XWi70K

ADVANCED ENERGY MANAGEMENT CONTROLLER

FW REL. 24.5

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 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 "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 **XWi70K** is a microprocessor-based controller suitable for applications on medium or low temperature refrigerating units. It must be connected by means of a two-wire shielded twisted cable (∅ 1mm) at up to 30 meters to the keyboard **CH620**, **T620T/H** or **T820T/H**. It is provided with five relay outputs to control compressor, defrost (which can be either electrical or hot gas), evaporator and condenser fans and light or alarm. It is also provided with 4 NTC-or PT1000 probe inputs. It has a both a frequency output and a serial port which can be used to control variable speed compressors. A couple of analogue outputs (4-20mA or 0-10Vdc) and a master 2-wire RS485 output for serial controlled ventilator complete the HW resources.
The HOTKEY I/O port allows connecting the unit, by means of the external module XJ485-CX, to a network line **ModBUS-RTU** compatible such as an X-WEB monitoring system. With the HOTKEY port it is possible to modify the configuration of the controller (by using the Wizmate Progtool Kit).
The instrument is fully configurable and it can be easily programmed through an external keyboard.

3 FIXED SPEED COMPRESSOR CONTROL

The regulation uses the temperature measured by the regulation probe with a positive differential from the set point: if the temperature increases and reaches set point plus differential the compressor is started and then turned off when the temperature reaches the set point value again. In case of any regulation probe fault, the compressor management will switch to fixed ON/OFF time mode, as set in the parameters **Con** and **CoF**.

3.1 DOUBLE FIXED SPEED COMPRESSOR CONTROL

The controller can drive double compressor circuits. To do this, a couple of relays need to be properly configured: **oAx=CP1** and **oAy=CP2**. (do not use **oA5** for compressor management). The parameters used for this kind of regulation are the following:

AC	Compressor anti-short-cycle delay
AC1	Second compressor anti-short-cycle delay
2CC	Activation mode for second compressor (valid if oAx=CP1 and oAy=CP2)
rCC	Compressors rotation enabled
Cdd	Maximum time with compressor active

The second compressor output is activated by following the **2CC** parameter:

- If **2CC=FUL** then in parallel with the relay of the first compressor (**CP1**), with a possible delay as set in the **AC1** parameter. Both compressors are switched off at the same time.
- If **2CC=HAF** then only if the temperature **T>SET+HY+HY1**. The delay **AC1** is always respected. The second compressor is deactivated when **T<SET+HY**.

With parameter **rCC** it is possible to enable the compressor rotation function: the activation of the first and the second compressor will be alternated to equalize the number of working hours of both of them. In case of hot gas defrost operation, it is possible to select if one or both compressors will be used.

3.2 PULL DOWN

When defrost is not in progress, it can be activated by keeping the **UP** button pressed for 3 sec. The compressor will operate to reach the **CCS** set point by the time set through the **CCt** parameter. The cycle can be terminated before the end of the **CCt** time by using the same activation button (keeping the **UP** pressed for 3 sec when PULL DOWN is running)

4 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 day enabled in the parameters **dd1**…**dd7** and the hours set in the parameters **Ld1...Ld6**.

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

4.1 SYNCHRONIZED DEFROST

This defrost function requires:

- To set a digital input of any controller as **ixF=dEF**
- To connect (by wire) all digital inputs set as **ixF=dEF**

A maximum number of 20 controllers can be used in this configuration.

The Synchronized defrost mode is enabled by par. **SYd=SYn**. After any defrost request (received by RTC, timed by par. **idF,** manually by defrost button or by digital input set as dEF), all controllers will activate their own defrost phase. The first controller which ends its defrost phase will release the defrost line and load its dripping time. At the end of the dripping time the normal regulation will restart.
The other controllers follow the same logic.

4.2 DESYNCRONIZED DEFROST

This defrost function requires:

- To set a digital input of any controller as **ixF=dEF**
- To connect (by wire) all digital inputs set as **ixF=dEF**

A maximum number of 20 controllers can be used in this configuration.

The De-Synchronized defrost mode is enabled by par. **SYd=nSY**. After any defrost request (received by RTC, timed by par. **idF,** manually by defrost button or by digital input set as dEF), all controllers will load a random delay. The first controller which ends the random delay will retain the **ixF=dEF** line to signal to the other controllers that they have to wait before starting their own defrost phases. When the first controller ends its defrost phase, it will release the **ixF=dEF** line. The other ones will repeat the same procedure. The total defrost phase will end when all controllers complete their own defrost phases.
NOTES:

- take care about the time available to complete the defrost phase. It must be used for selecting the proper **MdF** value
- all controllers in waiting mode will keep on the normal regulation

4.3 RANDOM DEFROST

A random defrost mode can be enabled by par. **Syd=rnd**. After any defrost request (received by RTC or timed by par. **idF**) a random delay will be added. At the end of the added delay the defrost will start. The random function lead to desynchronize the start of the defrost phases in those cases where more than a cabinet is installed in the same "island". The maximum defrost delay is linked to the following parameters:

- **Mdf**=maximum time for any defrost
- **ndE**=delay multiplier

by the following formula:

MAX_DEFROST_DELAY = Mdf*ndE (min)

For example: if **ndE=10** and **Mdf=20 min**, this means that the total interval of time used by any device for complete its defrost phase is 200 min (worst case).

NOTE:

- take care about the interval of time available for defrost. It must be used for selecting both **MdF** and **ndE** values
- the higher is the **ndE** value and the better is the result in terms of desynchronization. On the other side, the longer will be the total interval of time required to complete defrosts

5 FAN MANAGEMENT

The controller can manage the following type of fans:

- Fixed speed fans (**oAx=FAn**, **Cnd**)
- Variable speed fans with 0-10V or 4-20mA control signal (**1Ao or 2Ao=FAn, Cnd**)
- Variable speed fans with Modbus control signal (EBM models only)

5.1 MODBUS FAN SUPPORTED

It is possible to use up to 4 fans with EBM Modbus communication protocol. The following parameters need to be properly configured:

- **S00:** number of condenser fan controlled via Modbus
- **C01** to **C04:** serial address for condenser fans
- **vdF:** serial output for fan management enabled

NOTE:

- All configured fans must have a valid Modbus address
- The internal logic controls the available fans in parallel mode: all (configured) fans will receive the same speed command.
- Set **S00=0** to disable condenser fans controlled via Modbus

6 EVAPORATOR FAN CONTROL

The evaporator 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.

The par. **FAP** is used to select which temperature probe will be used from the evaporator fan regulator. A specific setpoint (par. **FSt**) provides the temperature value, 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-HYF**.

6.1 FORCED ACTIVATION FOR EVAPORATOR 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. If the difference between the evaporator temperature and the room temperature is higher than the **FCt** value, the controller will activate the fans. This function is disabled if **FCt=0**.

6.2 CYCLIC ACTIVATION OF THE FANS WHEN THE COMPRESSOR IS OFF

When **FnC=C-n** or **C-Y** (fans in parallel to the compressor), the fans will be able to carry out on and off cycles even if the compressor is switched off. The on and off interval of time follow the **Fon** and **FoF** parameters. When the compressor is stopped, the fans will go on working for the **Fon** time. On the other side, with **Fon=0** the fans will stay always off when the compressor is off.

7 CONDENSER FAN CONTROL

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

The par. **FAC** is used to select which temperature probe will be used from the condenser fan regulator. This regulator uses a specific setpoint (par. **St2**) and differential (par. **HY2**) to activate and deactivate the condenser fans:
- If **T>St2+HY2** the condenser fans are activated
- If **T<St2** the condenser fans are deactivated.

The par. **FCo** can be used to keep the ventilators active for a period after compressor OFF.

7.1 MODBUS CONFIGURATION

In case of fan controlled via Modbus, the following parameters need to be properly configured:
CMi: minimum speed in percentage
CMA: maximum speed in percentage
CSS: safety speed in case of any communication od regulation error

8 AUXILIARY REGULATORS

Up to 2 auxiliary regulators can be used. Both can be linked:
- To a digital output (relay) for ONOFF regulation
- To an analogue output for proportional regulation

The parameters used to configure the auxiliary regulators are the following:

ACH	Type of action for auxiliary regulator
SAA	Set point for auxiliary regulator
SHY	Differential for auxiliary regulator
ArP	Probe selection for auxiliary regulator
Sdd	Auxiliary regulator disabled during any defrost
A2C	Type of action for auxiliary regulator 2
SA2	Set point for auxiliary regulator 2
SH2	Differential for auxiliary regulator 2
Ar2	Probe selection for auxiliary regulator 2
Sd2	Auxiliary regulator 2 disabled during any defrost

9 ANALOGUE OUTPUTS

The controller is equipped with 2 configurable analogue outputs, type 4-20mA or 0-10Vdc (both selectable). It is possible to use them for proportional regulation of:
- Evaporator fan speed
- Condenser fan speed

Or as proportional output linked to the:
- Auxiliary regulator 1 (linked only to analogue output 1)
- Auxiliary regulator 2 (linked only to analogue output 2)

The parameters used to configure the analogue outputs are the following:

1An	Type of analogue output 1 (4,20mA or 0-10Vdc)
1oL	Minimum value for analogue output 1 (in percentage)
1oH	Maximum value for analogue output 1 (in percentage)
1At	Start-up time with analogue output 1 at 100%
2An	Type of analogue 2 output (4,20mA or 0-10Vdc)
2oL	Minimum value for analogue output 2 (in percentage)
2oH	Maximum value for analogue output 2 (in percentage)
2At	Start-up time with analogue output 2 at 100%

10 VARIABLE SPEED DRIVE CONTROL

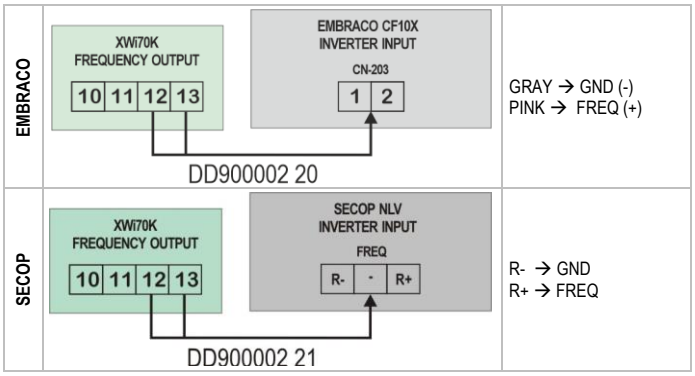
10.1 FREQUENCY MODE

The controller can drive variable speed drives with frequency control input. The frequency output port can issue a frequency signal from 0 to 200Hz, duty cycle=50%. A special cable must be used to connect the frequency output of the controller to the frequency input of the specific inverter.

- CAB/EMB2: cable **DD900002 20** for Embraco models
- CAB/SE1: cable **DD900002 21** for SECOP NLV models

NOTE:
- An inverter compressor is totally controlled from the frequency output.
- Due to maximum current value of the frequency driver, **only one compressor can be connected when frequency mode is used**.

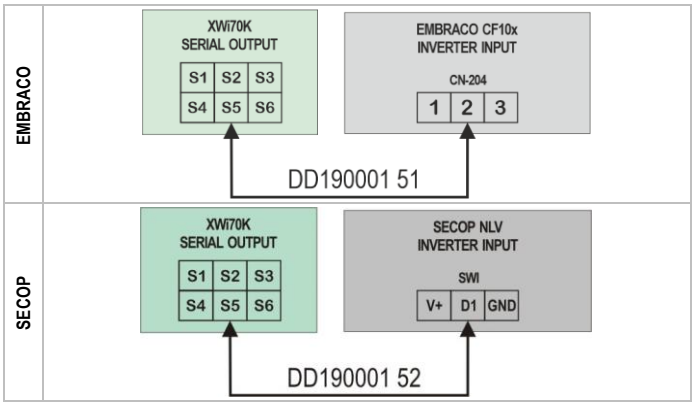
10.1.1 CABLES FOR FREQUENCY MODE CONTROL



10.2 SERIAL MODE CONTROL

The controller can drive variable speed compressors with serial control input. The speed command will use RPM's (from 0 to 4500rpm) instead of values in Hertz. A special cable must be used to connect the serial port of the controller to the serial port of the relative inverter.
- CAB/EMB 1.5MT: cable **DD190001 51** for Embraco models
- CAB/SE2 1.5MT: cable **DD190001 52** for SECOP NLV models

10.2.1 CABLES FOR SERIAL MODE CONTROL



10.3 PARAMETERS

The regulation band is from **SET** to **SET+HY+HY1**. When the regulation is running, the compressor speed is continuously calculated and updated by the PI regulator.
I case of regulation probe error, the compressor speed will be set to the value of par. **SPi**.
It is possible to enable a cyclic or a continuous mode operation both during normal mode and energy saving mode:
- **CMn, CME = Y**: after reaching the SETPOINT the VSC will keep on running
- **CMn, CME = n**: after reaching the SETPOINT the VSC will be stopped

10.4 HOT GAS DEFROST

If hot-gas defrost is selected, it will be possible to set the compressor speed by using par. **Aod**.

10.5 PULL DOWN

An automatic function named PULL DOWN is implemented. This function forces the controller to work at **FMA** 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 **SET+HY+HY1**
- 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 (**FMA**) until reaching the **CCS** setpoint. The maximum interval of time for any PULL DOWN is defined from par. **CCt**. At the end of any PULL DOWN it is possible to set an interval of time (par. **t1F**) with predefined compressor speed (**FMi**).

10.6 OIL MIGRATION CONTROL (VALID ONLY FOR VSD)

To avoid oil migration during variable speed compressor operation, a lubrication control is implemented. If the compressor works with a speed lower than the **MnP** threshold for **tMi** time, then the compressor speed will be increased to **FMA** for **tMA** time.
NOTES:
- **MnP= FMi to FMA, nu, OFF**
- If **MnP=nu**, then this function is disabled

- If **MnP=oFF**, then the compressor will be stopped for **tMA** if it works continuously for **tMi**

10.7 PI ALGORITHM

The VSC regulator implements a PI (Proportional-Integral) algorithm to guarantee temperature stability always near the setpoint. Here below there are some advises for parameter settings in some applications.

	Low Temperature Applications	Normal Temperature Applications
HY	0.3	2
HY1	0.7	1
tSt	1 to 3 min	1 to 3 min
iSt	10 to 20 min	5 to 10 min
rSr	20 to 60	90 to 180
Str	40 to 80 sec	10 to 20 sec
voS	1 to 3	3 to 5
vo2	3 to 7	5 to 10
vo3	5 to 10	5 to 10
tHv	90 to 120 sec	20 to 30 sec
tLv	30 to 60 sec	5 to 10 sec
dPt	2 to 4	1 or 2
SAt	5 to 10 min	1 to 3 min

NOTE:
- Every application needs specific tuning tests to find the optimal values.
- Use **HY < HY1** (better if **2*HY <= HY1**) in Low Temp Applications
- Use **HY > HY1** (better if **HY >= 2*HY1**) in Normal Temp Applications

11 SPECIAL FUNCTIONS

By using the parameters **oAx** it is possible to configure the functions of the relay outputs as described in the following paragraphs:

11.1 LIGHT RELAY (oAx = LiG)

By setting **oAx=Lig** the relay will work as light relay, it is switched on and off by the light button on the keyboard and is affected by status of the digital input when **i1F=dor**.
The parameter **LHt (Light timer)** sets the time the light will stay on after pressing the light switch on the keyboard. Every time the key is pushed the timer is re-loaded.

11.2 SECOND COMPRESSOR MANAGEMENT (oAx = CP2)

By setting one of the parameters **oAx=CP2**, the correspondent relay will operate as "second compressor". It will be activated in parallel with the relay of the first compressor, with a possible delay set in the **AC1** parameter (seconds).

11.3 ON/OFF RELAY (oAx = onF)

By setting one of the parameters **oAx=onF**, correspondent the relay will operate as "on-off" relay: it will be activated when the controller is switched on and it will be switched off when the controller is in stand-by status.

11.4 ALARM RELAY (oAx =Alr)

By setting **oAx=ALr** the correspondent relay will work as alarm relay, it is switched on when an alarm happens.
Parameters involved:
- **tbA (n, Y)** Alarm relay silencing
- **AoP (cL; oP)** Alarm relay polarity

11.5 ANTI-SWEAT HEATER (oAx =tiM)

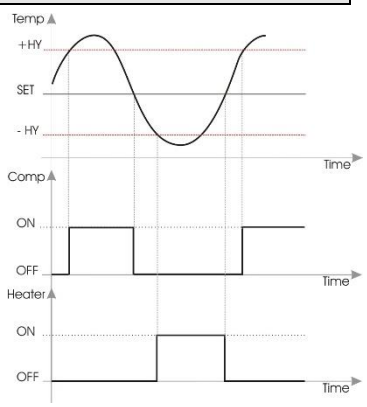
If **oAx=tiM,** the correspondent relay will be able to work as Anti-Sweat Heater output.
The relay will work based on the parameters **btA** (base time setting: seconds or minutes), **AtF** (output OFF time) and **Ato** (output ON time) with the following logic: the relay output will cycle (starting with the OFF time) between OFF and ON status.

11.6 ENERGY SAVING TIMEOUT

If the Energy Saving function has been activated by buttons or digital input, the Energy Saving will be automatically deactivated once the time defined in the parameter **ESt** is expired. If the value of **ESt=0** the timeout is not considered and the Energy Saving, once activated by button or digital input, can be deactivated only manually by the user.

11.7 DEAD BAND (oAx =db)

By setting **oAx=db** the controller will perform a "dead band" regulation.
The heating element has to be connected to the correspondent relay.
If the temperature increases and reaches set point plus differential (**HY**) the **compressor** is started and then turned off when the temperature reaches the set point value again.
If the temperature decreases and reaches the set point minus differential (**HY**) the output (**heater**) is switched on and then turned OFF when the temperature reaches again the set point.



12 KEYBOARDS

Depending on the type of used keyboard, some special function could be associated to predefined buttons. Follow here below the complete list of functions:

SET	**Normal pressure:** to visualize the temperature set point; in programming mode it selects a parameter or confirm an operation.
	Timed: to modify the temperature set point; when max or min temperature value is displayed, keep it pressed for 3 sec to reset the stored value.
▲	**Normal pressure: nu**=not special functions; **Std**=maximum temperature; **Lnt**=configuration change; **ALr**=alarm list
	Timed: nu=not special functions; **Std**=maximum temperature; **CC**=reload default configuration; **ALr**=not used; **Pdn**=Pull Down activation
▼	**Normal pressure: nu**=not special functions; **Std**=minimum temperature; **Lnt**=configuration change; **ALr**=alarm list
	Timed: nu=not special functions; **Std**=maximum temperature; **Lnt**=configuration change; **ALr**=not used; **Pdn**=Pull Down activation
❄	**Normal pressure: nu**=not special functions; **Pb2**=Second probe value; **AU1**=auxiliary output 1 activation; **AU2**=auxiliary output 2 activation
	Timed: nu=not special functions; **Std**=maximum temperature; **Lnt**=configuration change; **ALr**=not used; **Pdn**=Pull Down activation
☼	**Normal pressure: nu**=not special functions; **LiG**=light output activation; **AU1**=auxiliary output 1 activation; **AU2**=auxiliary output 2 activation; **Lnt**=configuration change
	Timed: nu=not special functions; **LiG**=light output activation; **AU1**=auxiliary output 1 activation; **AU2**=auxiliary output 2 activation; **Lnt**=configuration change; **rSt**=reset
⏻	**Normal pressure: nu**=not special functions; **oFF**=ON OFF function; **ES**=energy saving
	Timed: nu=not special functions; **oFF**=ON OFF function; **ES**=energy saving
AUX	**Normal pressure: nu**=not special functions; **AU1**=auxiliary output 1 activation; **AU2**=auxiliary output 2 activation; **LiG**=light output activation
	Timed: nu=not special functions; **AU1**=auxiliary output 1 activation; **AU2**=auxiliary output 2 activation; **LiG**=light output activation
ECO	**Normal pressure: nu**=not special functions; **ES**=energy saving
	Timed: nu=not special functions; **ES**=energy saving

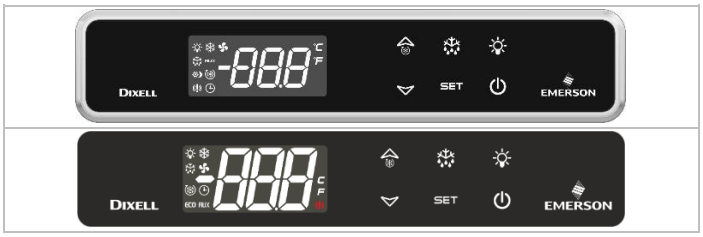
12.1 KEYBOARD LOCK

It is possible to select partial or complete keyboard lock:
- **brd**: type of lock, **UnL**=unlock; **SEL**=only buttons SET and ONOFF are available during lock condition (factory predefined configuration, not changeable); **ALL**=all buttons locked.
- **tLC**: power-on interval before locking keyboard

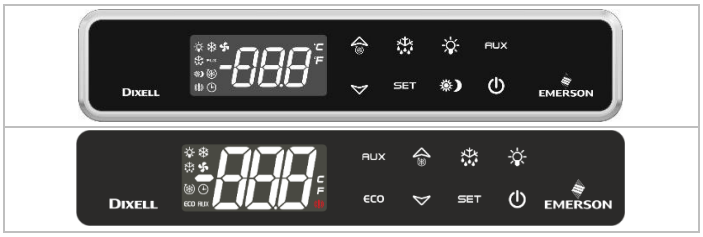
NOTE: a power-off is required to deactivate the keyboard lock function

12.2 CH620 OR VH620 KEYBOARD

12.3 T620T OR T620H KEYBOARD



12.4 T820T OR T820H KEYBOARD



12.5 KEY COMBINATIONS

▲ + ▼	To lock and unlock the keyboard.
SET + ▼	To enter the programming mode.
SET + ▲	To exit the programming mode.

12.6 USE OF LEDS

Each LED function is described in the following table.

LED	MODE	Function
❄	ON	The compressor is running
	FLASHING	- Programming menu - Anti-short cycle delay enabled
	ON	The fan is running
	FLASHING	Programming menu
	ON	The defrost is enabled
	FLASHING	Drip time in progress
	ON	- ALARM signal - In "Pr2" indicates that the parameter is also present in "Pr1"
	ON	Pull down is running
ECO	ON	Energy saving enabled
	ON	Light on
AUX	ON	Auxiliary output on
°C,°F	ON	Measurement unit

13 CONTROLLER INTERFACE

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

When the instrument is switched on, it could be necessary to program the real-time clock. This operation requires to enter the rtC menu (depending on the visibility level) and set the following parameters: **HUr** (hours), **Min** (minutes), **dAy** (day of the week), **dYM** (day of the month) **Mon (month**) and **YAr** (year).

13.2 HOW TO SEE THE MIN TEMPERATURE

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

13.3 HOW TO SEE THE MAX TEMPERATURE

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

13.4 HOW TO RESET THE MAX AND MIN TEMPERATURE RECORDED

To reset the stored temperature, when max or min temperature is displayed, press **SET** key until "rSt" label starts blinking.

Note: after the installation remember to RESET the temperature stored.

13.5 HOW TO SEE AND MODIFY THE SET POINT

1. Push and immediately release the **SET** key: the display will show the Set point value;
2. To change the **SEt** value, push the **UP** or **DOWN** arrows within 10 sec.
3. To save the new set point value push the **SET** key again or wait for 10 sec.

13.6 TO START A MANUAL DEFROST

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

13.7 ON/OFF FUNCTION (STAND BY)

⏻ By pushing the **ON/OFF** key, the instrument shows "OFF" for 5 sec. and the ON/OFF LED is switched ON.
During the OFF status, all the relays are switched OFF and the regulations are stopped; if a monitoring system is connected, it does not record the instrument data and alarms.
When the instrument is in stand by the keyboard displays "oFF".

N.B. During the OFF status the Light and AUX buttons are active.

13.8 HOW TO SEE THE PROBE VALUES

1. Enter "**Pr1**" programming menu.
2. Parameters "dP1", "dP2", "dP3" and "dP4" display the value of probes P1, P2, P3 and P4.

14 PROGRAMMING MODE

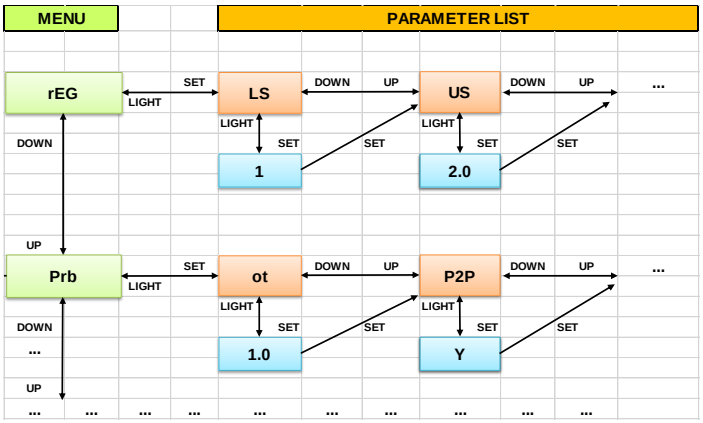
14.1 KEYBOARD LOCK

▲ + ▼	1. Keep both **UP** and **DOWN** buttons pressed for 3 sec. 2. The "PoF" message will be displayed and the keyboard is locked. At this point it is only possible the viewing of the set point or the MAX o Min temperature stored and to switch ON and OFF the light, the auxiliary output and the instrument. **TO UNLOCK THE KEYBOARD** Keep both **UP** and **DOWN** buttons pressed for 3 sec.

NOTE: if keyboard lock is enabled (see par. **brd**), then keyboard control function is disabled.

14.2 PARAMETER MENUS

The configuration parameters are divided in groups (named menu). After entering the programming mode, the first label corresponding to the first available group (menu) will appear on the display depending on the visibility level. Every parameter belonging to a specific menu has its own visibility rules for placement in PR1 (user accessible parameters) or PR2 (hidden parameters). Any menu can have parameters placed both in PR1 and/or PR2.



14.3 HOW TO ENTER PARAMETER PROGRAMMING MENU "PR1"

To enter a parameter list under "Pr1" level (user accessible parameters), under a specific menu, operate as follows:

SET + ▼

1. Enter the Programming mode by pressing the **SET+DOWN** key for 3 seconds.
2. The display will show the first menu available under "Pr1" level

14.4 HOW TO ENTER PARAMETER PROGRAMMING MENU "PR2"

In the PR2 level there are all the parameters of the instrument.

14.4.1 ENTERING THE PARAMETER PROGRAMMING MENU "PR2"

1. Enter the Programming mode by pressing both **SET+DOWN** buttons for 3 sec: the label of the first menu available in Pr1 will be displayed (for example: rEG)
2. Release the **SET+DOWN** buttons and then push them again for 7 sec: during this time both compressor and fan icon will blink. After 7 sec the "**Pr2**" label will be displayed immediately, and, after releasing the **SET+DOWN** buttons, the first parameter menu available will be displayed (for example: rEG)
   NOW THE PARAMETER MENU "PR2" IS AVAILABLE FOR ANY MODIFICATION

If no parameter is present in the "**Pr1**" level, after the first 3 sec the "**noP**" message will be displayed. Keep **SET+DOWN** buttons pushed till the "**Pr2**" message will be displayed.

14.4.2 HOW TO MOVE A PARAMETER FROM "PR2" MENU TO "PR1" MENU AND VICE-VERSA

Each parameter present in the PR2 level can be moved or put into PR1 level (user level) by pressing **SET+DOWN** buttons. When in PR2 menu, if a parameter is present also in the First Level (Pr1), the decimal point will be lit.

14.4.3 HOW TO CHANGE A PARAMETER VALUE

1. Enter the programming mode (both in PR1 or PR2 level)
2. Select the required menu with **UP** or **DOWN**
3. Press the SET button to enter the parameter list belonging to the selected menu
4. The first available parameter label (depending on the visibility level) will be displayed. The compressor icon will blink to indicate the position in the selected menu
5. Select the required parameter by using **UP** or **DOWN** buttons.
6. Press the **SET** key to display the current value (compressor and fan icon starts blinking to indicate this condition)
7. Use **UP** or **DOWN** to change its value.
8. Press **SET** to store the new value and move to the following parameter (belonging to the same menu)

To exit: Press **SET+UP** or wait for 30 sec without pressing any button.

NOTE:
- The new programming is stored even when the procedure ends by waiting the time-out
- The LIGHT button is used as BACK function when into PROGRAMMING MODE: press it to exit from a parameter list and return to the upper menu or to discard a parameter value modification and return to the same parameter label (without changing the previous parameter value)

15 PARAMETER LIST

The configuration parameters are divided in groups (named menu) to speed up the browsing operations. Here below the list of all Menu with their meaning:

rEG	**Regulation menu:** to set regulation band
Prb	**Temperature probe menu**
vSC	**Variable Speed Drive menu:** to set the VS functional parameters
vSF	**Modbus Variable Speed Fan menu:** to set Modbus VSF functional parameters
diS	**Display menu:** to set the visualization rules
dEF	**Defrost menu:** to set the defrost operational mode
FAn	**Fan menu:** to set the evaporator and condenser fan control mode
AUS	**Auxiliary menu:** to set the auxiliary output mode
ALr	**Alarm menu:** to set the alarm thresholds
oUt	**Output menu:** to set the function linked to any configurable output
inP	**Input menu:** to set the function linked to any configurable input
ES	**Energy saving menu:** to set the energy saving mode
rtC	**Real Time Clock menu:** to set the internal clock
CoM	**Serial communication menu:** to set serial port speed and baudrate
Ui	**User Interface:** to set keyboard related functions
inF	**Info menu:** to read probe values and FW information

REGULATION MENU - rEG

SEt	**Setpoint:** (LS to US) temperature regulation setpoint.
LS	**Minimum Set Point:** (-100.0°C to SET; -148°F to SET) fix the minimum value for the set point.

US	**Maximum Set Point:** (SET to 150.0°C; SET to 302°F) fix the maximum value for the set point.
HY	**Compressor regulation differential in normal mode:** (0.1 to 25.0°C; 1 to 45°F) set point differential. Compressor Cut-IN is **T > SET + HY**. Compressor Cut-OUT is **T<=SET**.
HY1	**Proportional band in normal mode:** (0.1 to 25.5°C; 1 to 45°F) define a second regulation band which is used when double ONOFF compressor regulation or a variable speed compressor is configured.
odS	**Output activation delay at start-up:** (0 to 255 min) this function is enabled after the instrument power-on and delays the output activations.
AC	**Anti-short cycle delay:** (0 to 999 sec) minimum interval between a compressor stop and the following restart.
AC1	**Anti-short cycle delay (2nd compressor):** (0 to 999 sec) delay before activating second compressor, depending on regulation mode selected by par. **2CC**
2CC	**Activation mode for 2nd compressor (valid if oAx=CP1 and oAy=CP2):** (FUL; HAF) **FUL**=second compressor will be activated after **AC1** delay. **HAF**=second compressor will be activated with step logic.
rCC	**Enable compressor rotation:** (n;Y) **n** = CP1 is always the first compressor activated. **Y** = CP1 and CP2 activation is alternated
MCo	**Maximum time with compressor ON:** (0 to 255min) maximum time with ONOFF compressor active. With **MCo=0** this function is disabled.
rtr	**Regulation percentage=F(P1; P2) (100=P1; 0=P2):** 100=P1 only; 0=P2 only
CCt	**Maximum duration for Pull Down:** (0.0 to 99h50min, res. 10min) after elapsing this time interval, the super cooling function is immediately stopped.
CCS	**Pull Down phase differential (SET+CCS or SET+HES+CCS):** (-12.0 to 12.0°C; -21 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	**Threshold for automatic activation of Pull Down in normal mode (SET+HY+oHt):** (0.0 to 25.5°C; 0 to 45°F) this is the upper limit used to activate the super cooling function.
Con	**Compressor ON time with faulty probe:** (0 to 255 min) time during which the compressor is active in case of faulty thermostat probe. With **Con=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 **CoF=0** compressor is always active.

PROBE MENU – Prb

PbC	**Probe selection:** (ntC; Pt1) **ntC**=NTC type; **Pt1**=PT1000 type
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	**Probe P2 presence: n** = not present; **Y** = present.
oE	**Probe P2 calibration:** -12.0 to 12.0°C; -21 to 21°F) allows to adjust any possible offset of the second probe.
P3P	**Probe P3 presence: n** = not present; **Y** = the defrost is present.
o3	**Probe P3 calibration:** (-12.0 to 12.0°C; -21 to 21°F) allows to adjust any possible offset of the third probe.
P4P	**Probe P4 presence: n** = not present; **Y** = present.
o4	**Probe P4 calibration:** (-12.0 to 12.0°C; -21 to 21°F) allows to adjust any possible offset of the fourth probe.

VARIABLE SPEED DRIVE MENU – vSC

FMi	**Minimum value for Variable Speed Compressor (RPM * 10):** (0 to FMA) select according to the VSC in use
FMA	**Maximum value for Variable Speed Compressor (RPM * 10):** (FMi to 500) select according to the VSC in use
EMi	**Minimum value for Variable Speed Compressor (RPM * 10) in Energy Saving Mode:** (0 to EMA) select according to the VSC in use
EMA	**Maximum value for Variable Speed Compressor (RPM * 10) in Energy Saving Mode:** (EMi to 500) select according to the VSC in use
Fr0	**Value when Variable Speed Compressor is shut down (RPM * 10):** (0 to 200) select according to the VSC in use
tSt	**PI regulator, temperature sampling time:** (00:00 to 42min:30sec)
iSt	**PI regulator, integral sampling time:** (00:00 to 42min:30sec)
vdC	**Type of Variable Speed Compressor:** (nu; FrE) **nu** = no VSC in use; **FrE** = VSC with frequency control mode is used; **VC1** = Embraco with serial control; **VC2** = SECOP with serial control.
voS	**Signal output variation for Variable Speed Compressor:** (0 to 100 Hz or RPM*10) VSC variation when **SET-HY ≤ T ≤ SET+HY**
vo2	**Signal output variation for Variable Speed Compressor:** (0 to 100 Hz or RPM*10; nu)) VSC variation when **SET-HY-HY1≤T<SET-HY and SET+HY<T≤SET+HY+HY1**
vo3	**Signal output variation for Variable Speed Compressor:** (0 to 100 Hz or RPM*10; nu)) VSC variation when **SET-HY-HY1<T and T>SET+HY+HY1**
PdP	**Variable Speed Compressor (in %) during any Pull Down:** (0 to 100%) this value is always calculated using FMi and FMA limits. 0=function disabled.
SPi	**Compressor speed (in %) in case of any probe error during Con interval:** (0 to 100%) this value is always calculated using FMi and FMA limits.
Aod	**Compressor speed (in %) during any defrost cycle (valid if tdf=in):** (0 to 100%) this value is always calculated using FMi and FMA limits.
AoF	**Compressor speed (in%) during a pre-defrost phase (valid if tdf=in):** (0 to 100%) this value is always calculated using FMi and FMA limits.
tHv	**PI regulator, max interval for output variation:** (tLv to 255 sec)
tLv	**PI regulator, min interval for output variation:** (1 sec to tHv)
rSr	**PI regulator, range for output value calculation (RPM * 10):** (0=disabled; 1 to 255 RPM*10)
Str	**PI regulator, delay before range drift:** (0 to 255 sec)
dPt	**PI regulator, divisor for PI response time reduction (acts on both par. tSt and iSt):** (1 to 10)
CMn	**Continuous control ON in normal mode:** (n; Y) **Y** = VSC is never stopped during regulation.
CME	**Continuous control ON in energy saving mode:** (n; Y) **Y** = VSC is never stopped during regulation.
MnP	**Compressor speed threshold to activate lubrication (valid for variable speed compressors only, 0=disabled):** (nu; 1 to 100%; OFF) nu = not used; 1 to 100% = select the percentage to activate function; OFF = compressor is stopped when the condition is reached
tMi	**Time range with compressor speed below MnP to activate lubrication cycle:** (00:00 to 24h00min) time before activating the lubrication function
tMA	**Time range with compressor speed at 100% to activate lubrication cycle:** (0 to 255 min) VSC will be forced to 100%, for **tMA**, after activating the lubrication function. NOTE: if **MnP=OFF**, VSC will be stopped for **tMA**
A00	**Number of serial controlled VSC:** (1 to 2) number of VSC connected
A01	**Serial address for compressor 1:** (1 to 247)
A02	**Serial address for compressor 2:** (1 to 247)

VARIABE SPEED FAN (MODBUS) - vSF

S00	**Number of serial condenser fans (0=disabled):** (0 to 4) number of variable speed condenser fans controlled via Modbus. Only EMB ventilators are supported.
C01…C04	**Serial addresses for condenser fans:** (1 to 247) up to 4 condenser fan can be controlled in parallel (all of them will use the same speed value).
F12	**Serial baudrate for condenser fan (kbaud): 4.8**=4800baud; **9.6**=9600baud; **19.2**=19200baud
SFr	**Direction of rotation for condenser fan:** (Lt; rt) **Lt** = left rotation; **rt** = right rotation
tCC	**Time with condenser efficiency function activated:** (0 to 255 sec) interval for condenser fans cleaning function.
CdF	**Default configuration sent to condenser fan (at power on):** (n; Y)

DISPLAY MENU - diS

CF	**Temperature measurement unit:** (°C; °F) **°C** = Celsius; **°F** = Fahrenheit.
rES	**Temperature resolution:** (dE; in) **dE** = decimal; **in** = integer.
rEd	**Remote keyboard visualization:** (P1; P2; P3; P4; Set; dtr) **Px**=probe "x"; **Set**=set point; **dtr**=percentage calculated from P1 and P2 and using par. **dtr**.
dLY	**Temperature display delay:** (0.0 to 20min00sec, res. 10 sec) when the temperature increases, the display is updated of 1°C or 1°F after this time.
dtr	**Probe visualization percentage, F(P1; P2):** (1 to 99) with **dtr=1** the display will show this value **VALUE=0.01*P1+0.99*P2**

DEFROST MENU - dEF

EdF	**Defrost mode: in**=fixed intervals; **rtC**=following real time clock
tdF	**Defrost type: EL**=electrical heaters; **in**=hot gas
dFP	**Probe selection for defrost control:** (nP; P1; P2; P3; P4) **nP**=no probe; **Px**=probe "x".
dSP	**Probe selection for 2nd defrost control:** (nP; P1; P2; P3; P4) **nP**=no probe; **Px**=probe "x".
dtE	**End defrost temperature:** (-55 to 50°C; -67 to 122°F) sets the temperature measured by the evaporator probe (**dFP**), which causes the end of defrost cycle.
dtS	**End 2nd defrost temperature:** (-55 to 50°C; -67 to 122°F) sets the temperature measured by the evaporator probe (**dFP**), which causes the end of defrost cycle.
idF	**Interval between two successive defrost cycles:** (0 to 120 hours) determines the time interval between the beginning of two defrosting cycles.
MdF	**Maximum length of defrost cycle:** (0 to 255 min; 0 means no defrost) when **P2P=n** (no evaporator probe presence) it sets the defrost duration, when **P2P=Y** (defrost end based on evaporator temperature) it sets the maximum length for the defrost cycle.
MdS	**Maximum length of 2nd defrost cycle:** (0 to 255 min; 0 means no defrost) when **P2P=n** (no evaporator probe presence) it sets the defrost duration, when **P2P=Y** (defrost end based on evaporator temperature) it sets the maximum length for the defrost cycle.
dSd	**Start defrost delay:** (0 to 255 sec) delay in defrost activation.
StC	**Compressor off-cycle before starting any defrost:** (0 to 255 sec) interval with compressor OFF before activating hot gas cycle
dFd	**Displaying during defrost:** (rt; it; SEt; dEF; Coo) **rt** = real temperature; **it** = start defrost temperature; **SEt** = set point; **dEF** = label "**dEF**"; **Coo** = when a defrost ends, it shows the label "Coo" until the regulation temperature is above **SET+HY+HY1**
dAd	**Temperature display delay after any defrost cycle:** (0 to 255 min) delay before updating the temperature on the display after the end of any defrost.
Fdt	**Draining time:** (0 to 120 min) regulation delay after finishing a defrost phase
Hon	**Drain heater enabled after draining time (par. Fdt):** (0 to 255 min) the relative output will stay on after draining time.
SAt	**Sampling time to calculate the average compressor speed before any desfrost cycle:** (0 to 255 min) the average compressor speed is used only with VSC.
dPo	**Defrost cycle enebled at stat-up:** (n; Y) enables defrost at power on.
dAF	**Pre-defrost time:** (0 to 255 min) enable a lower setpoint (SET-1°C or SET-2°F) before activating the defrost phase.
od1	**Automatic defrost (at the beginning of any energy saving mode):** (n; Y) **n**=function disabled; **Y**=function enabled
od2	**Optimized defrost:** (n;Y) **n** = function disabled; **Y** = the controller needs a temperature probe placed on the evaporator surface to monitor the presence of ice during any defrost phase.
Syd	**Type of synchronized defrost:** (n; SYn; nSY; rnd) **n** = function disabled; **SYn** = synchronized, all devices connected will start a defrost phase at the same time. **nSY** = de-synchronized, all devices connected will delay the beginning of the same defrost phase; **rnd** = random defrost function.
dt1	**Differential temperature for latent heating control** (0.1 to 1.0 °C) to catch the latent heating phase during any defrost
ndE	**Number of connected controllers for special defrost operations (valid if Syd=SYn, nSY or rnd):** (1 to 20) number of devices connected to the same network for syncro, desyncro or random defrost.

FAN MENU - FAn

FAP	**Probe selection for evaporator fan:** (nP; P1; P2; P3; P4) **nP**=no probe; **Px**=probe "x".
FSt	**Evaporator fan stop temperature:** (-55 to 50°C; -67 to 122°F) setting of temperature, detected by evaporator probe. Above this temperature value fans are always OFF. **NOTE: it works only for the evaporator fan, NOT for the condenser fan.**
HYF	**Evaporator fan regulator differential:** (0.1 to 25.5°C; 1 to 45°F) evaporator fan will stop when the measured temperature (from FAP) is T<FSt-HYF.

FnC	**Evaporator fan operating mode:** (Cn; on; CY; oY) • **Cn** = runs with the compressor, duty-cycle when compressor is OFF (see **FoF**, **Fon**, **FF1** and **Fo1** parameters) and OFF during defrost • **on** = continuous mode, OFF during defrost • **CY** = runs with the compressor, duty-cycle when compressor is OFF (see **FoF**, **Fon**, **FF1** and **Fo1** parameters) and ON during defrost • **oY** = continuous mode, ON during defrost
Fnd	**Evaporator fan delay after defrost cycle:** (0 to 255 min) delay before fan activation after any defrosts.
FCt	**Differential temperature for cyclic activation of evaporator fans:** (0 to 50°C; 0 to 90°F)
Ft	**Evaporator fan controlled during defrost:** (n; Y)
Fon	**Evaporator fan ON time in normal mode (with compressor OFF):** (0 to 15 min) used when energy saving status is not active.
FoF	**Evaporator fan OFF time in normal mode (with compressor OFF):** (0 to 15 min) used when energy saving status is not active.
LA1	**Evaporator fan working hours (x100) for maintenance alarm:** (0 to 999) set the warning interval for maintenance. NOTE: internal value is multiplied by 100.
rS1	**Evaporator fan maintenance function reset:** (n; Y) change to Y and confirm with SET button to reset condenser fan maintenance warning. **LA1** interval will be reloaded.
FAC	**Probe selection for condenser fan:** (nP; P1; P2; P3; P4) **nP**=no probe; **Px**=probe "x".
St2	**Set Point 2 regulation (for condenser fan):** (-55 to 50°C; -67 to 122°F) setting of temperature detected by evaporator probe. Above this value of temperature fans are always OFF.
HY2	**Set Point 2 differential (for condenser fan):** (0.1 to 25.5°C; 1 to 45°F) differential for evaporator ventilator regulator
FCC	**Condenser fan operating mode:** (Cn; on; CY; oY) • **Cn** = runs with the compressor and OFF during defrost • **on** = continuous mode, OFF during defrost • **CY** = runs with the compressor and ON during defrost • **oY** = continuous mode, ON during defrost
FCo	**Condenser fan deactivation delay:** (0 to 999 sec) interval with condenser fan on after stopping compressor and when **FCC=C-n** or **C-Y**
LA2	**Condenser fan working hours (x100) for maintenance alarm:** (0 to 999) set the warning interval for maintenance. NOTE: internal value is multiplied by 100.
rS2	**Condenser fan maintenance alarm reset:** change to Y and confirm with SET button to reset condenser fan maintenance warning. **LA2** interval will be reloaded.

AUXILIARY MENU – AUS

ACH	**Type of control for auxiliary regulator:** (CL; Ht) **CL** = cooling; **Ht** = heating.
SAA	**Set Point for auxiliary regulator:** (-100.0 to 150.0°C; -148 to 302°F) it defines the room temperature set point to switch auxiliary relay.
SHY	**Auxiliary regulator differential:** (0.1 to 25.5°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 regulator:** (nP; P1; P2; P3; P4) **nP** = no probe, the auxiliary relay is switched only by the digital input; **Px**=probe "x". Note: **P4**=Probe on Hot Key plug.
Sdd	**Auxiliary regulator disabled during any defrost cycle:** (n; Y) **n** = the auxiliary relay operates during defrost. **Y** = the auxiliary relay is switched off during defrost.
btA	**Base time for parameters Ato and AtF:** (SEC; Min) **SEC** = base time is in seconds; Min = base time is in minutes.
Ato	**Interval of time with auxiliary output ON:** (0 to 255) valid if oAx=tiM, x=0,1,2,3,4 or if xAo=tiM, x=1, 2
AtF	**Interval of time with auxiliary output OFF: (**0 to 255) valid if oAx=tiM, x=0,1,2,3,4 or if xAo=tiM, x=1, 2
1An	**Type of analogue output 1:** (VLt; Cur) **VLt** = 0-10Vdc; **Cur** = 4-20mA
1oL	**Minimum value for analogue output 1:** (0 to 100%) output value at the beginning of the scale
1oH	**Maximum value for analogue output 1:** (0 to 100%) output value at the end of the scale
1At	**Interval of time with analogue output 1 (maximum value):** (0 to 255 sec) analogue output is forced at 100%, after any activation, for **1At** seconds.
2An	**Type of analogue output 2:** (VLt; Cur) **VLt** = 0-10Vdc; **Cur** = 4-20mA
2oL	**Minimum value for analogue output 2:** (0 to 100%) output value at the beginning of the scale
2oH	**Maximum value for analogue output 2:** (0 to 100%) output value at the end of the scale
2At	**Interval of time with analogue output 2 (maximum value):** (0 to 255 sec) analogue output is forced at 100%, after any activation, for **2At** seconds.

ALARM MENU - ALr

ALP	**Probe selection for temperature alarms:** (nP; P1; P2; P3; P4) **nP**=no probe; **Px**=probe "x". Note: **P4**=Probe on Hot Key plug.
ALC	**Temperature alarm configuration:** (Ab, rE) **Ab** = absolute; **rE** = relative.
ALU	**High temperature alarm:** when this temperature is reached, the alarm is enabled after the **Ad** delay time. • If **ALC=Ab** → ALL to 150.0°C or ALL to 302°F. • If **ALC=rE** → 0.0 to 50.0°C or 0 to 90°F.
ALL	**Low temperature alarm:** when this temperature is reached, the alarm is enabled after the **Ad** delay time. • If **ALC=Ab** → -100.0°C to ALU or -148°F to ALU. • If **ALC=rE** → 0.0 to 50.0°C or 0 to 90°F.
AFH	**Temperature alarm differential:** (0.1 to 25.0°C; 1 to 45°F) alarm differential.
ALd	**Temperature alarm delay:** (0 to 255 min) delay time between the detection of an alarm condition and the relative alarm signalling.
dot	**Temperature alarm delay with door open:** (0 to 255 min) delay between the detection of a temperature alarm condition and the relative alarm signaling, after starting up the instrument.
dAo	**Temperature alarm delay at start-up:** (0.0 to 24h00min, res. 10 min) delay time between the detection of a temperature alarm condition and the relative alarm signalling, after starting up the instrument.
dot	**Temperature alarm delay with open door:** (0 to 255 min)
AP2	**Probe selection for second temperature alarm:** (nP; P1; P2; P3; P4) **nP**=no probe; **Px**=probe "x". Note: **P4**=Probe on Hot Key plug.
AL2	**Second low temperature alarm:** (-100.0 to 150.0°C; -148 to 302°F)
Au2	**Second high temperature alarm:** (-100.0 to 150.0°C; -148 to 302°F)
AH2	**Second temperature alarm differential:** (0.1 to 25.0°C; 1 to 45°F)
Ad2	**Second temperature alarm delay:** (0 to 254 min; 255 = not used) delay time between the detection of a condenser alarm condition and the relative alarm signalling.
dA2	**Second temperature alarm delay at start-up:** (0.0 to 24h00min, res. 10 min)
dE2	**Temperature alarm 2 disabled during every defrost and dripping phase:** (n; Y)
bLL	**Compressor OFF due to second low temperature alarm:** (n; Y) **n** = the compressor keep on working; **Y** = the compressor is switched off while the alarm is ON; in any case, the regulation restarts if delay AC is elapsed.
AC2	**Compressor OFF due to second high temperature alarm:** (n; Y) **n** = the compressor keep on working; **Y** = the compressor is switched off while the alarm is ON; in any case, the regulation restarts if delay AC is elapsed.
SAF	**Differential for anti-freezing control:** (0.0to 25.5°C; 0 to 45°F) the regulation stops if **T<SET-SAF**. NOTE: 0 = function disabled.
tbA	**Alarm relay deactivation:** (n; Y) **n** = no, it is not possible to deactivate neither the buzzer nor any digital output set as an alarm; **Y** = yes, it is possible to deactivate both the buzzer and the digital output set as an alarm.
bUM	**Buzzer muting:** (n; Y) **n** = disabling buzzer deactivation; **Y** = enabling buzzer deactivation.

OUTPUT CONFIGURATIONS – oUt

oA1 to oA4	**Relay output oAx configuration:** (nu; onF; dEF; Fan; Alr; LiG; AuS; db; CP1; CP2; dF2; HES; Het; inV; tiM; Cnd) • **nu** = not used • **onF** = always on with instrument on • **dEF** = defrost • **FAn** = evaporator Fan • **ALr** = alarm • **LiG** = light • **AuS** = auxiliary output • **db** = neutral zone • **CP1** = ONOFF compressor • **CP2** = second ONOFF compressor • **dF2** = second defrost • **HES** = energy saving • **HEt** = heater output control • **inV** = inverter output, relay activated only when inverter is running (compressor speed > 0) • **tiM** = timed mode activation • **Cnd** = condenser fan.
oA5	• **Relay output oA5 configuration**: (nu; onF; dEF; FAn; ALr; LiG; AuS; dF2; HES; tiM; Cnd;) • **nu** = not used • **onF** = always on with instrument on • **dEF** = defrost • **FAn** = evaporator Fan • **ALr** = alarm • **LiG** = light • **AuS** = auxiliary output • **dF2** = second defrost • **HES** = energy saving • **tiM** = timed mode activation • **Cnd** = condenser fan.
1Ao	**Analogue output 1 configuration (4-20mA; 0-10Vdc):** (nu, tiM, FAn, AUS, ALr, Cnd) • **nu** = not used • **tiM** = timed mode • **FAn** = linked to the evaporator fan regulator • **AUS** = linked to the auxiliary regulator • **ALr** = linked to any alarm condition • **Cnd** = linked to the condenser fan regulator
2Ao	**Analogue output 2 configuration: (4-20mA; 0-10Vdc):** (nu, tiM, FAn, AUS, ALr, Cnd) • **nu** = not used • **tiM** = timed mode • **FAn** = linked to the evaporator fan regulator • **AUS** = linked to the auxiliary regulator • **ALr** = linked to any alarm condition • **Cnd** = linked to the condenser fan regulator **NOTE: always set 3Ao=nu before using 2Ao analogue output**
3Ao	**Analogue output 3 configuration:** (nu; FrE; ALr) • **nu** = not used • **FrE** = frequency output for variable speed compressors **NOTE: when 3Ao is set, 2Ao is automatically deactivated**
AoP	**Alarm relay polarity:** (oP; CL) **oP** = alarm activated by closing the contact; **CL** = alarm activated by opening the contact

DIGITAL INPUT MENU - inP

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) • **EAL** = external warning alarm • **bAL** = external lock alarm • **PAL** = external pressure alarm • **dor** = door switch function • **dEF** = defrost activation • **AUS** = auxiliary output • **ES** = energy saving mode activation • **HdF** = holiday defrost • **LiG** = light output control • **onF** = ON/OFF status change • **Lnt** = change configuration (between Lt and nt)
did	**Digital input 1 alarm delay:** (0 to 255 min) delay between the detection of an external event and the activation of the relative function.
i2P	**Digital input 2 polarity:** (oP; CL) **oP** = activated by closing the contact; **CL** = activated by opening the contact.
i2F	**Digital input 2 configuration:** (nu; dor; dEF; AUS; ES; EAL; bAL; PAL; FAn; HdF; onF; LiG; CC; EMt) • **EAL** = external warning alarm • **bAL** = external lock alarm • **PAL** = external pressure alarm • **dor** = door switch function • **dEF** = defrost activation • **AUS** = auxiliary output • **ES** = energy saving mode activation • **HdF** = holiday defrost • **LiG** = light output control • **onF** = ON/OFF status change • **Lnt** = change configuration (between Lt and nt)
d2d	**Digital input 2 alarm delay:** (0 to 255 min) delay between the detection of an external event and the activation of the relative function.
nPS	**Number of external pressure switch alarms before stopping the regulation:** (0 to 15) after reaching nPS events in the digital input alarm delay (par. **dxd**), the regulation will be stopped and a manual restart (ON/OFF, power OFF and power ON) will be required
odC	**Compressor and fan status after door opening:** (no; FAn; CPr; F-C): no = normal; FAn = Fans OFF; CPr = Compressor OFF; F-C = Compressor and fans OFF.
rrd	**Regulation restart after door alarm:** (n; Y) **n** = regulation disabled until door open alarm is ON; **Y** = when the delay **rrd** elapses, the regulation restarts even if a door open alarm is ON.

ENERGY SAVING MENU – ES

HES	**Temperature differential in energy saving:** (-30.0 to 30.0°C; -54 to 54°F) sets the increasing value of the set point during the Energy Saving cycle.
ESt	**Energy saving timeout:** (0 to 255 hours) maximum duration for energy saving mode. If **ESt=0** then this function is disabled.
LdE	**Energy saving controls the lights:** (n; Y) lights off when energy saving mode is active
LHt	**Time-out for light output:** (0 to 255 min) the light output will be forced OFF after this period. **LHt=0** means function disabled.

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 weekend:** (Sun to SAt; nu) setting for the first day of the weekend.
Hd2	**Second day of weekend:** (Sun to SAt; nu) setting for the second day of the weekend.
iLE	**Energy saving cycle starting time on working days:** (00h00min to 23h50min) during the Energy Saving cycle, the set point is increased by the value in HES so that the operation set point is **SET+HES**.
dLE	**Energy saving cycle duration on working days:** (00h00min to 24h00min) sets the duration of the Energy Saving cycle on working days.
iSE	**Energy saving cycle starting time on weekends:** 00h00min to 23h50min
dSE	**Energy saving cycle duration on weekends:** 00h00min to 24h00min
dd1…dd6	**Daily defrost enabled:** (n; Y) to enable the **Ld1 to Ld6** defrost operations for any day of the week. • **dd1** = Sunday defrost • **dd2** = Monday defrost • **dd3** = Tuesday defrost • **dd4** = Wednesday defrost • **dd5** = Thursday defrost • **dd6** = Friday defrost • **dd7** = Sunday defrost
Ld1…Ld6	**Defrost starting time:** (00h00min to 23h50min) these parameters set the beginning of the programmable defrost cycles during any **ddx** day. Example: when **Ld2=12.4,** the second defrost starts at 12:40 am during working days.

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

SERIAL COMMUNICATION - CoM

Adr	**Serial address:** (1 to 247) device address for Modbus communication
bAU	**Baudrate:** (9.6; 19.2) select the correct baudrate for serial communication

USER INTERFACE - Ui

brd	**Type of keyboard lock:** (UnL; SEL; ALL) • **UnL** = function disabled • **SEL** = only some buttons are locked after **tLC** • **ALL** = all buttons are locked after **tLC**
tLC	**Delay before keyboard lock:** (0 to 255 sec) this delay is used after power-on to lock some functions of the keyboard.
onC	**ONOFF button configuration:** (nU; oFF; ES; SEr) • **nU** = not used • **oFF** = to switch on and off the device • **ES** = energy saving mode
on2	**ONOFF button timed configuration (3 sec):** (nU; oFF; ES) • **nU** = disabled • **oFF** = to switch on and off the device • **ES** = energy saving mode
LGC	**Light button configuration:** (nU; oFF; ES; SEr) • **nU** = not used • **LiG** = to switch on and off the light output • **AUS** = acts on the auxiliary output
LG2	**Light button timed configuration (3 sec):** (nU; oFF; ES) • **nU** = not used • **LiG** = to switch on and off the light output • **AUS** = acts on the auxiliary output • **Lnt** = to swap the parameter map between "Lt" and "nt" • **CC** = to load the default factory settings
dFC	**Defrost button configuration:** (nU; oFF; ES; SEr) • **nU** = not used • **Pb2** = to quickly visualize the current values of probe P2 • **AUS** = acts on the auxiliary output
dF2	**Defrost button timed configuration (3 sec):** (nU; oFF; ES) • **nU** = disabled • **dEF** = to start a defrost • **AUS** = acts on the auxiliary output
dn2	**Down button timed configuration (3 sec):** (nU; Std; Lnt; ALr; Pnd) • **nU** = not used • **Std** = lower temperature value • **Lnt** = configuration map change • **Pdn** = force Pull Down mode
UP2	**UP button timed configuration (3 sec):** (nU; Std; CC; ALr; Pnd) • **nU** = not used • **Std** = higher temperature value • **CC** = to load the default factory settings • **Pnd** = force Pull Down mode

Info Menu - Info

dP1	**Probe P1 value visualization**
dP2	**Probe P2 value visualization**
dP3	**Probe P3 value visualization**
dP4	**Probe P4 value visualization**
SPd	**Instantaneous compressor speed (RPM * 10)**
rSE	**Real regulation Set Point**
rEL	**Firmware release: progressive number**
Ptb	**Parameter map version**

16 DIGITAL INPUT

The free voltage digital inputs are programmable in different configurations by the **i1F or i2F** parameters.

16.1 DOOR SWITCH INPUT (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 is rtr = yES.** 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.

16.2 GENERIC ALARM (EAL)

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

16.3 SERIOUS ALARM MODE (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.

16.4 PRESSURE SWITCH (PAL)

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

16.5 AUXILIARY OUTPUT CONTROL (AUS)

To activate and deactivate the auxiliary output

16.6 DEFROST CONTROL (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.

16.7 ENERGY SAVING (ES)

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

16.8 HOLIDAY MODE (HdF)

Holiday mode activation.

16.9 REMOTE LIGHT CONTROL (LIG)

To manage the light activation from remote.

16.10 REMOTE ON OFF (onF)

To issue a remote ON/OFF command.

16.11 PARAMETER MAP CHANGE (Lnt)

To change the used parameter map from **nt** (first configuration or "normal temperature") to **Lt** (second configuration or "low temperature") and vice-versa.

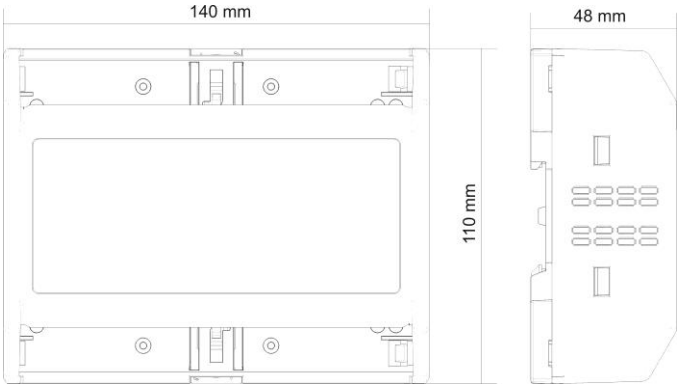
16.12 DIGITAL INPUTS POLARITY

The digital input polarity depends on the **i1P** or **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

17 HOW TO INSTALL AND MOUNT

The controller **XWi70K** shall be mounted in a din rail and in a horizontal position or with the relay output on the bottom side (IEC/60730).
It must be connected to the keyboard by using a 2-wire cable (∅ 1mm). 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 the air free to circulate by the aeration holes.

17.1 XWi70K – 8 DIN CASE - DIMENSIONS



18 ELECTRICAL CONNECTIONS

XWi70K is provided with screw terminal blocks to connect cables with a cross section up to 2.5 mm^2 for the RS485 (optional) and the keyboard. To connect the other inputs, power supply and relays, **XWi70K** is provided with Plug-in connections (6.3mm). Heat-resistant cables must be used. Before connecting cables make sure the power supply complies with the instrument's requirements. Separate the probe cables from the power supply cables, from the outputs and the power connections. Do not exceed the maximum current allowed, in case of heavier loads use a suitable external relay.
NOTE:
- **The maximum current allowed for the common line of the relays is 14A (IEC/60730)**
- **The maximum current allowed for insulated relay (oA5) is 3A (IEC/60730)**

18.1 PROBE CONNECTIONS

The probes shall be mounted with the bulb upwards to prevent damages due to 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.

19 TTL/RS485 SERIAL LINE

The TTL connector allows, by means of the external module TTL/RS485 **(XJ485CX)**, to connect the unit to a network line **ModBUS-RTU** compatible as the **Dixell** monitoring system. The same TTL connector is used to upload and download the parameter list of the "**HOT-KEY**".

20 HOW TO USE OF THE "HOT KEY"

NOTE: the XWi controllers need a 64KB HOT KEY (Dixell code: **DK00000300**). Standard Hot Key is not supported.

20.1 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.

20.2 HOT TO CHANGE PARAMETER MAP BY USING AN HOT-KEY (DOWNLOAD)

1. Turn OFF the instrument.
2. Insert a **pre-programmed** "**HOT-KEY**" **into the 5-PIN port** 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.

21 INTERNAL MEMORY

The controller has an internal memory where are stored:
- Parameter maps **nt** and **Lt**
- Factory default configurations for both **nt** and **Lt** parameters map

The controller is always shipped with:
- Parameter map **nt** = factory default configuration "**nt**"
- Parameter map **Lt** = factory default configuration "**Lt**"

Any modification to parameter map **nt** or **Lt** does not change factory values.
It will be possible to restore factory defaults values for **nt** or **Lt** parameters map by using **UP2=CC** function.

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

22 ALARM SIGNALS

Message	Cause	Outputs
P1	Thermostat probe failure	Alarm output ON; Compressor output according to parameters **Con** and **CoF**
P2	Second probe failure	Alarm output ON; Other outputs unchanged
P3	Third probe failure	Alarm output ON; Other outputs unchanged
P4	Fourth probe failure	Alarm output ON; Other outputs unchanged
HA	Maximum temperature alarm	Alarm output ON; Other outputs unchanged
LA	Minimum temperature alarm	Alarm output ON; Other outputs unchanged
HA2	Condenser high temperature	It depends on the **AC2** parameter
LA2	Condenser low temperature	It depends on the **bLL** parameter
dA	Door open	Compressor and fans restarts
EA	Warning	Output unchanged
CA	Lock alarm (i1F=bAL)	All outputs OFF
CA	Pressure switch alarm (i1F=PAL)	All outputs OFF
EE	Data or memory failure	Alarm output ON; Other outputs unchanged
noL	No communication between base and keyboard	Unchanged
EC1	VSC communication error	Unchanged

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

22.1 SERIAL COMPRESSOR AND MODBUS FAN MANAGEMENT

The following table shows the managed alarms and errors when the serial compressor or the serial fan control is used.
- **EMB1 or 2:** indication valid for Embraco compressor 1 or 2
- **SCP1 or 2:** indication valid for SECOP compressor 1 or 2

Message	Cause	Outputs
EC1	EMB1 or 2: communication error	Regulation stopped, retry function active
CP1, CP2	EMB1 or 2: compressor stopped	Regulation stopped, retry function active
HP1, HP2	EMB1 or 2: start fail	Regulation stopped, retry function active
E11, E21	EMB1 or 2: overload	Regulation stopped, retry function active
E12, E22	EMB1 or 2: under speed	Regulation stopped, retry function active
E13, E23	EMB1 or 2: wrong rotor position	Regulation stopped, power off required
E14, E24	EMB1 or 2: short circuit	Regulation stopped, power off required
HT1, HT2	EMB1 or 2: high temperature	Regulation stopped, retry function active
EC2	SCP1 or 2: communication error	Regulation stopped, retry function active
EV1, EV2	SCP1 or 2: voltage error	Regulation stopped, retry function active
EM1, EM2	SCP1 or 2: motor error	Regulation stopped, retry function active
ET1, ET2	SCP1 or 2: internal temperature error	Regulation stopped, retry function active
CSr	Condenser fan maintenance	Unchanged, warning reset required

22.2 BUZZER MUTING

Once the alarm signal is detected the buzzer can be silenced by pressing any key. Buzzer is mounted in the keyboard and it is an option.

22.3 "EE" ALARM

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

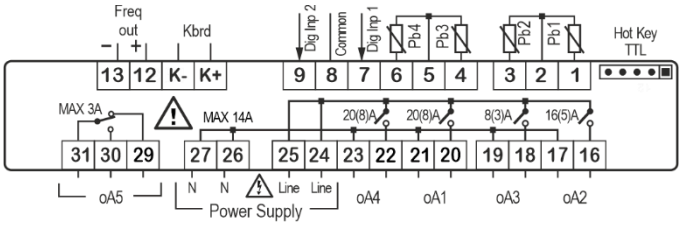
22.4 ALARM RECOVERY

Probe alarms: "**P1**" (probe1 faulty), "**P2**", "**P3**" and "**P4**"; they automatically stop 10 sec after the probe restarts normal operation. Check connections before replacing the probe.
Temperature alarms "**HA**", "**LA**" "**HA2**" and "**LA2**" automatically stop as soon as the temperature returns to normal values.
Alarms **"EA"** and **"CA"** (with **i1F=bAL**) recovers as soon as the digital input is disabled.
Alarm "**CA**" (with **i1F=PAL**) recovers only by **switching off and on** the instrument.

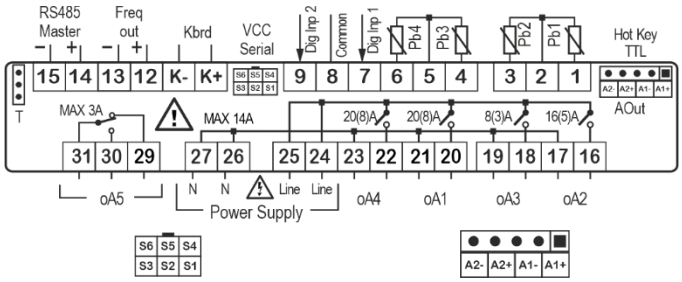
23 WIRING DIAGRAMS

Depending on the specific model, some I/O's could be present or not. The below diagrams refer to most common models.

23.1 XWi70K – STANDARD VERSION



23.2 XWi70K – FULL VERSION



23.3 PIN DESCRIPTION

I/O	DESCRIPTION
oA1 to oA5	Relay outputs
K+	Keyboard connector, positive line
K-	Keyboard connector, negative line
Pb1 to Pb4	Temperature probes
Dig Inp 1	Digital input 1
Dig Inp 2	Digital input 2
Hot Key / TTL	Hotkey connector and slave serial port (TTL levels)
VCC Serial	VCC serial port, special cables required
Line	Power Supply "Line"
N	Power Supply "Neutral"
T	Termination line for 2-wire RS485 Master
S1 to S6	I/O for serial compressor control
AOut: A1+	Analogue output 1, positive pin
AOut: A1-	Analogue output 1, negative pin
AOut: A2+	Analogue output 2, positive pin
AOut: A2-	Analogue output 2, negative pin
Freq out +	Frequency output, positive pin (max current 10mA)
Freq out -	Frequency output, negative pin (max current 10mA)
RS485 Master +	2-wire RS485 port, positive line
RS485 Master -	2-wire RS485 port, negative line

24 DEFAULT PARAMETER MAPS

24.1 LT

Label	Description	Value	Level	UOM
SEt	Setpoint	-10		°F
LS	Minimum Set point	-18	Pr1	°F
US	Maximum Set point	42	Pr1	°F
Hy	Compressor regulation differential in normal mode	1	Pr1	°F
Hy1	Variable Speed Compressor Differential in normal mode	4	Pr1	°F
odS	Output activation delay at start-up	0	Pr1	min
AC	Anti-short cycle delay	2	Pr1	sec
AC1	Anti-short cycle delay (2nd compressor)	0	Pr2	sec
2CC	Activation mode for 2nd compressor: HAF=step logic; FUL=delayed	HAF	Pr2	
rCC	Enable compressor rotation	no	Pr2	
MCo	Maximum time with compressor on (0=disabled)	0	Pr2	min
rtr	Regulation percentage=F(P1; P2) (100=P1; 0=P2)	100	Pr2	
CCt	Maximum duration for Pull Down	04:00	Pr1	hour
CCS	Pull Down phase differential (SET+CCS or SET+HES+CCS)	1	Pr1	°F
oHt	Threshold for automatic activation of Pull Down in normal mode (SET+HY+oHt)	10	Pr1	°F
Con	Compressor ON time with faulty probe	30	Pr1	min
CoF	Compressor OFF time with faulty probe	10	Pr1	min
PbC	Probe selection	ntC	Pr2	
ot	Probe P1 calibration	0	Pr1	°F
P2P	Probe P2 presence	yes	Pr1	
oE	Probe P2 calibration	0	Pr1	°F
P3P	Probe P3 presence	yes	Pr2	
o3	Probe P3 calibration	0	Pr2	°F
P4P	Probe P4 presence	no	Pr2	
o4	Probe P4 calibration	0	Pr2	°F
FMi	Minimum value for Variable Speed Compressor (RPM * 10)	159	Pr2	RPM*10
FMA	Maximum value for Variable Speed Compressor (RPM * 10)	450	Pr2	RPM*10
EMi	Minimum value for Variable Speed Compressor in energy saving mode (RPM * 10)	159	Pr2	RPM*10
EMA	Maximum value for Variable Speed Compressor in energy saving mode (RPM * 10)	450	Pr2	RPM*10
Fr0	Output value when Variable Speed Compressor is OFF	0	Pr2	RPM*10
tSt	PI regulator: temperature sampling time	01:00	Pr2	sec
iSt	PI regulator: integral sampling time	01:00	Pr2	sec
vdC	Type of Variable Speed Compressor	vC1	Pr2	
voS	Signal output variation for Variable Speed Compressor (SET-HY≤T≤SET+HY)	3	Pr2	RPM*10
vo2	Signal output variation for Variable Speed Compressor (SET-HY-HY1≤T<SET-HY e SET+HY<T≤SET+HY+HY1)	6	Pr2	RPM*10
vo3	Signal output variation for Variable Speed Compressor (SET-HY-HY1<T e T>SET+HY+HY1)	9	Pr2	RPM*10
PdP	Variable Speed Compressor (in percentage) during any Pull Down	100	Pr2	%
SPi	Compressor speed (in %) in case of any probe error during Con interval	80	Pr2	%
Aod	Compressor speed (in %) during any defrost cycle (valid if tdf=in)	100	Pr2	%
AoF	Compressor speed during any pre-defrost phase (valid if tdf=in)	100	Pr2	%
tHv	PI regulator: max interval for output variation	120	Pr2	sec
tLv	PI regulator: min interval for output variation	20	Pr2	sec
rSr	PI regulator: range for output value calculation (RPM * 10)	20	Pr2	RPM*10
Str	PI regulator: delay before range drift	60	Pr2	sec
dPt	PI regulator: divisor for PI response time reduction (acts on both par. tSt and iSt)	2	Pr2	
CMn	Continuous control ON in normal mode	no	Pr2	
CME	Continuous control ON in energy saving	yes	Pr2	
MnP	Compressor speed threshold to activate lubrication (valid only for variable speed compressors, 0=disabled)	nu	Pr2	%
tMi	Time range with compressor speed below MnP to activate lubrication cycle	00:00	Pr2	hour
tMA	Time range with compressor speed at 100% to activate lubrication cycle	0	Pr2	min
A00	Number of serial controlled compressors	2	Pr2	
A01	Serial address for compressor 1	1	Pr2	
A02	Serial address for compressor 2	2	Pr2	
S00	Number of serial condenser fans (0=disabled)	0	Pr2	

C01	Serial address for condenser fan 1	1	Pr2	
C02	Serial address for condenser fan 2	2	Pr2	
C03	Serial address for condenser fan 3	3	Pr2	
C04	Serial address for condenser fan 4	4	Pr2	
F12	Serial baudrate for condenser fan (kbaud)	19.2	Pr2	kBaud
SFr	Direction of rotation for condenser fan	Lt	Pr2	
tCC	Time with condenser efficiency function activated	30	Pr2	sec
CdF	Default configuration sent to condenser fan (at power on)	no	Pr2	
CF	Temperature measurement unit: Celsius; Fahrenheit	°F	Pr1	
rES	Temperature resolution: decimal, integer	dE	Pr1	
rEd	Remote keyboard visualization	dtr	Pr1	
dLy	Temperature display delay (resolution 10 sec)	00:00	Pr1	min
dtr	Probe visualization percentage=F(P1;P2) (ex: dtr=1 means VALUE=0.01*P1+0.99*P2)	99	Pr1	
EdF	Defrost mode	in	Pr2	
tdF	Defrost type: electric heating, hot gas	in	Pr1	
dFP	Probe selection for defrost control	P3	Pr1	
dSP	Probe selection for 2nd defrost control	P2	Pr2	
dtE	End defrost temperature	45	Pr1	°F
dtS	End 2nd defrost temperature	45	Pr2	°F
idF	Interval between two successive defrost cycles	4	Pr1	hour
MdF	Maximum length of defrost cycle	10	Pr1	min
MdS	Maximum length of 2nd defrost cycle	10	Pr2	min
dSd	Start defrost delay	0	Pr1	sec
StC	Compressor off-cycle before starting any defrost	0	Pr1	sec
dFd	Displaying during defrost	dEF	Pr1	
dAd	Temperature display delay after any defrost cycle	10	Pr1	min
Fdt	Draining time	2	Pr1	min
Hon	Drain heater enabled after draining time (par. Fdt)	0	Pr2	min
SAt	Defrost cycle enebled at stat-up	8	Pr2	min
dPo	Sampling time to calculate the average compressor speed before any desfrost cycle	no	Pr2	
dAF	Pre-defrost time	0	Pr1	min
od1	Automatic defrost (at the beginning of any energy saving)	no	Pr2	
od2	Optimized defrost	no	Pr2	
Syd	Tipe of synchronized defrost	nU	Pr2	
dt1	Differential temperature for latent heating control	0,2	Pr2	°C
ndE	Number of connected controllers for random refrost (Syd=rnd)	1	Pr2	
FAP	Probe selection for evaporator fan	P3	Pr1	
FSt	Evaporator fan stop temperature	50	Pr1	°F
HyF	Evaporator fan regulator differential	2	Pr1	°F
FnC	Evaporator fan operating mode	O_n	Pr1	
Fnd	Evaporator fan delay after defrost cycle	4	Pr1	min
FCt	Differential temperature for cyclic activation of evaporator fans (0=disabled)	0	Pr1	°F

Fon	Evaporator fan ON time in normal mode (with compressor OFF)	0	Pr2	min
FoF	Evaporator fan OFF time in normal mode (with compressor OFF)	0	Pr2	min
LA1	Maintenance interval for evaporator fans (tens of hours)	0	Pr2	hour *100
rS1	Maintenance function reset	no	Pr2	
FAC	Probe selection for condenser fan	nP	Pr2	
St2	Set Point 2 Regulation (for condenser fan)	15	Pr2	°F
Hy2	Set Point 2 differential (for condenser fan)	20	Pr2	°F
FCC	Condenser fan operating mode	O_n	Pr1	
FCo	Condenser fan deactivation delay	0	Pr1	sec
LA2	Condenser fan working hours (x100) for maintenance alarm	0	Pr2	hour *100
rS2	Condenser fan maintenance alarm reset	no	Pr2	
CMi	Minimum speed for condenser fan	20	Pr2	%
CMA	Maximum speed for condenser fan	100	Pr2	%
CSS	Safety speed for condenser fan	100	Pr2	%
ACH	Type of control for auxiliary regulator	CL	Pr1	
SAA	Set point for auxiliary regulator	100	Pr1	°F
SHy	Auxiliary regulator differential	1	Pr1	°F
ArP	Probe selection for auxiliary regulator	nP	Pr1	
Sdd	Auxiliary regulator disabled during any defrost cycle	no	Pr1	
btA	Base time for parameters Ato and AtF	Min	Pr1	
Ato	Interval of time with auxiliary output ON	5	Pr1	min
AtF	Interval of time with auxiliary output OFF	175	Pr1	min
1An	Type of analogue output 1	Vlt	Pr1	
1oL	Minimum value for analogue output 1	0	Pr1	%
1oH	Maximum value for analogue output 1	80	Pr1	%
1At	Interval of time with analogue output 1 (maximum value)	0	Pr1	sec
2An	Type of analogue output 2	Vlt	Pr1	
2oL	Minimum value for analogue output 2	0	Pr1	%
2oH	Maximum value for analogue output 2	80	Pr1	%
2At	Interval of time with analogue output 2 (maximum value)	0	Pr1	sec
ALP	Probe selection for temperature alarms	nP	Pr1	
ALC	Temperature alarms configuration: relative, absolute	Ab	Pr1	
ALU	High temperature alarm	100	Pr1	°F
ALL	Low temperature alarm	0	Pr1	°F
AFH	Temperature alarm differential	10	Pr1	°F
ALd	Temperature alarm delay	30	Pr1	min
dot	Temperature alarm delay with open door	5	Pr1	min
dAo	Temperature alarm delay at start-up	05:00	Pr1	hour
AP2	Probe selection for 2nd temperature alarm	nP	Pr2	
AL2	2nd low temperature alarm	-140	Pr2	°F
AU2	2nd high temperature alarm	300	Pr2	°F
AH2	2nd temperature alarm differential	20	Pr2	°F

Ad2	2nd temperature alarm delay	1	Pr2	min
dA2	2nd temperature alarm delay at start-up	04:00	Pr2	hour
dE2	Temperature alarm 2 disabled during every defrost and dripping phase	nU	Pr2	
bLL	Compressor OFF due to 2nd low temperature alarm	no	Pr2	
AC2	Compressor OFF due to 2nd high temperature alarm	yes	Pr1	
SAF	Differential for anti-freezing control	30	Pr1	°F
tbA	Alarm relay deactivation	yes	Pr1	
bUM	Buzzer muting	yes	Pr1	
oA1	Relay output oA1 configuration	dEF	Pr2	
oA2	Relay output oA2 configuration	FAn	Pr2	
oA3	Relay output oA3 configuration	CP1	Pr2	
oA4	Relay output oA4 configuration	dF2	Pr2	
oA5	Relay output oA5 configuration	Cnd	Pr2	
1Ao	Analogue output 1 configuration	nU	Pr2	
2Ao	Analogue output 2 configuration	nU	Pr2	
3Ao	Analogue output 3 configuration	nU	Pr2	
AoP	Alarm relay polarity	CL	Pr1	
i1P	Digital input 1 polarity	CL	Pr1	
i1F	Digital input 1 configuration	EAL	Pr1	
did	Digital inputs 1 alarm delay (base time depends on par. ibt)	0	Pr1	min
i2P	Digital input 2 polarity	CL	Pr1	
i2F	Digital input 2 configuration	dor	Pr1	
d2d	Digital inputs 2 alarm delay (base time depends on par. ibt)	0	Pr1	min
nPS	Number of external pressure switch alarms before stopping the regulation	15	Pr2	
odC	Compressor and fan status after door opening	no	Pr2	
rrd	Regulation restart after door alarm	no	Pr2	
HES	Temperature differential in energy saving	1	Pr1	°F
ESt	Energy saving timeout	24	Pr1	hour
LdE	Energy saving controls the lights (lights OFF when energy saving goes active)	no	Pr1	
LHt	Maximum duration for light output on	0	Pr1	min
HUr	Hours		Pr1	
Min	Minutes		Pr1	
dAy	Day of the week		Pr1	
dyM	Day of the month		Pr1	
Mon	Month		Pr1	
yAr	Year		Pr1	
Hd1	First day of weekend	nu	Pr1	
Hd2	2nd day of weekend	nu	Pr1	
iLE	Energy saving cycle starting time on working days	00:00	Pr1	hour
dLE	Energy saving cycle duration on working days	00:00	Pr1	hour
iSE	Energy saving cycle starting time on weekends	00:00	Pr1	hour
dSE	Energy saving cycle duration on weekends	00:00	Pr1	hour

dd1	Sunday defrost	no	Pr1	
dd2	Monday defrost	no	Pr1	
dd3	Tuesday defrost	no	Pr1	
dd4	Wednesday defrost	no	Pr1	
dd5	Thursday defrost	no	Pr1	
dd6	Friday defrost	no	Pr1	
dd7	Saturday defrost	no	Pr1	
Ld1	1st defrost starting time	nu	Pr1	hour
Ld2	2nd defrost starting time	nu	Pr1	hour
Ld3	3rd defrost starting time	nu	Pr1	hour
Ld4	4th defrost starting time	nu	Pr1	hour
Ld5	5th defrost starting time	nu	Pr1	hour
Ld6	6th defrost starting time	nu	Pr1	hour
Adr	Serial address	1	Pr1	
bAU	Baudrate	9.6	Pr1	
brd	Type of keyboard lock	UnL	Pr2	
tLC	Delay before keyboard lock	120	Pr2	min
onC	ONOFF button configuration (right lower side)	ES	Pr2	
on2	ONOFF button timed (3sec) configuration (right lower side)	oFF	Pr2	
dn2	Down button timed (3sec) configuration	nU	Pr2	
UP2	UP button timed (3sec) configuration	nU	Pr2	
dP1	Probe P1 value visualization		Pr1	°F
dP2	Probe P2 value visualization		Pr1	°F
dP3	Probe P3 value visualization		Pr1	°F
dP4	Probe P4 value visualization		Pr1	°F
SPd	Instantaneous compressor speed (RPM * 10)		Pr1	%
rSE	Real regulation Set Point (SET + HES + SETd)		Pr1	°F
rEL	Firmware release		Pr1	
Ptb	Parameter map version	0	Pr1	

24.2 NT

Label	Description	Value	Level	UOM
SEt_nt	Setpoint	3.0		°C
LS_nt	Minimum Set point	-50.0	Pr1	°C
US_nt	Maximum Set point	50.0	Pr1	°C
Hy_nt	Compressor regulation differential in normal mode	0.5	Pr1	°C
Hy1_nt	Variable Speed Compressor Differential in normal mode	1.0	Pr1	°C
odS_nt	Output activation delay at start-up	1	Pr1	min
AC_nt	Anti-short cycle delay	1	Pr1	sec
AC1_nt	Anti-short cycle delay (2nd compressor)	15	Pr2	sec
2CC_nt	Activation mode for 2nd compressor: HAF=step logic; FUL=delayed	HAF	Pr2	
rCC_nt	Enable compressor rotation	yes	Pr2	

MCo_nt	Maximum time with compressor on (0=disabled)	0	Pr2	min
rtr_nt	Regulation percentage=F(P1; P2) (100=P1; 0=P2)	100	Pr2	
CCt_nt	Maximum duration for Pull Down	01:00	Pr1	hour
CCS_nt	Pull Down phase differential (SET+CCS or SET+HES+CCS)	1.0	Pr1	°C
oHt_nt	Threshold for automatic activation of Pull Down in normal mode (SET+HY+oHt)	10.0	Pr1	°C
Con_nt	Compressor ON time with faulty probe	10	Pr1	min
CoF_nt	Compressor OFF time with faulty probe	5	Pr1	min
PbC_nt	Probe selection	ntC	Pr2	
ot_nt	Probe P1 calibration	0.0	Pr1	°C
P2P_nt	Probe P2 presence	yes	Pr1	
oE_nt	Probe P2 calibration	0.0	Pr1	°C
P3P_nt	Probe P3 presence	no	Pr2	
o3_nt	Probe P3 calibration	0.0	Pr2	°C
P4P_nt	Probe P4 presence	yes	Pr2	
o4_nt	Probe P4 calibration	0.0	Pr2	°C
FMi_nt	Minimum value for Variable Speed Compressor (RPM * 10)	200	Pr2	RPM*10
FMA_nt	Maximum value for Variable Speed Compressor (RPM * 10)	450	Pr2	RPM*10
EMi_nt	Minimum value for Variable Speed Compressor in energy saving mode (RPM * 10)	200	Pr2	RPM*10
EMA_nt	Maximum value for Variable Speed Compressor in energy saving mode (RPM * 10)	450	Pr2	RPM*10
Fr0_nt	Output value when Variable Speed Compressor is OFF	0	Pr2	RPM*10
tSt_nt	PI regulator: temperature sampling time	01:00	Pr2	sec
iSt_nt	PI regulator: integral sampling time	02:00	Pr2	sec
vdC_nt	Type of Variable Speed Compressor	vC1	Pr2	
voS_nt	Signal output variation for Variable Speed Compressor (SET-HY≤T≤SET+HY)	3	Pr2	RPM*10
vo2_nt	Signal output variation for Variable Speed Compressor (SET-HY-HY1≤T<SET-HY e SET+HY<T≤SET+HY+HY1)	6	Pr2	RPM*10
vo3_nt	Signal output variation for Variable Speed Compressor (SET-HY-HY1<T e T>SET+HY+HY1)	9	Pr2	RPM*10
PdP_nt	Variable Speed Compressor (in percentage) during any Pull Down	100	Pr2	%
SPi_nt	Compressor speed (in %) in case of any probe error during Con interval	80	Pr2	%
Aod_nt	Compressor speed (in %) during any defrost cycle (valid if tdf=in)	100	Pr2	%
AoF_nt	Compressor speed during any pre-defrost phase (valid if tdf=in)	0	Pr2	%
tHv_nt	PI regulator: max interval for output variation	30	Pr2	sec
tLv_nt	PI regulator: min interval for output variation	10	Pr2	sec
rSr_nt	PI regulator: range for output value calculation (RPM * 10)	90	Pr2	RPM*10
Str_nt	PI regulator: delay before range drift	60	Pr2	sec
dPt_nt	PI regulator: divisor for PI response time reduction (acts on both par. tSt and iSt)	1	Pr2	
CMn_nt	Continuous control ON in normal mode	yes	Pr2	
CME_nt	Continuous control ON in energy saving	yes	Pr2	
MnP_nt	Compressor speed threshold to activate lubrication (valid only for variable speed compressors, 0=disabled)	nu	Pr2	%
tMi_nt	Time range with compressor speed below MnP to activate lubrication cycle	00:00	Pr2	hour
tMA_nt	Time range with compressor speed at 100% to activate lubrication cycle	0	Pr2	min

A00_nt	Number of serial controlled compressors	2	Pr2	
A01_nt	Serial address for compressor 1	1	Pr2	
A02_nt	Serial address for compressor 2	2	Pr2	
S00_nt	Number of serial condenser fans (0=disabled)	0	Pr2	
C01_nt	Serial address for condenser fan 1	1	Pr2	
C02_nt	Serial address for condenser fan 2	2	Pr2	
C03_nt	Serial address for condenser fan 3	3	Pr2	
C04_nt	Serial address for condenser fan 4	4	Pr2	
F12_nt	Serial baudrate for condenser fan (kbaud)	19.2	Pr2	kBaud
SFr_nt	Direction of rotation for condenser fan	Lt	Pr2	
tCC_nt	Time with condenser efficiency function activated	5	Pr2	sec
CdF_nt	Default configuration sent to condenser fan (at power on)	no	Pr2	
CF_nt	Temperature measurement unit: Celsius; Fahrenheit	°C	Pr1	
rES_nt	Temperature resolution: decimal, integer	dE	Pr1	
rEd_nt	Remote keyboard visualization	P1	Pr1	
dLy_nt	Temperature display delay (resolution 10 sec)	00:00	Pr1	min
dtr_nt	Probe visualization percentage=F(P1;P2) (ex: dtr=1 means VALUE=0.01*P1+0.99*P2)	99	Pr1	
EdF_nt	Defrost mode	rtC	Pr2	
tdF_nt	Defrost type: electric heating, hot gas	EL	Pr1	
dFP_nt	Probe selection for defrost control	P2	Pr1	
dSP_nt	Probe selection for 2nd defrost control	nP	Pr2	
dtE_nt	End defrost temperature	12.0	Pr1	°C
dtS_nt	End 2nd defrost temperature	10.0	Pr2	°C
idF_nt	Interval between two successive defrost cycles	24	Pr1	hour
MdF_nt	Maximum length of defrost cycle	20	Pr1	min
MdS_nt	Maximum length of 2nd defrost cycle	0	Pr2	min
dSd_nt	Start defrost delay	1	Pr1	sec
StC_nt	Compressor off-cycle before starting any defrost	1	Pr1	sec
dFd_nt	Displaying during defrost	dEF	Pr1	
dAd_nt	Temperature display delay after any defrost cycle	0	Pr1	min
Fdt_nt	Draining time	5	Pr1	min
Hon_nt	Drain heater enabled after draining time (par. Fdt)	0	Pr2	min
SAt_nt	Defrost cycle enebled at stat-up	10	Pr2	min
dPo_nt	Sampling time to calculate the average compressor speed before any desfrost cycle	no	Pr2	
dAF_nt	Pre-defrost time	0	Pr1	min
od1_nt	Automatic defrost (at the beginning of any energy saving)	no	Pr2	
od2_nt	Optimized defrost	no	Pr2	
Syd_nt	Tipe of synchronized defrost	nU	Pr2	
dt1_nt	Differential temperature for latent heating control	0,2	Pr2	°C
ndE_nt	Number of connected controllers for random refrost (Syd=rnd)	1	Pr2	
FAP_nt	Probe selection for evaporator fan	nP	Pr1	
FSt_nt	Evaporator fan stop temperature	20.0	Pr1	°C

HyF_nt	Evaporator fan regulator differential	5.0	Pr1	°C
FnC_nt	Evaporator fan operating mode	C_n	Pr1	
Fnd_nt	Evaporator fan delay after defrost cycle	1	Pr1	min
FCt_nt	Differential temperature for cyclic activation of evaporator fans (0=disabled)	0	Pr1	°C
Fon_nt	Evaporator fan ON time in normal mode (with compressor OFF)	1	Pr2	min
FoF_nt	Evaporator fan OFF time in normal mode (with compressor OFF)	1	Pr2	min
LA1_nt	Maintenance interval for evaporator fans (tens of hours)	0	Pr2	hour *100
rS1_nt	Maintenance function reset	no	Pr2	
FAC_nt	Probe selection for condenser fan	nP	Pr2	
St2_nt	Set Point 2 Regulation (for condenser fan)	15.0	Pr2	°C
Hy2_nt	Set Point 2 differential (for condenser fan)	20.0	Pr2	°C
FCC_nt	Condenser fan operating mode	C_n	Pr1	
FCo_nt	Condenser fan deactivation delay	20	Pr1	sec
LA2_nt	Condenser fan working hours (x100) for maintenance alarm	0	Pr2	hour *100
rS2_nt	Condenser fan maintenance alarm reset	no	Pr2	
CMi_nt	Minimum speed for condenser fan	20	Pr2	%
CMA_nt	Maximum speed for condenser fan	100	Pr2	%
CSS_nt	Safety speed for condenser fan	80	Pr2	%
ACH_nt	Type of control for auxiliary regulator	CL	Pr1	
SAA_nt	Set point for auxiliary regulator	0.0	Pr1	°C
SHy_nt	Auxiliary regulator differential	5.0	Pr1	°C
ArP_nt	Probe selection for auxiliary regulator	nP	Pr1	
Sdd_nt	Auxiliary regulator disabled during any defrost cycle	yes	Pr1	
btA_nt	Base time for parameters Ato and AtF	Min	Pr1	
Ato_nt	Interval of time with auxiliary output ON	0	Pr1	min
AtF_nt	Interval of time with auxiliary output OFF	0	Pr1	min
1An_nt	Type of analogue output 1	Vlt	Pr1	
1oL_nt	Minimum value for analogue output 1	5	Pr1	%
1oH_nt	Maximum value for analogue output 1	100	Pr1	%
1At_nt	Interval of time with analogue output 1 (maximum value)	5	Pr1	sec
2An_nt	Type of analogue output 2	Vlt	Pr1	
2oL_nt	Minimum value for analogue output 2	5	Pr1	%
2oH_nt	Maximum value for analogue output 2	100	Pr1	%
2At_nt	Interval of time with analogue output 2 (maximum value)	5	Pr1	sec
ALP_nt	Probe selection for temperature alarms	nP	Pr1	
ALC_nt	Temperature alarms configuration: relative, absolute	Ab	Pr1	
ALU_nt	High temperature alarm	150.0	Pr1	°C
ALL_nt	Low temperature alarm	-100.0	Pr1	°C
AFH_nt	Temperature alarm differential	5.0	Pr2	°C
ALd_nt	Temperature alarm delay	0	Pr1	min
dot_nt	Temperature alarm delay with open door	0	Pr1	min
dAo_nt	Temperature alarm delay at start-up	00:00	Pr1	hour

AP2_nt	Probe selection for 2nd temperature alarm	nP	Pr2	
AL2_nt	2nd low temperature alarm	100.0	Pr2	°C
AU2_nt	2nd high temperature alarm	5.0	Pr2	°C
AH2_nt	2nd temperature alarm differential	5.0	Pr2	°C
Ad2_nt	2nd temperature alarm delay	0	Pr2	min
dA2_nt	2nd temperature alarm delay at start-up	00:00	Pr2	hour
dE2_nt	Temperature alarm 2 disabled during every defrost and dripping phase	nU	Pr2	
bLL_nt	Compressor OFF due to 2nd low temperature alarm	no	Pr2	
AC2_nt	Compressor OFF due to 2nd high temperature alarm	no	Pr2	
SAF_nt	Differential for anti-freezing control	3.0	Pr1	°C
tbA_nt	Alarm relay deactivation	yes	Pr1	
bUM_nt	Buzzer muting	no	Pr1	
oA1_nt	Relay output oA1 configuration	FAn	Pr2	
oA2_nt	Relay output oA2 configuration	Cnd	Pr2	
oA3_nt	Relay output oA3 configuration	LiG	Pr2	
oA4_nt	Relay output oA4 configuration	dEF	Pr2	
oA5_nt	Relay output oA5 configuration	ALr	Pr2	
1Ao_nt	Analogue output 1 configuration	nU	Pr2	
2Ao_nt	Analogue output 2 configuration	nU	Pr2	
3Ao_nt	Analogue output 3 configuration	nU	Pr2	
AoP_nt	Alarm relay polarity	CL	Pr1	
i1P_nt	Digital input 1 polarity	CL	Pr1	
i1F_nt	Digital input 1 configuration	EAL	Pr1	
did_nt	Digital inputs 1 alarm delay (base time depends on par. ibt)	0	Pr1	min
i2P_nt	Digital input 2 polarity	CL	Pr1	
i2F_nt	Digital input 2 configuration	dor	Pr1	
d2d_nt	Digital inputs 2 alarm delay (base time depends on par. ibt)	0	Pr1	min
nPS_nt	Number of external pressure switch alarms before stopping the regulation	0	Pr2	
odC_nt	Compressor and fan status after door opening	F-C	Pr2	
rrd_nt	Regulation restart after door alarm	yes	Pr2	
HES_nt	Temperature differential in energy saving	1	Pr1	°C
ESt_nt	Energy saving timeout	0	Pr1	hour
LdE_nt	Energy saving controls the lights (lights OFF when energy saving goes active)	no	Pr1	
LHt_nt	Maximum duration for light output on	0	Pr1	min
HUr_nt	Hours		Pr1	
Min_nt	Minutes		Pr1	
dAy_nt	Day of the week		Pr1	
dyM_nt	Day of the month		Pr1	
Mon_nt	Month		Pr1	
yAr_nt	Year		Pr1	
Hd1_nt	First day of weekend	nu	Pr1	
Hd2_nt	2nd day of weekend	nu	Pr1	

iLE_nt	Energy saving cycle starting time on working days	00:00	Pr1	hour
dLE_nt	Energy saving cycle duration on working days	00:00	Pr1	hour
iSE_nt	Energy saving cycle starting time on weekends	00:00	Pr1	hour
dSE_nt	Energy saving cycle duration on weekends	00:00	Pr1	hour
dd1_nt	Sunday defrost	no	Pr1	
dd2_nt	Monday defrost	no	Pr1	
dd3_nt	Tuesday defrost	no	Pr1	
dd4_nt	Wednesday defrost	no	Pr1	
dd5_nt	Thursday defrost	no	Pr1	
dd6_nt	Friday defrost	no	Pr1	
dd7_nt	Saturday defrost	no	Pr1	
Ld1_nt	1st defrost starting time	nu	Pr1	hour
Ld2_nt	2nd defrost starting time	nu	Pr1	hour
Ld3_nt	3rd defrost starting time	nu	Pr1	hour
Ld4_nt	4th defrost starting time	nu	Pr1	hour
Ld5_nt	5th defrost starting time	nu	Pr1	hour
Ld6_nt	6th defrost starting time	12:00	Pr1	hour
Adr_nt	Serial address	1	Pr1	
bAU_nt	Baudrate	9.6	Pr1	
brd_nt	Type of keyboard lock	UnL	Pr2	
tLC_nt	Delay before keyboard lock	120	Pr2	min
onC_nt	ONOFF button configuration (right lower side)	ES	Pr2	
on2_nt	ONOFF button timed (3sec) configuration (right lower side)	oFF	Pr2	
dn2_nt	Down button timed (3sec) configuration	nU	Pr2	
UPC_nt	UP button configuration	Std	Pr1	
UP2_nt	UP button timed (3sec) configuration	nU	Pr2	
dP1_nt	Probe P1 value visualization		Pr1	°C
dP2_nt	Probe P2 value visualization		Pr1	°C
dP3_nt	Probe P3 value visualization		Pr1	°C
dP4_nt	Probe P4 value visualization		Pr1	°C
SPd_nt	Instantaneous compressor speed (RPM * 10)		Pr1	%
rSE_nt	Real regulation Set Point (SET + HES + SETd)		Pr1	°C
rEL_nt	Firmware release		Pr1	
Ptb_nt	Parameter map version	0	Pr1	

25 TECHNICAL DATA

FEATURES	DESCRIPTION			
Housing	Self-extinguishing PC			
Dimensions	8-DIN, 140x176x148			
Mounting	DIN rail mounting device			
Degree of Protection	NEMA (UL 50e)	Indoor use, Open Type		
	IP (IEC/EN 60529)	IP00		
Power Supply	230Vac ±10%, 50/60Hz; 110Vac ±10%, 50/60Hz			
Overvoltage Category	III			
Rated Power	110VAC: 10VA; 230VAC: 10VA			
Rated Impulse Voltage	4000V			
Display Supported Models	CH620, V620H, T620x and T820x (x=H or T)			
Software Class	A			
Terminal blocks / Terminal Connections	Plug-in or screw terminal block, wire section between 0,5 and 2,5 mm2 Max tightening force: 0.4 N/m for 5,0mm pitch			
Data Storing	**Real Time Clock:** Data maintenance up to 6 months with lithium battery. **Other parameters:** internal EEPROM.			
Type of Action	1.B			
Pollution Degree	2, non-condensing humidity			
Ambient Operating Temperature and Humidity	IEC/EN	0T50°C; 20-85 rH% (non-condensing humidity)		
	UL-CAN/CSA	-10T50°C; 20-85 rH% (non-condensing humidity)		
Shipping and storage temperature	-40T85°C; 20-85 rH% (non-condensing humidity)			
Resistance to Heat	UL 94 V-0			
Measurement range	**NTC:** -40T110°C, resolution 0.1°C or 1°C (selectable); **PT1000:** -100T150°C, resolution 0.1°C or 1°C (selectable); **PTC:** -50T150°C, resolution 0.1°C or 1°C (selectable)			
Accuracy	±1°C relative to the full scale			
Inputs	4 NTC, PTC or PT1000 (configurable); Up to 2 voltage free contacts			
I/O port	HOT-KEY: MAX voltage allowed is 5 VDC. DO NOT CONNECT ANY EXTERNAL POWER SUPPLY.			
Serial Outputs (*)	TTL standard available on 5-pin port (HOT-KEY connector); 2-wire RS485 with termination; 6-wire for VCC; Maximum cable length = 2m			
Relay Outputs (standard)	**Ref**	**Nominal**	**UL**	**IEC**
	oA1, oA4	SPST 20A, 250VAC	Resistive load 14A, 110/230Vac, 30K cycles Motor load 2HP (12FLA/72LRA), 230Vac, 30K cycles Motor load 1HP (16FLA/96LRA), 110Vac, 30K cycles Motor load 4.9FLA/29.4LRA, 110/230Vac, 30K cycles	14(8)A, 230Vac, 30K cycles
	oA2, oA4	SPST 16A, 250VAC	Resistive load 10A, 230 Vac, 30K cycles	14A (NO), 230Vac, 50K cycles
	oA3	SPST 8A, 250VAC	Resistive load 10A, 110/230Vac, 30K cycles Motor load 1/2HP, 230Vac, 30K cycles Motor load 4.9FLA/29.4LRA (NO), 110/230Vac, 30K cycles	8(3)A (CO), 230Vac, 100K cycles
	oA5	SPDT 7A 250VAC	Resistive load 4A, 250Vac, 100K cycles	4A, 250Vac, 100K cycles
Relay Outputs (optional, on request only)	**oA2**	SPST 8A, 250VAC	Resistive load 10A, 110/230Vac, 30K cycles Motor load 1/2HP, 230Vac, 30K cycles Motor load 4.9FLA/29.4LRA (NO), 110/230Vac, 30K cycles	8(3)A (CO), 230Vac, 100K cycles
	oA2, oA4	SPST 16A inrush, 250VAC	Resistive load 14A, 230Vac, 30K cycles	14A, 230Vac, 50K cycles
	oA3	SPST 10A 250VAC	Resistive load 10A, 230Vac, 50K cycles	10A, 230Vac, 25K cycles
Maximum ampacity	12A Plug-in terminal block, 14A other types, 3A on insulated relay oA5			
Analogue Outputs (*)	**1Ao**	0-10Vdc; Min load = 10k ohm 4-20mA; Max load = 500 ohm		A1+: V+ or I+ A1-: GND or I-
	2Ao	0-10Vdc; Min load = 10k ohm 4-20mA; Max load = 500 ohm		A2+: V+ or I+ A2-: GND or I-
	Freq	Frequency output; Supply max voltage = 5Vdc; Max supply current = 10mA; Duty cycle = 50%; Range = 0 to 166 Hz; Maximum cable length = 2m		12: FREQ+ 13: GND
Purpose of control	Operating control			
Construction of control	Incorporated control, intended to be used in Class I equipment			
Approvals	R290/R600a: relays tested according to IEC EN60079:0 and IEC EN60079:15 IEC/EN 60730-1; IEC/EN 60730-2-9 UL 60730-1; UL 60730-2-9 CAN/CSA-E60730-1; CAN/CSA-E60730-2-9 Tested according to the requirements of the relevant subclauses of IEC/EN 60335-2-89 in conjunction with IEC/EN 60335-1			

(*) Depending on the specific model, some of these I/O could not be present.

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