



XER



**Cold Room Temperature Controller
Installation Guide**

(FW rel. 93.01.01)

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1. IMPORTANT USER INFORMATION

- The  symbol is intended to alert the user of a non-insulated voltage source within the product area that is sufficiently high to constitute a risk of electric shock to persons.
- The  symbol is intended to alert the user of important operating and maintenance (servicing) instructions.
- Copeland Controls S.r.l. reserves the right to modify this user's manual at any time without prior notice. The documentation can be downloaded from the website <https://webapps.copeland.com/Dixell/Pages/Manuals> even prior to purchase.
- This manual is an integral part of the product and must always be kept near the device for easy and quick reference. **This document is a summarized version to ease installation. We strongly recommend the reading of the full version which contains the full parameters and functions list.** The product cannot be used as a safety device. Please read this manual very carefully be sure you understand the information provided before using the device.
- Verify that the power supply voltage is correct before connecting the device. Do not expose it to water or humidity: use the controller only within the operating limits, avoiding sudden temperature changes and high atmospheric humidity in order to prevent condensation from forming. Recommendations: disconnect all the electrical connections before performing any maintenance task; insert the probe where it cannot be reached by the End User; the device must not be opened; consider the maximum current that can be applied to each relay; make sure that the wires of the probes, of the loads and the electrical power supply cables are sufficiently separated from each other, without crossing or intertwining. In case of applications in industrial environments, it may be useful to use the main filters as well as the inductive loads.
- The customer shall bear full responsibility and risk for product configuration in order to achieve the final installation of the equipment/system. Upon the customer's request and following a specific agreement, Copeland Controls S.r.l. may be present during the start-up of the final machine/application, as a consultant, however, under no circumstances can the company be held responsible for the correct operation of the final equipment/system.
- Since Copeland Controls S.r.l. products are part of a high-level technology, a qualification and a configuration/programming/commissioning stage is required to best use them. Otherwise, these products may malfunction and Copeland Controls S.r.l. cannot be held responsible. The product must not be used in any way that differs from that stipulated in the documentation.

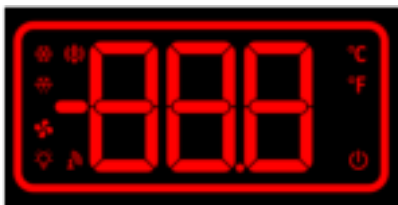
- The device must always be installed inside an electrical panel that can only be accessed by authorised personnel. For safety purposes, the keyboard must be the only part that can be reached.
- The electrical wiring connections must never be modify while the device is being used.
- It is good practice to bear in mind the following indications for all Copeland Controls S.r.l. products:
 - Prevent the electronic circuits from getting wet as contact made with water, humidity or any other type of liquid can damage them. Comply with the temperature and humidity limits specified in the manual in order to store the product correctly.
 - The device must not be installed in particularly hot environments as high temperatures can damage the electronic circuits and/or plastic components forming part of the casing. Comply with the temperature and humidity limits specified in the manual in order to store the product correctly.
 - Prevent the device from being dropped, knocked or shaken as either can cause irreparable damage.
 - Do not clean the device with corrosive chemical products, solvents or aggressive detergents.
 - The device must not be used in applications that differ from that specified in the following document.
- ***Separate the power supply of the device from the rest of the electrical devices connected inside the electrical panel. The secondary of the transformer must never be connected to the earth.***
- Copeland Controls S.r.l. reserves the right to change the components of its products, even without notice, ensuring the same and unchanged functionality.”

2. PRODUCT DISPOSAL (WEEE)

In compliance with the Directive 2002/96/EC of the European Parliament and of the Council of January 27th 2003 and to the relative national legislation, please note that:

- There lies the obligation not to dispose of electrical and electronic waste as municipal waste but to separate the waste.
- Public or private collection points must be used to dispose of the goods in accordance with local laws. Furthermore, at the end of the product's life, it is also possible to return this to the retailer when a new purchase is made.
- This equipment may contain hazardous substances. Improper use or incorrect disposal can have adverse effects on human health and the environment.
- The symbol shown on the product or the package indicates that the product has been placed on the market after August 13th 2005 and must be disposed of as separated waste.
- Should the product be disposed of incorrectly, sanctions may be applied as stipulated in applicable local regulations regarding waste disposal.

3. USER INTERFACE










XER has a button user interface with an alarm frame. Specific screens can be used to enter or activate some functions.

3.1 SCREENS






SCREEN	DESCRIPTION
	Home: this screen shows the regulation temperature value, the measurement unit, the active alarms and the output activation. This is the first screen after power on or after exiting from other screens.
	SET point modification: this screen enables the modification of the Set point.
	PROGRAMMING mode: this screen enables the modification of the parameter values.
	Functions: on this screen is it possible to enable some special features.
	Information: these screens show the information relative to I/O (probe, digital inputs and analogue outputs).
	Stand-By: in this condition all outputs are deactivated.
	HotKey Download: "doL" label and alarm frame animation during download operations (copy from HotKey to the internal memory)
	HotKey Upload: "UPL" label and alarm frame animation during upload operations (copy from internal memory to the HotKey)
	X9: it is possible to build the label of the parameter to be visualized or modified.

3.2 ICONS

	DESCRIPTION	MODE	FUNCTION
	LIGHT/BACK	OFF	Light output OFF
		FLASH	
		ON	Light output ON
		OFF	Compressor output OFF

	COMPRESSOR	FLASH	Anti short cycle delay is running
		ON	Compressor output ON
	FAN	OFF	Evaporator fan output OFF
		FLASH	Activation delay is running
		ON	Evaporator fan output ON
	DEFROST	OFF	Defrost output is OFF
		FLASH	Activation delay is running
		ON	Defrost output is ON
	ALARM	OFF	No alarm is active
		FLASH	
		ON	Some alarm is active
	Celsius Degree	OFF	Not used
		FLASH	Not used
		ON	Measurement units: Celsius degree
	Fahrenheit Degree	OFF	Not used
		FLASH	Not used
		ON	Measurement units: Fahrenheit degree
	ONOFF	OFF	
		FLASH	
		ON	The device is in standby mode

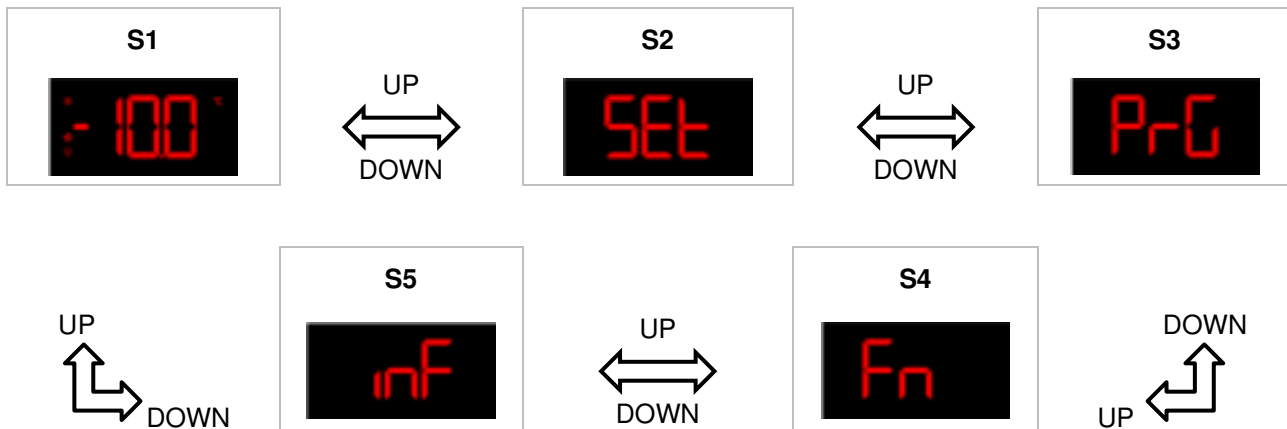
3.3 KEYBOARD

ICON	STANDARD	MODE	OTHER FUNCTIONS
	LIGHT or BACK (button "b1")	Normal	Depends on par. b1C
		3 sec	Depends on par. b1t
	DEFROST (button "b2")	Normal	Depends on. b2C
		3 sec	Depends on par. b2t
	DOWN (button "b3")	Normal	Depends on par. b3C
		3 sec	Depends on par. b3t
SET	SET (button "b4")	Normal	Depends on par. b4C
		3 sec	Depends on par. b4t
	UP (button "b5")	Normal	Depends on par. b5C
		3 sec	Depends on par. b5t
	STAND-BY (button "b6")	Normal	Depends on par. b6C
		3 sec	Depends on par. b6t

3.4 ALARM FRAME

TYPE OF ALARM	LABEL ON DISPLAY	ALARM ICON	ALARM FRAME	BUZZER
Warning	Px, HA, LA, HP2, HA2, LA2, EA, dA, rtC, rtF; bAt	ON	OFF	ON
Lockout	CA, PA, EE, SAF, PdA	ON	ON	ON
Man trapped alarm	tPA,	ON	BLINK (500ms on + 500ms off)	ON
Gas leakage alarm	GAS	ON	BLINK (500ms on + 500ms off)	ON
Cleaning	CLt	OFF	Rot Right	OFF
Fan maintenance	FSr, CSr	OFF	OFF	OFF
Sanitization	SAn	OFF	Rot Right	OFF
Parameter value modified	Parameter value blinks 3 times	OFF	Rot Right + 2 blink	OFF
Parameter upper limit reached	Parameter value blinks 1 time	OFF	1x BLINK (500ms on + 500ms off) of upper part of the frame	OFF
Parameter lower limit reached	Parameter value blinks 1 time	OFF	1x BLINK (500ms on + 500ms off) of the lower part of the frame	OFF

3.5 USER INTERFACE



- S1:** Home screen
S2: Direct access to Set point modification
S3: Direct access to Programming mode
S4: Direct access to special Function activation
S5: Direct access to I/O information

Use UP or DOWN button to move through the screens **S1**...**S5**. The logic implements a circular browsing: from **S1** is possible to go to **S5** or to **S2** depending on the pressed button. A programmable timeout is implemented to return **HOME (S1)** from any other screen.

3.6 SETPOINT MODIFICATION

When in **HOME screen**, it is possible to enter the **Setpoint Menu**:

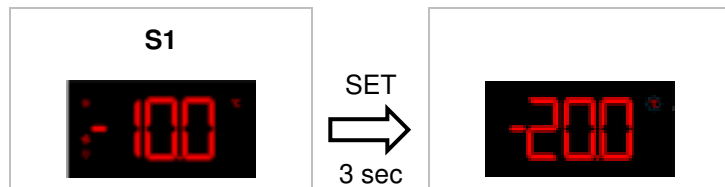
- By keeping the **SET** button pressed for 3 sec.
- By moving to SET screen and entering the Setpoint menu to modify the current SET value.

The temperature measurement icon (°C or °F) will blink to indicate that the current displayed value is editable.

To exit from Setpoint Menu:

- Wait for timeout (see par. SC1)
- Press **SET** button to confirm value and come back to the **HOME** screen.
- Press **BACK** button (button “b1”) to exit and come back to the **HOME** screen.

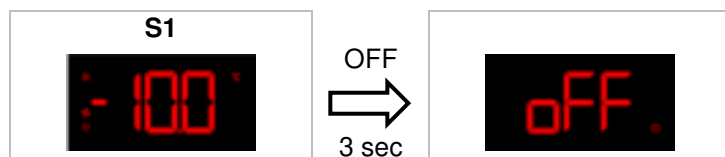
3.6.1 QUICK SETPOINT ACCESS



3.6.2 SETPOINT MENU ACCESS



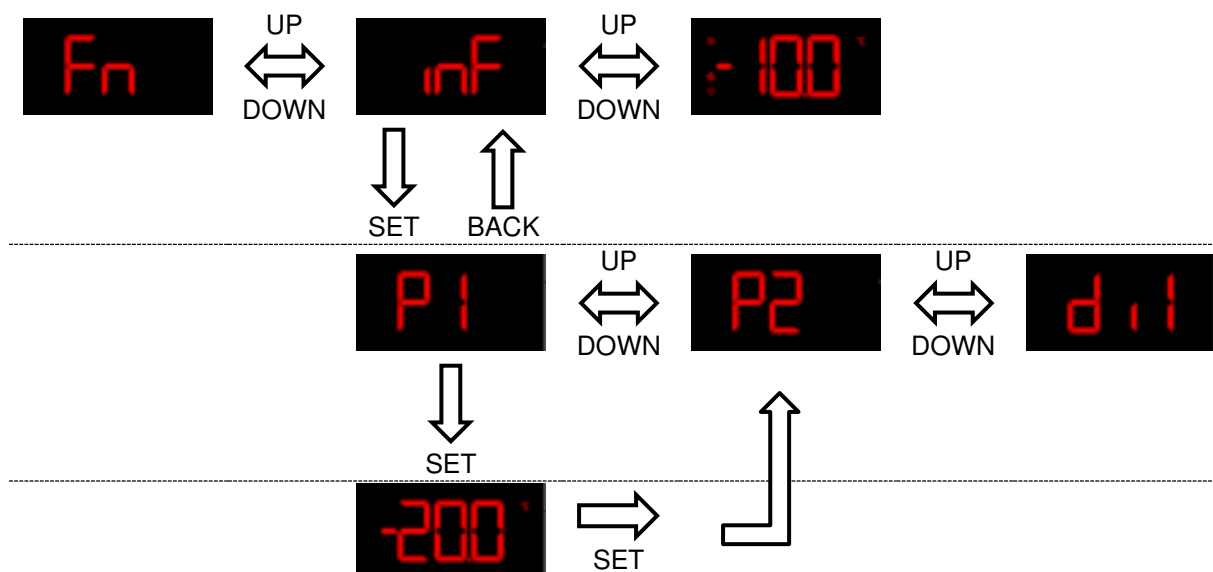
3.7 STAND-BY MODE



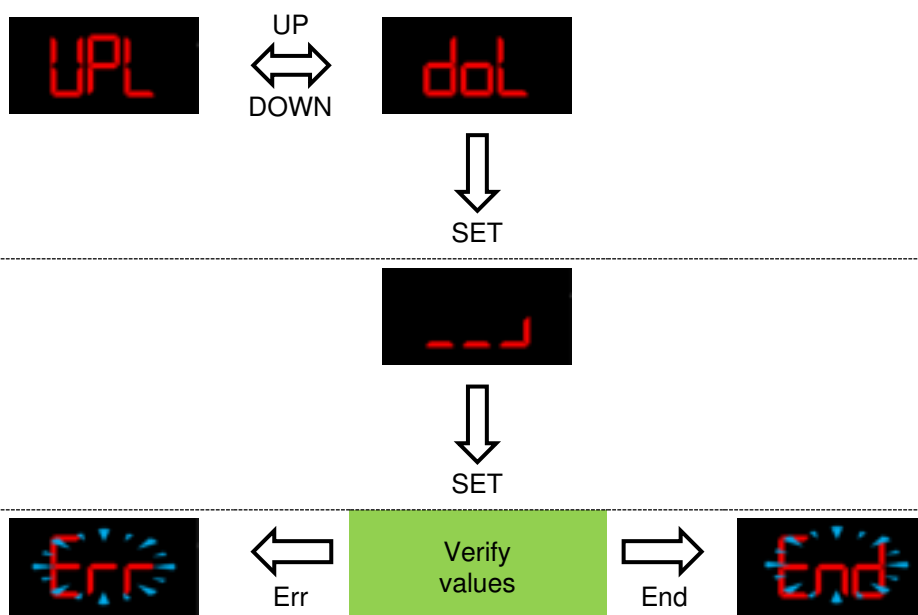
When in **HOME** screen, keep the OFF button pressed for 3 sec to activate stand-by mode. All outputs and alarms are deactivated in Stand-by mode. It is possible to visualize the label “oFF” timely through the par. **SC9**. With **SC9=YES**, the label “oFF” will appear 1 sec out of 10.

3.8 INFO MENU

This menu allows the immediate visualization of the available I/Os like probes, digital inputs and analogue outputs when present



3.9 HOTKEY – UPLOAD AND DOWNLOAD



Both **HotKey Upload and Download** operations can be activated only after power-on.

To start the selected operation, follow these instructions:

1. Device power-off
2. Open the plastic box and insert the HotKey-64K (on the 5-pin ports on the back of the device)
3. Power-on the device and select:
 - a. **UPL** to copy the parameters from device memory to the **HotKey**
 - b. **doL** to copy the parameters from **HotKey** to the device memory
4. Press the **SET** button to start the selected operation
5. The copying procedure will start and the alarm frame will start rotating-right 3 times during the copy operations.
6. At the end of the copying procedure, a message will notify the user that the operation has been completed:
 - a. **End**: all parameters were copied
 - b. **Err**: some error occurred during copying operations

3.10 PROGRAMMING MENU

When in **HOME screen**, it is possible to enter the **Programming Menu**:

- By keeping the **SET+DOWN** buttons pressed for 3 sec.
- By moving to PRG screen and entering the Programming menu to modify the current parameter values.

When into the Programming menu, the temperature measurement icon (°C or °F) will blink to indicate that the current displayed value is editable.

To exit from Programming Menu:

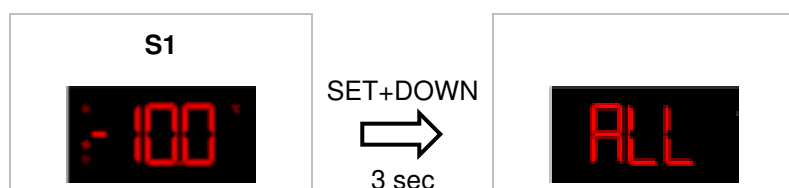
- Wait for timeout (see par. **SC5**)
- Press **BACK** button (button “b1”) until come back to the **HOME** screen.
- Keep the **BACK** button (button “b1”) pressed for 3 sec to exit and come back to the **HOME** screen.

3.10.1 MENU DESCRIPTIONS

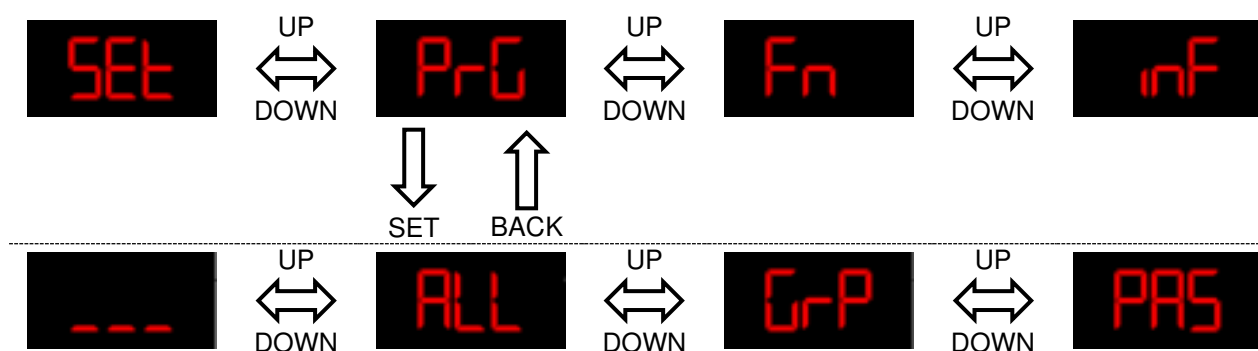
Parameters are also separated by groups. To access, enter Programming Menu as described in section 3.10.4 and use the UP and **DOWN** buttons to find GrP. Press **SET** and search for group labels according to the table below:

Group Label	Description
ALL	All parameters menu
rEG	Main regulation parameters
Prb	Probe configuration parameters
diS	Visualization parameters
dEF	Defrost configuration parameters
FAn	Evaporator and condenser fan configuration parameters
AUS	Auxiliary regulator parameters
dYn	Dynamic setpoint for condenser fan
ALr	Alarm configuration parameters
oUt	Digital and analogue output configuration parameters
inP	Digital input configuration parameters
ES	Energy saving configuration parameters
Cnt	Counters, read only values
rtC	Real Time Clock configuration parameters
E2	Memory storage management
CoM	Serial Communication port configuration parameters
Ui	User Interface configuration parameters
inF	Information, read only parameters
PAS	Password for entering protected menu parameters
---	X9 Menu

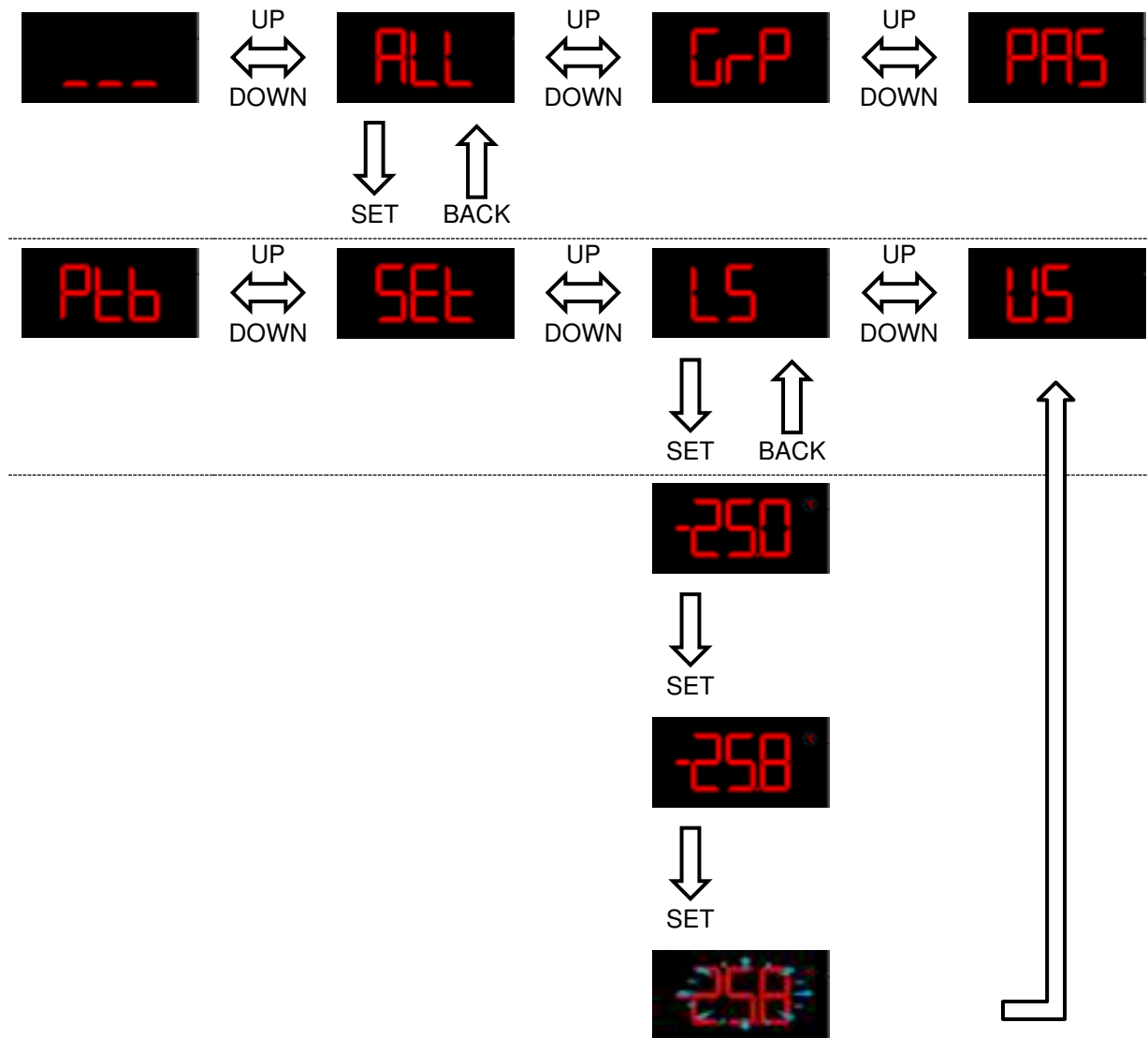
3.10.2 QUICK PROGRAMMING MODE ACCESS



3.10.3 PROGRAMMING MENU STRUCTURE



3.10.4 SEE AND MODIFY PARAMETERS



3.10.5 X9: INTELLIGENT PARAMETER SEARCH AND MODIFICATION

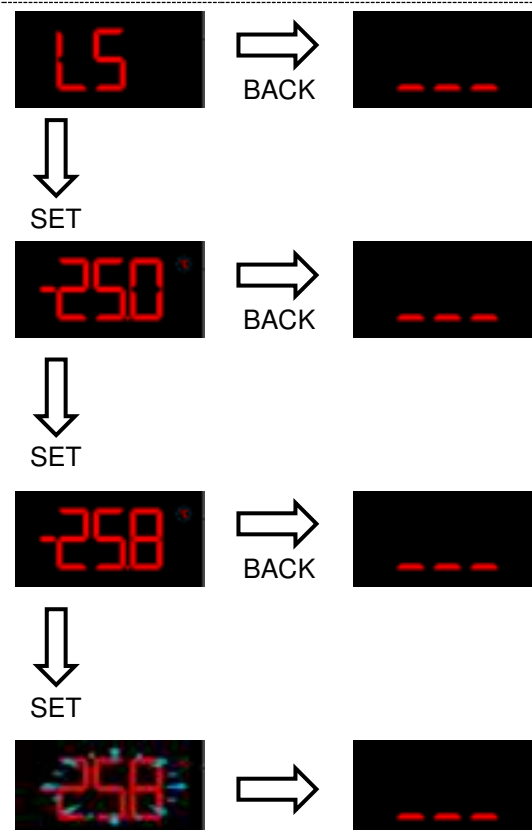
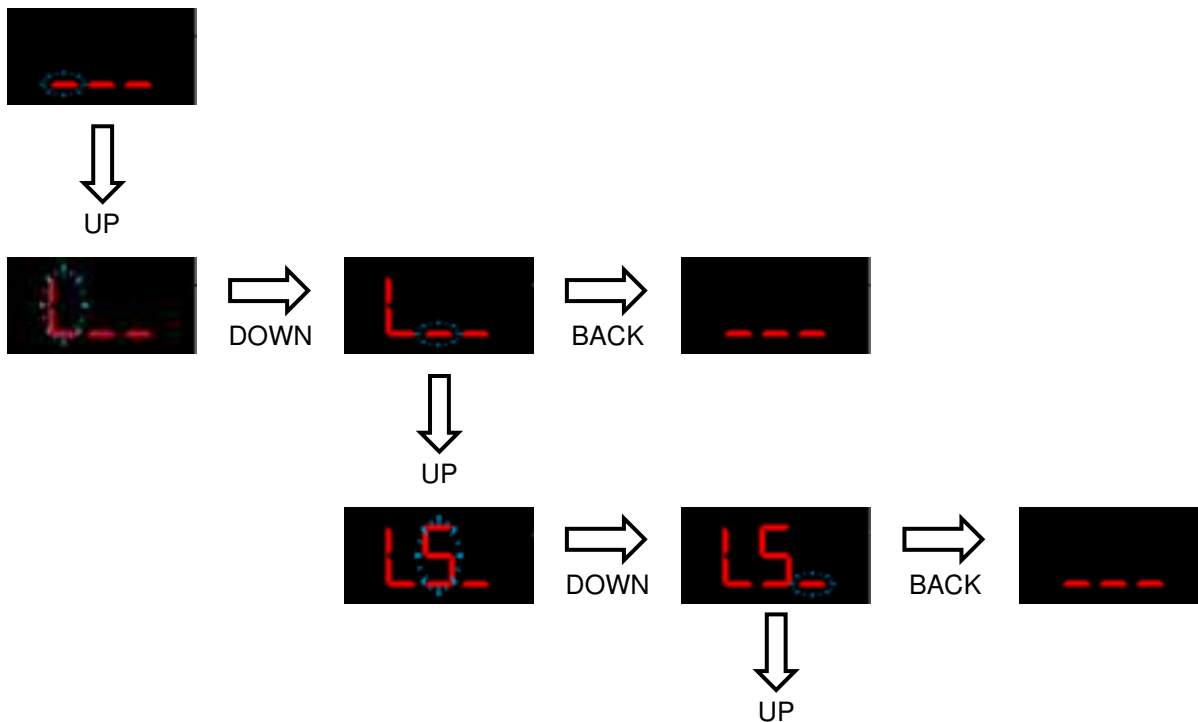
“X9” is XER intelligent parameter navigation mechanism. Every parameter is identified by a unique label that can have two or three alphanumeric characters. When In X9 screen the system is able to drive the user through the available symbols, showing only those referring to existing parameters.

For example, if a modification of the “interval between defrosts” parameters is required (label “idF”), these are the steps to follow:

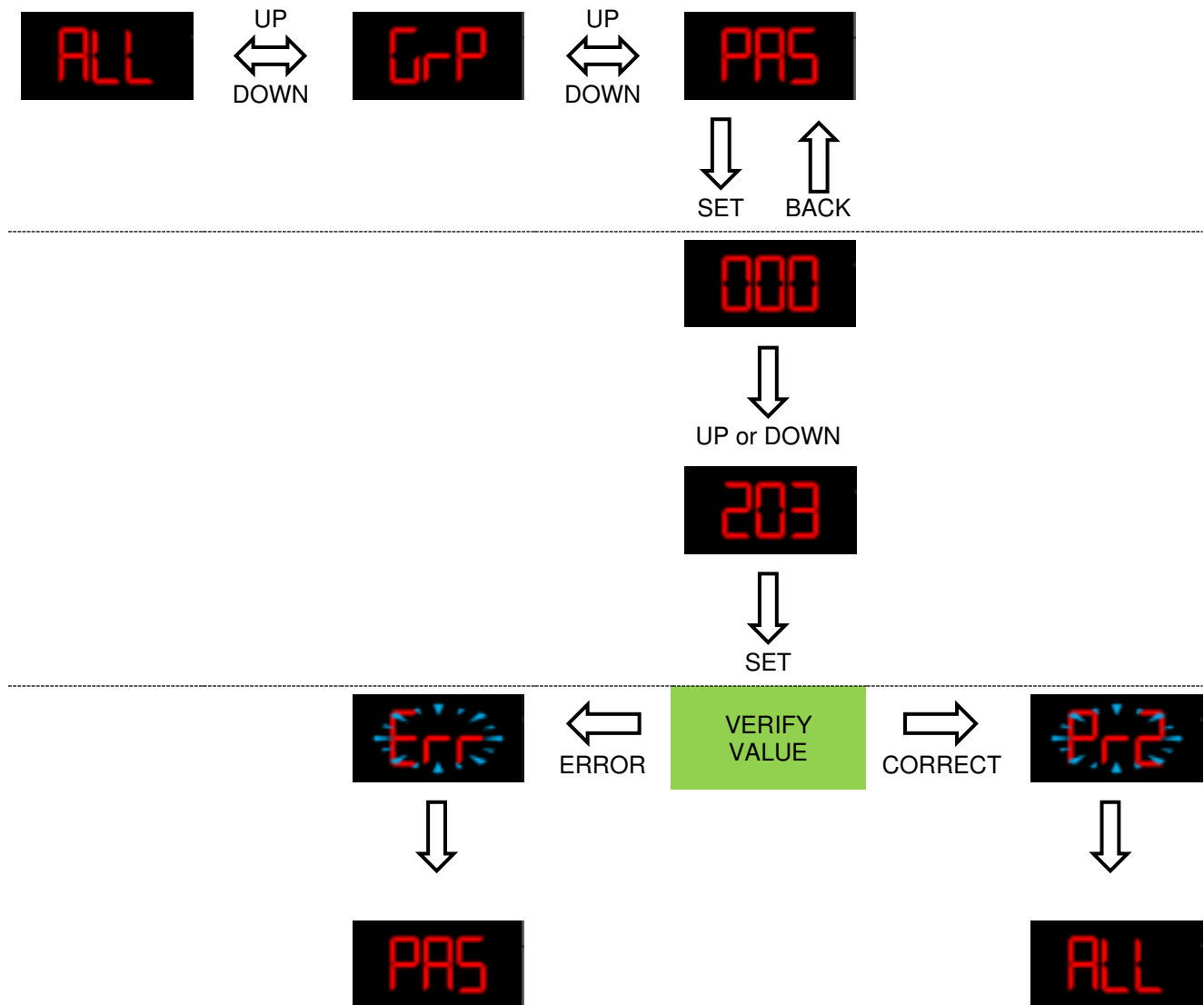
1. Enter the **X9** screen
2. Select the first char position (lower segment on the left will blink)
3. Use the UP button to browse through the available characters until char “i” (lowercase) appears
4. Use the DOWN button to move to the second char position (segment in the middle)
5. Use the UP button to browse through the available characters until char “d” appears
6. Use the DOWN button to move on the third char position (segment on the right)
7. Use the UP button to browse through the available characters until char “F” appears
8. Enter the par. value by using the **SET** button.

NOTE: pay attention to the upper or lower case when browsing through the available characters.

For simplicity, here is the complete list of available characters: A, b, C, d, E, F, G, H, i, L, M, n, o, P, q, r, S, t, u, V, Y, 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9.



3.10.6 USE THE PASSWORD TO ENTER THE PARAMETER LEVEL “PR2”



When in Pr2, the label of all parameters in Pr1 will have the “decimal point”.
The level Pr2 will be accessible until exiting programming mode.

3.10.7 PASSWORD RESET PROCEDURE

The default password value for XER is “000”. It is possible to set a different value for entering the protected parameters (level PR2) by using the par. **PSU**. Par. **PSU** is visible and editable only in level PR2.

in If a password reset is required, follow these procedures:

3.10.7.1 Wizmate

- Connect Wizmate to the serial port
- Login into Wizmate using the “Administrator” account
- Scan the network and then read the existing configuration
- Go to **PSU** parameter and read the current value or modify it as for your requirements
- Update the XER parameter map if required

3.10.7.2 HOTKEY

- Upload the existing configuration using a compatible HOTKEY
- Login into Wizmate using the “Administrator” account
- Read the HOTKEY using the **ProgTool**
- Go to **PSU** parameter and read the current value or modify it as for your requirements.
- Update the XER parameter map if required (download the modified map using the HOTKEY)

4. REGULATION

4.1 REGULATION TYPES

Parameter "**tMr**" defines the management of the probe inputs for temperature regulation:

1. **nu**: not used. P1 will be used by default
2. **LoE**: regulation performed on the minimum value between selected probes
3. **HiE**: regulation performed on the maximum value between selected probes
4. **AvG**: regulation performed on weighted average of probes:

$$T_{reg} = \frac{(C01 * PA1 + C02 * PA2 + C03 * PA3 + C04 * PA4)}{(C01 + C02 + C03 + C04)}$$

Where:

- **PAx (x=1,2,3,4)**: select the temperature probes to use (nP, P1, P2, P3 or P4)
- **C0x (x=1,2,3,4)**: weight value applied to each probe

Notes:

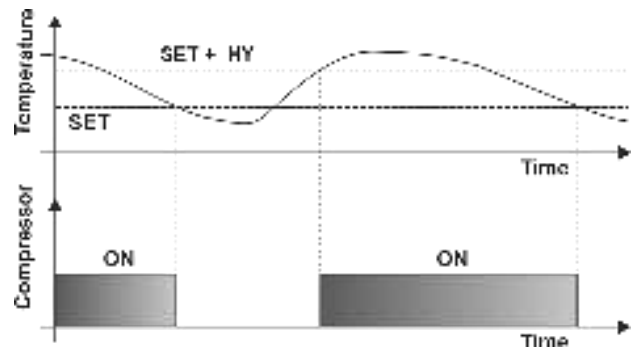
- If probe **PAx (x=1,2,3,4) = nP** the respective probe is not considered
- If probe **PAx (x=1,2,3,4)** is in error the probe number in error is not considered
- If all selected probes for calculating the regulation temperature value are in error, the compressor output will be controlled following par. **Con** and **CoF**.

4.2 SINGLE ONOFF COMPRESSOR

4.2.1 COOLING/HEATING ACTION

The regulation is based on the temperature measured by the regulation temperature value with a tolerance (**HY**) respect to the set point.

- **T > SET+HY (cooling) or T < SET-HY (heating)**: output **oAx=CP1** activation
- **T < SET (cooling) or T > SET (heating)**: output **oAx=CP1** deactivation

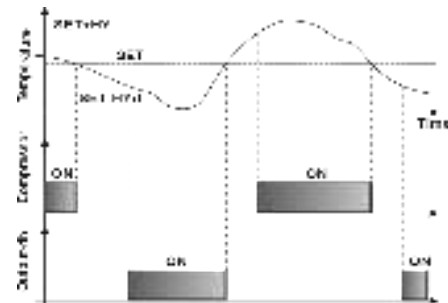


4.2.2 DEAD BAND

The regulation is based on the temperature measured by the regulation temperature value with a couple of differentials respect to the set point.

- **T > SET+HY**: cooling output activation
- **T < SET**: cooling output deactivation
- **T < SET-HYd**: output **oAx=db** activation
- **T > SET**: output **oAx=db** deactivation

Par. **rAr** set a delay between cooling and heating output activations and vice-versa.



4.3 DOUBLE ONOFF COMPRESSOR

This regulation can be activated when **oAx=CP1** and **oAy=CP2** and is valid only for ONOFF compressor. It allows the activation of the second compressor according to a step logic (**2CC =HAF**) or a parallel logic (**2CC=FUL**). Please refer to the complete manual for more information.

5. PUMP DOWN

PUMP DOWN process removes the liquid from the low pressure side, preventing liquid from entering the compressor during off-cycle and potentially damaging it. It requires a solenoid valve to close the liquid line. This function requires the following parameters to be properly configured:

- **oAx (x=1,2,3...)=CP1 or CP2**: a digital output set as “compressor” output
- **oAy (y=1,2,3...)=So1**: a digital output set as “solenoid valve” output
- **Pdn=Y**: to enable the PUMP DOWN logic
- **Pdt>0**: maximum time for PUMP DOWN function
- **ixF (X=1,2)=LPS**: low pressure contact to stop the PUMP DOWN
- **PdA>0**: delay before signaling low pressure contact failure

6. PULL DOWN

The pull down activates the compressor with a different setpoint configurable by the parameter CCS and it is activated:

- By pressing a button (bxt = **CCt**)
- Automatically after defrost
- Automatically after power-on if **T>SET+CCS**
- Automatically when the regulation probe temperature **T** is:
 - **T>SET+HY+oHt** value in normal mode
 - **T>SET+HES+HYE+oHE** value in energy saving mode

In these cases, a different set-point value (**SET+CCS**) will be used. As soon as the room temperature reaches the **SET+CCS** value, the compressor will stop and the normal regulation will restart.

NOTE:

- Pull Down function is disabled when **CCS=0** or **CCt=0**.
 - The **CCt** parameter sets the maximum activation time for any pull down. When **CCt** expires, the Pull Down will be immediately stopped and the standard SET-POINT will be restored.

7. EVAPORATORS CONFIGURATION

7.1 EVAPORATOR DEFROST MANAGEMENT

The XER manages the defrost up to two evaporators and uses a combination of six different parameters (**MdF**, **MdS**, **dFP**, **dSP**, **dtE**, **dtS**). The following combinations are available:

1. One evaporator with single probe (**MdF**, **MdS** = 0, **dFP** ≠ nu, **dSP** = nu, **dtE**, **dtS** = 0);
2. One evaporator with dual probe management (**MdF**, **MdS** = 0, **dFP** ≠ nu, **dSP** ≠ nu, **dtE**, **dtS**);
3. Two independent evaporators (**MdF**, **MdS**, **dFP** ≠ nu, **dSP** ≠ nu, **dtE**, **dtS**)

NOTE: If one of defrost probes is not present or in error, the defrost will depend on the second defrost probe (if present and functioning). If both probes are in error or not properly set, the defrost will end by time (par. **MdF**)

7.1.1 SINGLE EVAPORATOR WITH SINGLE PROBE

For this configuration it is necessary to select the respective defrost probe on parameter **dFP** and configure the maximum defrost duration on parameter **MdF** (**0÷255 minutes**). Parameters relative to a second defrost, like **MdS** and **dSP** must be set to 0 or nu. (not used)

7.1.2 SINGLE EVAPORATOR WITH DOUBLE PROBE

For this configuration is necessary to select the respective defrost probes on **dFP** and **dSP** (**dFP** ≠ nu and **dSP** ≠ nu), configure maximum defrost duration on **MdF** (**0÷255 minutes**) and set **MdS** = 0. The defrost will be activated when at least one of the two probes (par. **dFP** and **dSP**) measures a temperature lower than its end defrost set point (par. **dtE** and **dtS**) and ends once both probes are above their respective temperature limits, **dtE** and **dtS**.

7.1.3 DOUBLE EVAPORATOR

For this configuration is necessary to set the two different defrost probes through parameters **dFP** and **dSP** and the maximum defrost duration on **MdF** and **MdS** as found in the following table:

	EVAPORATOR 1	EVAPORATOR 2
End defrost set	par. dtE	par. dtS
Defrost timeout	par. MdF	par. MdS
Evaporator probe	par. dFP	par. dSP
Digital output	Relay oAx=dEF	Relay oAy=dF2

7.2 EVAPORATOR FAN MANAGEMENT

Evaporators fans are managed through the output set as **oAx = FAn**. The regulation probe must be configured through the parameter **FAP** (by default **FAP = P2**). The list of involved parameters are:

- **FAP**: to select the control probe
- **FSt**: to select the deactivation setpoint
- **HYF**: differential to restart after deactivation
- **FnC**: to define the working mode:
 - **C-n**: in parallel with compressor output and OFF during defrost.
 - **O-n**: always ON, OFF during any defrost
 - **C-Y**: in parallel with compressor output and always ON during defrost
 - **o-Y**: always on
- **Fnd**: activation delay after any defrost

In case of two evaporators, the second fan will be managed by the output configured as **FA2**.

8. DEFROST OPERATIONS

Defrost operations can be initiated in the following ways:

- **EdF=rtC**: by using an internal real-time clock (only for models equipped with RTC)
- **EdF=in**: timed defrost, in this case a new defrost will start as soon as the **idF** timer elapses

In both cases a dripping time can be configured with parameter **Fdt**.

8.1 DEFROST MODES

Defrost processes are terminated by time or controlled by a temperature probe. When controlled by temperature probe, its time can be optimized by setting **od2 = Y** (See section 9.3 – Optimized Defrost). Available defrost types are: Available defrost types are:

- **tdF=EL**: with an electric heater
- **tdF=in**: by using hot gas cycle

8.1.1 ELECTRIC DEFROST (tdF=EL)

To use this function, one of the following resources must be configured:

- **oAx=dEF**
- **oAx=HEt** (Output for the electric Heaters)
- **dFP=P2** (Defrost Probe)

In order to have the Heaters (**oAx=HEt**) working for Defrost purposes, "**Htt=dEF**" must be configured.

See section **9.4 Heaters Element Control** for details.

8.1.2 HOT GAS DEFROST (tdF=in)

To use this function, the following resources must be configured:

- **oAx=dEF** (Output for the 4-way Valve)
- **dFP=P2** (Defrost Probe)

8.2 OPTIMIZED DEFROST

This function must have the presence of a temperature probe to control the end defrost temperature and to set par. **od2=Y**. During the defrost phase, the temperature will be monitored to detect the ice on the evaporator, characterized by a period of constant evaporator temperature.

If the **MdF** time expires before the end defrost condition occurs, the **MdF** timer will be reloaded once, leading to a maximum defrost time of **2*MdF**.

NOTE: The correct position of the evaporator probe is of fundamental importance for this methodology of defrost time optimization. It should be placed on the position with the most ice accumulation and where the ice tends to melt last to ensure the evaporator clear of ice once the defrost ends.

8.3 DISPLAY VISUALIZATION DURING ANY DEFROST PHASE

The par. **dFd** permits to change the display visualization:

- **dFd = rt**: real time temperature
- **dFd = it**: temperature at the beginning of the current defrost
- **dFd = SEt**: set point value used during the current defrost phase
- **dFd = dEF**: label "dEF" during the current defrost phase
- **dFd = CoO**: label "dEF" during the current defrost phase and label "Coo" during dripping phase.

8.4 HEATER ELEMENT CONTROL

This function can be used for:

- Avoid freezing of the door gasket in low temperature applications by activating a heating resistance.
- Removing ice from the dripping pipes during defrost phase

The function requires:

- A relay set as **oAx=HEt**
- A timer (par. **tHE**) for the cyclical activation of the **HEt** outputs

The **HEt** outputs can be controlled with par. **Htt**:

- **Htt = nu**: function disabled
- **Htt = dEF**: activation of the output only during the pre-defrost, defrost and post-defrost (dripping phases).
- **Htt = tiM**: cyclical activation defined by par. **tHE** (ON and OFF cycles of equal duration and equal to par. **tHE**).
- **Htt = dor**: in addition to the cyclical activation defined by par. **tHE**, the **HEt** output is forced active for 120 sec after each door opening. At the expiration of 120 seconds, the cyclical activation defined by par. **tHE** restarts (with first cycle OFF).

9. CONDENSER FAN

To enable the condenser fan management it is required to set a condenser probe (par. **FAC**). Here are the involved parameters:

- **FAC**: to select the control probe
- **St2**: to select the deactivation setpoint
- **HY2**: differential for restarting fan
- **FCC**: to define the working mode:
 - **C-n**: in parallel with compressor output and OFF during defrost.
 - **o-n**: always ON, stopped during defrost
 - **C-Y**: in parallel with compressor output and always ON during defrost.
 - **o-Y**: always on

10. AUXILIARY REGULATOR

The auxiliary output can be managed by digital inputs (**oAx=AUS**, **ixF=AUS**): the output is switched on and off following the relative digital input status.

10.1 AUXILIARY REGULATOR

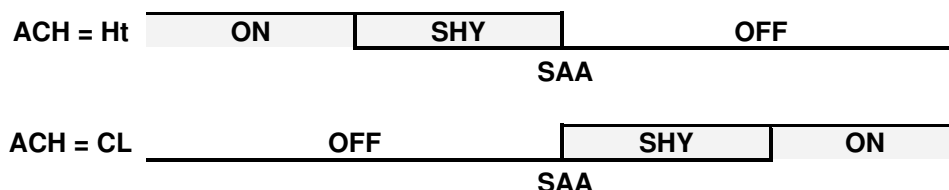
The auxiliary regulator can be used to manage the auxiliary output. Here are the involved parameters:

- **ACH**: type of regulation for the auxiliary output: **Ht**=inversely proportional (heating); **CL**=directly proportional (cooling).
- **SAA**: set point for regulation band.
- **SHY**: differential for regulation band.
- **ArP**: probe for auxiliary regulator.
- **Sdd**: auxiliary output OFF during any defrost.
- **2At**: start-up interval at max.

10.2 ONOFF REGULATION WITH DIGITAL OUTPUT

Heating action // Cooling action

- Output activation when $T < SAA - SHY$ // $T > SAA + SHY$
- Output deactivation when $T > SAA$ // $T < SAA$



11. LIGHT OUTPUTS

The light output can be managed by:

- When the device ON, if **LAU=Y**
- By door opening, if **ixF=dor** and **CLi=Y**
- By pressing a button, if set as **bxC=LiG**
- Digital inputs, if set as **ixF=LiG**
- Energy saving, if **LdE=Y**
- Modbus command

12. DIGITAL OUTPUTS

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

oAx	Relay output oAx configuration	nu(0); CP1(1); dEF(2); FAn(3); ALr(4); ALM(5); LiG(6); AUS(7); db(8); onF(9); HES(10); Cnd(11); CP2(12); dF2(13); FA2(14); HEt(15); inv(16); EFn(17); So1(18); SAn(19)	nu=not used; CP1= compressor 1; dEF=defrost; Fan=evaporator fan; Alr=alarm; Alm = trapped man alarm (sirene activation); LiG=light; AUS=auxiliary relay; db=neutral zone; onF=always ON with instrument ON; HES=energy saving; Cnd=condenser fan; CP2=second onoff compressor; dF2=second defrost; FA2= second evaporator fan; HEt=heater control; inv=inverter output; EFn=air extraction fan; So1=solenoid valve; SAn=sanitization
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13. ANALOGUE OUTPUTS

This controller may be equipped with up to two configurable analogue outputs (1An, 2An – PWM, 0-10VdC or 4-20mA). Please refer to the full version of this manual if you must configure one of them.

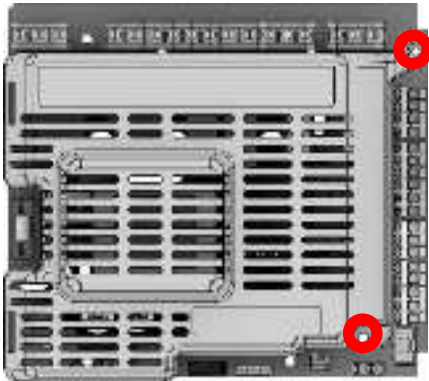
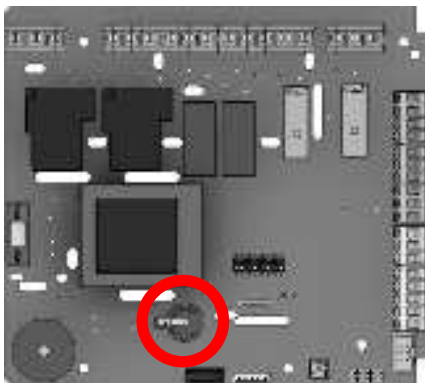
14. ALARM SIGNALLING

Label	Cause	How to solve
P1	P1 probe failure	Check probe connections – Alarm recovery is automatic as soon as condition is solved
P2	P2 probe failure	
P3	P3 probe failure	
P4	P4 probe failure	

HA	High temperature inside the coldroom	Alarm recovery is automatic as soon as condition is solved.
LA	Low temperature inside the coldroom	Check if parameters ALP , ALL and ALU have correct configuration probe
HP2	High temperature pre-alarm	Alarm recovery is automatic as soon as condition is solved.. Check if AU1 and AH1 are correctly configured
HA2	Second high temperature alarm for second evaporator probe	Alarm recovery is automatic as soon as condition is solved.
LA2	Second low temperature alarm for second evaporator probe	Check if parameters AP2 , AL2 and AU2 have correct configuration
dA	Door open alarm	Regulation recovery automatic after condition is solved (digital input deactivation)
EA	Warning external alarm	Regulation recovery automatic after condition is solved (digital input deactivation)
CA	Lock external alarm	Regulation recovery automatic after condition is solved (digital input deactivation)
PA	Pressure switch alarm	Alarm recovery is: <ul style="list-style-type: none"> Automatic once the alarm condition is solved (digital input deactivation) and if the number of alarm activations is less than nPS during interval dx. Manual, through power cycling, if the number of alarm activations is larger than nPS during interval dx.
EE	Internal memory alarm	Alarm recovery is manual and through power cycling.
rtC	Real time clock not properly set	Enter programming mode and check all the "rtC" parameters
rtF	Real time clock failure (HW problem)	Device must be repaired from Copeland Controls S.r.l. Please contact local reseller or Copeland Controls S.r.l. Service for more information
bAt	Low battery level	Replace battery (see session 13.1)
SAF	Anti freezing alarm	Alarm recovery is automatic as soon as temperature is T>SET .
tPA	Trapped man alarm	Alarm recovery is automatic as soon as the digital input (ixF=tPA) is deactivated.
Pdt	Pump down	Alarm recovery is automatic as soon as the digital input (ixF=LPS) is deactivated.
PdA	Low pressure switch failure	Alarm recovery is manual through any button. Alarm output will be deactivated and buzzer muted, but the alarm label (PdA) will stay visible in HOME until system is checked
GAS	Gas leakage alarm	Alarm recovery is automatic as soon as the digital input (ixF=GAS) is deactivated
FSr	Evaporator fan maintenance	Alarm recovery is manual. Enter programming mode and set par. rS1=YES to reset maintenance alarm.
CSr	Condenser fan maintenance	Alarm recovery is manual. Enter programming mode and set par. rS2=YES to reset maintenance alarm.
dEt	Latest defrost ends by time	Alarm recovery is: <ul style="list-style-type: none"> Automatic if the next defrost ends before the maximum time Manual by pressing any button, or via modbus command

The buzzer can be muted by pressing any button and only if parameter **tbA=Y**.

14.1.1 Real Time Clock Battery Replacement

	Operation
	1. Disconnect power supply and open the controller box 2. Remove the PCB protection cover (fixed with 2 screws)
	3. Replace the battery with a new one. Battery model to use is BR1225/BN

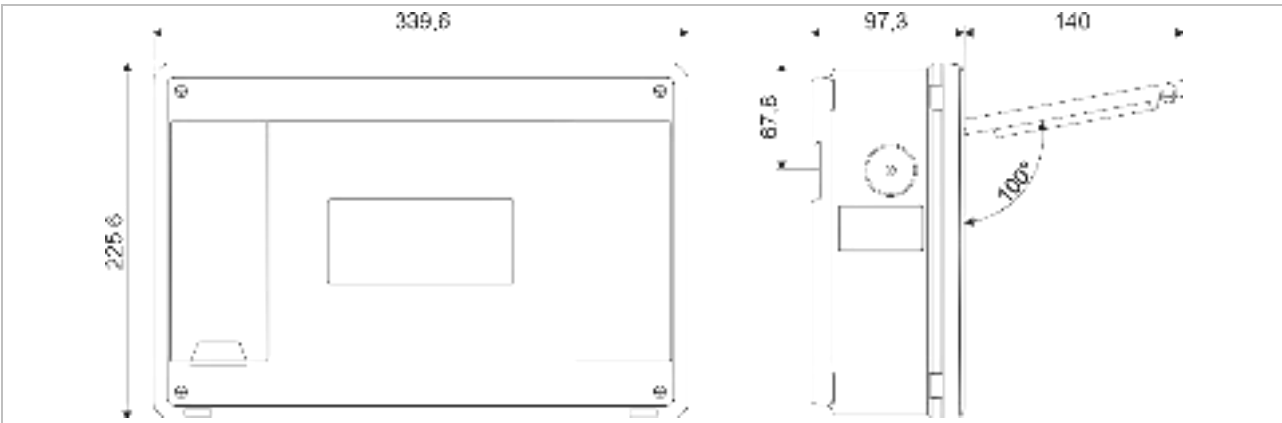
15. SERIAL COMMUNICATION

The device supports different baudrates (par. **bAU**) and parity control (par. **PAr**). Please check the serial network to adapt them according to the other devices.

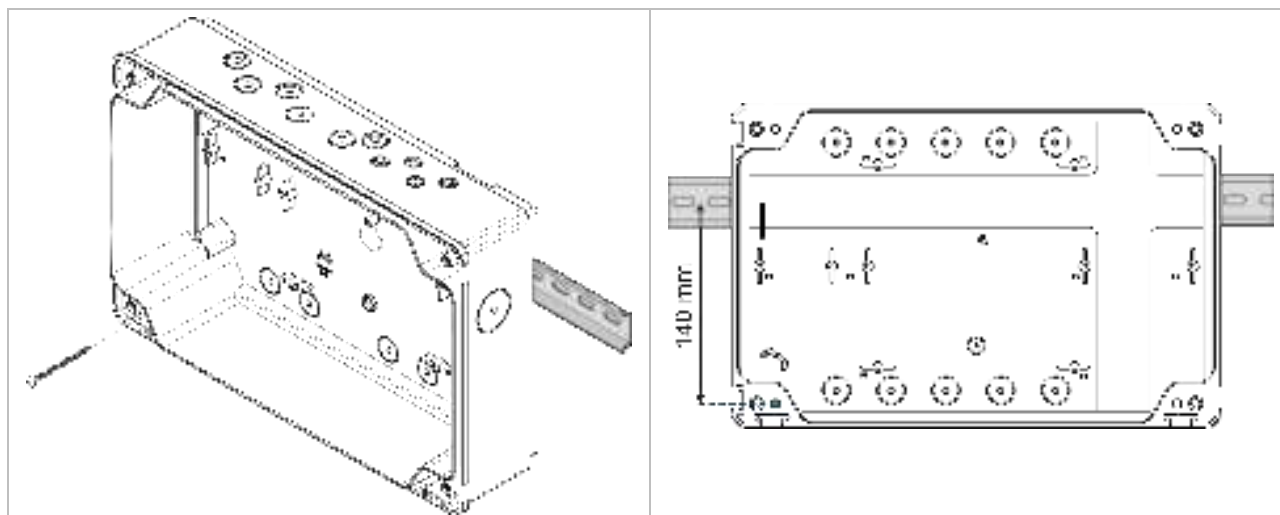
16. INSTALLATION AND MOUNTING

XER can be mounted on DIN rail or on a wall and fixed using up to 4 screws (type: D4.5mm x L55mm). 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.

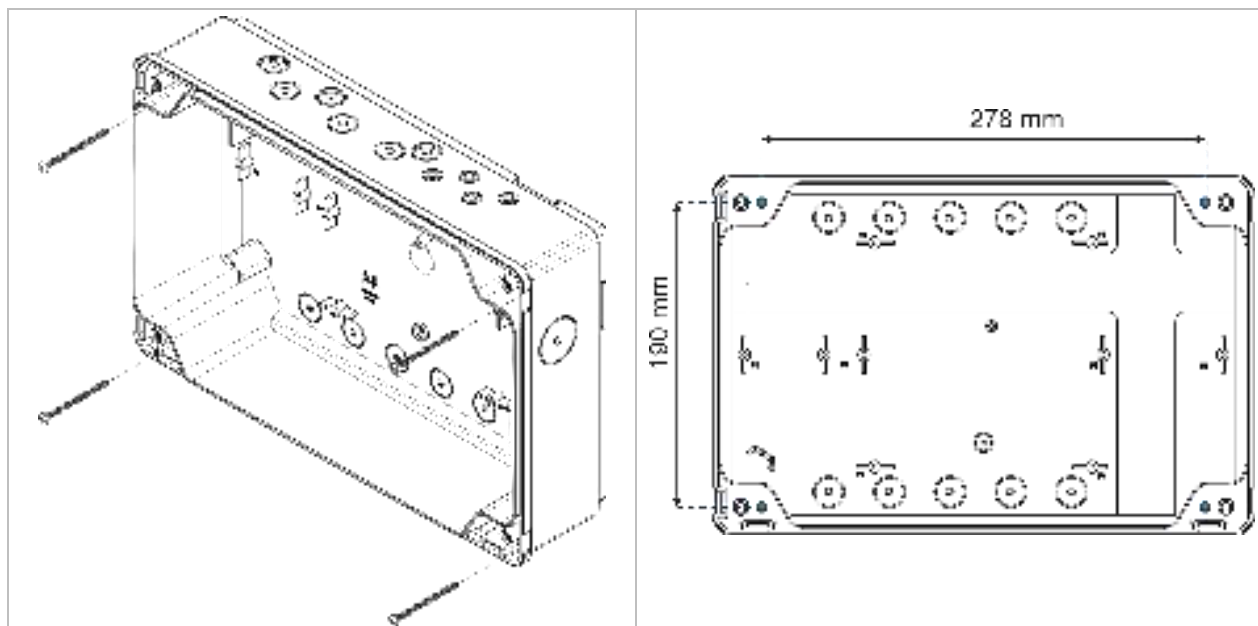
16.1 DIMENSIONS



16.2 DIN RAIL MOUNT



16.3 WALL MOUNT



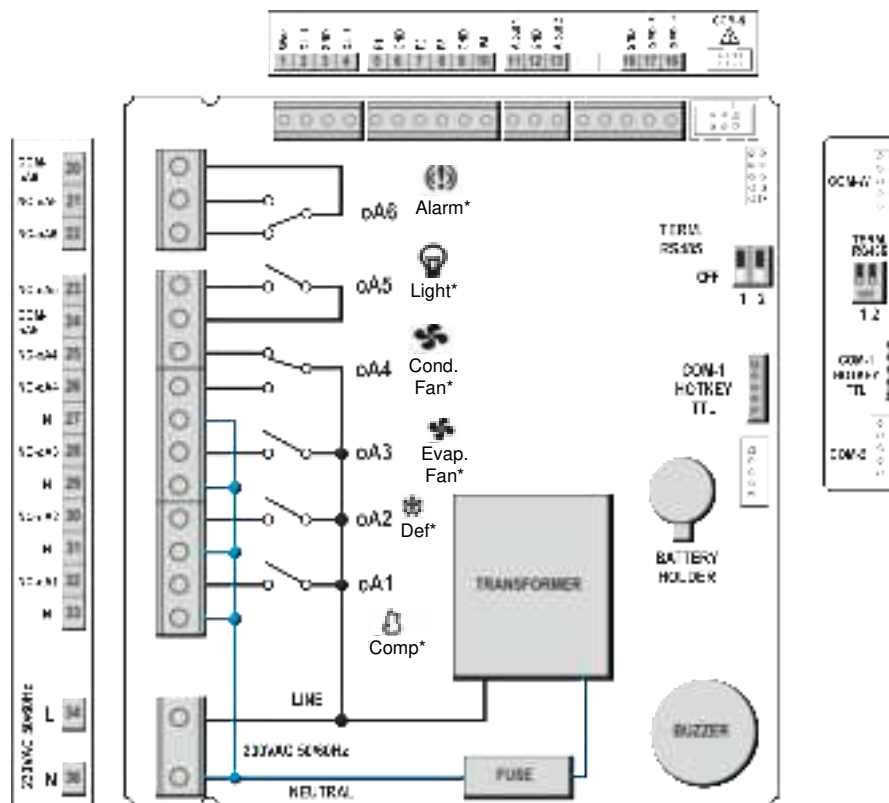
17. WIRING DIAGRAMS

XER1x0P: models without lateral door for electromechanical devices.

XER2xxP: models with lateral door for electromechanical devices. They can use a 16A circuit breaker

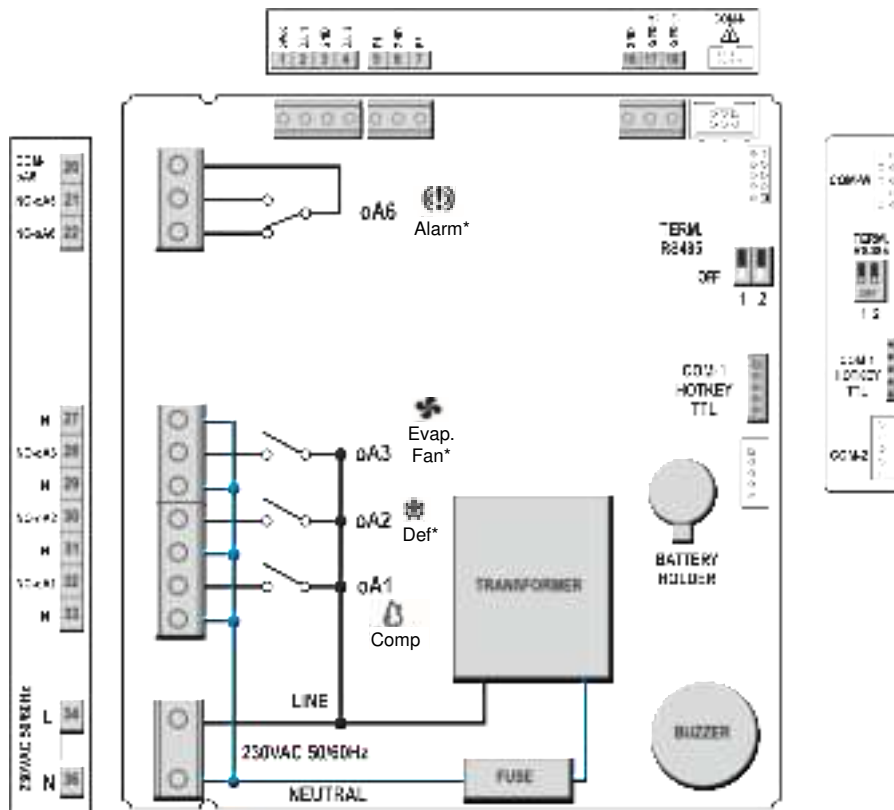
		XER140P	XER160P	XER240P	XER260P	XER241P	XER261P
Digital outputs	oA1	Yes	Yes	Yes	Yes	Yes	Yes
	oA2	Yes	Yes	Yes	Yes	Yes	Yes
	oA3	Yes	Yes	Yes	Yes	Yes	Yes
	oA4	No	Yes	No	Yes	No	Yes
	oA5	No	Yes	No	Yes	No	Yes
	oA6	Yes	Yes	Yes	Yes	Yes	Yes
Probe inputs	P1	Yes	Yes	Yes	Yes	Yes	Yes
	P2	Yes	Yes	Yes	Yes	Yes	Yes
	P3	No	Yes	No	Yes	No	Yes
	P4	No	Yes	No	Yes	No	Yes
Digital inputs	D.I.1	Yes	Yes	Yes	Yes	Yes	Yes
	D.I.2	Yes	Yes	Yes	Yes	Yes	Yes
Analogue outputs	A.Out1	Optional	Optional	Optional	Optional	Optional	Optional
	A.Out2	Optional	Optional	Optional	Optional	Optional	Optional
Accessory	Circuit Breaker	No	No	No	No	Yes	Yes

17.1 XER160P OR XER260P



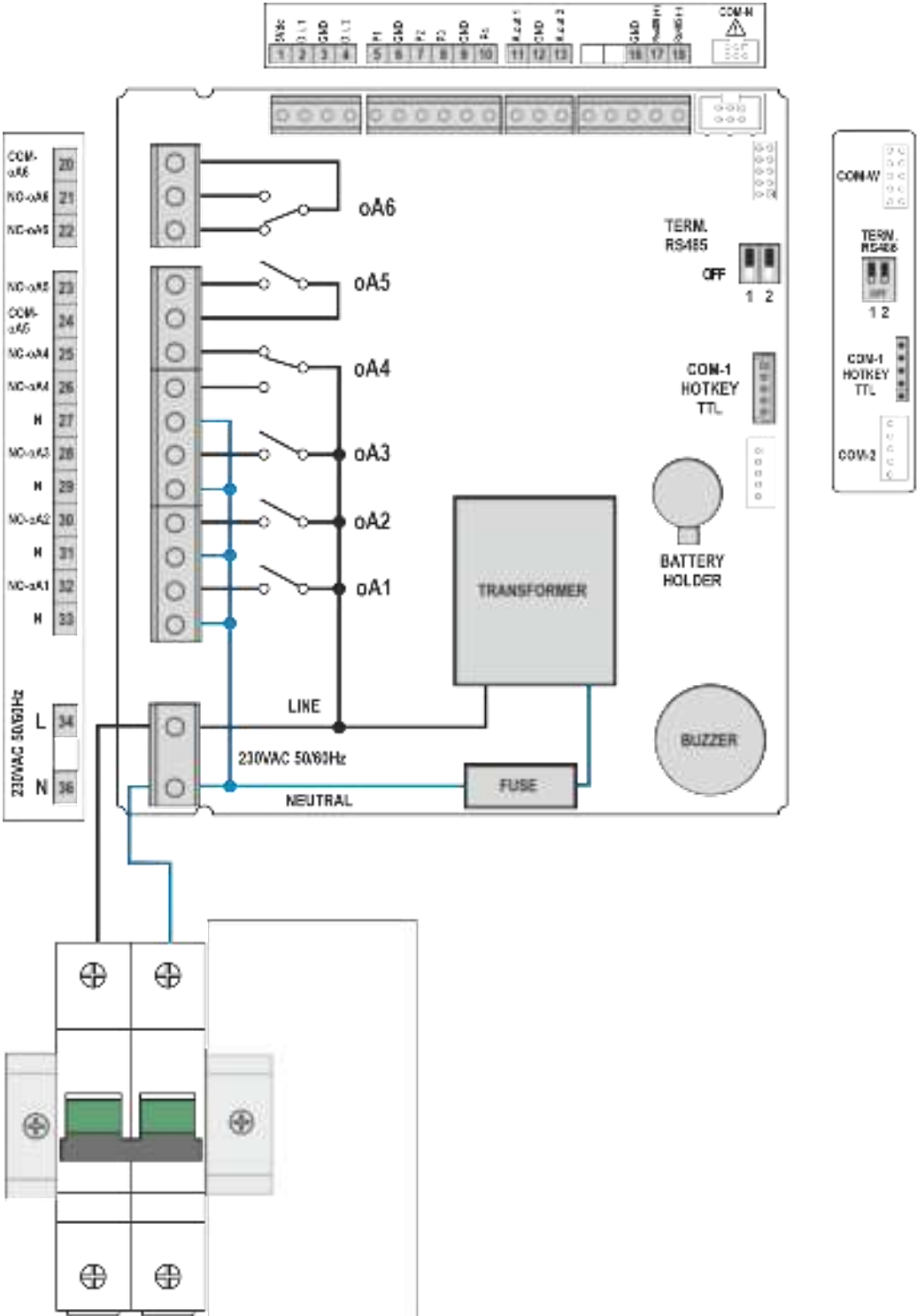
*The I/O's legend and drawings refer to **factory default configuration**; however, all relays, digital inputs and probes are configurable as preferred by the user.

17.2 XER140P OR XER240P



*The I/O's legend and drawings refer to **factory default configuration**; however, all relays, digital inputs and probes are configurable as preferred by the user.

17.3 XER261P WITH CIRCUIT BREAKER



17.4 TERMINAL BLOCK DESCRIPTIONS

PIN	Label	Description
1	5Vdc	+5Vdc output, only for X-MOD motion sensor power supply
2	D.i.1	Digital input 1
3	GND	Ground for analogue and digital inputs
4	D.i.2	Digital input 2
5	A.i.1	Analogue input 1 (temperature only)
6	GND	Ground for analogue and digital inputs
7	A.i.2	Analogue input 2 (temperature only)
8	A.i.3	Analogue input 3 (temperature only)
9	GND	Ground for analogue and digital inputs
10	A.i.4	Analogue input 4 (temperature only)
11	A.out1	Analogue output 1, PWM type
12	GND	Ground for analogue and digital inputs
13	A.out2	Analogue output 2, 0-10Vdc or 4-20mA
14		Not Used
15		Not Used
16	GND	Ground for RS485 serial port
17	RS485 (+)	Positive terminal for RS485 (+) serial port
18	RS485 (-)	Negative terminal for RS485 (-) serial port

PIN	Label	Description
20	COM-oA6	Digital output 6: common
21	NO-oA6	Digital output 6: normally open
22	NC-oA6	Digital output 6: normally closed
23	NO-oA5	Digital output 5: normally open
24	COM	Digital output 5: common
25	NC-oA4	Digital output 4: normally closed
26	NO-oA4	Digital output 4: normally open
27	N	High voltage power supply: Neutral
28	NO-oA3	Digital output 3: normally open
29	N	High voltage power supply: Neutral
30	NO-oA2	Digital output 2: normally open
31	N	High voltage power supply: Neutral
32	NO-oA1	Digital output 1: normally open
33	N	High voltage power supply: Neutral
34	L	High voltage power supply: Line
35		Not Used
36	N	High voltage power supply: Neutral

COM	Label	Description
1	COM-1	Serial communication port 1 (HOTKEY or TTL)
2	COM-2	Serial communication port 2 (TTL) (*)
W	COM-W	Serial communication port W (*)
N	COM-N	Serial communication port N (*)
	TERM. RS485	Terminalization for Serial communication port 1 and 2

(*) Available only on special models

18. TECHNICAL SPECIFICATIONS

FEATURES	DESCRIPTION		
Housing	Self-extinguishing PC+ABS		
Dimensions	Front 340x226 mm; case depth 98 mm		
Mounting device	DIN rail or wall mount		
Degree of Protection	EN 60529	IP54 (front panel only)	
Power Supply	230VAC (ENEC) or 100 to 240VAC ±10%, 50/60Hz		
Overvoltage Category	II		
Rated Power	230VAC: 13VA (ENEC) 100-240VAC: 13VA		
Rated Impulse Voltage	2500V		
Display	Red display, LED type, 3 digits with decimal point and multi-function icons		
Buzzer	Internal, always present		
Software Class	A		
Terminal blocks / Terminal Connections	Low voltage signals: Screw terminal block, wire section between 0,5 and 2,5 mm2 Max tightening force: 0.4 N/m High Voltage signals: Screw terminal block, wire section between 1,5 and 4 mm2 Max tightening force: 0.5 N/m		
Data Storing	Real Time Clock: data maintenance up to 6 months with removable non-rechargeable lithium battery. Other parameters: internal flash.		
Type of Action	1.B		
Pollution Degree	2, non-condensing humidity		
Ambient Operating Temperature and Humidity	Models without circuit breaker:	0T60°C / 32T140°F; 20-85 rH% (non-condensing humidity)	
	Models with circuit breaker:	0T40°C/32T104°F; 20-85 rH% (non-condensing humidity)	
Shipping and storage temperature	-25T60°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)		
Accuracy	NTC, PT1000: ±1% compared to the full scale If NTC probe is used: Class 0.5; less than 1% in the range [-25°C to +10°C].		
Inputs	Up to 4 NTC or PT1000 (configurable)		
	Up to 2 voltage free contacts; digital inputs connected to SELV Limited energy		
Relay Outputs without circuit breaker (XER1x0) IEC * NOT for XER140P and XER24xP	oA1	20(8)A, 250Vac	
	oA2	20(8)A, 250Vac	
	oA3	10(4)A,250Vac	
	oA4*	10(4)A,250Vac	
	oA5*	8(3), 250Vac	
	oA6	8(3), 250Vac	
Relay Outputs with circuit breaker (XER2x1) IEC * NOT for XER140P and XER24xP	Ambient temperature: 30°C		Ambient temperature 40°C
	oA1	16(8)A,250Vac	14(8)A,250Vac
	oA2	16(8)A,250Vac	14(8)A,250Vac
	oA3	10(4)A,250Vac	10(4)A,250Vac
	oA4*	10(4)A,250Vac	10(4)A,250Vac
	oA5*	8(3)A,250Vac	8(3)A,250Vac
	oA6	8(3),250Vac	8(3),250Vac
Optional Relays (*)		Nominal	Type
	oA3	SPST 16A, 250VAC	Inrush type, same currents as the above configurations (with or without circuit breaker)
	oA4	SPST 16A, 250VAC	Inrush type, same currents as the above configurations (with or without circuit breaker)
Maximum ampacity on terminal 34	With Circuit Breaker: 16A MAX at 30°C ambient temperature or 14A MAX at 40°C ambient temperature (oA1+oA2+oA3+oA4+oA5+oA6 or oA1+oA2+oA3+oA4) Without Circuit Breaker: 20A MAX (oA1+oA2+oA3+oA4)		

FEATURES	DESCRIPTION	
Analogue Outputs	1Ao	Frequency output: Supply max voltage=12Vdc; Max supply current=2mA; duty cycle 50%; 0 to 166 Hz Accuracy: ± 1 Hz compared to the full scale PWM: Supply max voltage=12Vdc; Max supply current=2mA; 0 to 4kHz
	2Ao	4-20mA 0-10Vdc; Max supply current = 5mA Accuracy: $\pm 1\%$ compared to the full scale
I/O port	HOT-KEY: MAX voltage allowed is 5 VDC. DO NOT CONNECT ANY EXTERNAL POWER SUPPLY.	
Purpose of control	Operating control	
Construction of control	Incorporated control, intended to be used in Class I or Class II equipment	
Approvals	R290/R600a: relays tested according to IEC EN60079:0 and IEC EN60079:15 IEC 60730-1; IEC 60730-2-9	
Circuit Breaker (**)	Number of poles: 1+N; Rated Current: 16 A; C characteristic; $I_d = 300\text{mA}$, $I_{cn} = 4.5\text{kA}$, Standard: IEC/EN 60898-1, IEC/EN 60947-2	

(*) See official How-To-Order for available inrush models.

(**): Circuit Breaker is an optional component, selectable through official How-To-Order. Any third-party Circuit with overcurrent protection used (for replacement or for installing operations outside Copeland Controls S.r.l.) **MUST HAVE** the same or better characteristics.

COPELAND

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