Digital controller for variable speed compressors
XRi77CX

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1. GENERAL WARNING

1.1 PLEASE READ BEFORE USING THIS MANUAL

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

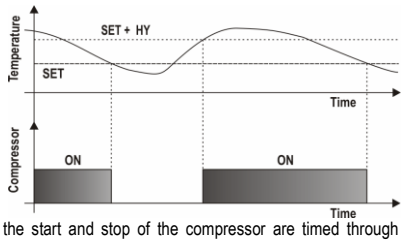
2. GENERAL DESCRIPTION

Model **XRi77CX**, format 32x74mm, is microprocessor based controller, suitable for applications on medium or low temperature ventilated refrigerating units. It has four relay outputs to control compressor, fan, defrost, which can be either electrical or reverse cycle (hot gas) and light (configurable). It could be provided with a Real Time Clock which allows programming of up to six daily defrost cycles, divided into holidays and workdays. A "Day and Night" function with two different set points is fitted for energy saving. It is also provided with up to four NTC probe inputs. The first probe is used for temperature control. The second probe is used to control the defrost termination temperature at the evaporator. One of the two digital inputs can operate as third temperature probe. The fourth probe is used to control the condenser temperature (for condenser alarm management) or to display a temperature.
The RS485 serial output allows connecting the unit to a network line (**ModBUS-RTU** compatible) such as any **dixell** monitoring units of X-WEB family. The HOT-KEY receptacle allows programming the controller by using an HOTKEY programming device.
The instrument is fully configurable through special parameters that can be easily programmed through the frontal keyboard.

3. CONTROLLING LOADS

3.1 COMPRESSOR

The regulation is performed according to the temperature measured by the thermostat probe with a positive differential (**HY**) over the set point: if the temperature increases and reaches set point plus differential, the compressor will start. It will turn off as soon as the temperature reaches the set point value again.



In case of fault in the thermostat probe the start and stop of the compressor are timed through parameters **Con** and **CoF**.

3.2 DEFROST

Two defrost modes are available through the **tdF** parameter: defrost through electrical heater (**tdF=EL**) and hot gas defrost (**tdF=in**).
The defrost interval depends on the presence of the RTC (optional). The internal RTC is controlled by means of the **EdF** parameter:
- **EdF=in:** the defrost is made every **idF** time – standard way for controller without RTC.
- **EdF=rtC:** the defrost is real time controlled, depending on the hours set in the parameters **Ld1...Ld6** (for workdays).

Other parameters are used to control defrosting cycles: the maximum length (**MdF**) and defrosting modes: timed or controlled by the evaporator's probe (**P2P**).

At the end of defrost dripping time is started, its length is set in the **Fdt** parameter. With **Fdt=0** the dripping time is disabled.

3.3 CONTROL OF EVAPORATOR FANS

The fan control mode is selected by means of the **FnC** parameter:
FnC=C_n, fans will switch ON and OFF with the compressor and **not run** during defrost.
FnC=o_n, fans will run even if the compressor is off, and not run during defrost.

After defrost, there is a timed fan delay allowing for drip time, set by means of the **Fnd** parameter.
FnC=C_Y, fans will switch ON and OFF with the compressor and **run** during defrost.
FnC=o_Y, fans will run continuously also during defrost.

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

3.3.1 FORCED ACTIVATION OF FANS

This function managed by the **FCt** parameter is designed to avoid short cycles of fans, that could happen when the controller is switched on or after a defrost, when the room air warms the evaporator. **How it works:** if the temperature difference between evaporator probe and room probe is higher than the **FCt** parameter value, fans will be switched on. With **FCt=0** the function is disabled.

3.3.2 CYCLIC ACTIVATION OF THE FANS WITH COMPRESSOR OFF

When **FnC=C-n** or **C-Y** (fans working in parallel with the compressor), by means of the **Fon** and **FoF** parameters the fans can carry out on and off cycles even if the compressor is switched off. When the compressor is stopped the fans go on working for the **Fon** time. With **Fon=0** the fans remain always off, also when the compressor is off.

3.4 RELAY CONFIGURATION (PAR. OA0, oA1, oA2, oA3)

The functioning of the configurable relays (terminals 1-2 and 1-7-8) can be set by the **oA1** and **oA2** parameters, according to the kind of application. In the following paragraph the possible setting:

3.4.1 LIGHT RELAY

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

3.4.2 AUXILIARY RELAY

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.

3.4.3 ON/OFF RELAY (OAX = ONF)

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

3.4.4 NEUTRAL ZONE REGULATION

With **oAx=db** the related relay can control a heater element to perform a neutral zone action.
- **oAx** cut in = **SET-HY**
- **oAx** cut out = **SET**

3.4.5 ALARM RELAY

With **oAx=Alr** the related 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.

3.4.6 SECOND COMPRESSOR

If **oAx=CP2**, it will work as second compressor output. The anti-short cycle parameter **AC1** gives the possibility to desynchronize the compressor activations.

3.4.7 SECOND DEFROST OUTPUT

If **oAx=dF2**, it will work as second defrost output.
NOTE: It is also possible to manage 2 different and independent defrost by using special parameter map. Please refer to Dixell to activate this function.

3.4.8 NIGHT BLIND MANAGEMENT DURING ENERGY SAVING CYCLES

With **oAx=HES,** the related relay operates to manage the night blind: the relay is energised when the energy saving cycle is activated by digital input or frontal button.

3.4.9 HEATER FOR WATER DRIPPING

If **oAx=Het**, the related output will work as heater for water dripping during and after any defrost.

3.4.10 REGULATION OUTPUT

If **oAx=inV**, the related output will work as regulation output and will stay active as soon as the regulation request is running.

4. VARIABLE SPEED COMPRESSOR CONTROL

The controller is able to drive variable speed compressor with frequency control input. The HOTKEY port is able to issue a frequency signal from 30 to 200Hz, duty cycle=50%. A special cable (CAB/HK-VNEK) is used to connect the frequency output of the controller to the frequency input of the compressor. One of the available relays can be set as **oAx=inV** in order to control the condenser fan. In this case the fans will be activated only when the regulation is running.
NOTE: in case of using an inverter compressor, it must be controlled ONLY from the frequency output. **DO NOT USE ANY RELAY TO CONTROL THE COMPRESSOR POWER SUPPLY**.

4.1 CABLE FOR FREQUENCY OUTPUT

CAB/HK-VNEK		The wiring polarity follows: GRAY → GND (-) PINK → FREQ (+)

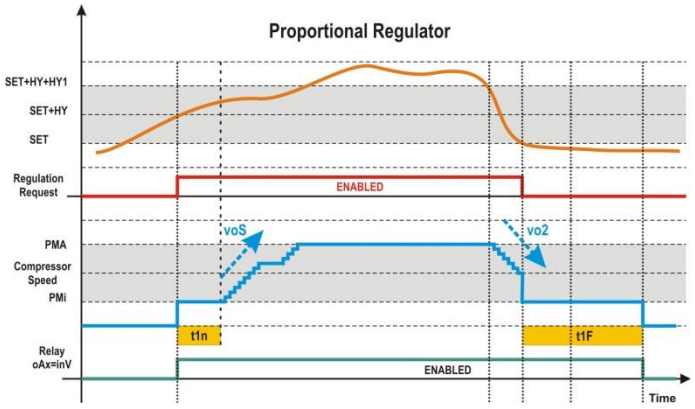
4.2 PARAMETERS

The following parameters are used to set the regulation:

HY1	**Differential for proportional band:** (0.1 to 25.5°C; 1 to 45°F)
PMi	**Lower speed limit (in percentage):** (0 to PMA)
PMA	**Upper speed limit (in percentage):** (Pmi to 100%)
voS	**Speed variation when temperature increases:** (1 to 100 Hz/min)

vo2	**Speed variation when temperature decreases:** (0 to 100 Hz/min)
t1n	**Interval of time with speed fixed to Pmi after start-up:** (0 to 999 min)
t1F	**Interval of time with speed fixed to Pmi before stopping regulation:** (0 to 999 min)
tC2	**Interval of time to control temperature deadlocks:** (1 to 255 min)
SPi	**Speed in case of probe error:** (Pmi to PMA)

The value of the par **HY1** can normally be set to the same value of par. **HY**. In this way, the regulation band will be extended from **SET** to **SET+HY+HY1**. The device will activate the regulation when the measured temperature will go over the **SET+HY** value and will stop the regulation when the temperature will reach the **SET** value. When the regulation is running, the frequency output, and then the compressor speed, will be calculated in proportional way by using the **Pmi…PMA** band. After reaching the **SET+HY** value, the controller will start increasing the frequency output, and then the equivalent compressor speed, by using the par. **voS**. The speed increasing will be stopped as soon as the proportional calculated value (for the compressor speed) hooks the requested value. In case of temperature decrement and compressor speed higher than the new requested value, the controller will decrease the compressor speed proportionally by using the **vo2** value.
At start-up and after reaching the **SET** value, it is possible to force the compressor speed to **Pmi** for two different intervals of time defined from par. **t1n** and **t1F**.
I case of regulation probe error, the compressor speed will be set to the value of par. **Spi**.



4.3 TEMPERATURE DEADLOCK CONTROL

The controller is able to detect temperature deadlocks. If the actual speed is not able to reach the SETPOINT, and if this condition lasts more than the **tC2** interval of time, then the controller will increment the actual speed of a fixed value of 10%. The new compressor speed will stay unchanged till reaching the SETPOINT or until another interval of time equal to **tC2** will expire.

4.4 HOT GAS DEFROST

In case of using hot-gas defrost, it will be possible to set the compressor speed by using par. **Aod**.

5. PULL DOWN

An automatic function named PULL DOWN is implemented. This function forces the controller to work at **PMA** until reaching a specific SETPOINT (par. **CCS**) for a maximum interval of time (par. **CCt**). The PULL DOWN function is activated:

- At start-up if the temperature measured from the regulation probe is higher than the SETPOINT
- After any defrost
- If the temperature measured from regulation probe go over the **SET+HY+HY1+oHt** value.

If one of the above conditions happens, the controller will maintain the maximum compressor speed (**PMA**) until reaching the **CCS** setpoint. The maximum interval of time for any PULLDOWN is defined from par. **CCt**. At the end of any PULL DOWN it is possible to set a couple of intervals (par. **tAP**) with predefined compressor speed (par. **tP1** and **tP2**).

6. DUAL MAP FEATURE

The controller is programmed with 2 different parameter maps. In this way, it is possible to choose the right map to meet both LT and NT applications. There are two different way to do this:

- If **i1F=nt**, it will be possible to change the working map by using the digital input.
- By using the **DOWN** button: it is set to work as map changing function button. Only press it for 3 sec to activate its function.

7. FRONT PANEL COMMANDS

SET	To display target set point; in programming mode it selects a parameter or confirm an operation.
❄	(**DEF**) To start a manual defrost.
∧	(**UP**) To see the used parameter map. When in programming mode, it browses the parameter codes or increases the displayed value.
∨	(**DOWN**) To see the used parameter map. When in programming mode, it browses the parameter codes or decreases the displayed value. Keep it pressed 5 sec to change parameter map (from "nt" to "Lt" and vice-versa).
⏻	To switch the instrument on and off (when **onF=oFF**).
💡	To switch on and off the light (when **oAx=LiG**).

KEY COMBINATIONS:

∧ + ∨	To lock & unlock the keyboard**.**
SET + ∨	To enter in programming mode.
SET + ∧	To return to the room temperature display.

7.1 USE OF LEDS

Each LED function is described in the following table.

LED	MODE	FUNCTION
❄	ON	Compressor enabled
	Flashing	Anti-short cycle delay enabled
❄	ON	Defrost enabled
	Flashing	Drip time in progress
🌀	ON	Fans enabled
	Flashing	Fans delay after defrost in progress.
🔔	ON	An alarm is occurring
❄	ON	A PULL DOWN is running
	ON	Energy saving enabled
💡	ON	Light on
AUX	ON	Auxiliary relay on
°C,°F	ON	Measurement unit
	Flashing	Programming phase

8. MAX & MIN TEMPERATURE MEMORIZATION

8.1 HOW TO: SEE THE MIN TEMPERATURE

1. Press and release the **DOWN** button.
2. The "**Lo**" message will be displayed followed by the minimum temperature recorded.
3. By pressing the **DOWN** button again or waiting for 5 sec the normal display will be restored.

8.2 HOW TO: SEE THE MAX TEMPERATURE

1. Press and release the **UP** button.
2. The "**Hi**" message will be displayed followed by the maximum temperature recorded.
3. By pressing the **UP** button again or waiting for 5 sec the normal display will be restored.

8.3 HOW TO: RESET THE MAX AND MIN TEMPERATURE RECORDED

1. Keep **SET** button pressed for more than 3 sec while the max or min temperature is displayed. ("**rSt**" message will be displayed)
2. After confirming the operation, the "**rSt**" message will start blinking and then the normal temperature will be displayed.

9. MAIN FUNCTIONS

9.1 TO SET THE CURRENT TIME AND DAY (ONLY WITH RTC)

When the instrument is switched on, it's necessary to program the time and day.

1. Enter the Pr1 programming menu, by pushing the **SET+DOWN** keys for 3 sec.
2. The **rtC** parameter is displayed. Push the **SET** key to enter the real time clock menu.
3. The **Hur** (hour) parameter is displayed.
4. Push the **SET** and set current hour by the **UP** and **DOWN** keys, then push **SET** to confirm the value.
5. Repeat the same operations with **Min** (minutes) and **dAy** (day) parameters.

To exit: Push both **SET+UP** keys or wait for 15 sec without pushing any keys.

9.2 HOW TO: SEE THE SET POINT

1. Push and immediately release the **SET** key: the display will show the Set point value;
2. Push and immediately release the **SET** key or wait for 5 sec to display the probe value again.

9.3 HOW TO: CHANGE THE SET POINT

1. Push the **SET** button for more than 2 sec to change the Set point value.
2. The value of the set point will be displayed and the **°C** or **°F** LED will start blinking.
3. To change the actual value, push the **UP** or **DOWN** buttons within 10 sec.
4. To memorise the new set point value, push the **SET** button again or wait for 10 sec.

9.4 HOW TO: START A MANUAL DEFROST

Push the **DEF** button for more than 2 sec and a manual defrost will start.

9.5 HOW TO: 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 (the **°C** or **°F** LED will start blinking).
2. Select the required parameter. Press the **SET** button to display its actual value.
3. Use **UP** or **DOWN** buttons to change its value.

4. Press **SET** button to store the new value and move to the following parameter.

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

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

9.6 THE HIDDEN MENU

The hidden menu includes all the parameters of the instrument.

9.6.1 HOW TO: ENTER THE HIDDEN MENU

1. Enter the Programming mode by pressing the **SET+DOWN** buttons for 3 sec (the **°C** or **°F** LED will start blinking).
2. Released the buttons and then push again the **SET+DOWN** buttons for more than 7 sec. The Pr2 label will be displayed immediately followed from the **HY** parameter.
   Now it is possible to browse the hidden menu.
3. Select the required parameter.
4. Press the **SET** button 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+DOWN** or wait for 15 sec without pressing any key.

NOTE1: if no parameter is present in Pr1 menu, after 3 sec the "**noP**" message will be displayed. Keep the buttons pushed till the Pr2 message will be displayed.

NOTE2: the set value is stored even when the procedure is exited by waiting for the time-out to expire

9.6.2 HOW TO: MOVE A PARAMETER FROM THE HIDDEN MENU TO THE FIRST LEVEL AND VICEVERSA.

Each parameter present in the hidden menu (Pr2) can be moved into the user level (Pr1) by pressing **SET+DOWN** buttons. If a parameter is part of the user level, when showed in the hidden menu the decimal point will be lit.

9.7 HOW TO: LOCK THE KEYBOARD

1. Keep both **UP** and **DOWN** buttons pressed for more than 3 sec.
2. The "**PoF**" message will be displayed and the keyboard will be locked. At this point it will be possible only to see the set point or the MAX o Min temperature stored
3. If a button is pressed more than 3 sec the "**PoF**" message will be displayed.

9.8 HOW TO: UNLOCK THE KEYBOARD

Keep both **UP** and **DOWN** pressed more than 3 sec till the **"Pon"** message will be displayed.

9.9 THE ON/OFF FUNCTION

When **onF=oFF**, pushing the **ON/OFF** key, the instrument is switched off. The "OFF" message is displayed. In this configuration, the regulation is disabled.
To switch the instrument on, push again the **ON/OFF** key.

WARNING: Loads connected to the normally closed contacts of the relays are always supplied and under voltage, even if the instrument is in stand-by mode.

10. PARAMETERS

rtC	**Real time clock menu (only for controller with RTC):** to set the time and date and defrost start time.

REGULATION

HY	**Differential:** (0.1 to 25.5°C; 1 to 45°F) differential for set point. Compressor Cut IN is Set Point + differential (**HY**). Compressor Cut OUT is when the temperature reaches the set point.
LS	**Minimum set point:** (-100°C to SET; -148°F to SET) sets the minimum value for the set point.
US	**Maximum set point:** (SET to 150°C; SET to 302°F) set the maximum value for set point.
Ot	**Thermostat probe calibration:** (-12.0 to 12.0°C; -21 to 21°F) allows to adjust possible offset of the thermostat probe.
P2P	**Evaporator probe presence:** (n; Y) **n** = not present, the defrost stops by time; **Y** = present, the defrost stops by temperature.
oE	**Evaporator probe calibration:** (-12.0 to 12.0°C; -21 to 21°F) allows to adjust possible offset of the evaporator probe.
P3P	**Third probe presence (P3):** (n; Y) **n** = not present, the terminals 18-20 operate as digital input; **Y** = present, the terminals 18-20 operate as third probe.
O3	**Third probe calibration (P3):** (-12.0 to 12.0°C; -21 to 21°F) allows to adjust possible offset of the third probe.
P4P	**Fourth probe presence (P4):** (n; Y) **n** = not present; **Y** = present
O4	**Fourth probe calibration (P4):** (-12.0 to 12.0°C; -21 to 21°F) allows to adjust possible offset of the fourth probe
odS	**Outputs activation delay at start up:** (0 to 255min) this function is enabled at the initial start-up of the instrument and inhibits any output activation for the period of time set in the parameter.
AC	**Anti-short cycle delay:** (0 to 50min) minimum interval between the compressor stop and the following restart.
AC1	**Anti-short cycle delay for second compressor:** (0 to 50min) minimum interval between the second compressor stop and the following restart.
rtr	**Percentage of the second and first probe for regulation:** (0 to 100; 100=P1, 0=P2) it allows to set the regulation according to the percentage of the first and second probe, as for the following formula (**rtr**(P1-P2)/100 + P2).
CCt	**PULL DOWN time:** (0.0 to 24h00min, res. 10min) allows setting the length of the PULL DOWN cycle. Compressor stays on without interruption during **CCt** time. This is useful, for instance, when the room is filled with new products.
CCS	**PULL DOWN differential:** (-12 to 12°C; -21 to 21°F) relative value to add to the regulation SETPOINT and to use during any PULL DOWN cycle.
oHt	**Differential for PULL DOWN activation:** (0.0 to 25.5°C; 0 to 45°F) upper threshold for auto activation of a PULL DOWN
Con	**Compressor ON time with faulty probe:** (0 to 255min) time during which the compressor is active in case of faulty thermostat probe. With **Con=0** compressor is always OFF.
CoF	**Compressor OFF time with faulty probe:** (0 to 255min) time during which the compressor is OFF in case of faulty thermostat probe. With **CoF=0** compressor is always active.

VARIABLE SPEED COMPRESSOR CONTROL

HY1	**Differential for proportional band:** (0.1 to 25.5°C; 1 to 45°F)
tAP	**Interval of time with fixed speed after PULL DOWN:** (0 to 999 min)
Pmi	**Lower speed limit (in percentage):** (0 to PMA)
PMA	**Upper speed limit (in percentage):** (Pmi to 100%)
voS	**Speed variation when temperature increases:** (1 to 100 Hz/min, StP) **StP** = means that inverter speed is adapted immediately on temperature variation
vo2	**Speed variation when temperature decreases:** (1 to 100 Hz/min, StP, nu) **StP** = means that inverter speed is adapted immediately on temperature variation; **nu** = speed decrement disabled
t1n	**Interval of time with speed fixed to Pmi after start-up:** (0 to 999 min)
t1F	**Interval of time with speed fixed to Pmi before stopping regulation:** (0 to 999 min)
tP1	**First interval of time (tAP) with speed fixed after PULL DOWN:** (Pmi to PMA)
tP2	**Second interval of time (tAP) with speed fixed after PULL DOWN:** (Pmi to PMA)
tC2	**Interval of time to control temperature deadlocks:** (1 to 255 min)
Spi	**Speed in case of probe error:** (Pmi to PMA)
Aod	**Speed during defrost (used in case of hot gas defrost):** (Pmi to PMA)

DISPLAY

CF	**Temperature measurement unit:** (°C; °F) **°C** = Celsius; **°F** = Fahrenheit. **WARNING:** When the measurement unit is changed the SET point and the values of the parameters **HY**, **LS**, **US**, **ot**, **ALU** and **ALL** have to be checked and modified (if necessary).
rES	**Resolution (for °C):** (in=1°C; dE=0.1°C) allows decimal point display.
Lod	**Instrument display:** (P1; P2, P3, P4, SET, dtr) it selects which probe is displayed by the instrument. **P1** = Thermostat probe; **P2** = Evaporator probe; **P3** = Third probe (only for model with this option enabled); **P4** = Fourth probe, **SET** = set point; **dtr** = percentage of visualization.
dLY	**Display delay:** (0 to 20min00s; res. 10 sec) when the temperature increases, the display is updated of 1°C or 1°F after this time.
Dtr	**Percentage of the second and first probe for visualization when Lod=dtr:** (0 to 99; 100=P1, 0=P2) if **Lod=dtr** it allows to set the visualization according to the percentage of the first and second probe, as for the following formula (**dtr**(P1-P2)/100 + P2).

DEFROST

EdF	**Defrost mode (only for controller with RTC):** - **rtC: Real Time Clock mode**. Defrost time follows **dd1...dd6** and **Ld1…Ld6** parameters on working days. - **in**: **interval mode**. The defrost starts when the time **idF** is expired.
tdF	**Defrost type:** (EL; in) **EL** = electrical heater; **in** = hot gas.
dFP	**Probe selection for defrost termination:** (nP; P1; P2; P3; P4) **nP** = no probe; **P1** =thermostat probe; **P2** = evaporator probe; **P3** =configurable probe; **P4** = Probe on Hot Key plug.
dtE	**Defrost termination temperature:** (-55 to 50°C; -67 to 122°F) (enabled only when **EdF=Pb**) sets the temperature measured by the evaporator probe, which causes the end of defrost.
idF	**Interval between defrost cycles:** (0 to 120 hours) determines the interval of time between two defrost cycles.
MdF	**(Maximum) length for defrost:** (0 to 255min) when **P2P=n**, (not evaporator probe: timed defrost) it sets the defrost duration. When **P2P=Y** (defrost end based on temperature) it sets the maximum length for defrost.
dSd	**Start defrost delay:** (0 to 99min) this is useful when different defrost start times are necessary to avoid overloading the plant.
StC	**Compressor stop before starting any defrost:** (0 to 30 min) is used stop the compressor when the defrost is managed for inversion (hot-gas).
dFd	**Temperature displayed during defrost:** (rt; it; Set; dEF) **rt** = real temperature; **it** = temperature at defrost start; **Set** = set point; **dEF** = "**dEF**" label.
dAd	**MAX display delay after defrost:** (0 to 255min) sets the maximum time between the end of defrost and the restarting of the real room temperature display.
Fdt	**Drip time:** (0 to 120min) time interval between reaching defrost termination temperature and the restoring of the control's normal operation. This time allows the evaporator to eliminate water drops that might have formed due to defrost.
Hon	**Heating elements on after dripping phase:** (0.0 to 24h00min, res. 10 min) the heating elements stay on for this time after finishing the dripping phase.
dPo	**First defrost after start-up:** (n; Y) **n** = after the **idF** time or following RTC, **Y** = immediately.
dAF	**Delay before activating the defrost output (used only if tdF=in):** (0 to StC) used to delay the activation of the defrost output.

FANS

FnC	**Fans operating mode:** (C-n; o-n; C-Y; o-Y) **C-n** = runs with the compressor, OFF during defrost; **o-n** = continuous mode, OFF during defrost; **C-Y** = runs with the compressor, ON during defrost; **o-Y** = continuous mode, ON during defrost.
Fnd	**Fans delay after defrost:** (0 to 255min) interval between the end of a defrost and the next evaporator fans start.
FCt	**Temperature differential to avoid fan short cycles:** (0 to 59°C; 0 to 90°F) (N.B.: **FCt=0** means function disabled) if the difference of temperature between the evaporator and the room probes is higher than **FCt** value, the fans will be switched on.
FSt	**Fans stop temperature:** (-50 to 50°C; -55 to 122°F) setting of temperature, detected by evaporator probe, above which fans are always OFF.
Fon	**Fan ON time:** (0 to 15min) with **Fnc=C_n** or **C_Y**, (fan activated in parallel with compressor) it sets the evaporator fan ON cycling time when the compressor is off. With **Fon=0** and **FoF≠0** the fan are always off, with **Fon=0** and **FoF=0** the fan are always off.

FoF	**Fan OFF time:** (0 to 15min) With **FnC=C_n** or **C_Y**, (fan activated in parallel with compressor) it sets the evaporator fan off cycling time when the compressor is off. With **Fon=0** and **FoF≠0** the fan are always off, with **Fon=0** and **FoF=0** the fan are always off.
FAP	**Probe selection for fan management:** (nP; P1; P2; P3; P4) **nP** = no probe; **P1** =thermostat probe; **P2** = evaporator probe; **P3** =configurable probe; **P4** = Probe on Hot Key plug.

ALARMS

ALP	**Probe selection for alarm:** (nP; P1; P2; P3; P4) **nP** = no probe, the temperature alarms are disabled; **P1** = Probe 1 (Thermostat probe); **P2** = Probe 2 (evaporator probe); **P3** = Probe 3 (display probe); **P4** = Fourth probe.
ALC	**Temperature alarms configuration:** (Ab; rE) **Ab** = absolute temperature, alarm temperature is given by the **ALL** or **ALU** values. **rE** = temperature alarms are referred to the set point. Temperature alarm is enabled when the temperature exceeds the [**SET+ALU**] or [**SET-ALL**] values.
ALU	**MAXIMUM temperature alarm:** • 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] when this temperature is reached the alarm is enabled, after the **AId** delay time.
ALL	**Minimum temperature alarm:** • If **ALC=Ab**: [-100°C to ALU; -148 to ALU] • If **ALC=rE**: [0.0 to 50.0°C or 0 to 90°F] when this temperature is reached the alarm is enabled, after the **AId** delay time.
AFH	**Differential for temperature alarm recovery:** (0.1 to 25.5°C; 1 to 45°F) intervention differential for recovery of temperature alarm.
AId	**Temperature alarm delay:** (0 to 255 min) time interval between the detection of an alarm condition and alarm signalling.
dAo	**Exclusion of temperature alarm at start-up:** (0.0 to 24h00min, res. 10min) time interval between the detection of the temperature alarm condition after instrument power on and alarm signalling.

CONFIGURABLE RELAYS

oA0	**Relay 1 configuration (7-8):** (dEF; Fan; Alr; LiG; AUS; onF; db; CP2; dEF2; HES; Het; inV, CMP, nu) **dEF** = defrost; **Fan** = do not select it; **Alr** = alarm; **LiG** = light; **AUS** = Auxiliary relay; **onF** = always on with instrument on; **db** = neutral zone; **CP2** = second compressor output; **dF2** = do not select it; **HES** = night blind; **Het** = heater output; **inV** = inverter compressor; **CMP** = ONOFF compressor; **nu**=not used.
oA1	**Relay 2 configuration (4-5-6):** (dEF; Fan; Alr; LiG; AUS; onF; db; CP2; dEF2; HES; Het; inV, CMP, nu) **dEF** = defrost; **Fan** = do not select it; **Alr** = alarm; **LiG** = light; **AUS** = Auxiliary relay; **onF** = always on with instrument on; **db** = neutral zone; **CP2** = second compressor output; **dF2** = do not select it; **HES** = night blind; **Het** = heater output; **inV** = inverter compressor; **CMP** = ONOFF compressor; **nu**=not used.
oA2	**Relay 3 configuration (8-9):** (dEF; Fan; Alr; LiG; AUS; onF; db; CP2; dEF2; HES; Het; inV, CMP, nu) **dEF** = defrost; **Fan** = do not select it; **Alr** = alarm; **LiG** = light; **AUS** = Auxiliary relay; **onF** = always on with instrument on; **db** = neutral zone; **CP2** = second compressor output; **dF2** = do not select it; **HES** = night blind; **Het** = heater output; **inV** = inverter compressor; **CMP** = ONOFF compressor; **nu**=not used.
oA3	**Relay 4 configuration (10-11-12):** (dEF; Fan; Alr; LiG; AUS; onF; db; CP2; dEF2; HES; Het; inV, CMP, nu) **dEF** = defrost; **Fan** = do not select it; **Alr** = alarm; **LiG** = light; **AUS** = Auxiliary relay; **onF** = always on with instrument on; **db** = neutral zone; **CP2** = second compressor output; **dF2** = do not select it; **HES** = night blind; **Het** = heater output; **inV** = inverter compressor; **CMP** = ONOFF compressor; **nu**=not used.
oAn	**Frequency output enabled:** (n;Y) **n** = 5-pin port is used for HOT-KEY; **Y** = 5-pin port is used as frequency output.

CONDENSER TEMPERATURE ALARM

AP2	**Probe selection for temperature alarm of condenser:** (nP; P1; P2; P3; P4) **nP** = no probe; **P1** = thermostat probe; **P2** = evaporator probe; **P3** = configurable probe; **P4** = Probe on Hot Key plug.
AL2	**Low temperature alarm of condenser:** (-100 to 150°C; -148 to 302°F) when this temperature is reached the **LA2** alarm is signalled, possibly after the Ad2 delay.
Au2	**High temperature alarm of condenser:** (-100 to 150°C; -148 to 302°F) when this temperature is reached the **HA2** alarm is signalled, possibly after the **Ad2** delay.
AH2	**Differential for temperature condenser alarm recovery:** 0.1 to 25.5°C; 1 to 45°F
Ad2	**Condenser temperature alarm delay:** (0 to 255 min) time interval between the detection of the condenser alarm condition and alarm signalling.
dA2	**Condenser temperature alarm exclusion at start up:** 0.0 to 24h00min, res. 10min.
bLL	**Compressor off with low temperature alarm of condenser:** (n; Y) **n** = compressor keeps on working; **Y** = compressor is switched off till the alarm is present, in any case regulation restarts after **AC** time at minimum.
AC2	**Compressor off with high temperature alarm of condenser:** (n; Y) **n** = compressor keeps on working; **Y** = compressor is switched off till the alarm is present, in any case regulation restarts after **AC** time at minimum.

DIGITAL INPUTS

i1P	**Digital input 1 polarity:** (oP; CL) **oP** = the digital input is activated by opening the contact; **CL** = the digital input is activated by closing the contact.
I1F	**Digital input 1 configuration:** (EAL; bAL; dor; dEF; ES; AUS; Htr; HdF; onF; nt) **EAL** = external alarm: "**EA**" message is displayed; **bAL** = serious alarm "**CA**" message is displayed; **dor** = door switch function; **dEF** = activation of a defrost cycle; **ES** = energy saving; **AUS** = auxiliary relay activation with **oAx=AUS**; **Htr** = type of inverting action (cooling or heating); **HdF** =do not set it; **onF** = to switch the controller off; **nt** = to change parameter map
i2P	**Digital input 2 input polarity:** (oP; CL) **oP** = the digital input is activated by opening the contact; **CL** = the digital input is activated by closing the contact.
I2F	**Digital input 2 configuration:** (EAL; bAL; dor; dEF; ES; AUS; Htr; HdF; onF; nt) **EAL** = external alarm: "**EA**" message is displayed; **bAL** = serious alarm "**CA**" message is displayed; **dor** = door switch function; **dEF** = activation of a defrost cycle; **ES** = energy saving; **AUS** = auxiliary relay activation with **oAx=AUS**; **Htr** = type of inverting action (cooling or heating); **HdF** =do not set it; **onF** = to switch the controller off; **nt** = to change parameter map
Did	**Digital input 1 alarm delay:** (0 to 255 min) delay between the detection of the external alarm condition and its signalling. When **i1F= PAL**, it is the interval of time to calculate the number of pressure switch activation.
D2d	**Digital input 2 alarm delay:** (0 to 255 min) delay between the detection of the external alarm condition and its signalling. When **i1F= PAL**, it is the interval of time to calculate the number of pressure switch activation.
nPS	**Number of external BAL alarms before stopping regulation:** (1 to 15) after **nPS** activations of the **ixF=BAL** digital input the regulation will be stopped.
odC	**Compressor status when open door:** (no; Fan; CPr; F_C) **no** = normal; **Fan** = normal; **CPr** = compressor OFF, **F_C** = compressor OFF.
Rrd	**Outputs restart after door open alarm:** (n; Y) **n** = outputs follow the **odC** parameter. **Y** = outputs restart with a door open alarm.
HES	**Delta temperature during an Energy Saving cycle:** (-30.0 to 30.0°C; -54 to 54°F) it sets the increasing value of the set point **[SET+HES]** during the Energy Saving cycle.

CURRENT TIME AND WEEKLY HOLIDAYS (ONLY FOR MODELS WITH RTC)

Hur	**Current hour:** 0 to 23h
Min	**Current minute:** 0 to 59min
dAY	**Current day:** Sun to Sat
Hd1	**First weekly holiday:** (Sun to Sat; nu) set the first day of the week which follows the holiday times.
Hd2	**Second weekly holiday:** (Sun to Sat; nu) set the second day of the week which follows the holiday times.

N.B. **Hd1,Hd2** can be set also as **"nu"** value (Not Used).

ENERGY SAVING TIMES (ONLY FOR MODELS WITH RTC)

iLE	**Energy Saving cycle start during workdays:** (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	**Energy Saving cycle length during workdays:** (0 to 24h00min) sets the duration of the Energy Saving cycle on workdays.
iSE	**Energy Saving cycle start on holidays:** 0 to 23h50min.
dSE	**Energy Saving cycle length on holidays:** 0 to 24h00min.

DEFROST TIMES (ONLY FOR MODELS WITH RTC)

dd1…dd6	**Daily defrost enabled:** (n; Y) to enable the **Ld1…Ld6** defrost operations for any day of the week.
Ld1…Ld6	**Workday defrost start:** (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.*

OTHER

Adr	**Serial address:** (1 to 247) identifies the instrument address when connected to a ModBUS compatible monitoring system.
PbC	**Probe type:** (ntC; PtC; Pt1) **ntC** = NTC probe; **PtC** = PTC probe; **Pt1** = PT1000 probe
dPC	**Function linked to the defrost button:** (AUS; dEF) AUS=to activate oAx=AUS output; dEF=to activate a manual defrost.
dP1	Thermostat probe display.
dP2	Evaporator probe display.
dP3	Third probe display.
SPd	Actual speed in Hz (read only)
rSE	Real set point: it shows the set point used during the energy saving cycle or during the continuous cycle.
rEL	Software release for internal use.
Ptb	Parameter table code: readable only.

11. DIGITAL INPUTS

The first digital input (terminals 18-20) is enabled with **P3P=n**.
With **P3P=n** and **i1F=i2F** the second digital input is disabled.
The free voltage digital inputs are programmable by the **i1F** and **i2F** parameters.

11.1 GENERIC ALARM (ixF = EAL)

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

11.2 SERIOUS ALARM MODE (ixF = bAL)

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

11.3 DOOR SWITCH INPUT (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 **doA**, the door alarm is enabled, the display shows the message **dA** and the regulation restarts is **rtr=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.

11.4 START DEFROST (ixF = dEF)

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

11.5 SWITCH THE AUXILIARY RELAY (ixF = AUS)

With **oA2=AUS** the digital input switched the status of the auxiliary relay.

11.6 INVERSION OF THE KIND OF ACTION: HEATING-COOLING (ixF = Htr)

This function allows inverting the regulation of the controller: from cooling to heating and viceversa.

11.7 ENERGY SAVING (ixF = ES)

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

11.8 ON OFF FUNCTION (ixF = onF)

To switch the controller on and off.

11.9 CHANGE PARAMETER MAP (ixF = nt)

To move from LT to NT parameter map.

11.10 DIGITAL INPUTS POLARITY

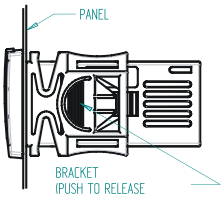
The digital input polarity depends on the **i1P** and **i2P** parameters.

- **i1P or i2P=CL**, the input is activated by closing the contact.
- **i1P or i2P=OP**, the input is activated by opening the contact.

12. RS485 SERIAL LINE – FOR MONITORING SYSTEMS

The RS485 serial line allows connecting the instrument to a monitoring system (**ModBUS-RTU** compatible) such as the X-WEB500/3000/300.

13. INSTALLATION AND MOUNTING



Instrument **XRi77CX** 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.

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 PROBE CONNECTION

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

15. HOW TO USE THE HOT KEY

To enable the HOT-KEY port (5-pin connector), set the par. **oAn=n**.

15.1 PROGRAM A HOT KEY FROM AN INSTRUMENT (UPLOAD)

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

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

15.2 PROGRAM AN INSTRUMENT BY USING A HOT KEY (DOWNLOAD)

1. Turn OFF the instrument.
2. Insert a **pre-programmed** "**HOT-KEY**" **into the 5-PIN receptacle** and then turn the Controller ON.
3. The parameter list of the "**HOT-KEY**" will be automatically downloaded into the Controller memory. The "**doL**" message will blink followed a by a flashing "**End**" label.
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 SIGNALS

Message	Cause	Outputs
P1	Room probe failure	Compressor output acc. to par. **Con** and **CoF**
P2	Evaporator probe failure	Defrost end is timed
P3	Third probe failure	Outputs unchanged
P4	Fourth probe failure	Outputs unchanged
HA	Maximum temperature alarm	Outputs unchanged.
LA	Minimum temperature alarm	Outputs unchanged.
HA2	Condenser high temperature	It depends on the **AC2** parameter
LA2	Condenser low temperature	It depends on the **bLL** parameter
dA	Door open	Compressor restarts
EA	External alarm	Output unchanged.
CA	Serious external alarm (**ixF=bAL**)	All outputs OFF.
rtC	Real time clock parameter error	Output unchanged. Defrost follows **idF**. Need to set RTC parameters.
rtF	Real time clock malfunctioning	Output unchanged. Defrost follows **idF**

16.1 SILENCING BUZZER / ALARM RELAY OUTPUT

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

16.2 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**" and "**LA**" automatically stop as soon as the temperature returns to normal values.
Alarms "**EA**" and "**CA**" (with **i2F=bAL**) recover as soon as the digital input is disabled.

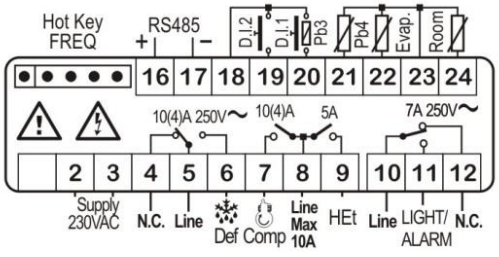
16.3 OTHER MESSAGES

Pon	Keyboard unlocked.
PoF	Keyboard locked
noP	**In programming mode**: no parameter present in Pr1. **On the display** or in dP2, dP3, dP4: the selected probe is not enabled.

17. TECHNICAL DATA

Housing: self-extinguishing ABS
Case: frontal 32x74mm; depth 60mm
Mounting: panel mounting in a 71x29mm panel cut-out
Protection: IP20
Frontal protection: IP65
Connections: Screw terminal block ≤ 2.5 mm^2 wiring
Power supply: (according to the model)
24Vac, ±10%
230Vac ±10%, 50/60Hz; 110Vac ±10%, 50/60Hz
Power absorption: 3VA max
Display: 3 digits, red LEDs, 14.2 mm high
Inputs: Up to 3 NTC probes
Digital inputs: free voltage contact
Frequency output: 30 to 200 Hz, 14Vdc MAX, duty cycle=50%
Relay outputs:
Compressor: SPST 16A 250Vac
Defrost: SPDT 8(3)A, 250Vac
Fan/Heater: SPST 5(2)A, 250Vac
Light/Compressor2: SPST 8(3)A 250Vac
Data storing: on the non-volatile memory (EEPROM)
Internal clock back-up: 24 hours
Kind of action: 1B; **Pollution degree:** 2; **Software class:** A
Rated impulsive voltage: 2500V; **Overvoltage Category:** II
Operating temperature: 0 to 55°C (32 to 131°F)
Storage temperature: -30 to 85°C (-22 to 185°F)
Relative humidity: 20 to 85% (no condensing)
Measuring and regulation range:
NTC probe: -40 to 110°C (-40 to 230°F)
PTC probe: -50 to 150°C (-55 to 302°F)
PT1000 probe: -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

18. WIRINGS



19. DEFAULT SETTING VALUES

Label	Name	Range	LT	NT	Level
Set	Set point	LS to US	-23°C	3.0°C	- - -
rtC[1]	Real time clock menu	-	-	-	Pr1
HY	Differential	[0.1 to 25.5°C] [1 to 255°F]	1.0°C	1.0°C	Pr1
LS	Minimum set point	[-100.0°C to SET] [-148°F to SET]	-25°C	0.0°C	Pr2
US	Maximum set point	[SET to 150.0°C] [SET to 302°F]	-20°C	4.0°C	Pr2
Ot	Thermostat probe calibration	[-12.0 to 12.0°C] [-21 to 21°F]	1.0°C	1.0°C	Pr1
P2P	Evaporator probe presence	n=not present; Y=pres.	n	n	Pr1
oE	Evaporator probe calibration	[-12.0 to 12.0°C] [-21 to 21°F]	0.0°C	0.0°C	Pr2
P3P	Third probe presence	n=not present; Y=pres.	n	n	Pr2

Label	Name	Range	LT	NT	Level
o3	Third probe calibration	[-12.0 to 12.0°C] [-21 to 21°F]	0.0°C	0.0°C	Pr2
P4P	Fourth probe presence	n=not present; Y=pres.	n	n	Pr2
o4	Fourth probe calibration	[-12.0 to 12.0°C] [-21 to 21°F]	0.0°C	0.0°C	Pr2
odS	Outputs delay at start up	0 to 255 min	1	1	Pr2
AC	Anti-short cycle delay	0 to 50 min	3	3	Pr1
AC1	Anti-short cycle delay for second compressor	0 to 50 min	3	3	Pr1
rtr	P1-P2 percentage for regulation	0 to 100 (100=P1 , 0=P2)	100	100	Pr2
CCt	PULL DOWN duration	0.0 to 24h 00min, res. 10min	0.0	0.0	Pr2
CCS	PULL DOWN differential	[-12.0 to 12.0°C] [-21 to 21°F]	-2.0°C	-1.0°C	Pr2
oHt	Threshold for PULL DOWN activation	0.0 to 25.5°C	10.0	10.0	Pr1
Con	Compressor ON time with faulty probe	0 to 255 min	30	10	Pr2
CoF	Compressor OFF time with faulty probe	0 to 255 min	5	25	Pr2
HY1	Differential for proportional band	[0.1 to 25.5°C] [1 to 45°F]	1.0	1.0	Pr1
tAP	Interval of time with fixed speed after PULL DOWN	0 to 999 min	10	10	Pr2
PMi	Lower speed limit (in percentage)	0 to PMA	20	20	Pr2
PMA	Upper speed limit (in percentage)	PMi to 100%	100	100	Pr2
voS	Speed variation when temperature increases	1 to 100 Hz, StP	2	2	Pr2
vo2	Speed variation when temperature decreases	1 to 100 Hz, StP, nu	nu	nu	Pr2
t1n	Interval of time with speed fixed to **PMi** after start-up	0 to 999 min	0	0	Pr2
t1F	Interval of time with speed fixed to **PMi** before stopping regulation	0 to 999 min	0	0	Pr2
tP1	First interval of time (**tAP**) with speed fixed after PULL DOWN	PMi to PMA	60	60	Pr2
tP2	Second interval of time (**tAP**) with speed fixed after PULL DOWN	PMi to PMA	30	30	Pr2
tC2	Interval of time to control temperature deadlocks	1 to 255 min	15	15	Pr2
SPi	Speed in case of probe error	PMi to PMA	80	80	Pr2
Aod	Speed during defrost (used in case of hot gas defrost)	PMi to PMA	80	80	Pr2
CF	Temperature measurement unit	°C; °F	°C	°C	Pr2
rES	Resolution (only for °C)	in=integer; dE= dec.point	in	in	Pr1
Lod	Probe displayed	P1; P2	P1	P1	Pr2
dLY	Display temperature delay	0.0 to 20min 00s, res. 10s	0.0	0.0	Pr2
dtr	P1-P2 percentage for display	1 to 99	99	99	Pr2
EdF[1]	Defrost control	rtC; in	in	in	Pr2
tdF	Defrost type	EL=el. heater; in= hot gas	in	in	Pr1
dFP	Probe selection for defrost termination	nP; P1; P2; P3; P4	P2	P2	Pr2
dtE	Defrost termination temperature	[-50.0 to 50.0°C] [-55 to 122°F]	4.0°C	20.0°C	Pr1
idF	Interval between defrost cycles	1 to 120 hours	72	72	Pr1
MdF	(Maximum) length for defrost	0 to 255 min	15	5	Pr1
dSd	Start defrost delay	0 to 255 min	0	0	Pr2
StC	Compressor stop before activating any defrost	0 to 30 min	5	1	Pr2
dFd	Displaying during defrost	rt, it, SEt, DEF	it	it	Pr2
dAd	MAX display delay after defrost	0 to 255 min	120	120	Pr2
Fdt	Draining time	0 to 120 min	5	2	Pr2
Hon	Heating elements on after dripping phase	0 to 24h 00min, res. 10min	0.0	0.0	Pr2
dPo	First defrost after start-up	n=after idF; Y=immediately	n	n	Pr2
dAF	Delay for defrost output activation	0 to StC	2.0	2.0	Pr2
FnC	Fan operating mode	C-n; o-n; C-Y; o-Y	o-n	o-n	Pr1
Fnd	Fan delay after defrost	0 to 255 min	0	0	Pr1
FCt	Temperature differential to avoid fan short cycles	0 to 59°C 0 to 90°F	0	0	Pr2
FSt	Fan stop temperature	[-50.0 to 50.0°C] [-55 to 122°F]	50°C	50°C	Pr1
Fon	Fan on time with compressor off	0 to 15 min	0	0	Pr2
FoF	Fan off time with compressor off	0 to 15 min	0	0	Pr2
FAP	Probe selection for fan management	nP; P1; P2; P3; P4	nP	nP	Pr2
ALP	Alarm probe selection	nP; P1; P2; P3; P4	P1	P1	Pr2
ALC	Temperature alarms configuration	rE= related to set; Ab = absolute	rE	rE	Pr2
ALU	MAXIMUM temperature alarm	[ALL to 150.0°C] [ALL to 302°F]	8.0°C	8.0°C	Pr1
ALL	Minimum temperature alarm	[-100.0°C to ALU] [-148°F to ALU]	7.0°C	7.0°C	Pr1
AFH	Differential for temperature alarm recovery	[0.1°C to 25.5°C] [1°F to 45°F]	1.0°C	1.0°C	Pr2
ALd	Temperature alarm delay	0 to 255 min	150	150	Pr2

Label	Name	Range	LT	NT	Level
dAo	Delay of temperature alarm at start up	0.0 to 24h00min, res. 10min	24.0	24.0	Pr2
AP2	Probe for temperature alarm of condenser	nP; P1; P2; P3; P4	P4	Pr2	
AL2	Condenser for low temperature alarm	[-100 to 150°C] [-148 to 302°F]	-40	Pr2	
AU2	Condenser for high temperature alarm	[-100 to 150°C] [-148 to 302°F]	110	Pr2	
AH2	Differential for condenser temperature alarm recovery	[0.1 to 25.5°C] [1 to 45°F]	5	Pr2	
Ad2	Condenser temperature alarm delay	0 to 254 min, 255(nu)	15	Pr2	
dA2	Delay of cond. temper. alarm at start up	0.0 to 24h00min, res. 10 min	1.3	Pr2	
bLL	Compressor off due to condenser low temperature alarm	n; Y	n	Pr2	
AC2	Compressor off due to condenser high temperature alarm	n; Y	n	Pr2	
oA0	Relay 1 configuration (7-8)	dEF; FAn; ALr; LiG; AUS; onF; db; CP2; dF2; HES; HEt; CMP, inV; nu	inV	inV	Pr2
oA1	Relay 2 configuration (4-5-6)	dEF; FAn; ALr; LiG; AUS; onF; db; CP2; dF2; HES; HEt; CMP, inV; nu	dEF	dEF	Pr2
oA2	Relay 3 configuration (8-9)	dEF; FAn; ALr; LiG; AUS; onF; db; CP2; dF2; HES; HEt; CMP, inV; nu	HEt	Het	Pr2
oA3	Relay 4 configuration (10-11-12)	dEF; FAn; ALr; LiG; AUS; onF; db; CP2; dF2; HES; HEt; CMP, inV; nu	LiG	LiG	Pr2
oAn	Frequency output enabled	n; Y	Y	Y	Pr2
i1P	Digital input polarity (18-20)	oP; CL	CL	CL	Pr1
i1F	Digital input 1 configuration	EAL; bAL; dor; dEF; ES; AUS; Htr; FAn; HdF; onF; nt	dor	dor	Pr1
i2P	Digital input polarity	oP; CL	CL	CL	Pr2
i2F	Digital input configuration	EAL; bAL; dor; dEF; ES; AUS; Htr; FAn; HdF; onF; nt	EAL	EAL	Pr2
did	Digital input 1 alarm delay	0 to 255 min	0	0	Pr1
d2d	Digital input 2 alarm delay	0 to 255 min	10	10	Pr1
nPS	Number of activation of the digital input before activating pressure alarm	0 to 15	15	15	Pr1
odC	Compressor and fan status when open door	no; FAn; CPr; F_C	no	no	Pr2
rrd	Regulation restart with door open alarm	n; Y	n	n	Pr2
HES	Differential for Energy Saving	[-30.0 to 30.0°C] [-54 to 54°F]	0.0°C	0.0°C	Pr2
Hur[1]	Current hour	0 to 23	-	-	Pr1
Min[1]	Current minute	0 to 59	-	-	Pr1
dAY[1]	Current day	Sun to SAt	-	-	Pr1
Hd1[1]	First weekly holiday	Sun to SAt; nu	nu	nu	Pr1
Hd2[1]	Second weekly holiday	Sun to SAt; nu	nu	nu	Pr1
ILE[1]	Energy Saving cycle start during workdays	0.0 to 23h 50min	22.0	22.0	Pr1
dLE[1]	Energy Saving cycle length during workdays	0.0 to 24h 00min	8.0	8.0	Pr1
ISE[1]	Energy Saving cycle start on holidays	0.0 to 23h 50min	22.0	22.0	Pr1
dSE[1]	Energy Saving cycle length on holidays	0.0 to 24h 00min	8.0	8.0	Pr1
dd1[1]	Sunday defrost	n; Y	n	n	Pr1
dd2[1]	Monday defrost	n; Y	n	n	Pr1
dd3[1]	Tuesday defrost	n; Y	n	n	Pr1
dd4[1]	Wednesday defrost	n; Y	n	n	Pr1
dd5[1]	Thursday defrost	n; Y	n	n	Pr1
dd6[1]	Friday defrost	n; Y	Y	Y	Pr1
dd7[1]	Saturday defrost	n; Y	n	n	Pr1
Ld1[1]	1st workdays defrost start	0.0 to 23h 50min; nu	nu	nu	Pr1
Ld2[1]	2nd workdays defrost start	0.0 to 23h 50min; nu	nu	nu	Pr1
Ld3[1]	3rd workdays defrost start	0.0 to 23h 50min; nu	nu	nu	Pr1
Ld4[1]	4th workdays defrost start	0.0 to 23h 50min; nu	nu	nu	Pr1
Ld5[1]	5th workdays defrost start	0.0 to 23h 50min; nu	nu	nu	Pr1
Ld6[1]	6th workdays defrost start	0.0 to 23h 50min; nu	nu	nu	Pr1
Adr	Serial address	1 to 247	1	1	Pr2

[1] Only for models with RTC on board

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