



MOD : AP40M-1Z-R2

Production code : BYWS251MA05P11-DI

05/2025

Packaged units controller

Operating instructions| v. 00

Instructions translated from the original



CE EAC



DANGER! Anyone who uses this machine is required to read these instructions for their own safety.

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Conformity

Certifications



Directives

List of Directives for which the product is declared to be conforming:

- 2014/35/EU (Low Voltage Directive)
- EMC 2014/30/EU (Electromagnetic Compatibility Directive)
- RED 2014/53/EU (Radio Equipment Directive)

Standards and regulations

- IEC/EN 60730-1
- IEC/EN 60079-0
- IEC/EN 60079-15
- EN 55016-2
- EN 55016-3
- EN 61000-3
- EN 61000-4

Note: the original declaration of conformity accompanies the machine.

1. Introduction

This section includes the following topics:

1.1 Warnings	4
1.2 General description	4
1.3 Identification data and information on the manual	4

1.1 Warnings

NOTICE: the controller must never be opened.



NOTICE: 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

1.2.1 What is XW470K?

The XW470K controller integrates software dedicated to the complete management of cooling systems for high-, medium- and low-temperature cold rooms, and enables the simultaneous control of both the condensing and evaporating parts of the system.

1.3 Identification data and information on the manual

1.3.1 Manual data

Title: XW470K - BEST packaged units controller - Operating instructions

Code: 9600-0178

Month and year of publication: 12-2024

1.3.2 Manual updates

Code	Publication date	Updates
9600-0178	12-2024	First publication

1.3.3 Documentation provided

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

Manual	Code	Date
Operating instructions (this manual)	9600-0178 - 12-2024	12-2024

2. Control panel

This section includes the following topics:

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2.1 About the control panel

2.1.1 Control elements supplied with the packaged unit

The packaged unit can be controlled via the control panel.

2.1.2 Description of the buttons on the control panel



Button	Function
	Switches the packaged unit on and off.
	It switches the light on and off.
	Manually controls the defrosting cycle.
SET	Displays the setpoint value. In programming mode, it confirms a parameter category or a displayed parameter or value. Press SET and  simultaneously: to access the programming menu. Press SET and  simultaneously: to exit the displayed menu.
	To scroll through the menu items or increase the displayed value. Press SET and  simultaneously: to exit the displayed menu.
	To scroll through the menu items or decrease the displayed value. Press SET and  simultaneously: to access the programming menu.

2.1.3 Description of the display



Pilot light	Steady on	Flashing on
	Display of: - parameters - set values - measured values	-
	Defrosting active	Dripping stage active; defrosting request pending
ECO	Energy Saving active	-
	Light on	-
	Evaporator-fan active	Evaporator-fan waiting after defrosting
	One or more compressors active	Compressor not enabled at start-up due to: - Safety device times - Open door - Start-up delay
	Active alarm	-
°C/°F	Active unit of measurement	Active programming mode
	Global operating mode	Remote display mode active

2.2 Control panel operations

2.2.1 Turn the packaged unit on and off

- Turn on: press and hold the button for 3 seconds. The display shows **ON** and the value of the set variable in parameter **Lod**.
- Turn off: press and hold the button for 3 seconds. **OFF** appears on the display.

Note: the ambient temperature must be below 32°C to be able to carry out the first start-up.

2.2.2 Lock the control panel

- Press **SET** and simultaneously one or more times to exit all menus and display the cold room temperature.
- Hold down buttons and simultaneously for 3 seconds: **LOC** appears on the display and the keyboard is unlocked.

2.2.3 Unlock the control panel

Hold down buttons  and  simultaneously for 3 seconds: **UnL** appears on the display and the keyboard is unlocked.

2.2.4 Switch the Cold room light on and off

- Switch on: press button : the cold room pilot light comes on, on the display.
- Switch off: press the  button: the cold room pilot light goes out, on the display.

2.2.5 Set the temperature setpoint value

1. Press the **SET** button briefly: the setpoint value appears on the display (parameter **SEt**).
2. Press the  and  buttons to select the desired setpoint value.
3. Briefly press the **SET** button or wait 30 seconds to store the new setpoint value.

2.2.6 Controlling the manual defrosting cycle

Press and hold the  button for 3 seconds: the defrosting and compressor indicator lights up on the display.

2.2.7 Display the active alarms

If an alarm is active, the pilot light  comes on, a buzzer sounds and the display shows the code of the active alarm. If several alarms are active, the codes appear in sequence.

To deactivate the buzzer, press any button on the control panel.

The reset of each alarm is automatic upon re-entry of the indicated condition. See "Errors indicated by the controller" on page 42.

2.2.8 Exiting from a menu

Press buttons **SET** and  simultaneously one or more times to return to the desired position.

2.3 Quick menu

2.3.1 Functions

The Quick Menu provides access to the key information on parameters and probes.

Function code	Description
MAP	Current parameters map
dP1	Value read by probe 1
dP2	Value read by probe 2
dP3	Value read by probe 3 (if present) - if not present, the text noP will be displayed
dP4	Value read by probe 4 (if present) - if not present, the text noP will be displayed
Adr	Serial address
LSn	Number of devices connected in LAN
LAN	List of addresses connected in LAN

2.3.2 Access the Quick menu

1. Press **SET** and  simultaneously one or more times to exit all menus and display the cold room temperature.
2. Press  to display the first Quick menu item.

3. Parameters

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3.1 Structure and editing parameters

3.1.1 Parameter menu structure

Menu	Description	Level
rEG	Regulation	1
dEF	Defrosting	1
FAn	Evaporator fans	1
ALr	Alarms	1
oUt	Digital output configuration	2
inP	Digital input configuration	1
ES	Energy saving	1
LAN	LAN	1
Prb	Probe configuration	2
CoM	RS485 configuration	1
Ui	Display	2
Oth	Other variables (read-only)	1
PAS	Password for 2nd level parameters	only 1

3.1.2 Modify a 1st level parameter

1. Press **SET** and  simultaneously one or more times to exit all menus and display the cold room temperature.
2. Press the buttons **SET** and  simultaneously for 3 seconds to access programming mode.
3. Press buttons  and  to scroll through the parameter categories.
4. Press the **SET** button to select the desired category.
5. Press buttons  and  to scroll through the parameters of the selected category.
6. Press the **SET** button to select the desired parameter.

7. Press buttons ∇ and Δ to change the parameter value.
8. Press the **SET** button to confirm the value and return to the previous level.
9. Press buttons **SET** and Δ simultaneously or wait 15 seconds to exit programming mode.

3.1.3 Modify a 2nd level parameter

1. Press **SET** and Δ simultaneously one or more times to exit all menus and display the cold room temperature.
2. Press the buttons **SET** and ∇ simultaneously for 3 seconds to access programming mode.
3. Press buttons ∇ and Δ to scroll to category **PAS** and press **SET**.
4. Enter the 2nd level password **022** and press button **SET**: if the password is correct, the flashing text **Ps2** appears and you have access to the 2nd level parameters; if the password is incorrect, the flashing text **Err** appears.

3.2 Regulation parameters

3.2.1 List of parameters



rEG

Parameter	Description	Options	Unit of measurement	Range	Default
SE C	LAN mode selection	Loc = Local ALL = Global	-	-	Loc
SE t	Temperature set point	-	°C	LS...US	TN/BT= 0/-20
HP	Differential	-	K	0.1...25.5	2
LS	Minimum set point limit	-	°C	-100...Set	TN/BT= -5/-25
US	Maximum set point limit	-	°C	SEt...150	TN/BT= 15/-5
Od S	Output activation delay at power on	-	minutes	0...255	3
CC O	Dual compressor adjustment	Std = Standard mode PrE = Preventive control	-	-	Std
RC	Anti-swaying delay	-	minutes	0...60	3
RC I	2nd compressor activation delay	-	seconds	0...255	5
CC t	Continuous cycle duration	-	Hours: 10 minutes	00:00...24:00	00:00

Parameter	Description	Options	Unit of measurement	Range	Default
C C S	Continuous cycle set point	-	°C	-100...150	TN/BT=-2/-24
C o n	Compressor ON time with faulty probe	-	minutes	0...255	10
C o F	Compressor OFF time with faulty probe	-	minutes	0...255	10
r E S	Resolution	in = 1°C	-	-	dE
		dE = 0.1°C			
L o d	Instrument display: default display	P1 = Probe 1	-	-	P1
		P2 = Probe 2			
		P3 = Probe 3			
		P4 = Probe 4			
		P5 = Probe 5			
		P6 = Probe 6			
		tEr = Virtual probe for thermostating			
		dEF = Virtual probe for defrost			
		St1 = do not use			
		St2 = do not use			
r E d	Remote display: default display	P1 = Probe 1	-	-	P1
		P2 = Probe 2			
		P3 = Probe 3			
		P4 = Probe 4			
		P5 = Probe 5			
		P6 = Probe 6			
		tEr = Virtual probe for thermostating			
		dEF = Virtual probe for defrost			
		St1 = do not use			
		St2 = do not use			
d L P	Temperature display delay	-	Minutes: 10 seconds	00:00...24:00	00:00

Parameter	Description	Options	Unit of measurement	Range	Default
r P A	Adjustment probe A	nP = No Probe	-	-	P1
		P1 = Probe 1			
		P2 = Probe 2			
		P3 = Probe 3			
		P4 = Probe 4			
		P6 = Probe 6			
r P b	Adjustment probe B	nP = No Probe	-	-	nP
		P1 = Probe 1			
		P2 = Probe 2			
		P3 = Probe 3			
		P4 = Probe 4			
		P6 = Probe 6			
r P d	Selecting the control probe	rPA = probe selected via parameter rPA	-	-	rPA
		rAb = virtual probe: obtained via rPA and rPb temperatures according to parameter rPE			
		Aur = average of all valid probes defined as Adjustment Probe			
		LoE = minimum value of all valid probes defined as Adjustment Probe			
		HiE = maximum value of all valid probes defined as Adjustment Probe			
r P E	Virtual control probe percentage	-	%	0...100	0
Π A P	Parameter map used during standard operation	C-1	-	-	TN/BT= C-1/C-2
		C-2			
		C-3			
		C-4			
		C-5			
		C-6			
Π P I	Alternative parameters map enabled via digital input or Modbus command	C-1	-	-	TN/BT= C-1/C-2
		C-2			
		C-3			
		C-4			
		C-5			
		C-6			

Parameter	Description	Options	Unit of measurement	Range	Default
L d n	Reloads the map selected in the MAP parameter	n = no	-	-	n
		Y = yes			
U d n	Updates the map selected in the MAP parameter	n = no	-	-	n
		Y = yes			

3.2.2 Parameter rPE

Defines the percentage of **rPA** with respect to **rPb**.

The value used to adjust the ambient temperature is obtained:

$$rAb = [rPA \times rPE + rPb \times (100 - rPE)]/100$$

3.2.3 MAP parameter

To change the parameters map, proceed as follows:

1. Press the buttons **SET** and  simultaneously for 3 seconds to access programming mode.
2. Press buttons  and  to scroll to parameter **MAP** and press **SET**.
3. Press buttons  and  to select the desired parameter map (C-1 to C-6) and press **SET**: the controller loads the selected parameter map.

3.2.4 Parameter LdM

To reload the selected parameter map (default reset), proceed as follows:

1. Press the buttons **SET** and  simultaneously for 3 seconds to access programming mode.
2. Press buttons  and  to scroll to parameter **LdM** and press **SET**.
3. Press buttons  and  to select **Y** and press **SET**: the controller reloads all the map parameters set via parameter **MAP**.

3.2.5 Parameter UdM

To change a parameter map with the current configuration, proceed as follows:

1. Press the buttons **SET** and  simultaneously for 3 seconds to access programming mode.
2. Press buttons  and  to scroll to parameter **UdM** and press **SET**.
3. Press buttons  and  to select **Y** and press **SET**: the controller copies the current parameter configuration within the parameter map set via parameter **MAP**.

3.3 Defrost parameters

3.3.1 List of parameters



Parameter	Description	Options	Unit of measurement	Range	Default
d P A	Defrosting probe A	nP = no Probe	-	-	P2
		P1 = Probe 1			
		P2 = Probe 2			
		P3 = Probe 3			
		P4 = Probe 4			
		P6 = Probe 6			
d P b	Defrosting probe B	nP = no Probe	-	-	nP
		P1 = Probe 1			
		P2 = Probe 2			
		P3 = Probe 3			
		P4 = Probe 4			
		P6 = Probe 6			
t d F	Defrosting type	Air = air defrosting (the defrosting relay will not be activated)	-	-	in
		EL = electric heater defrosting			
		in = hot gas defrosting			
		rt = defrosting with pulse electric heaters			
E d F	Defrosting mode	rtc = defrosting activation via RTC (only if RTC is present)	-	-	in
		in = defrosting activation via IdF			
		Aut = On Demand defrosting			
		Sd = intelligent defrosting			
S d F	Setpoint for SMARTFROST	-	°C	-100...150	TN/BT= 0/-20

Parameter	Description	Options	Unit of measurement	Range	Default
S r t	Set heaters during defrosting	-	°C	-100...150	150
H P r	Differential for the heaters	-	K	0.1...25.5	2
d 2 P	Defrosting with two probes	n = only the dPA probe is used for defrost management Y = defrosting is managed with probe dPA and probe dPb	-	-	n
d t E	Defrosting end temperature (Probe A)	-	°C	-55...50	5
d t S	Defrosting end temperature (Probe B)	-	°C	-55...50	5
I d F	Interval between defrosting cycles	-	hours	0...255	6
n d t	Minimum defrosting duration	-	minutes	0...MdF	0
n d F	Maximum defrosting duration	-	minutes	ndt...255	15
d S d	Defrosting start delay	-	minutes	0...255	0
d F d	Display during the defrosting cycle	rt = actual temperature it = temperature read at start of defrosting Set = setpoint dEF = 'dEF' label dEG = 'dEG' label dEd = 'dEd' label	-	-	dEF
d R d	Temperature display delay after defrosting	-	minutes	0...255	TN/BT= 4/5

Parameter	Description	Options	Unit of measurement	Range	Default
F d t	Dripping time	-	minutes	0...255	3
H o n	Drain pan heater ON after dripping	-	minutes	0...255	0
d P o	Defrosting at power-on	n = after time IdF Y = imme- diately	-	-	n
d R F	Defrosting delay after the continuous cycle	-	hours: 10 minutes	00:00...24:00	00:00
C t d	Defrosting on demand: defrosting start differential	-	K	0.1...25.5	2
n b d	Defrosting on demand: minimum compressor running time before a defrosting cycle	-	hours: 10 minutes	00:00...24:00	04:00
n d b	Defrosting on demand: maximum compressor running time before a defrosting cycle	-	hours: 10 minutes	00:00...24:00	24:00
n c t	Defrosting on demand: minimum evaporator temperature to activate a defrosting cycle	-	°C	-100...150	TN/BT=-20/-40

3.3.2 Parameter tdF

Defines the type of defrosting set.

Natural defrosting (tdF = Air)

Defrosting takes place by stopping the compressor. The operation of the fan during defrosting depends on parameter **Fnc**. The defrosting relay is switched off. The valve is closed.

Defrosting with electric heater (tdF = EL)

Defrosting takes place by stopping the compressor. The operation of the fan during defrosting depends on parameter **Fnc**. The defrosting relay is ON. The valve is closed.

It depends on the parameters:

- **Srt** (heater setpoint during defrosting)
- **Hyr** (differential for the heater)

During defrosting, the defrosting relay performs an ON/OFF adjustment with Srt as setpoint. If the heater temperature exceeds the **Srt** value for a **tdo** time (heater timeout), defrosting ends, even if the temperature detected by the defrosting probe is below the **dtE** or **dtS** values.

Hot gas defrosting (tdF = in)

Defrosting takes place by closing the compressor/electro-valve relay. The operation of the fan during defrosting depends on parameter **Fnc**. The defrosting relay is ON. The percentage of valve opening during defrosting is set by parameter **oPd**.

3.3.3 Parameter EdF

Defines the defrosting activation mode. The device always checks the temperature detected by the defrosting probe before starting the procedure.

Defrosting via real time clock (EdF = rtc)

Can only be set if RTC is present. The defrosting interval is controlled by the defrost parameter and is executed in real time according to the times set in parameters **Ld1** to **Ld6** for working days and **Sd1** to **Sd6** for public holidays.

Defrosting by interval (EdF = in)

Defrosting is performed every time interval defined by parameter **IdF**.

Intelligent defrosting (EdF = Sd)

Recommended for medium temperature applications only, it is related to the following parameters:

- **IdF**: minimum time between two defrosting cycles. Timer **IdF** is only updated if the compressor is on and the evaporator temperature is below parameter **SdF** (temperature threshold below which the interval is counted).
- **MdF**: maximum defrosting duration
- **dtE**: defrosting end temperature

On Demand defrosting (EdF = Aut)

See "On Demand defrosting" below.

Manual defrosting

It can be activated locally via the keyboard, by supervisor command or via a digital input (if the function is configured).

3.3.4 Synchronised defrosting via LAN

Whenever a LAN controller starts a defrosting cycle, it sends the command over the network and activates the cycle of all other controllers. This allows perfect synchronisation of the defrosting of all units connected in LAN, according to parameter **LMd**.

The command can come from the LAN defrosting Master unit. The controller performs the defrosting cycle according to the programmed parameters but, at the end of the drainage time, waits until all other controllers in the LAN have completed their defrosting cycle before resuming normal temperature adjustment according to parameter **dEM**.

3.3.5 On Demand defrosting

Principle of operation

The controller monitors the evaporator temperature and starts a defrosting cycle if certain conditions are met.

NOTICE: to ensure efficient defrosting, it is important to position the end-of-defrosting probe (usually P2) at the coldest point of the evaporator.

Note: due to the different evaporator models and the resulting behaviour, it is strongly recommended to test and validate this algorithm in a climate chamber before applying it in the field.

Parameters and settings

After setting the On Demand defrosting cycle, set the following parameters:

- **ctd**: evaporator temperature differential to activate the defrosting cycle
- **nbd**: minimum compressor running time (or minimum solenoid valve activation time) before an automatic defrosting cycle. It must be set correctly to avoid premature defrosting.
- **Mbd**: maximum compressor running time (or maximum solenoid valve activation time) before an automatic defrosting cycle.
- **nct**: minimum evaporator temperature to activate an automatic defrosting cycle.

Exceptions

Defrosting on demand cannot be activated in the following cases:

- If the compressor has not run for the minimum time required by parameter **nbd** since the last defrosting cycle or initial switch-on.
- If the compressor has been running for longer than the maximum time defined by parameter **Mbd** since the last defrosting cycle or initial switch-on. In this case, a defrosting cycle is initiated regardless of the coil temperature.
- If the coil temperature reaches a very low temperature defined by parameter **nct**. In this case, a defrosting cycle is initiated regardless of the **ctd** value.

3.4 Evaporator fan parameters

3.4.1 List of parameters



Fan

Parameter	Description	Options	Unit of measurement	Range	Default
F R P	Evaporator A fan probe	nP = no Probe P1 = Probe 1 P2 = Probe 2 P3 = Probe 3 P4 = Probe 4 P6 = Probe 6	-	-	P2
F n C	Evaporator fan operating mode	C_n = switched on in parallel with the solenoid valve, OFF during defrosting O-n = continuous mode, OFF during defrosting C_y = switched on in parallel with the solenoid valve, ON during defrosting O-y= continuous mode, ON during defrosting	-	-	C_n
F n d	Fan start delay after a defrosting cycle	-	minutes	0...255	TN=4 / BT=5
F S t	Evaporator fan stop temperature	-	°C	-50...50	TN=25 / BT=5
F H P	Evaporator fan restart differential	-	K	0.1...25.5	2
F o n	ON time during anti-stratification cycle	-	minutes	0...255	0
F o F	OFF time during anti-stratification cycle	-	minutes	0...255	0

3.4.2 Anti-Stratification Function

The function is only activated with **Fnc** = C_n or C_y (fan activated in parallel with the compressor)

- **Fon**: evaporator fan on time when the compressor is off.
- **Fof**: evaporator fan off time when the compressor is off.

With **Fon** = 0, the fans are always switched off.

Example:

Fnc= C_n

Fon=5

Fof=5

When the setpoint is reached, the machine stops and the fans start cycles in which they are off for 5 minutes (**Fof**) and on for 5 minutes (**Fon**). When the machine is restarted, normal operation resumes.

3.5 Alarm parameters

3.5.1 List of parameters



Alr

Parameter	Description	Options	Unit of measurement	Range	Default
ALC	Temperature alarm configuration	rE = Set Point high and low alarms Ab = High and low absolute temperature alarms	-	-	rE
ALU	High temperature alarm threshold	-	K	ALC=rE --> 0...50	10
			°C	ALC=Ab --> ALL...150	
ALL	Low temperature alarm threshold	-	K	ALC=rE --> 0...50	5
			°C	ALC=Ab --> -100...ALU	
AHP	Differential for temperature alarms	-	K	0.1...25.5	2
ALd	Temperature alarms delay	-	minutes	0...255	15
rA2	Probe for second temperature alarm	nP = no Probe P1 = Probe 1 P2 = Probe 2 P3 = Probe 3 P4 = Probe 4 P6 = Probe 6 tEr = virtual probe for thermostatting	-	-	nP

Parameter	Description	Options	Unit of measurement	Range	Default
A2U	Second high temperature alarm threshold	-	°C	A2L...150	150
A2L	Low-temperature second alarm threshold	-	°C	-100...A2U	-50
A2H	Differential for second temperature alarms	-	K	0.1...25.5	2
A2d	Temperature alarm seconds delay	-	minutes	0...255	0
dRo	Temperature alarm delay at start-up	-	hours: 10 minutes	00:00...24:00	12:00
EdR	Temperature alarm delay at end of defrosting cycle	-	minutes	0...255	60
dot	Temperature alarm override after door opening	-	minutes	0...255	5
t b R	Deactivating the alarm relay by pressing a button	n = no	-	-	Y
		Y = yes			

3.6 Output configuration parameters

3.6.1 List of parameters

 **oUt**

Parameter	Description	Options	Unit of measurement	Range	Default
o R I	Relay configuration on terminals 15-16	nP = not used	-	-	LiG
		CPr = compressor function			
		CP2 = second compressor function			
		dEF = defrosting function			
		Fan = evaporator fan function			
		ALr = alarm function			
		LiG = cold room light function			
		AUS = auxiliary relay, can also be switched on/off via button			
		OnF = the relay functions as ON/OFF output			
		AC = anti-fog heaters function			
		db = dead band adjustment (not compatible with CrE=y)			
		ES = the relay is activated when the energy-saving function is active			
		HEt = counter heater function			
		Cnd = condenser fan function			

Parameter	Description	Options	Unit of measurement	Range	Default
o A 2	Relay configuration on terminals 13-14	nP = not used	-	-	Fan
		CPr = compressor function			
		CP2 = second compressor function			
		dEF = defrosting function			
		Fan = evaporator fan function			
		ALr = alarm function			
		LiG = cold room light function			
		AUS = auxiliary relay, can also be switched on/off via button			
		OnF = the relay functions as ON/OFF output			
		AC = anti-fog heaters function			
		db = dead band adjustment (not compatible with CrE=y)			
		ES = the relay is activated when the energy-saving function is active			
		HEt = counter heater function			
		Cnd = condenser fan function			

Parameter	Description	Options	Unit of measurement	Range	Default
o A 3	Relay configuration on terminals 17-18	nP = not used	-	-	CPr
		CPr = compressor function			
		CP2 = second compressor function			
		dEF = defrosting function			
		Fan = evaporator fan function			
		ALr = alarm function			
		LiG = cold room light function			
		AUS = auxiliary relay, can also be switched on/off via button			
		OnF = the relay functions as ON/OFF output			
		AC = anti-fog heaters function			
		db = dead band adjustment (not compatible with CrE=y)			
		ES = the relay is activated when the energy-saving function is active			
		HEt = counter heater function			
		Cnd = condenser fan function			

Parameter	Description	Options	Unit of measurement	Range	Default
o R 4	Relay configuration on terminals 1-2-3	nP = not used	-	-	dEF
		CPr = compressor function			
		CP2 = second compressor function			
		dEF = defrosting function			
		Fan = evaporator fan function			
		ALr = alarm function			
		LiG = cold room light function			
		AUS = auxiliary relay, can also be switched on/off via button			
		OnF = the relay functions as ON/OFF output			
		AC = anti-fog heaters function			
		db = dead band adjustment (not compatible with CrE=y)			
		ES = the relay is activated when the energy-saving function is active			
		HEt = counter heater function			
		Cnd = condenser fan function			

Parameter	Description	Options	Unit of measurement	Range	Default
o R S	Relay configuration on terminals 11-12	nP = not used	-	-	OnF
		CPr = compressor function			
		CP2 = second compressor function			
		dEF = defrosting function			
		Fan = evaporator fan function			
		ALr = alarm function			
		LiG = cold room light function			
		AUS = auxiliary relay, can also be switched on/off via button			
		OnF = the relay functions as ON/OFF output			
		AC = anti-fog heaters function			
		db = dead band adjustment (not compatible with CrE=y)			
		ES = the relay is activated when the energy-saving function is active			
		HEt = counter heater function			
		Cnd = condenser fan function			

Parameter	Description	Options	Unit of measurement	Range	Default
o 10	Relay configuration on terminals 47-48	nP = not used	-	-	CP2
		CPr = compressor function			
		CP2 = second compressor function			
		dEF = defrosting function			
		Fan = evaporator fan function			
		ALr = alarm function			
		LiG = cold room light function			
		AUS = auxiliary relay, can also be switched on/off via button			
		OnF = the relay functions as ON/OFF output			
		AC = anti-fog heaters function			
		db = dead band adjustment (not compatible with CrE=y)			
		ES = the relay is activated when the energy-saving function is active			
		HEt = counter heater function			
		Cnd = condenser fan function			

Parameter	Description	Options	Unit of measurement	Range	Default
	Relay configuration on terminals 45-46	nP = not used	-	-	Cnd
		CPr = compressor function			
		CP2 = second compressor function			
		dEF = defrosting function			
		Fan = evaporator fan function			
		ALr = alarm function			
		LiG = cold room light function			
		AUS = auxiliary relay, can also be switched on/off via button			
		OnF = the relay functions as ON/OFF output			
		AC = anti-fog heaters function			
		db = dead band adjustment (not compatible with CrE=y)			
		ES = the relay is activated when the energy-saving function is active			
		HEt = counter heater function			
		Cnd = condenser fan function			
	Alarm relay polarity	cL = normally closed	-	-	cL
		oP = normally open			
	The auxiliary output is not related to the ON/OFF status of the device	n = if the instrument is switched off, the auxiliary output is also switched off	-	-	n
		y = the status of the auxiliary output is independent of the ON/OFF status of the device			

3.7 Digital input parameters

3.7.1 List of parameters

 **inP**

Parameter	Description	Options	Unit of measurement	Range	Default
	Digital input 1 polarity (terminals 31-32)	cL = the digital input is activated by	-	-	OP

Parameter	Description	Options	Unit of measurement	Range	Default
		closing the contact			
		oP = the digital input is activated by opening the contact			

Parameter	Description	Options	Unit of measurement	Range	Default
I F	Digital input 1 function (terminals 31-32)	nu = not used	-	-	dor
		EAL = external alarm			
		bAL = external serious alarm			
		PAL = pressure switch activation			
		dor = door switch			
		dEF = defrosting activation command			
		AUS = auxiliary output activation			
		LiG= cold room light activation			
		OnF = instrument ON/OFF			
		FHU = not used			
		ES = energy saving function activation			
		nt = enable second parameter map			
		cLn = enable cleaning function			
		dEn = defrosting end command			
		CP1 = compressor 1 safety devices			
		CP2 = compressor 2 safety devices			
		StC = cooling stop			

Parameter	Description	Options	Unit of measurement	Range	Default
d 1 d	Time/delay interval for digital input 1 signalling	-	minutes	0...255	10
, 2 P	Digital input 2 polarity (terminals 30-31)	cL = the digital input is activated by closing the contact	-	-	OP
		oP = the digital input is activated by opening the contact			

Parameter	Description	Options	Unit of measurement	Range	Default
i 2 F	Digital input 2 function (terminals 30-31)	nu = not used	-	-	EAL
		EAL = external alarm			
		bAL = external serious alarm			
		PAL = pressure switch activation			
		dor = door switch			
		dEF = defrosting activation command			
		AUS = auxiliary output activation			
		LiG= cold room light activation			
		OnF = instrument ON/OFF			
		FHU = not used			
		ES = energy saving function activation			
		nt = enable second parameter map			
		cLn = enable cleaning function			
		dEn = defrosting end command			
		CP1 = compressor 1 safety devices			
		CP2 = compressor 2 safety devices			
		StC = cooling stop			

Parameter	Description	Options	Unit of measurement	Range	Default
d 2 d	Time/delay interval for digital input 2 signalling	-	minutes	0...255	0
, 3 P	Digital input 3 polarity (terminals 25-26)	cL = the digital input is activated by closing the contact	-	-	OP
		oP = the digital input is activated by opening the contact			

Parameter	Description	Options	Unit of measurement	Range	Default
i 3 F	Digital input 3 function (terminals 25-26)	nu = not used	-	-	PAL
		EAL = external alarm			
		bAL = external serious alarm			
		PAL = pressure switch activation			
		dor = door switch			
		dEF = defrosting activation command			
		AUS = auxiliary output activation			
		LiG= cold room light activation			
		OnF = instrument ON/OFF			
		FHU = not used			
		ES = energy saving function activation			
		nt = enable second parameter map			
		cLn = enable cleaning function			
		dEn = defrosting end command			
		CP1 = compressor 1 safety devices			
		CP2 = compressor 2 safety devices			
		StC = cooling stop			

Parameter	Description	Options	Unit of measurement	Range	Default
d 3 d	Time/delay interval for digital input 3 signalling	-	minutes	0...255	90
, 4 P	Digital input 4 polarity (terminals 24-25)	cL = the digital input is activated by closing the contact	-	-	CL
		oP = the digital input is activated by opening the contact			

Parameter	Description	Options	Unit of measurement	Range	Default
, 4 F	Digital input 4 function (terminals 24-25)	nu = not used	-	-	nU
		EAL = external alarm			
		bAL = external serious alarm			
		PAL = pressure switch activation			
		dor = door switch			
		dEF = defrosting activation command			
		AUS = auxiliary output activation			
		LiG= cold room light activation			
		OnF = instrument ON / OFF			
		FHU = not used			
		ES = energy saving function activation			
		nt = enable second parameter map			
		cLn = enable cleaning function			
		dEn = defrosting end command			
		CP1 = compressor 1 safety devices			
		CP2 = compressor 2 safety devices			
		StC = cooling stop			

Parameter	Description	Options	Unit of measurement	Range	Default
d 4 d	Time/delay interval for digital input 4 signalling	-	minutes	0...255	0
n P 5	Number of pressure switch activations	-	-	0...15	3
0 d C	Status of compressor and evaporator fans with door open	no = normal Fans = evaporator fans off CPr = compressor off F-C = compressor and evaporator fans off	-	-	F-C
r r d	Open door alarm effect on the outputs	n = outputs not affected by open door alarm Y = the outputs restart with the open door alarm	-	-	Y
o F C	Compressor stop delay when the door is opened	-	seconds	0...255	30

3.8 Energy saving parameters

3.8.1 List of parameters



Parameter	Description	Options	Unit of measurement	Range	Default
H E S	Temperature increase during the energy-saving cycle	-	K	-30...30	3
P E L	Activating energy saving when the light is switched off	n = disabled function Y = energy saving is activated when the light is switched off and vice versa	-	-	n

3.9 LAN management parameters

3.9.1 List of parameters



LAN

Parameter	Description	Options	Unit of measurement	Range	Default
L N D	Defrosting synchronisation	n = the section does not send a global defrosting command	-	-	Y
		y = the section sends a defrosting start command to the other controllers			
D E N	Type of defrosting end	n = the end of the defrosting cycle is independent for the controller connected to the LAN	-	-	Y
		y = the end of the defrosting cycle is synchronised for the controllers connected to the LAN			
L S P	Set-point synchronisation L.A.N.	n = the set-point value is only changed in the local controller	-	-	n
		y = when the set-point is changed, it is updated with the same value for all other controllers connected to the LAN			
L d S	Synchronisation of the L.A.N. display	n = the displayed value is not shared across the LAN	-	-	Y
		y = the value displayed by the section is sent to all other controllers			
L O F	L.A.N. On/Off synchronisation	n = On / Off command only acts on the local section	-	-	n
		y = the On/Off command is sent to all other sections			
L L ,	L.A.N. light synchronisation	n = the light command only acts on the local section	-	-	Y
		y = the lights command is sent to all other sections			
L A U	L.A.N. AUX output synchronisation	n = the AUX command only acts on the local section	-	-	n
		y = the AUX command is			

Parameter	Description	Options	Unit of measurement	Range	Default
		sent to all other sections			
L E S	L.A.N. energy-saving synchronisation	n = the energy-saving command only acts on the local section y = the energy-saving command is sent to all other sections	-	-	Y
L S d	Remote probe display	n = the displayed value is that of the local probe y = the displayed value is from another section (which has parameter LdS = y)	-	-	n
S t n	Shared cooling request via LAN	n = not used y = a generic cooling request from the LAN activates the electro-valve, the fan and the SH control	-	-	n
A C E	Shared cooling request via LAN even if the compressor is blocked	n= no Y = yes	-	-	n

Note: maximum number of devices permitted **8**.

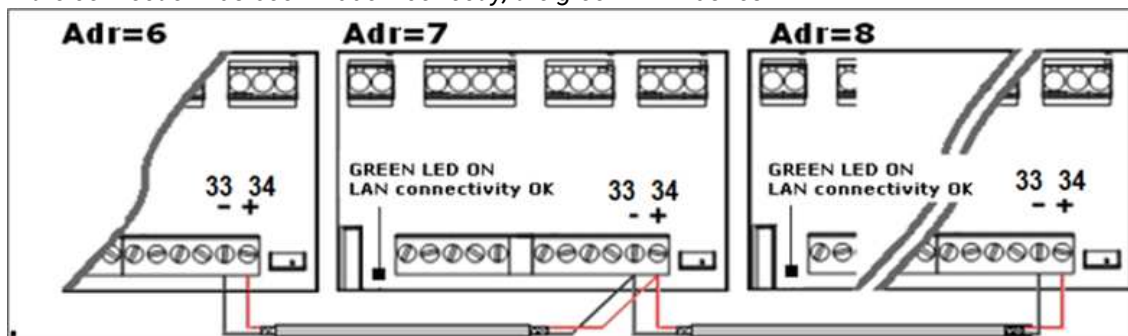
Identify each device with a different address via parameter **Adr**.

Use a shielded cable for the connection. Max distance: **30m**.

The address **Adr** is the same as that used for the ModBus network.

If the network is correctly connected, the green LED lights up.

If the connection has been made incorrectly, the green LED flashes.



NOTICE: DO NOT connect the shielding to the GND terminal or the device's earth.

3.10 Probe configuration parameters

3.10.1 List of parameters



PrB

Parameter	Description	Options	Unit of measurement	Range	Default
P 1 C	Probe 1 configuration	nP = not present	-	-	ntc
		ntc = NTC			
		PtM = Pt1000			
OF 1	Probe 1 calibration	-	K	-12...12	0
P 2 C	Probe 2 configuration	nP = not present	-	-	ntc
		ntc = NTC			
		PtM = Pt1000			
OF 2	Probe 2 calibration	-	K	-12...12	0
P 3 C	Probe 3 configuration	nP = not present	-	-	nP
		ntc = NTC			
		PtM = Pt1000			
		di = digital input (the function is selected via parameter i3F)			
OF 3	Probe 3 calibration	-	K	-12...12	0
P 4 C	Probe 4 configuration	nP = not present	-	-	nP
		ntc = NTC			
		PtM = Pt1000			
		di = digital input (the function is selected via parameter i4F)			
OF 4	Probe 4 calibration	-	K	-12...12	0

3.11 Communication parameters

3.11.1 List of parameters



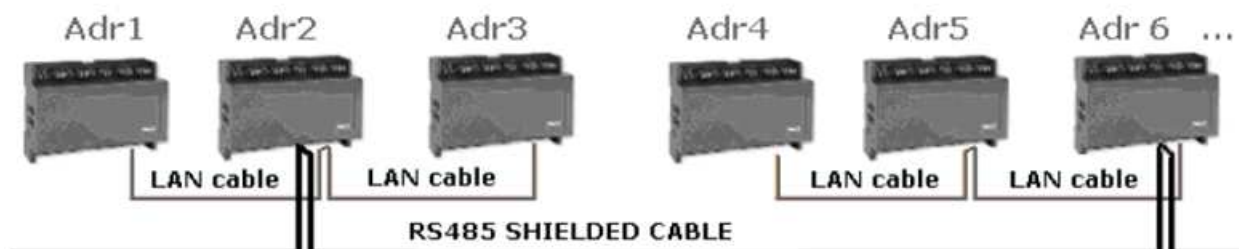
COM

Parameter	Description	Options	Unit of measurement	Range	Default
R d r	RS485 serial address	-	-	1...247	1

Parameter	Description	Options	Unit of measurement	Range	Default
b A u	Set the speed in communication between:	9.6...9600	-	-	9.6
		19.2...19200			
		38.4...38400			
		57.6...57600			
		115...115000			
P A r	Parity check	no = no parity check	-	-	no
		odd = odd parity check			
		EvE = even parity check			
F n	Read-only parameters	Std = standard: the parameters can be changed	-	-	Std
		ro = read-only mode: the parameters can be read but not changed by the supervision system			

Note: identify each device with a different address via parameter **Adr**.
Use a shielded cable for the connection. Max distance: **1km**.
The address **Adr** is the same as that used for the LAN.

NOTICE: only connect one device per LAN to the RS485 connection.



NOTICE: DO NOT connect the shielding to the GND terminal or the device's earth.

3.12 User interface parameters

3.12.1 List of parameters

Ui

Parameter	Description	Options	Unit of measurement	Range	Default
P S U	Password setting for second-level parameters	-	-	0...999	22

3.13 Other parameters (read only)

3.13.1 List of parameters



oth

Parameter	Description	Options	Unit of measurement	Range	Default
r E L	Software version	-	-	-	-
S r L	Software subversion	-	-	-	-
F d Y	Firmware release date: day	-	-	-	-
F n n	Firmware release date: month	-	-	-	-
F Y r	Firmware release date: year	-	-	-	-
P t b	Table of parameters	-	-	-	-

3.14 HOT KEY flash drive

3.14.1 Download the parameters to the flash drive

1. Set the controller programmed with the desired values.
2. Insert the flash drive with the controller ON, then press : the download of the parameters to the flash drive starts and the display shows **uPL** flashing.
3. At the end of the operation, the display shows the following for 10 sec:
 - **End** if programming was successful.
 - **Err** if programming failed.

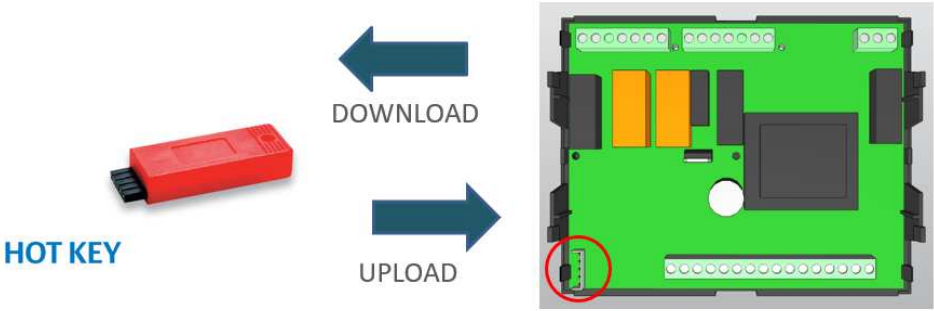
Note: pressing the button restarts programming.

3.14.2 Load the parameters from the flash drive

To program the controller with a previously programmed flash drive, proceed as follows:

1. Switch off the instrument or put it in stand-by via the keyboard.
2. Insert the programmed flash drive.
3. Switch on the instrument: data is automatically downloaded from the flash drive to the controller and the display shows **doL** flashing.
4. At the end of the operation, the display shows the following for 10 sec:
 - **End** if programming was successful and adjustment starts again.
 - **Err** if programming failed.

Note: repeat the operation or remove the flash drive to start with normal adjustment.



4. Diagnostics and communication

This section includes the following topics:

4.1 Errors indicated by the controller	42
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4.1 Errors indicated by the controller

4.1.1 Skills



COMPANY

4.1.2 Errors

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

ID	Reference	Condition / Meaning	How the machine behaves	Reset
n o d	No display	The keyboard is trying to communicate with another board in LAN, but is not responding or there is a problem with the connection. Press the 'up arrow' for 3 sec, enter the 'SEC' menu and select 'LOC'.	The machine works normally.	AUT
r S t	-	Alarm reset	The alarm relay is reset.	AUT
n o P	Probe input	Probe not configured	The compressor enters a cycle of 15 min on (Con) and 15 min off (Cof).	AUT
n o L	-	The keyboard does not communicate with the XW470k board.	Check the wiring and call Service.	AUT
P 1	Probe input	Cold room probe error, check connection	The compressor enters a cycle of 15 min on (Con) and 15 min off (Cof).	AUT
P 2	Probe input	Defrosting probe error, check connection	Defrosting lasts according to parameter (MdF).	AUT
P 3	Probe input	Probe P3 error (default - probe not configured)	The machine works normally.	AUT
P 4	Probe input	Probe P4 error (default - probe not configured)	The machine works normally.	AUT
H R	Temperature threshold	High-temperature alarm; triggered when the setpoint value + "ALU" + "AHy" diff. param. is exceeded. Delays 'dAO' (start-up), 'ALd' (threshold), 'EdA' (defrost), 'dot' (door opening) are considered.	The machine works normally.	AUT

ID	Reference	Condition / Meaning	How the machine behaves	Reset
L R	Temperature threshold	High-temperature alarm; triggered when the setpoint value + "ALL" param. + "AHy" diff. is exceeded. Delays 'dAO' (start-up), 'ALd' (threshold), 'EdA' (defrost), 'dot' (door opening) are considered.	The machine works normally.	AUT
H R 2	Second temperature threshold	If rA2≠ nP, then: High-temperature alarm; triggered when the setpoint value + "A2U" param. + "A2H" diff. is exceeded. Delays 'dAO' (start-up), 'A2d' (threshold), 'EdA' (defrost), 'dot' (door opening) are considered.	The machine works normally.	AUT
L R 2	Second temperature threshold	If rA2≠ nP, then: High-temperature alarm; triggered when the setpoint value + "A2L" param. + "A2H" diff. is exceeded. Delays 'dAO' (start-up), 'A2d' (threshold), 'EdA' (defrost), 'dot' (door opening) are considered.	The machine works normally.	AUT
P R	Digital input	Blocking due to the pressure switch tripping; the alarm will only be displayed after the pressure switch trips 'nPS' times within the 'd3d' time span.	All OFF outputs; power must be disconnected to reset alarm.	SEMI-AUT
d R	Digital input	Warning due to door opening. 'd#d' delays are considered (default: 'd1d').	Compressor, fans OFF (depending on "odc" parameter) and cold room light on. After the alarm, adjustment resumes following the 'rrd' parameter.	AUT
E R	Digital input	Compressor 1-2 digital input activated (compressor circuit breaker activation)	The alarm relay is activated. The compressor in alarm stops electro-mechanically. The compressor not in alarm remains active.	AUT*
C R	Digital input	Not configured	All outputs OFF	AUT
C P 1	Compressor 1 alarm	Not configured	All outputs active except that of comp.1, alarm relay activated	AUT*
C P 2	Compressor 2 alarm	Not configured	All outputs active except that of comp.2, alarm relay activated	AUT*
E E	-	Faulty EEPROM memory	All outputs OFF - Board to be replaced	AUT

Note (*): AUT alarm reset, intervention on compressor(s) circuit breaker required

5. Appendix

This section includes the following topics:

5.1 Disposal44

5.1 Disposal

5.1.1 Warnings

Polluting materials. Environmental contamination.



Disposal of polluting materials according to DIRECTIVE 2012/19/EU (WEEE) and It. Legislative Decree 49/2014 on waste 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.