER INVOLVED

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

FROM	TO	CHANGED BY
Normal mode	Energy Saving	- Pushing the **DOWN** button for 3 sec (if enabled). - Door continuously closed for the **StE** time.
Energy Saving	Normal mode	- Pushing 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 described:

5 PULL DOWN FUNCTION

The Pull Down is automatically activated:

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

In this case, a different set-point value (**SET+CCS**) 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. **NOTE:** Pull Down function is disabled when **CCS=0** or **CCt=0**.
The **CCt** parameter sets the maximum activation time for any pull down. When **CCt** expires, the Pull Down will be immediately stopped and the standard SET-POINT will be restored.

6 EVAPORATOR FANS

6.1 GENERAL DESCRIPTION

The evaporator fan is can be managed by dedicated control. To enable it, an evaporator probe must be selected by using par. **FAP**. Here follows the description of all the related parameters:

- **FAP**: to select the evaporator fan probe
- **FSt**: to select the evaporator fan deactivation setpoint
- **HYF**: differential for evaporator fan activation
- **FnC** parameter it can be selected the evaporator fan working mode:
  - **FnC=C-n:** evaporator fan will switch ON and OFF with the compressor and will not run during defrost; when compressor is OFF, evaporator fan will start a duty-cycle mode (see **FoF**, **Fon**, **FF1** and **Fo1** parameters).
  - **FnC=o-n:** evaporator fan will run even if the compressor is off, and will not run during defrost;
  - **FnC=C-Y:** evaporator fan will switch ON and OFF with the compressor and will run during defrost; when compressor is OFF, evaporator fan will enter a duty-cycle working mode (see **FoF**, **Fon**, **FF1** and **Fo1** parameters).
  - **FnC=o-Y:** evaporator fan will run continuously, also during defrost.
- **Fnd:** activation delay after any defrost

6.2 EVAPORATOR FAN AND DIGITAL INPUT

When the digital input is configured as door switch (**i1F=dor**), evaporator fan and compressor status will depend on the par. **odC**:

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

When **rrd=Y** the regulation will always restart after a door open alarm.

7 CONDENSER FAN

7.1 GENERAL DESCRIPTION

The condenser fan is can be managed by dedicated control. To enable it, a condenser probe must be selected by using par. **FAC**. Here follows the description of all the related parameters:

- **FAC**: to select the condenser fan probe
- **St2**: to select the condenser fan deactivation setpoint
- **HY2**: differential for condenser fan activation
- **FCC** parameter it can be selected the condenser fan working mode:
  - **FCC=C-n:** condenser fan will switch ON and OFF with the compressor and will not run during defrost
  - **FCC =o-n:** condenser fan will run even if the compressor is off, and will not run during defrost
  - **FCC =C-Y:** condenser fan will switch ON and OFF with the compressor and will run during defrost
  - **FCC =o-Y:** condenser fan will run continuously, also during defrost.

8 DEFROST

8.1 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

8.2 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

9 DIGITAL OUTPUT CONFIGURATION

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

9.1 CONFIGURABLE OUTPUT

9.1.1 LIGHT OUTPUT

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

9.1.2 DIGITAL OUTPUT ACTIVATION

The auxiliary output can be managed by digital inputs **(oAx=AUS, i1F or i2F=AUS):** with **oAx=AUS** and **i1F, i2F=AUS** the output is switched on and off following the linked digital input status.

9.1.3 AUXILIARY THERMOSTAT

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

- **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

9.1.4 TIMED ACTIVATION

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

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

9.1.5 GENERAL NOTES

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

- 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 **Ato>0** and **AtF>0** (if **Ato=0** or **AtF=0** the auxiliary output is disabled)

9.2 ON/OFF OUTPUT (OAX = ONF)

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

9.3 DEAD BAND REGULATION

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

- **oAx=db** cut in is **SET-HY**
- **oA1=db** cut out is **SET**

9.4 ALARM OUTPUT

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

9.5 ACTIVATION DURING ENERGY SAVING CYCLES

With **oAx=HES,** the output is activated when the energy saving cycle begins.

10 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
AUX	(**AUX/DEF**) Programmable button, see 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** (if available)
▼	(**DOWN**) In programming mode it browses the parameter codes or decreases the displayed value. Other functions related to the par. **dnC** and **dn2** (if available)
⏻	(**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
ᛒ	**On**	Bluetooth connection enabled

10.1 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 visualization.

10.2 CHANGE THE SETPOINT

1. Push the **SET** key for more than 3 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** button again or wait for 60 sec.

10.3 START A MANUAL DEFROST

Push the **DEFROST** button for more than 3 sec to start a manual defrost.

11 PARAMETER MENU

The device has a parameter menu available from keyboard and where it is possible to modify some specific parameters. A couple of parameter levels are present:

- PR1: user menu, standard parameters are placed into this menu
- PR2: protected menu, application specific parameters are placed here. A password can be used to protect these values from unauthorized modification.

11.1 MENU NAVIGATION

A tree-structured menu is implemented to simplify the parameter browsing and modification. Follow the button functions (valid both in PR1 and PR2):

- **SET**: used to enter a submenu or a stored value
- **UP** and **DOWN**: used to scroll the menu labels, the parameters into a submenu and to modify a parameter value
- **AUX/DEF**: used to go back to the upper menu level (for example, from a submenu list of parameters to the main menu labels)

11.2 CHANGE A PARAMETER VALUE

To change a parameter value, 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 button.

NOTE: The modified value will be stored even if the programming mode ends by timeout.

11.3 PROTECTED LEVEL

The Protected Level has all the parameters of the instrument. This level is password protected. The default password is: "000". It is strongly recommended to change the standard password after ending the installing operations.

11.3.1 ENTER THE PROTECTED LEVEL

1. Enter the Programming mode by pressing **SET+DOWN** buttons for 3 sec (**°C** or **°F** LED starts blinking)
2. Released the buttons and then search for submenu **Pr2**
3. Per SET button and then insert the password value
4. Confirm with SET. If the password is correct, the label "Pr2" will blink for some time and then protected parameter menu will be enabled.

11.3.2 PROTECTED MENU

1. Select the parameter to modify
5. Press the **SET** key to display its current value
6. Use **UP** or **DOWN** to change its value

7. 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 button.

NOTE:
1. If there are no parameters into the User Level, after 3 sec the "nP" label will be displayed. Go to submenu Pr2 and follow the previous procedure.
2. The modified value will be stored even if the programming mode ends by timeout.
3. Modify the par. **PSU** (when into Protected Level) to change the current password

11.3.3 MOVE PARAMETERS THROUGH LEVELS

Each parameter present into the Protected Level can be moved into the User Level by pressing both **SET+DOWN** buttons. If a parameter is into the User Level, when visualized into the Protected Level it will have also the decimal point.

11.4 KEYBOARD MANAGEMENT

11.4.1 TEMPORARY LOCK

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.

11.4.2 TEMPORARY UNLOCK

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

11.4.3 ADVANCED LOCK FUNCTION

It is possible to selectively lock the keyboard by using the following parameters:
1. **brd**: select the kind of lock:
   a. **UnL**: all buttons unlocked
   b. **SEL**: buttons **UP**, **DOWN** and **DEFROST** are locked
   c. **ALL**: all keyboard is locked
2. **tLC**: delay after power-on before activating the advanced lock function

NOTE: when advanced lock function is active, temporary lock and unlock functions are disabled.

11.5 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.

12 PARAMETERS

MENU LIST

rEG	Regulation: it includes all parameters related to main temperature regulation
Prb	Probe setup: it includes all parameters related to probe configuration
diS	Display: it includes all parameters related to the user interface
dEF	Defrost: it includes all parameters to control any defrost operation
FAn	Ventilators: it includes all parameters to control the ventilators
AUS	Auxiliary: it includes all parameters for auxiliary regulators
ALr	Alarms: it includes all parameters to set up the alarm conditions
oUt	Outputs: it includes all parameters to set up the digital outputs
inP	Inputs: it includes all parameters to set up the digital inputs
ES	Energy Saving: it includes all parameters to define the energy saving mode
Cnt	Counters: to see the counters values
rtC	Real Time Clock: it includes all parameters to set up the internal clock
bLE	Bluetooth: it includes all parameters to set up the Bluetooth communication
E2	EEPROM: it includes all parameters to set up the datalogger
oth	Other: it includes all parameters to set up the serial communication and the keyboard
viS	Visualization: it includes the read only parameters (probe values and FW info)

REGULATION - rEG

SEt	**Regulation Set Point:** range from LS to US
LS	**Minimum Set Point:** (-100.0°C to SET; -148°F to SET) sets the minimum value for the set point.
US	**Maximum Set Point:** (SET to 200.0°C; SET to 392°F) set the maximum value for set point.
HY	**Differential in normal mode:** (0.1 to 25.0°C; 1 to 45°F) differential for set point. Compressor Cut-IN is **T > SET + HY**. Compressor Cut-OUT is **T<=SET**.
HYE	**Differential in energy saving mode:** (0.1 to 25.0°C; 1 to 45°F) differential for set point. Compressor Cut-IN is **T > SET + HES + HYE**. Compressor Cut-OUT is **T<= SET + HES**.
odS	**Outputs delay activation after power on:** (0 to 255 min) this function is enabled after the power-on of the instrument and delays output activations.
AC	**Anti-short cycle delay:** (0 to 50 min) minimum interval between a compressor stop and the following restart.
rtr	**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 - Prb

PbC	**Probe selection:** ntC; PtC; Pt1000
ot	**Probe P1 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 - diS

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	**Visualization percentage = F(P1;P2):** (0 to 100) with **dtr=1** the display will show this value **VALUE=0.01*P1+0.99*P2**

DEFROST - dEF

EdF	**Defrost mode: in**=fixed intervals; **rtC**=following real time clock
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)
Hon	**Drain heater enabled after draining time (Fdt):** (0 to 255 min) the relative output will stay on after draining time.
dPo	**First defrost after start-up:** (n; Y) to enable defrost at power on.
Pd1	**Differential during any pre-defrost phase:** (-12.0 to 12.0°C; -21 to 21°F) the regulation Set Point is changed to a temporary different value before any defrost
Pd2	**Pre-defrost time:** (0 to 120 min) interval with temporary Set Point before any defrost.
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
SYn	**Tipe of synchronized defrost:** (nu; rnd) nu=not used; rnd=random defrost
ndE	**Number of devices connected to the virtual network for random defrost (valid if Syd=rnd):** (1 to 20) used to define how many devices will use the Random Defrost Function

FAN - 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**
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 - AUS

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 - ALr

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 - ALr

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.
SAF	**Differential for anti freezing control:** (-12.0 to 12.0°C; -21.0 to 21.0°F) regulation sopped if T<SET+SAF

DIGITAL OUTPUT MANAGEMENT - oUt

tbA	**Alarm muting:** (n; Y) to disable the (optional) buzzer and the output configured as alarm.
oAx (x=1,2,3,4)	**Output 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 blinds; **Cnd**=Condenser fan; **CP2**=second compressor; **dF2**=second defrost; **HEt**=heater control; **inV**=do not use it.
AoP	**Alarm relay polarity:** (oP; CL) **oP** = alarm activated by closing the contact; **CL** = alarm activated by opening the contact

DIGITAL INPUT - inP

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; EAL; bAL; PAL; FAn; HdF; onF; LiG; CC; EMt) • **nu**=not used • **dor** = door switch function • **dEF** = defrost activation • **AUS** = auxiliary output • **ES** = energy saving mode activation • **EAL** = external warning alarm • **bAL** = external lock alarm • **PAL** = external pressure alarm • **FAn** = evaporator fan control • **HdF** = holiday defrost • **onF** = ON/OFF status change • **LiG** = light output control • **CC** = change configuration (between C1 and C2) • **EMt** = do not use it
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; EAL; bAL; PAL; FAn; HdF; onF; LiG; CC; EMt) • **nu**=not used • **dor** = door switch function • **dEF** = defrost activation • **AUS** = auxiliary output • **ES** = energy saving mode activation • **EAL** = external warning alarm • **bAL** = external lock alarm • **PAL** = external pressure alarm • **FAn** = evaporator fan control • **HdF** = holiday defrost • **onF** = ON/OFF status change • **LiG** = light output control • **CC** = change configuration (between C1 and C2) • **EMt** = Motion detector
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 min) a digital input event will activate the light output and the output will stay ON for this interval

ENERGY SAVING - ES

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:** (n; Y) lights off when energy saving mode is active
StE	**Period 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 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 - Cnt

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)**
n5d	**Number of daily activations of digital input 1 (read only)**
n5H	**Number of digital input 1 activations (thousands of) (read only)**
n5L	**Number of digital input 1 activations (hundreds of) (read only)**
n6d	**Number of daily activations of digital input 2 (read only)**
n6H	**Number of digital input 2 activations (thousands of) (read only)**
n6L	**Number of digital input 2 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 (hundreds 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 (hundreds 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 (hundreds 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 (hundreds of) (read only)**

REAL TIME CLOCK MENU - rtC

Hur	**Hours:** 0 to 23 hours
Min	**Minutes:** 0 to 59 minutes
dAY	**Day of the week:** Sun to Sat
dYM	**Day of the month:** 1 to 31
Mon	**Month:** 1 to 12
YAr	**Year:** 00 to 99
Hd1	**First day of the weekend:** (Sun to Sat; nu) set the first day of the week which follows the holiday times.
Hd2	**Second day of the weekend:** (Sun to Sat; nu) set the second day of the week which follows the holiday times.
iLE	**Working day energy saving starting time:** (0 to 23h50min) during the Energy Saving cycle the set point is increased by the value in HES so that the operation set point is **SET+HES**.
dLE	**Working day energy saving duration:** (0 to 24h00min) sets the duration of the Energy Saving cycle on workdays.
iSE	**Holyday energy saving starting time:** 0 to 23h50min.
dSE	**Holyday energy saving duration:** 0 to 24h00min.
dd1…dd6	**Daily defrost enabled:** (n; Y) to enable the **Ld1…Ld6** defrost operations for any day of the week.
Ld1…Ld6	**Daily defrost starting time:** (0 to 23h50min) these parameters set the beginning of the 6 programmable defrost cycles during workdays. Ex: when **Ld2=12.4** the second defrost starts at 12.40 during workdays.

N.B.: To disable a defrost cycle set it to "nu" (not used). *Ex: if Ld6=nu; the sixth defrost cycle will be disabled.*

BLUETOOTH - bLE

btM	**Bluetooth Mode:** (0; 1; 2) define the pairing&bonding method: - **0**=6-digit PIN is required for pairing&bonding - **1,2**=no PIN required (just works mode)
rPS	**Reset owner password:** (n;Y) select and confirm YES to 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.
rLi	**Reset whitelist:** (n;Y) select and confirm YES for reset the device whitelist and come back to default factory configuration.

EEPROM – E2

rSC	**Reset Daily Counters:** used to reset the daily counters memory. Please note that after selecting rSC=Y the device will take some time to complete the operation. During the reset phase, the display will show some blinking lines.

OTHER - oth

Adr	**Serial address:** (1 to 247) device address for Modbus communication
bAU	**Baudrate:** (9.6; 19.2; 38.4; 57.6) select the correct baudrate for serial communication
brd	**Keyboard lock type:** (nu; SEL; ALL) **UnL**=keyboard unlocked; **SEL**=only SET and DEF/AUX button enabled when locked; **ALL**=keyboard unlocked after **tLC**.
tLC	**Keyboard lock timeout:** (0 to 255 sec) timeout after power-on and before activating the keyboard lock
LGC	**Light button configuration (left upper side): nu**=not used; **LiG**=light output control; **AUS**=auxiliary output control; **dEF**=defrost control; **Pb2**=probe 2 value visualization; **ES**=change working mode from normal to energy saving mode and vice-versa;
LG2	**Light button timed (3sec) configuration (left upper side): nu**=not used; **LiG**=light output control; **AUS**=auxiliary output control; **dEF**=defrost control; **CC**=change configuration between NT and LT map; **ES**=change working mode from normal to energy saving mode and vice-versa;
UP2	**Up button timed (3sec) configuration: nu**=not used; **Std**=standard function; **LdC**=load default configuration (factory values); **Pdn**=pull down activation

VISUALIZATION - ViS

d1	**Probe P1 value visualization**
d2	**Probe P2 value visualization**
d3	**Probe P3 value visualization**
d4	**Probe P4 value visualization**
rSE	**Real Set point**
FdY	**Firmware release date: day**
FMt	**Firmware release date: month**
FYr	**Firmware release date: year**
rEL	**Firmware release: progressive number**
Sub	**Firmware sub release: progressive number**
Ptb	**Parameter code table**

13 DIGITAL INPUTS

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=EMt)

It counts the motion sensor detections.

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. It does not lock the regulation.

EXTERNAL LOCK ALARM (ixF=bAL)

It is used to detect any critical external alarm. It 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.

EVAPORATOR FAN MODE (ixF=FAn)

It is used to control the evaporator fan.

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.

LIGHT OUTPUT (ixF=LiG)

It is used to control the light output.

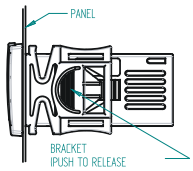
CHANGE CONFIGURATION (ixF=CC)

It is used to change the controller configuration.

MOTION SENSOR DETECTOR (ixF=EMt)

To use the X-MOD motion sensor. Please note that motion sensor can be connected only to the HOTKEY port, so it needs digital input 2 properly configurated.

14 INSTALLATION AND MOUNTING



Instrument **XR70CHC** shall be mounted on vertical panel, in a 29x71 mm hole, and fixed using the special bracket supplied.
The temperature range allowed for correct operation is 0 to 60°C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let air circulate by the cooling holes.

15 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) the parameter map.

The **XJ485LE** 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 other version of this converter does not work with XR-CHC devices.

16 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.

16.1 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.

17 USE THE HOT-KEY

17.1 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**.**

17.2 COPY PARAMETERS FROM A HOT-KEY (DOWNLOAD PARAMETER VALUES)

1. Turn OFF the instrument.
2. Insert a **programmed "HOT-KEY" into the 5-PIN port** and then turn the Controller ON.
3. The parameter list of the "**HOT-KEY**" is automatically copied into the controller memory. During this operation the "**do**" message will blink
4. A flashing "**End**" label will inform that the operation was successful
5. Remove the "**HOT-KEY**".
6. After some seconds the instrument will restart, using with the new parameters.

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**.**

18 INTERNAL MEMORY

The controller has an internal memory where are stored:
- Two different parameter maps identified as **C1** and **C2**
- Factory default configurations for both **C1** and **C2** parameters map

The controller is always shipped with:
- Parameter map **C1** = factory default configuration **C1**
- Parameter map **C2**= factory default configuration **C2**

Any modification to parameter map **C1** or **C2** does not change the default factory values.
It is possible to change parameter map between **C1** and **C2** by using a digital input or a button properly configurated (**ixF** or **LG2=CC**).
It is possible to restore factory defaults values for both **C1** or **C2** parameters map by using **UP2=LdC** (Load default configuration) function.

NOTES:
- If controller is using **C1** parameter map, the factory default configuration **C1** will be reloaded overwriting **C1** parameter map. The same for parameter map **C2**.
- The factory default configurations are read only (it is not possible to modify them on the field).

19 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

19.1 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 internal buzzer can be muted by pressing any key if parameter **tbA=Y**.

20 TECHNICAL DATA

Housing: self extinguishing PC/PC+ABS
Case: frontal 38x80 mm; depth 62mm
Mounting: panel mounting device in a 71x29mm panel cut-out
Protection: NEMA - UL 50e**: Indoor use only, type 1 enclosure**
IEC 60529: Front panel: IP65; **Rear housing:** IP00
Connections: Screw terminal block ≤ 2.5 mm² wiring.
Power supply: according to the model 230Vac ±10%, 50/60Hz; 110Vac ±10%, 50/60Hz
Overvoltage Category: III
Power absorption: 3VA max
Rated impulse voltage: 4000V
Display: 3 digits, red LED, 19.0 mm high
Buzzer: optional
Software class: A
Terminal blocks/Terminal Connections: Plug-in or screw terminal block, wire section between 1 and 2,5 mm²
Max tightening force: 0.5 N*m for 5,0mm pitch
Data storing: on the non-volatile memory (EEPROM)
Real time clock: data maintenance up to 6 months with lithium battery
Type of action: 1B
Pollution Degree: 3
Ambient operating temperature: 0T60°C (ENEC) / -20T60°C (UL)
Shipping and storage temperature: -25T60°C
Inputs: Up to 4 NTC, PTC or PT1000 probes.
Digital input: up to 2 free voltage contact
HOT-KEY inputs: MAX voltage allowed is 3.3VDC. DO NOT CONNECT ANY EXTERNAL POWER SUPPLY.
Relay outputs: Compressor SPST 16(5)A, 250VAC;
oA2: SPDT 8(2)A, 250VAC;
oA3: SPST 8(3)A, 250VAC;
oA4: SPST 5(2)A, 250VAC
Relative humidity: 20÷85% (no condensing)
Measuring and regulation range: NTC -40 to 110°C (-40 to 230°F)
PTC -55 to 150°C (-67 to 302°F)
PT1000 -100 to 200°C (-148 to 392°F)
Resolution: 0,1 °C or 1°C or 1 °F (selectable)
Accuracy (ambient temp. 25°C): ±0.7°C ±1 digit
Purpose of control: operating control
Construction of control: incorporated control, intended to be used in Class I or Class II equipment

Measuring and regulation range:
NTC -40 to 110°C (-40 to 230°F)
PTC -55 to 150°C (-67 to 302°F)
PT1000 -100 to 200°C (-148 to 392°F)
Resolution: 0.1°C or 1°C (selectable)
Accuracy (ambient temp. 25°C):
NTC or PTC: ±0.1°C ±1 digit
PT1000: ±0.1°C ±1 digit for probes Pb1, Pb2 and Pb3; ±1.0°C ±1 digit for probe Pb4

20.1 STANDARDS

20.1.1 THE XR70CHC IS COMPLIANT WITH THE FOLLOWING STANDARDS

ETSI EN 300 328 V2.1.1 (2016-11)
ETSI EN 301 489-17 V3.1.1 (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.

It therefore meets the essential requirements of the following Directives:
Radio equipment Directive 2014/53/EU
Electromagnetic compatibility 2004/108/EC
Low Voltage equipment 2006/95/EC

20.1.2 THE XR70CHC IS COMPLIANT WITH THE FOLLOWING STANDARDS

FCC 15.247

20.1.3 THE XR70CHC IS COMPLIANT TO PART 15 OF THE FCC RULE

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."

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.

20.1.4 THE XR70CHC IS COMPLIANT TO RSS 102

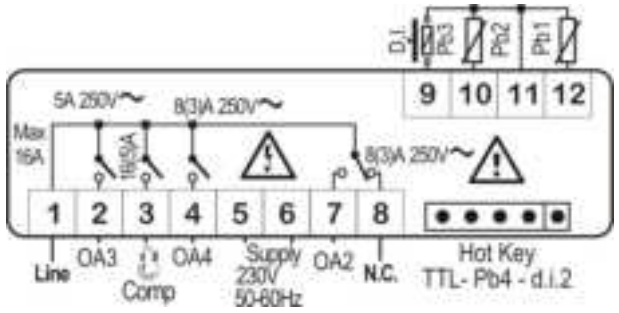
This device complies with Industry Canada RSS-210. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

20.1.5 CET XR70CHC INSTRUMENT REPOND AUX NORMES RSS 102

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio RSS-210. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

21 WIRINGS

21.1 XR70CHC, 16+8+8+5A



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

22 BLUETOOTH COMMUNICATION

The controller implements a Bluetooth 4.2 communication module. This gives the possibility to communicate with external devices (for example with a mobile APP able to recognize and decode the device). All controllers use a unique MAC-ADDRESS, which is used both for identification and communication. The communication range is about 5 m (worst case, indoor coverage in presence of obstacles). Over this distance it is possible to suffer interruptions in the communication or quality degradation of the communication. A 6-digit pairing secure code can be required for connection. Please follow the Copeland Connected APP instruction for more information.

22.1 FIRST INSTALLATION

After installation, it will be possible to manage the controller by using the Copeland Connected APP. Il will be required to:
- Install the Copeland Connected APP on your mobile device (smartphone or tablet)
- Create a new user account before using the APP

The owner is the only account that can:
- Manage the controller via Bluetooth
- Extend rights of access to a specific appliance also to other users

A Cloud portal will be used for:
- Extend rights of access to a specific appliance also 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 Device List page and follow the "Cloud management" link. Please note that the login and password for the Cloud webpage are the same of the mobile APP.

22.2 RESET TO FACTORY DEFAULT

In case a factory reset is required, please follow these operations:
- Access to the Cloud webpage and select the appliance you want to reset (search for name and/or 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
- Select the par. **rLi** (reset device whitelist)
- Select "Y" and confirm with SET button
- Exit from the programming menu
- Logout and login from the mobile APP

After this, the controller will be reset to factory default configuration and it will be ready for a new association.

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