RIVACOLD
MASTERING COLD

XM670K

Controller for Blocksystem

FA, FT, FS, SF, ST, STH-DF, SP, P, SX, BX, SV

Instructions for use | v. 01

CE

Ownership of information

Requests for authorisations, additional copies of this manual or technical information about it, must be addressed to:

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Contents

1. Introduction

1.1 Warnings

***ATTENTION**: the controller must never be opened.*

***ATTENTION**This manual is an integral part of the product and must be kept with the appliance for quick and easy reference.*

1.2 General description

The XM670K packaged unit controller is designed for medium and low temperature applications.

This instrument can be connected in a local network of up to eight connected units. It can operate, depending on programming, as a single controller or following commands received from other controllers.

The XM670K allows the following functions to be managed:

- defrosting
- synchro display
- synchro set- point
- light control
- cold call command
- temperature probe synchro

The XM670K is equipped with six relay outputs to control:

- compressor
- defrosting (which can be done with hot gas or heaters)
- evaporator fans
- lights
- alarms
- a configurable auxiliary output

The XM670K is equipped with up to three configurable probes for cold room temperature control, end-of-defrosting temperature and general temperature display. Furthermore, it is equipped with three parameter-configurable dry contact digital inputs.

The instruments are equipped with a HOTKEY port for easy programming.

The instrument has an RS485 serial output that allows devices to interface with monitoring and supervision systems via Modbus RTU protocol (E.g.: Carel, Dixell).

The configuration of any probe/digital inputs will vary depending on the type of machine in which the controller is mounted.

1.3 Identification data and information on the manual

1.3.1 Manufacturer's contacts

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1.3.2 Manual data

Title: XM670K - Instructions for use Code: 9600- 0099_controller XM670K Month and year of publication: 11- 2022

1.3.3 Manual updates

Code	Publication date	Updates
9600- 0099	11- 2022	First publication

1.3.4 Documentation provided

***Note**: the controller is mounted on several product ranges. Please refer to the respective Instruction manuals*

Manual	Code	Date
Instructions for use (this manual)	9600- 0099 - 11- 2022	11- 2022

2. Interface

2.1 Control panel

2.1.1 Button description

SET	To view and change the set point. In programming, it allows parameters to be selected and an operation to be confirmed. Pressing and holding the button for 3 s when the maximum or minimum temperature is displayed resets the adjustment.
△	In programming, it allows parameters to be scrolled through and values to be incremented. Pressing and holding the button for more than 3 s activates access to the section menu. Press the button briefly to access the quick access menu
▽	In programming, it allows parameters to be scrolled through and their values to be decreased. By briefly pressing the button, the relay configured as auxiliary (AUS) can be activated or deactivated
❄	Press and hold the button for 3 s to activate manual defrosting
☼	Allows the light to be switched on and off
⏻	Holding the button down for about 3 s switches the instrument from ON to OFF and vice versa.

2.1.2 Description of the display

LED	Steady on	Flashing on
	Compressor enabled	Anti-swaying compressor
	Defrosting active	Dripping
	Alarm	-
	Energy saving Active/ Set reduced	-
	Evaporator fans active	Door open or fan delay after defrosting
°C/°F/	Unit of measurement set	Programming active
	Global operating mode	Remote display mode active
	-	Change clock (if any)

2.2 Control panel operations

2.2.1 Button combination

	Allows the keyboard to be locked or unlocked
SET + 	Grants access to programming
SET + 	Allows instantaneous exit from programming

2.2.2 Entering the quick access menu

1. Press the  button. The first label is displayed.
2. Pressing  or  allows you to navigate through the menu.

2.2.3 Display recorded temperatures

1. Press the ∧ button.
2. Scroll down the menu to the label **L°t and** press **SET** to see the lowest recorded temperature, press **SET** on the **H°t** label to display the maximum recorded temperature.

2.2.4 Display and change set point

1. Press the **SET** button for approx. 3 s: the set point value is displayed. The unit of measurement icons flash.
2. Change the **SET** value by using the ∧ or ∨ buttons.
3. Press the **SET** button again to store the value.

2.2.5 Enabling the manual defrosting cycle

Press the defrosting button for more than 3 seconds.

Note: Only if the conditions are present (i.e. if the value of probe P2 is below the value of **dtE**).

2.2.6 Enter the PR1 programming menu

Press the **SET** + ∨ button combination for a few seconds. The units start flashing and the instrument displays the label of the first parameter present.

2.2.7 Changing the value of a parameter

1. Enter parameter programming.
2. Press the **SET** button to display the parameter value (units start flashing).
3. Press ∧ or ∨ to set the parameter.
4. Press the **SET** button to store the value and move to the next parameter.

   Note: The new programming is stored even if you exit the programming phase by time-out.

2.2.8 OFF Status

By pressing the button ⏻ , the instrument displays “OFF”. In this situation, all relays are deactivated and the control is switched off. If a monitoring system is connected, it will not record any valid data or alarm situations.

Note: In the OFF state, the light relay is active.

3. Special menus

3.1 Quick access

From the quick access menu, you can scroll through the following parameters to view their value.

Parameter	Description
dP1	Probe 1
dP2	Probe 2
dP3	Probe 3
L°t	Minimum temperature recorded by the control probe
H°t	Maximum temperature recorded by the control probe
dPr	Virtual control probe
dPd	Virtual defrosting probe
dPF	Virtual fan management probe
rSE	Control set point (also influenced by activation of energy saving)

3.2 Control privileges

This menu allows the user to access a particular function of the board directly related to local network operation.

A single keyboard, depending on the programming of the instrument, can control both local and remote modules.

ID	Function
LOC	The keyboard only acts on the board to which it is physically connected
SEC	The keyboard acts on the selected tab
ALL	Keyboard commands are sent to all instruments in the local network

4. Inputs and outputs

4.1 Input functionality

The circuit board supports up to three configurable dry contact digital inputs. These inputs are configurable via the corresponding **i#F** parameter.

4.1.1 Digital input table

ID	Description	Detail
EAL	GENERIC ALARM	An alarm is generated after a parameter delay **did** from the activation of the input; the message **EA** is displayed and the status of the outputs is not changed. The alarm reset is automatic as soon as the digital input is switched off.
BAL	BLOCKING ALARM	A lockout alarm is generated after a parameter delay **did** from the activation of the input; the message **CA** is displayed and the control relay outputs are deactivated. The alarm reset is automatic as soon as the digital input is switched off.
PAL	PRESSURE SWITCH	If a number of pressure switch trips equal to the parameter **nPS** is reached within the time period set by parameter **d#d** , the alarm is triggered. The message **PA** is displayed, the compressor is switched off and adjustment is suspended. To resume normal operation, the instrument must be switched off and on again. When the input is active, the compressor is always switched off.
dor	OPEN DOOR	It signals the device to open the cold room door. When the door is opened, the compressor and fans regulate according to the value of the **odc** parameter. After the time set in parameter **d#d**, the door open alarm is activated, the message **dA"** appears on the display. After the alarm signal and the time indicated by the parameter rrd, adjustment resumes. In the open door situation, the high and low temperature alarms are disabled. Furthermore, after the door is closed, the cold room light remains on for one minute (function cannot be changed). The alarm returns automatically as soon as the digital input is switched off.
DEF	DEFROSTING ACTIVATION	Starts a defrosting cycle if conditions are right.
AUS	AUXILIARY ACTIVATION	When the digital input is activated, the auxiliary relay is also activated. When the digital input is switched off, the auxiliary relay is also switched off.
LIG	LIGHT ACTIVATION	Allows the light output to be switched on or off by activating the digital input
ONF	REMOTE ON/OFF	When the digital input is activated, the instrument is switched off. When the digital input is switched off, the instrument is switched on.
HTR	ACTION TYPE REVERSAL	Enables the control mode to be reversed from cold action to hot action
FHU	NOT USED	-
ES	ENERGY-SAVING ACTIVATION	During the energy-saving cycle, the set point is increased by the value contained in **HES** so that the operating set point becomes **SET+HES**. Naturally, the operating set point must be such that it complies with the regulations governing product preservation. The energy-saving cycle continues as long as the input remains active.
HDY	HOLIDAY FUNCTION ACTIVATION	NOT USED

4.2 Output functionality

4.2.1 Compressor

Control is carried out according to the temperature measured by the control probe with a positive differential to the set point. If the temperature reaches and exceeds the set point value plus the differential, the compressor output opens and closes again when the temperature returns to the set point value.

In the event of a probe fault, the compressor is switched on or off by the **Cone CoF** parameters.

4.2.2 Defrosting

Defrosting activation mode

In any case, the device checks the temperature of the defrosting probe before starting the procedure.

Defrosting can be triggered locally (manual activation or from the digital input or when the **idF** interval expires) or the command to start defrosting can be issued from the local network. In this case, defrosting follows the set parameters and at the end of the drip time, the instrument will wait until the other controllers have also finished defrosting before resuming adjustment in accordance with the **dEM** parameter.

Whenever a controller within the local network starts defrosting, the defrosting start command can also be sent to the other controllers in accordance with what is configured via parameter **LMd**.

Defrosting end mode

When defrosting is activated by the clock (if present), the maximum duration of the defrosting procedure is obtained from the value of the parameter **MdF and** the defrosting end temperature is given by the parameter **dtE** (and **dtS** if two probes have been selected).

If **dPA and dPb** are present and configured and **d2P=y** the instrument terminates the defrosting procedure when **dPA is** greater than **dtE and dPb is** greater than **dtS**.

At the end of the defrosting procedure, the drip is carried out, the duration of which can be set via parameter **Fdt.**

4.2.3 Evaporator fans - control via relay

The fan control mode is selected by the parameter **FnC**.

- **C, n**: the fans run in parallel with the compressor, they are switched off during defrosting.
- **C, y**: the fans run in parallel with the compressor, switched on during defrosting.
- **O, n**: fans always on, off in defrosting OFF.
- **O, y**: fans always on, also active in defrosting.

A further **FSt** parameter allows the lockout temperature of the fans, detected by the probe selected to control them, to be set. This can be used to be sure to activate the fans when the air is sufficiently cold.

4.3 Input and output specifications

4.3.1 Digital input polarity

The digital input depends on the parameter **i#P**.

- **CL**: the digital input is active when the contact is closed
- **OP**: The digital input is active when the contact is open.

4.3.2 Power output devices

Cold room light

The maximum luminaire power that can be connected to the cold room light cable (supplied) is 10W for LED lamps (power supply 230V- 50/60Hz).

Door heater

The maximum heater power that can be connected to the door heater cable (supplied on all LBP models) is 100W (power supply 230V- 50/60Hz).

5. Parameters

5.1 Parameter list

***IMPORTANT**: all parameter changes must only be carried out by qualified technicians after consultation with Rivacold personnel.*

***ATTENTION**: Incorrect modification of even a single parameter may lead to malfunctioning of the unit.*

5.1.1 Adjustment

Parameter	Description	Range
Hy	Differential: always positive. Activation occurs when the **Set Point+Hy** temperature is reached. Deactivation occurs when the temperature is less than or equal to the set point.	0.1...25.5°C 1...45°F
odS	Output activation delay at switch-on: at switch-on, activation of any load is inhibited for the set time.	0...255 min
AC	Anti-fluctuation delay: minimum interval between switching off the compressor and the subsequent restart.	0...60 min

5.1.2 Display

Parameter	Description	Range
dLy	Display delay: When the temperature of the thermostat probe rises, the display is updated by 1 °C/ after the time set for this parameter.	0 . 24.0 m resolution 10 s
rPA	Adjustment probe A: first probe used for adjustment. If **rPA=nP** adjustment is carried out via the actual value of the **rPb** probe.	nP, P1, P2, P3
rPb	Adjustment probe B: second probe used for adjustment. If **rPb=nP** adjustment is carried out with the value detected by the **rPA** probe	nP, P1, P2, P3
rPE	Virtual probe percentage: defines the percentage use of the **rPA** probe in relation to the **rPb** probe. The value used for adjustment is obtained from: value for adjustment=**(rPA*rPE+ rPb***(100- **rPE**))/100	0...100%

5.1.3 Defrosting

Parameter	Description	Values/Range
dPA	Defrosting probe A: first defrosting probe. If **rPA=nP** defrosting is managed via the dPb probe.	nP, P1, P2, P3
dPb	Defrosting probe B: first defrosting probe. If **rPb=nP** defrosting is managed via the dPA probe.	nP, P1, P2, P3
dPE	Virtual defrosting probe percentage: defines the percentage of **dPA** with respect to **dPb**. The value used for defrosting management is the value for defrosting= (**dPA*dPE** + **dPb***(100- **dPE**))/100.	0...100%
tdF	Defrosting type: **EL=** heaters. **in=** cycle inversion, hot gas.	EL, in
EdF	Defrosting activation mode: (only if RTC is present) **rtc=** activation via RTC. **in=** activation on expiry of defrosting interval **idF**.	rtc, in
Srt	Heater set point during defrosting: if **tdF=EL** during defrosting, the defrosting relay makes an ON/OFF adjustment with set point **Srt.** By setting **Srt=150**.0°C/302°F the relay remains always switched on without any adjustment.	-55.0...150.0°C - 67...302°F

Parameter	Description	Values/Range
Hyr	Differential for heaters.	0.1°C...25.5°C 1°F...45°F
tod	Time out for thermostat-controlled defrosting: if the defrosting probe remains at a value greater than **Srt** for the entire tod time, defrosting ends even though the end defrosting temperature has not been reached. This reduces the duration of the defrosting stage.	0...255 min
dtP	Minimum temperature difference to start defrosting: if the difference between the **dPA and dPb** probes remains below the **dtP** value for the entire ddP time, a defrosting request is made.	0.1°C...50.0°C 1°F...90°F
ddP	Delay before defrosting activation (relative to **dtP**): delay relative to parameter **dtP**.	0...60 min
d2P	Activation of defrosting function with 2 probes: n= only the **dPA** probe is used. Y= defrosting is managed via the **dPA and dPb** probes. Defrosting can only be carried out if the value of the dPA probe remains below **dtE and** that of the **dPb** probe below **dtS**.	n, Y
dtE	Defrosting end temperature (Probe A): enabled only if **dPA** is not **nP** sets the defrosting end temperature value relative to probe A.	-55.0...50.0°C -67...122°F
dtS	Defrosting end temperature (Probe B): enabled only if **dPb** is not **nP** sets the defrosting end temperature value relative to probe B.	-55.0...50.0°C -67...122°F
idF	Defrosting interval: determines the duration of the intervals between defrosting cycles.	0...120h
MdF	Maximum defrosting duration: Sets the maximum defrosting duration.	0...255 min
dSd	Delayed defrosting start: useful to prevent overloading. Enables to differentiate defrosting cycles starts.	0...255 min
dFd	Display during defrosting: **rt=** actual temperature. **en=** defrosting start temperature. **Set=** set point. **dEF= dEF** label.	rt, en, Set, dEF
dAd	Display update delay after defrosting: sets the maximum delay time before the display is updated following a defrosting. If the temperature falls below the set point before this time expires, the display is reset.	0...255 min
Fdt	Drip time: time interval between the end of the defrosting stage and the restoration of normal control condition. This time allows residual moisture in the evaporator to be removed.	0...255 min
dPo	Defrosting on switch-on: **y=** immediate. **n=** on request from interval or RTC.	y, n
dAF	Defrosting activation delay after continuous cycle: time interval between the end of the continuous cycle stage and defrosting activation.	0...23.5 h

5.1.4 Fans

Parameter	Description	Values/Range
FPA	Fan probe A: first probe used for fan management. If **FPA=nP**, adjustment is carried out using probe **FPb**.	nP, P1, P2, P3
FPb	Fan probe B: second probe used for fan management. If **FPb=nP**, adjustment is carried out using the **FPA** probe.	nP, P1, P2, P3
FPE	Virtual fan probe percentage: defines the percentage of **FPA** with respect to **FPb**. The value used for fan management is obtained from: value for fan management=**(FPA*FPE+ FPb***(100- **FPE**))/100.	0...100%

Parameter	Description	Values/Range
FnC	Fan operation mode: **C-n=** in parallel with compressor, OFF in defrosting. **C-y=** in parallel with compressor, ON during defrosting. **O-n=** continuous mode, OFF during defrosting. **O-y=** continuous mode, ON during defrosting.	C, n C, y O, n O, y
Fnd	Fan delay after defrosting: time interval between end of defrosting and activation of fans.	0...255 min
FCt	Temperature differential to prevent fan fluctuation, if the temperature difference between the evaporator and the control probe is greater than the parameter **FCt**, the fans are activated.	0.0°C...50.0°C 0°F...90°F
FSt	Fan stop temperature: temperature at which the fans are stopped.	- 50... 110°C - 58...230°F
FHy	Fan restart differential: When the fans stop, they can only restart if the fan control probe reaches the value **FSt- FHy**.	0.1°C...25.5°C 1°F...45°F
Fod	Fan activation time after defrosting: forces activation of fans for the indicated time. During this time the compressor is switched off. This serves to expel warm air before it starts to get cold again.	0...255 min
Fon	Fan time ON: with **FnC=** C_n or C_y, (fans in parallel with compressor). Sets the ON time of the fans when the compressor is switched off. With **Fon**=0 and **FOF** ≠ 0 the fans are always off, with **Fon**=0 and **FOF**=0 the fans are always off.	0...15 min
FOF	Fan time OFF: with **FnC=** C_n or C_y, (fans in parallel with compressor). Sets the OFF time of the fans when the compressor is switched off. With **Fon**=0 and **FOF** ≠ 0 the fans are always off, with **Fon**=0 and **FOF**=0 the fans are always off.	0...15 min

5.1.5 Alarms

Parameter	Description	Values/Range
rAL	Temperature alarm probe selection: selects the probe used for temperature alarm signalling.	nP, P1, P2, P3
ALC	Temperature alarm configuration: **rE=** alarm thresholds are relative to set point. **Ab=** alarm thresholds are absolute.	-
ALU	High temperature alarm threshold: if this temperature threshold is exceeded for **ALd** time, the **HA** alarm is signalled.	ALC= rE 0...50°C or 90°F ALC= Ab ALL...150°C or 302°F
ALL	Low temperature alarm threshold: if the temperature falls below this threshold for **ALd** time, the **LA** alarm is signalled.	ALC= rE 0...50 °C or 90°F ALC= Ab - 55°C or - 67°F...AL U
AHy	Temperature alarm return differential: temperature alarm return differential.	0.1°C...25.5°C 1°F...45°F
ALd	Temperature alarm delay: time interval between the detection of the alarm condition and its signalling.	0...255 min
Ao	Temperature alarm signalling delay at switch-on.	0 min...23 h 50 min
EdA	Alarm signalling delay after defrosting.	0...255 min

Parameter	Description	Values/Range
dot	Temperature alarm override time after door open alarm.	-
AOP	Alarm relay polarity: **cL**= normally closed. **oP**= normally open.	-
iAU	Auxiliary output independent of ON/OFF status: **n**= if the instrument is switched off, the auxiliary output is also switched off. **Y**= the status of the auxiliary output is independent of the ON/OFF status of the device.	-

5.1.6 Digital inputs

Parameter	Description	Values/Range
i1P	Digital input 1 polarity. **CL**: the digital input is active when the contact is closed. **OP**: The digital input is active when the contact is open.	cL, oP
i1F	Digital input 1 function. **EAL**= external alarm. **bAL**= block alarm. **PAL**= pressure switch activation. **dor**= door open. **dEF**= defrosting activation. **AUS**= auxiliary activation. **LiG**= light activation. **OnF**= ON/OFF switch. **Htr**= reversal of action type. **FHU**= not used. **ES**= energy saving activation. **Hdy**= holiday function activation.	EAL, bAL, PAl, dor, dEF, AUS, LiG, OnF, Htr, FHU, ES, Hdy
d1d	Time interval before alarm signal: Time interval for calculating pressure switch tripping before blocking when **i1F=PAL**. If **I1F=EAL** or **bAL** or **dor**, parameter **d1d** defines the time interval before the alarm is signalled.	0...255 min
I2P	Digital input 2 polarity. **CL**: the digital input is active when the contact is closed. **OP**: The digital input is active when the contact is open.	cL, oP
I2F	Digital input 2 function. **EAL**= external alarm. **bAL**= block alarm. **PAL**= pressure switch activation. **dor**= door open. **dEF**= defrosting activation. **AUS**= auxiliary activation. **LiG**= light activation. **OnF**= ON/OFF switch. **Htr**= reversal of action type. **FHU**= not used. **ES**= energy saving activation. **Hdy**= holiday function activation.	EAL, bAL, PAl, dor, dEF, AUS, LiG, OnF, Htr, FHU, ES, Hdy
d2d	Time interval before alarm signal. Time interval for calculating pressure switch tripping before blocking when **i2F=PAL**. If **I2F=EAL** or **bAL** or **dor**, parameter **d2d** defines the time interval before the alarm is signalled.	0...255 min
i3P	Digital input 3 polarity. **CL**: the digital input is active when the contact is closed. **OP**: The digital input is active when the contact is open.	cL, oP
i3F	Digital input 3 function. **EAL**= external alarm. **bAL**= block alarm. **PAL**= pressure switch activation. **dor**= door open. **dEF**= defrosting activation. **AUS**= auxiliary activation. **LiG**= light activation. **OnF**= ON/OFF switch. **Htr**= reversal of action type. **FHU**= not used. **ES**= energy saving activation. **Hdy**= holiday function activation.	EAL, bAL, PAl, dor, dEF, AUS, LiG, OnF, Htr, FHU, ES, Hdy
d3d	Time interval before alarm signal. Time interval for calculating pressure switch tripping before blocking when **i3F=PAL**. If **I3F=EAL** or **bAL** or **dor**, parameter **d3d** defines the time interval before the alarm is signalled.	0...255 min
nPS	Maximum number of pressure switch interventions: number of activation at status during time **d#d** before alarm signal(**I#F= PAL**). If the number of **nPS** interventions in time **d#d** is reached, normal adjustment is restored by switching the instrument off and on again.	0...15
Odc	Compressor and fan status during open door. **no**= normal. **Fan**= Fans OFF. **CPr**= Compressor OFF. **F_C**= Compressor and fans OFF.	-
rrd	Control restart after door open alarm **doA**. Adjustment starts again after the **rrd** delay following the door open alarm.	0...255 min

5.1.7 Keyboard

Parameter	Description	Values/Range
bbc	Keyboard selection: 6 buttons	6bb

5.1.8 Energy saving

Parameter	Description	Values/Range
ESP	Energy-saving probe selection.	nP, P1, P2, P3
HES	Temperature increase during energy-saving cycle. Determines by how much the set point increases or decreases during the energy-saving cycle.	- 30.0°C... 30.0°C - 54...54°F
PEL	Activation of energy saving together with light switch-off: **n**= function disabled. **Y**= energy saving activated at light switch-off and vice versa.	n, Y

5.1.9 LAN network management

Parameter	Description	Values/Range
LdS	Display synchronisation: **y**= The value shown on the local section display is also sent to all other sections. **n**= The value is only shown on the local display.	y, n
LSd	Remote probe display: **y**= Enables the display of the value measured by a remote probe (sent from a section with parameter **LdS**= 1). **n**= Displays the value of one of the local probes.	y, n

5.1.10 Read-only service

Parameter	Description	Values/Range
CLt	Cold call percentage: shows the actual cooling time calculated by XM670 during adjustment.	-
tMd	Time remaining until next defrosting (tens of seconds): shows the time before the next defrosting if interval defrosting is selected.	-
LSn	Number of LAN Sections: displays the number of sections available in the local network.	1...5
LAn	Serial address in LAN: identifies the address of the instrument within the local network of the ducted counter.	1...LSn
Adr	Serial address: identifies the serial address of the instrument when connected within a Modbus serial network.	1...247
rEL	Software version: (read-only) shows the software version of the microprocessor.	-
Ptb	Parameter Table: (read-only) shows the original code of the parameter map.	-
Pr2	Second-level menu access (read-only).	-

6. Diagnostics and communication

6.1 Alarms

6.1.1 List of alarm messages

Note: The reset of each alarm described below is automatic upon re-entry of the mentioned condition

Message	Reference	Meaning	How the machine behaves
PoN	-	Keyboard active	The keyboard is active, allowing access to all parameters without any restrictions
PoF	-	Keyboard locked	The keyboard is locked, only allowing the parameters of the Quick Access Menu to be displayed (dP1, dP2, L°t, H°t, dPr, dPd, dPF, rSE)
rst	-	Alarm reset	The alarm relay is reset
noP	Probe input	Probe not configured	The compressor enters a cycle of 15 min on (Con) and 15 min off (Cof)
P1	Probe input	Probe 1 error	The compressor enters a cycle of 15 min on (Con) and 15 min off (Cof)
P2	Probe input	Probe 2 error	Defrosting lasts according to parameter (MdF)
P3	Probe input	Probe 3 error	The machine works normally
HA	Temperature threshold	High temperature alarm	The machine works normally
LA	Temperature threshold	Low temperature alarm	The machine works normally
HAd	Temperature threshold	Defrosting probe high temperature alarm	The machine works normally
LAd	Temperature threshold	Defrosting probe low temperature alarm	The machine works normally
HAF	Temperature threshold	High fan temperature alarm	The machine works normally
LAF	Temperature threshold	Low fan temperature alarm	The machine works normally
PA	Digital input	Blockage due to pressure switch intervention	All outputs OFF
dA	Digital input	Open door	Compressor, fans OFF (depending on odc parameter) and cold room light on. Signalling, if set, following parameter d#d. Resumes adjustment following parameter (rrd) after any alarm
EA	Digital input	External alarm	The machine operates normally, only the alarm relay is activated
CA	Digital input	External lockout alarm (Compressor circuit breaker alarm / fan circuit breaker alarm)	All outputs OFF
EE	-	Faulty EEPROM	All outputs OFF

6.1.2 EE Alarm

The board is equipped with a system to check the integrity of the internal memory. In case of problems, the **EE** alarm appears.

In this situation, the alarm output is activated.

6.2 Serial line and network

The board has two built-in RS485 connections that allow the controller to interface for:

- Modbus RTU remote management.
- LAN local network.

Refer to the wiring diagram.

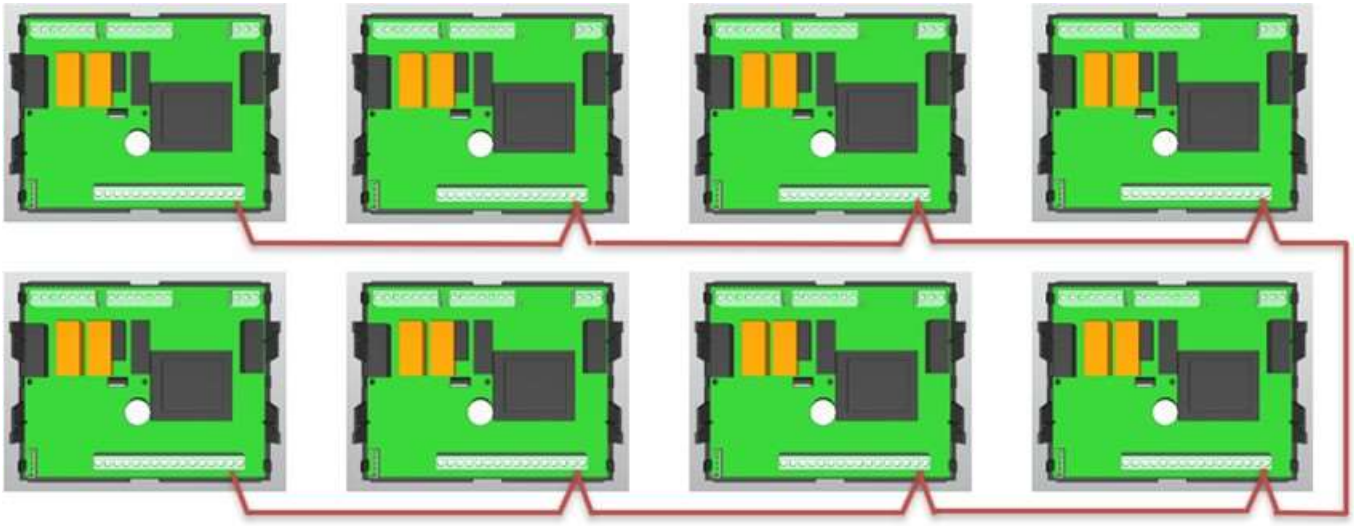
6.2.1 Remote management connection (Modbus RTU)

1. Upload dedicated board template to your monitoring system. If you do not have the dedicated file, ask your dealer for assistance.
2. Use shielded braided cable.
3. Connect to board pins 36(-) and 37(+) .
4. Change the **Adr** parameter identifying the serial address of the board in the Modbus RTU network if required.

6.2.2 Local network (LAN) connection

Maximum of 8 electronic boards to manage defrosting cycles start/end synchronisation, setpoint synchronisation, display synchronisation, light synchronisation and cold room probe synchronisation.

1. Use shielded serial cable.
2. Connect to board pins 38(-) and 39(+) by making a serial connection (see connection photo below).
3. Enter the PR1 programming menu to change the following **Lds and Lsd** parameters and then define the main unit/secondary units. Change the parameters written above according to the values in the programming table enclosed with the unit.



7. Accessories

7.1 Programming key

7.1.1 Programming the key

1. Set the controller programmed with the desired values.
2. Insert the key with the controller switched on, then press △.
   The key programming operation starts. The display shows flashing **uPL** .
3. When finished, the instrument displays for 10 sec:
   - **End** if programming was successful.
   - **Err** if programming failed.

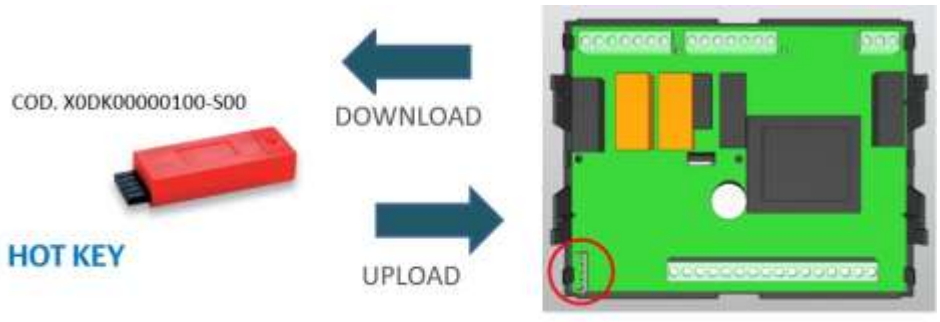
   ***Note**: Pressing the △ button restarts programming.*

7.1.2 Programming the controller

To programme the controller with a previously programmed key, proceed as follows:

1. Switch off the instrument or put it in stand-by via the keyboard.
2. Insert the programmed key.
3. Switch on the instrument: automatic downloading (DOWNLOAD) of data from the stick to the instrument begins. The display shows **doL** flashing.
4. When finished, the instrument displays for 10 sec:
   - **End** if programming was successful and adjustment starts again.
   - **Err** if programming failed.

   ***Note**: repeat the operation or remove the key to start with normal adjustment.*

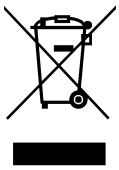


8. Appendix

8.1 Disposal

8.1.1 Warnings

Polluting materials. Environmental contamination.



Disposal of polluting materials according to DIRECTIVE 2012/19/EU (WEEE) and It.Legislative Decree 49/2014 on the disposal of electrical and electronic equipment:

- Do not throw away the packaging of your equipment but sort the materials according to local waste disposal regulations.
- This equipment must not be disposed of in municipal waste but must be disposed of as separate collection. Contact the Waste Electrical and Electronic Equipment (WEEE) collection centres in your area or return it to the vendor when purchasing equivalent new equipment.
- The symbol on the side indicates that the equipment cannot be disposed of as municipal waste.
- Unauthorised or incorrect disposal of the equipment will result in administrative and/or criminal penalties as provided for by the laws in force.

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