COPELAND

XM750D – XM756D - XM759D and CT760 Keyboard

Controllers for multiplexed cabinets

(Rel.0.3)

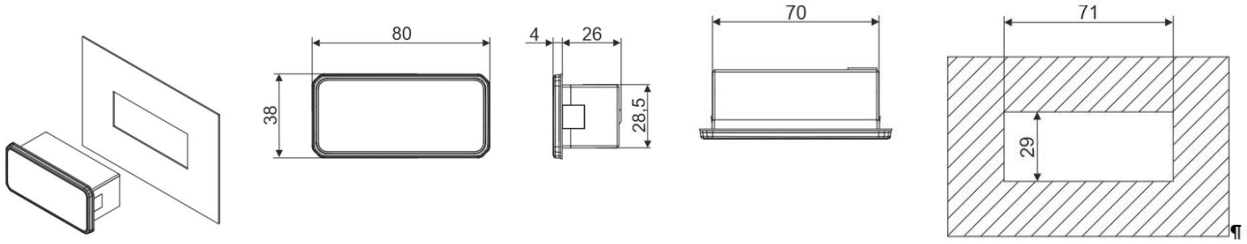
INDEX

1. SAFETY INFO

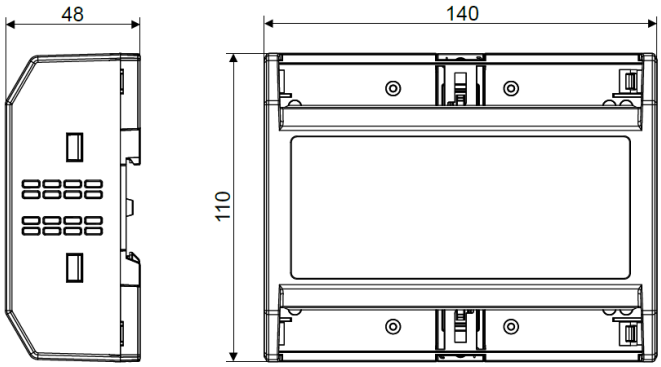
- This manual is part of the product and should be kept near the instrument for easy and quick reference.
- The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
- Copeland Controls S.r.l. reserves the right to change the composition of its products, even without notice, ensuring the same and unchanged functionality.
- In case of failure or faulty operation contact the local distributor or “Copeland Controls S.r.l.” with a detailed description of the fault.
- Strictly follow the safety instructions before opening the box.
- Check the application limits and the correct power supply voltage before proceeding.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to avoid condensation
- Warning: disconnect the power supply and all other electrical connections before any kind of maintenance.
- Observe the maximum current value which can be applied to each relay (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining.

2. DIMENSIONS AND MODUNTING

2.1 CT760 KEYBOARD



2.2 XM759D CONTROLLER



3. TECHNICAL SPECIFICATIONS

CT760 - KEYBOARD	DESCRIPTION		
Housing	Self-extinguishing polycarbonate		
Dimensions	Front 80x38mm, case depth 26mm		
Mounting device	Panel, 71x29 mm panel cut-out; panel thickness 0.7 ÷1.0mm; Insertion force: 40-60N		
Degree of Protection	**EN 60529**	Rear Housing: IP20	Front panel: IP65
Power Supply	From XM759D power module, 3 wires, 0,5-2.5mm^2		
Display	3 digits, red LED, 20,4 mm high		
Buzzer	Internal, always present		
Max distance between controller and keyboard	10m		

XM750D – XM756D - XM759D – MAIN CONTROLLER	DESCRIPTION				
Housing	Self-extinguishing polycarbonate				
Dimensions	140x110x48mm (w x h xd)				
Mounting device	DIN Rail				
Degree of Protection	**EN 60529**	IP20 (whole controller)			
Power Supply	**XM750D, XM759D:** 12VAC/DC SELV (class 2) source ; 230VAC or 115VAC or 100 to 240VAC ±10%, 50/60Hz **XM756D:** 100 to 240VAC ±10%, 50/60Hz				
Overvoltage Category	III				
Rated Power	**XM750D, XM759D:** 12VAC/DC SELV (class 2) source - 5VA **XM750D, XM759D:** 230VAC 50/60 Hz or 110VAC 50/60 Hz : 10VA **XM750D, XM759D,** 100-240VAC 50/60 Hz : 10VA; **, XM756D:** 100-240VAC 50/60 Hz : 20VA				
Rated Impulse Voltage	4000V				
Software Class	A				
Terminal blocks / Terminal Connections	**Low voltage signals:** Screw or Disconnectable terminal block, wire section between 0,5 and 2,5 mm^2; max tightening force: 0.4 N/m **High Voltage signals:** Plug-in or Screw terminal block, wire section between 1,5 and 2,5 mm^2; 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	**IEC/EN:** 0T50°C; 20-85 rH% (non-condensing humidity) **UL/CSA:** -10T50°C; 20-85 rH% (non-condensing humidity)				
Shipping and storage temperature	-40T85°C; 20-85 rH% (non-condensing humidity) -20T70°C; 20-85 rH% (non-condensing humidity) – controller with RTC				
Resistance to heat	UL 94 V-0				
Measurement range	**NTC, NTC_US:** -40T110°C, resolution 0.1°C or 1°C (selectable) **PTC:** -50T150°C, resolution 0.1°C or 1°C (selectable) **PT1000:** -100T150°C, resolution 0.1°C or 1°C (selectable)				
Accuracy	**NTC, PTC, PT1000:** ±1% compared to the full scale				
Inputs	Up to 6 NTC, NTC_US, PTC or PT1000 (configurable); max distance 10m				
	Up to 2 voltage free contacts; max distance 10m				
	1 4-20mA or 0-5V; max distance 10m				
Relay Outputs	**OUTPUT**	**TERMINALS**	**RATING UL 60730**	**RATING IEC/EN 60730**	**RATING IEC/EN 60335**
	oA5	11-12	Resistive load 1A, 230Vac, 30K cycles Pilot duty C300, 30K cycles Motor load 1FLA/6LRA, 230Vac, 30K cycles	1(1)A, 230Vac, 100K cycles	1(1)A, 230Vac, 100K cycles
	oA3	17-18	Resistive load 5A, 230Vac, 30K cycles Motor load 1/2HP, 230Vac, 30K cycles Pilot duty B300, 6K cycles	5A, 230Vac, 60K cycles 2(2)A, 250Vac, 100K cycles	5A, 230Vac, 100K cycles 2(2)A, 250Vac, 100K cycles
	oA4 (NO)	1-2	Resistive load 8A, 230Vac, 30K cycles Motor load 1/2HP, 230Vac, 30K cycles Pilot duty B300, 6K cycles	8A, 230Vac, 60K cycles 2(2)A, 230Vac, 100K cycles	8A, 230Vac, 100K cycles 2(2)A, 230Vac, 100K cycles
	oA4 (NC)	1-3	Resistive load 3A, 230Vac, 30K cycles Pilot duty C300, 6K cycles	3A, 230Vac, 30K cycles	3A, 230Vac, 30K cycles
	oA2	13-14	Resistive load 10A, 230Vac, 100K cycles Motor Load 10FLA/60LRA, 230Vac, 30K cycles Pilot Duty B300, 30K cycles	10(4)A, 230Vac, 100K cycles	10(4)A, 230Vac, 100K cycles
	oA1 (standard relay)	15-16	Resistive load 8A, 230Vac, 100K cycles Motor Load 8LA/48LRA, 230Vac, 30K cycles Pilot Duty B300, 30K cycles	8(4)A, 230Vac, 100K cycles	8(4)A, 230Vac, 100K cycles
	oA1 (inrush relay)	15-16	Resistive load 8A, 230Vac, 50K cycles Motor Load 8FLA/48LRA, 230Vac, 30K cycles Pilot Duty B300, 30K cycles	8(2)A, 230Vac, 100K cycles	8(2)A, 230Vac, 100K cycles
Triac output – XM759D only	**4-5**	**PWM VALVE**	8-30W / 250V AC		
	4-6	**PWM VALVE**	8-30W / 24V AC; short circuit terminals 5-6 with 24V AC coils		

XM750D – XM756D - XM759D – MAIN CONTROLLER	DESCRIPTION	
Unipolar Valve – XM756D only	Max current: 400mA; Max distance between XM756D and valve: 10m	
Analogue Outputs	**1Ao**	**Frequency output:** Supply voltage=12Vdc; Max supply current=5mA; duty cycle 50%; 0 to 166 Hz Accuracy: ±1Hz compared to the full scale **Current output:** 4-20mA; Max load 100 ohm **Voltage output:** 0-10Vdc; Max supply current=5mA; Min load 2 K ohm **Accuracy**: ±2% compared to the full scale
	2Ao	**Frequency output:** Supply voltage=12Vdc; Max supply current=5mA; duty cycle 50%; 0 to 166 Hz Accuracy: ±1Hz compared to the full scale **Voltage output:** 0-10Vdc; Max supply current=5mA; Min load 2 K ohm **Accuracy**: ±2% compared to the full scale
I/O port	**HOT-KEY:** Output voltage is 5 VDC **DO NOT CONNECT ANY EXTERNAL POWER SUPPLY.**	
Purpose of control	Operating control	
Construction of control	Built-in 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 Additionally evaluated to: clauses 22, 24, 29, 30 Annex N of 60335-2-40 and IEC 60335-2-89 in conjunction with IEC/EN 60335-1	

4. GENERAL DESCRIPTION

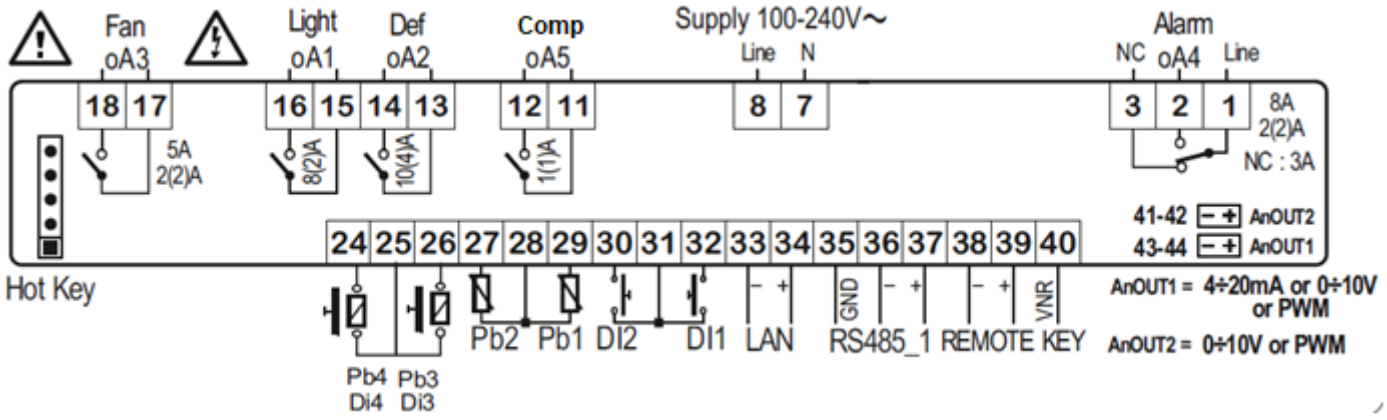
The **XM700 series** is a family of high level microprocessor based controller for multiplexed cabinets suitable for applications on medium or low temperature. They can be inserted in a LAN of up to 8 different sections which can operate, depending on the programming, as stand alone controllers or following the commands coming from the other sections. The **XM750D, XM756D and XM759D,** are provided with 5 relay outputs to control the solenoid valve, defrost - which can be either electrical or hot gas - the evaporator fans, the lights, an auxiliary output and one output to drive **pulsed (XM759D) or stepper unipolar (XM756D) electronic expansion valves**. The device is also provided with four probe inputs, one for temperature control, one to control the defrost end temperature of the evaporator, the third for the display and the fourth can be used for application with virtual probe or for inlet/outlet air temperature measurement. XM756D and XM759D are also provided by other two probes that have to be used for superheat measurement and regulation. Finally, they are equipped with the 2 digital inputs (free voltage contact), fully configurable by parameters.
The instruments are equipped with the HOTKEY connector that permits to be programmed in a simple way. Direct serial output **RS485 ModBUS-RTU** compatible permits a simple monitoring/supervising systems connection. Internal **RTC** are available as options.

5. SERIES OVERVIEW

	XM750D	XM759D	XM756D
Valve	TXV	EEV PULSE	EEV STEPPER UNIPOLAR
Relay outputs	**5**	**5**	**5**
Probe inputs	4	6	6
Digital Input	2	2	2
RS485 Modbus Slave	2 wires + gnd	2 wires + gnd	2 wires + gnd
LAN / II RS485	Up to 8 devices / 2 wires + gnd	Up to 8 devices / 2 wires + gnd	Up to 8 devices / 2 wires + gnd
Analog outputs	Up to 2	Up to 2	Up to 2
0-10V / 4-20mA	**✓+ PWM**	**✓+ PWM**	**✓+ PWM**
0-10V	✓	✓	✓
Back up battery for EEV			Internal
RTC	✓	✓	✓
Hot Key	64K (DK00000300)	64K (DK00000300)	64K (DK00000300)

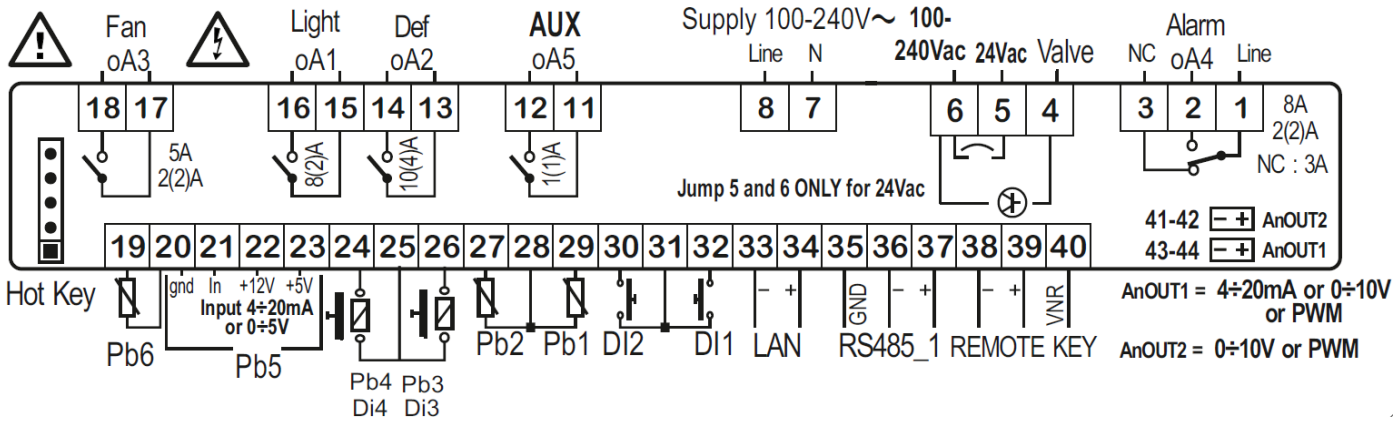
6. ELECTRICAL CONNECTIONS

6.1 XM750D



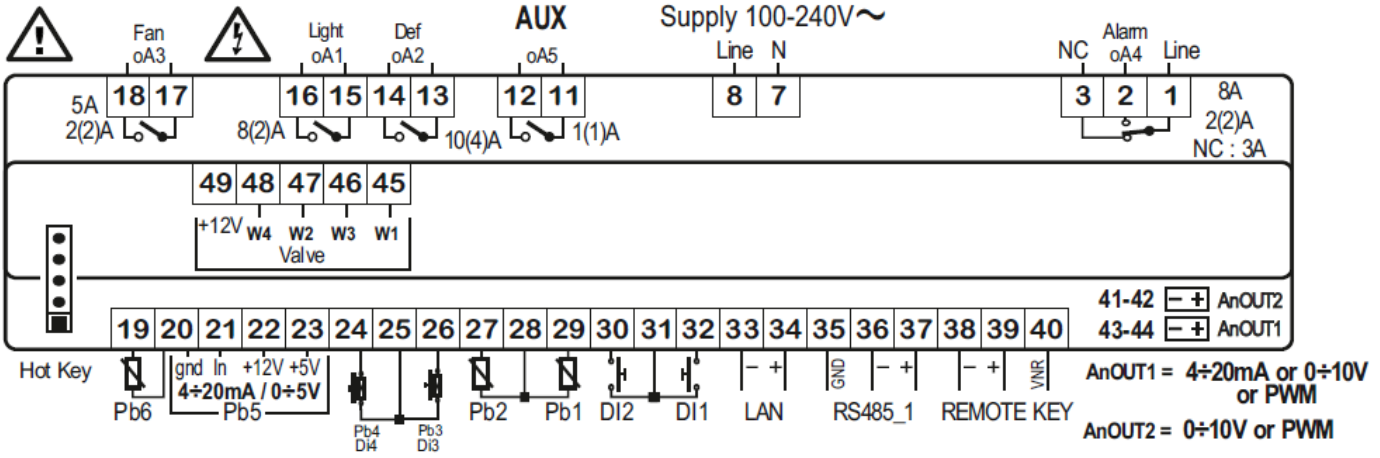
NOTE
Models at 230Vac: connect supply to terminals 7-8
Models at 115Vac: connect supply to terminals 7-8
Analog outputs are optional

6.2 XM759D



NOTE
Models at 230Vac: connect supply to terminals 7-8
Models at 115Vac: connect supply to terminals 7-8
Analog outputs are optional

6.3 XM756D



NOTE
Analog outputs are optional

PIN	Label	Description
1	Line	Digital output 4: Common
2	Alarm	Digital ouput 4: normally closed
3	NC	Digital ouput 4: normally open
4	Valve	PWM output for Pulse valve *(XM759D)*
5	24Vac	24Vac line for PWM Valve with 24Vac coil *(XM759D)*
6	100-240Vac	Main line for PWM Valve with 115Vac or 230Vac coil // With 24Vac coil short circuit 5 & 6 terminals *(XM759D)*
7	N	100-240V power supply: Neutral
8	Line	100-240V power supply: Line;
11	AUX	Digital output 5: Common
12	AUX	Digital output 5: normally open
13	Def	Digital output 2: Common
14	Def	Digital output 2: normally open
15	Light	Digital output 1: Common
16	Light	Digital output 1: normally open
17	Fan	Digital output 3: Common
18	Fan	Digital output 3: normally open
19	Pb6-In	Analogue input 6 (temperature only)
20	GND	Ground for analogue input 5 and 6
21	Pb5-In	Analogue input 5 (temperature, current or ratiometric)
22	Pb5-12V	+12Vdc/20mA output for 4-20mA pressure transducer
23	Pb5-5V	+5Vdc/10mA output for ratiometric pressure transducer
24	Pb4-In	Analogue input 4 (temperature only)
25		Ground for analogue input 3 and 4

PIN	Label	Description
26	Pb3-In	Analogue input 3 (temperature only)
27	Pb2-In	Analogue input 2 (temperature only)
28		Ground for analogue input 1 and 2
29	Pb1-In	Analogue input 1 (temperature only)
30	DI2-In	Digital input 2 (free voltage)
31		Ground for digital input 1 and 2
32	DI1-In	Digital input 1 (free voltage)
33	LAN -	Digital ouput 1: normally open
34	LAN +	High voltage power supply: Neutral
35	RS485 (GND)	Ground terminal for RS485 serial port
36	RS485 (-)	Negative terminal for RS485 (-) serial port
37	RS485 (+)	Positive terminal for RS485 (+) serial port
38	Remote key (-)	Negative terminal for Remote keyboard (-)
39	Remote key (+)	Positive terminal for Remote keyboard (+)
40	Remote key (VNR)	Supply for remote keyboard
41	AnOUT2 (-)	Analog output 2 ground – *optional*
42	AnOUT2 (+)	Analog output 2 Signal (+) – *optional*
43	AnOUT1 (-)	Analog output 2 ground – *optional*
44	AnOUT1 (+)	Analog output 2 Signal (+) – *optional*
45	Valve output	Winding 1 - *XM756D*
46	Valve output	Winding 3 - *XM756D*
47	Valve output	Winding 2 - *XM756D*
48	Valve output	Winding 4 - *XM756D*
49	-12V	Supply for EEV stepper unipolar - *XM756D*

6.4 NOTE WIRING CONNECTIONS

Devices of **XM700** series could be provided with dis-connectable terminal block to connect cables with a cross section up to 1.6 mm^2 for all the low voltage connection: the RS485, the LAN, the probes, the digital inputs and the keyboard. Other inputs, power supply and relay connections are provided with screw terminal block or fast-on connection (5.0 mm). Heat-resistant cables have to be used.
Before connecting cables make sure the power supply complies with the instrument's requirements. Separate the probe cables from the power supply cables, from the outputs and the power connections. Do not exceed the maximum current allowed on each relay, in case of heavier loads use a suitable external relay.

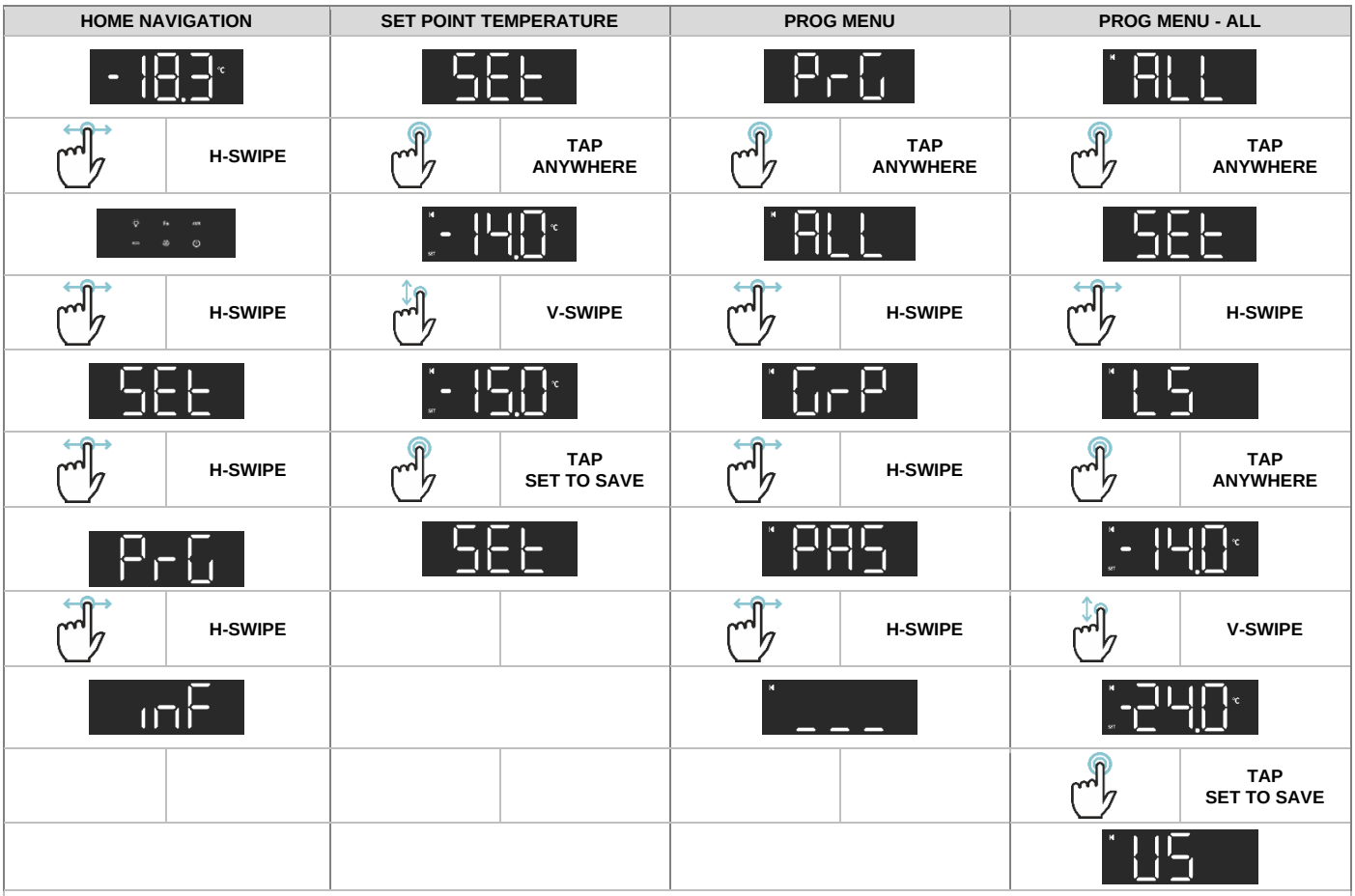
N.B. Maximum current allowed for all the loads is 16A. The probes shall be mounted with the bulb upwards to prevent damages due to casual liquid infiltration. It is recommended to place the thermostat probe away from air streams to correctly measure the average room temperature. Place the defrost termination probe among the evaporator fins in the coldest place, where most ice is formed, far from heaters or from the warmest place during defrost, to prevent premature defrost termination.

7. USER INTERFACE

SCREEN	APPEARANCE	SCREEN	APPEARANCE
Home		**Status Visualization**	
Virtual Keyboard		**Temperature Set Point**	
Programming Mode		**Parameter Menu - ALL**	
Parameter Menu - X9		**Parameter Menu - Groups**	
Upload Parameters		**Download Parameters**	
Device Locked		**Info Menu**	

SCREEN NAME	DESCRIPTION
Home	Show temperature value, measurement unit and active alarms only. It is the first screen after power on or after exit from other status.
Status Visualization	This screen shows activated functions and regulation outputs (compressor, ventilators) overlapped with temperature and/or humidity value
Virtual Keyboard	This screen shows available functions. Activated function will blink when this screen is visualized.
Temperature Setpoint	This screen enables the modification of the Temperature Set Point value.
Programming Mode	This screen enables the modification of parameters: **ALL**, **GrP** or "**X9**" mode can be used.
Hotkey Management	**UPL** = upload parameters from device to HOTKEY, **doL** = download parameters from HOTKEY to device
Info Menu	To scroll all I/O variables and status (probes, digital inputs, digital outputs, etc.)
Device Locked	V-Swipe from Home screen to lock or unlock the device

7.1 USER INTERACTION



GESTURE	HOW-TO	DESCRIPTION
ONE TAP	Press a specific area of the screen with a finger for 1 sec	**Switch ON / Switch OFF:** when in Virtual Keyboard, use this to turn on/off a specific function. When in Programming mode, use this to select a parameter or a parameter value.
TAP and HOLD	Press anyplace of the surface with a finger for more than 3 sec	**Enter / Save:** use this to enter programming mode or parameter menu and to save modifications. When in Virtual Keyboard, use this on the "ONOFF" to switch OFF and ON the device.
H-SWIPE	Drag a finger across surface, from left to right or from right to left	**Browse:** use horizontal swipe (right to left or left to right) to browse through HOME, Virtual Keyboard and Info View. When in Programming menu: use horizontal swipe to browse through parameter menu.
V-SWIPE	Drag a finger across surface, from top to bottom or from bottom to top (overlapping only one of the digits)	**Modify:** use vertical swipe (from top to bottom or bottom to top) to change a parameter value.

7.2 INF MENU

This menu contains the list of probes and some values that are automatically evacuate by the board such as the superheat and the percentage of valve opening. The values: **nP** or **noP** stands for probe not present or value not evacuate, **Err** value out of range, probe damaged not connected or incorrectly configured.

MAP Current map (1÷6): it shows which map is used
SH* Value of superheat. **nA** = not Available;
oPP* Percentage of valve opening.
dP1 (Pb1) Value read by probe 1.
dP2 (Pb2) Value read by probe 2.
dP3 (Pb3) Value read by probe 3.
dp4 (Pb4) Value read by probe 4.
dP5* (Pb5) Temperature read by probe 5 or value obtained from pressure transducer.
dP6* (Pb6) Value read by probe 6.
dPP* Pressure value read by (Pb5) transducer.
rPP Virtual pressure probe, only on slave.
rCP Value of P4 remote probe for heaters. It is displayed only with P4C = LAn. If the value is not available "noP" label is displayed.
An1 Value of analog output 1 – *if present*
An2 Value of analog output 2– *if present*
dPr **R**egulation probe value
rSE Real thermoregulation set point: the value includes the sum of SET, HES and/or the dynamic set point if the functions are enabled.
tMd Time to next defrost (mins)
Adr Serial Address
LSn Number of devices in the LAN
LAn Address list of devices in the LAN

* XM756D and XM759D only

8. APPLICATIONS

8.1 APPLICATIONS – XM750D

The controller is already pre-set with 6 types of applications, divided in Medium Temp, Low Temp with 1 or 2 regulation probe (Air In and Air out).
According to the following table

Application 1	CO2 - MT display case, 1 regulation probe, 1 defrost probe, Air defrost
Application 2	CO2 - MT display case, AIR ON and AIR OFF regulation probes, 1 defrost probe, Air defrost
Application 3	CO2 - MT display case, 1 regulation probe, 1 defrost probe, Heater defrost, thermostat regulation
Application 4	CO2 - LT display case, 1 regulation probe, 1 defrost probe, Heater defrost
Application 5	CO2 – MT cold room, 1 regulation probe, 1 defrost probe, Heater defrost, thermostat regulation
Application 6	CO2 – LT cold room, 1 regulation probe, 1 defrost probe, Heater defrost, thermostat regulation

Depending on the applications, the relay outputs, the probe inputs and the digital input will be properly set according to the following table.

Application	oA1 (15-16)	oA2 (13-14)	oA3 (17-18)	oA4 (1-2-3)	oA5 (11-12)	Pb1 (28-29)	Pb2 (27-28)	Pb3 (25-26)	Pb4 (24-25)	DI1 (31-32)	DI2 (30-31)	AO1 (43-44)	AO2 (41-42)
1	Lig	Def	Fan	AUX Aux	Comp	NTC Reg	NTC Def	-	-	Door	ES	0-10V Anti sweat heater (AC)	0-10V Fan Speed (UAL)
2	Lig	Def	Fan	AUX Aux	Comp	NTC Air in	NTC Def	NTC Air out	-	Door	ES	0-10V Anti sweat heater (AC)	0-10V Fan Speed (UAL)
3	Lig	Def	Fan	AUX Aux	Comp	NTC Reg	NTC Def	-	-	Door	ES	0-10V Anti sweat heater (AC)	0-10V Fan Speed (UAL)
4	Lig	Def	Fan	AC	Comp	NTC Reg	NTC Def	-	-	Door	ES	0-10V Anti sweat heater (AC)	0-10V Fan Speed (UAL)
5	Lig	Def	Fan	AUX Aux	Comp	NTC Reg	NTC Def	-	-	Door	ES	0-10V Anti sweat heater (AC)	0-10V Fan Speed (UAL)
6	Lig	Def	Fan	On/Off OnF	Comp	NTC Reg	NTC Def	-	-	Door	ES	0-10V Anti sweat heater (AC)	0-10V Fan Speed (UAL)

8.1.1 APP. 1: CO2, MT DISPLAY CASE, 1 REGULATION PROBE, 1 DEFROST PROBE, AIR DEFROST

Label	Description	Value
SEt	**Set point**	**3**
rPA	Regulation probe A	P1
rPb	Regulation probe B	nP
dPA	Defrost probe A	P2
tdF	Kind of defrost: air, resistors, inversion	Air
trA	Kind of regulation for modulating output 1	AC
tr2	Kind of regulation for modulating output 2	UAL
oA1	Relay 1 configuration	LiG
oA2	Relay 2 configuration	dEF
oA3	Relay 3 configuration	FAn
oA4	Relay 4 configuration	AC
oA5	Relay 5 configuration	CPr
i1F	Digital input 1 configuration	dor
i2F	Digital input 2 configuration	ES
P1C	P1 configuration	ntc
P2C	P2 configuration	ntc
P3C	P3 configuration	nu

8.1.2 APP. 2: CO2 - MT DISPLAY CASE, AIR ON AND AIR OFF REGULATION PROBES, 1 DEFROST PROBE, AIR DEFROST

Label	Description	Value
SEt	Set point	3
rPA	Regulation probe A	P1
rPb	Regulation probe B	P3
dPA	Defrost probe A	P2
tdF	Kind of defrost: air, resistors, inversion	Air
trA	Kind of regulation for modulating output 1	AC
tr2	Kind of regulation for modulating output 2	UAL
oA1	Relay 1 configuration	LiG
oA2	Relay 2 configuration	dEF
oA3	Relay 3 configuration	FAn
oA4	Relay 4 configuration	AC
oA5	Relay 5 configuration	CPr
i1F	Digital input 1 configuration	Dor
i2F	Digital input 2 configuration	ES
P1C	P1 configuration	Ntc
P2C	P2 configuration	Ntc
P3C	P3 configuration	Ntc

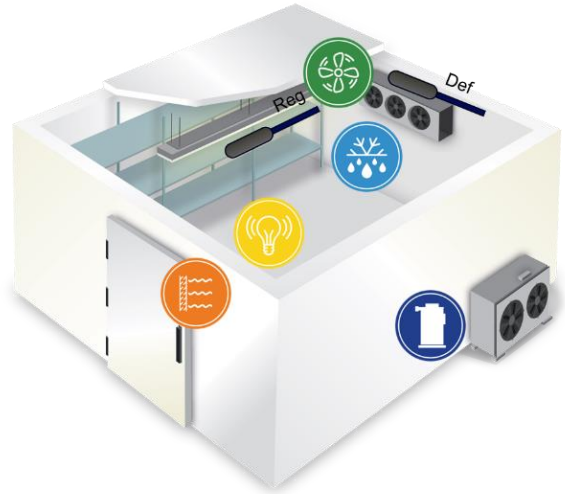
8.1.3 APP. 3: CO2 - MT DISPLAY CASE, 1 REGULATION PROBE, 1 DEFROST PROBE, HEATER DEFROST

Label	Description	Value
SEt	Set point	3
rPA	Regulation probe A	P1
rPb	Regulation probe B	nP
dPA	Defrost probe A	P2
tdF	Kind of defrost: air, resistors, inversion	EL
trA	Kind of regulation for modulating output 1	AC
tr2	Kind of regulation for modulating output 2	UAL
oA1	Relay 1 configuration	LiG
oA2	Relay 2 configuration	dEF
oA3	Relay 3 configuration	Fan
oA4	Relay 4 configuration	AC
oA5	Relay 5 configuration	CPr
i1F	Digital input 1 configuration	dor
i2F	Digital input 2 configuration	ES
P1C	P1 configuration	Ntc
P2C	P2 configuration	Ntc
P3C	P3 configuration	Nu

8.1.4 APP. 4: CO2 - LT DISPLAY CASE, 1 REGULATION PROBE, 1 DEFROST PROBE, HEATER DEFROST,

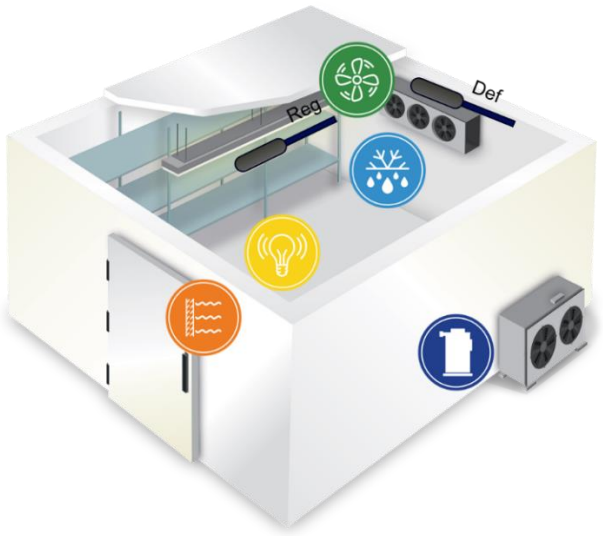
Label	Description	Value
SEt	Set point	3
rPA	Regulation probe A	P1
rPb	Regulation probe B	nP
dPA	Defrost probe A	P2
tdF	Kind of defrost: air, resistors, inversion	EL
trA	Kind of regulation for modulating output 1	AC
tr2	Kind of regulation for modulating output 2	UAL
oA1	Relay 1 configuration	Lig
oA2	Relay 2 configuration	DEF
oA3	Relay 3 configuration	Fan
oA4	Relay 4 configuration	AC
oA5	Relay 5 configuration	CPr
i1F	Digital input 1 configuration	dor
i2F	Digital input 2 configuration	ES
P1C	P1 configuration	NTC
P2C	P2 configuration	NTC
P3C	P3 configuration	NU

8.1.5 APP. 5: CO2 – MT COLD ROOM, 1 REGULATION PROBE, 1 DEFROST PROBE, HEATER DEFROST



Label	Description	Value
SEt	Set point	3
rPA	Regulation probe A	P1
rPb	Regulation probe B	nP
dPA	Defrost probe A	P2
tdF	Kind of defrost: air, resistors, inversion	EL
trA	Kind of regulation for modulating output 1	AC
tr2	Kind of regulation for modulating output 2	UAL
oA1	Relay 1 configuration	Lig
oA2	Relay 2 configuration	DEF
oA3	Relay 3 configuration	Fan
oA4	Relay 4 configuration	AC
oA5	Relay 5 configuration	CPr
i1F	Digital input 1 configuration	DOR
i2F	Digital input 2 configuration	ES
P1C	P1 configuration	NTC
P2C	P2 configuration	NTC
P3C	P3 configuration	NU

8.1.6 APP. 6: CO2 – LT COLD ROOM, 1 REGULATION PROBE, 1 DEFROST PROBE, HEATER DEFROST



Label	Description	Value
SEt	Set point	-18
rPA	Regulation probe A	P1
rPb	Regulation probe B	NP
dPA	Defrost probe A	P2
tdF	Kind of defrost: air, resistors, inversion	EL
trA	Kind of regulation for modulating output 1	AC
tr2	Kind of regulation for modulating output 2	UAL
oA1	Relay 1 configuration	LiG
oA2	Relay 2 configuration	DEF
oA3	Relay 3 configuration	FAN
oA4	Relay 4 configuration	AC
oA5	Relay 5 configuration	CPr
i1F	Digital input 1 configuration	Dor
i2F	Digital input 2 configuration	ES
P1C	P1 configuration	NTC
P2C	P2 configuration	NTC
P3C	P3 configuration	NU

8.2 XM756D AND XM759D

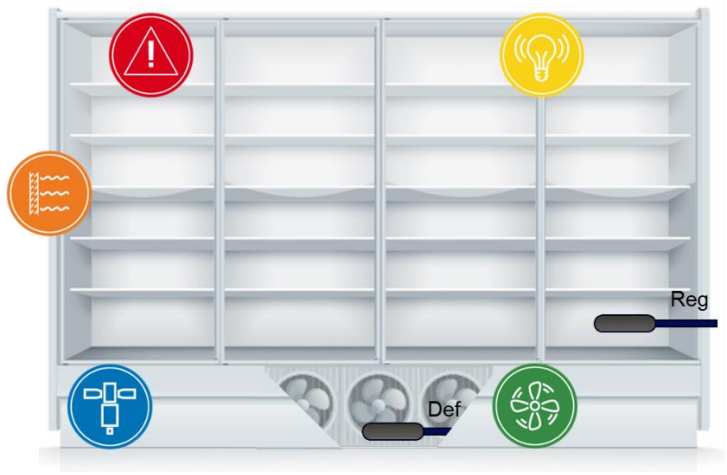
The controller is already pre-set with 6 types of applications, divided in Medium Temp, Low Temp with 1 or 2 regulation probe (Air In and Air out).
According to the following table

Application 1	CO2 - MT display case, 1 regulation probe, 1 defrost probe, Air defrost, continuous regulation, adaptive superheat
Application 2	CO2 - MT display case, AIR ON and AIR OFF regulation probes, 1 defrost probe, Air defrost, continuous regulation, adaptive superheat
Application 3	CO2 - MT display case, 1 regulation probe, 1 defrost probe, Heater defrost, thermostat regulation, adaptive superheat
Application 4	CO2 - LT display case, 1 regulation probe, 1 defrost probe, Heater defrost, continuous regulation, adaptive superheat
Application 5	CO2 – MT cold room, 1 regulation probe, 1 defrost probe, Heater defrost, thermostat regulation, adaptive superheat
Application 6	CO2 – LT cold room, 1 regulation probe, 1 defrost probe, Heater defrost, thermostat regulation, adaptive superheat

Depending on the applications, the relay outputs, the probe inputs and the digital input will be properly set according to the following table.

Application	oA1 (15-16)	oA2 (13-14)	oA3 (17-18)	oA4 (1-2-3)	oA5 (11-12)	Valve (45~49) (4~6)	Pb1 (28-29)	Pb2 (27-28)	Pb3 (25-26)	Pb4 (24-25)	Pb5 (20~23)	Pb6 (19-20)	DI1 (31-32)	DI2 (30-31)	AO1 (43-44)	AO2 (41-42)
1	Lig	Def	Fan	Alr	AUX Aux	Valve	NTC Reg	NTC Def	-	-	4-20mA SH Press	Pt1000 SH Temp	Door	ES	0-10V Anti sweat heater (AC)	0-10V Fan Speed (UAL)
2	Lig	Def	Fan	Alr	AUX Aux	Valve	NTC Air in	NTC Def	NTC Air out	-	4-20mA SH Press	Pt1000 SH Temp	Door	ES	0-10V Anti sweat heater (AC)	0-10V Fan Speed (UAL)
3	Lig	Def	Fan	Alr	AUX Aux	Valve	NTC Reg	NTC Def	-	-	4-20mA SH Press	Pt1000 SH Temp	Door	ES	0-10V Anti sweat heater (AC)	0-10V Fan Speed (UAL)
4	Lig	Def	Fan	Alr	AC	Valve	NTC Reg	NTC Def	-	-	4-20mA SH Press	Pt1000 SH Temp	Door	ES	0-10V Anti sweat heater (AC)	0-10V Fan Speed (UAL)
5	Lig	Def	Fan	Alr	AUX Aux	Valve	NTC Reg	NTC Def	-	-	4-20mA SH Press	Pt1000 SH Temp	Door	ES	0-10V Anti sweat heater (AC)	0-10V Fan Speed (UAL)
6	Lig	Def	Fan	Alr	On/Off OnF	Valve	NTC Reg	NTC Def	-	-	4-20mA SH Press	Pt1000 SH Temp	Door	ES	0-10V Anti sweat heater (AC)	0-10V Fan Speed (UAL)

8.2.1 APP. 1: CO2, MT DISPLAY CASE, 1 REGULATION PROBE, 1 DEFROST PROBE, AIR DEFROST, CONTINUOUS REGULATION, ADAPTIVE SUPERHEAT

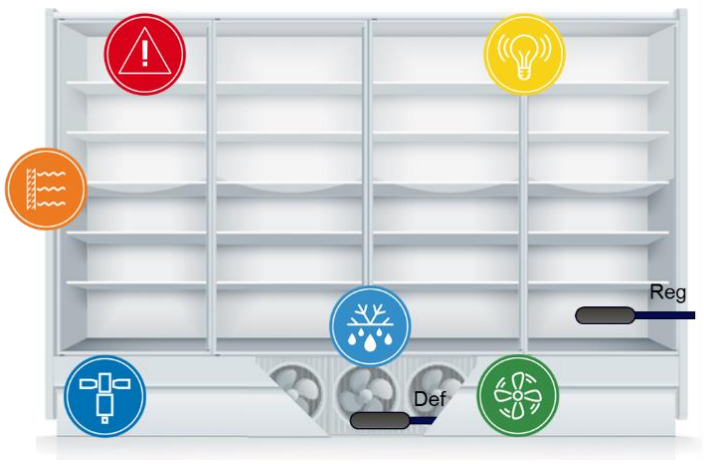


Label	Description	Value
SEt	**Set point**	**3**
CrE	Continuous regulation activation	y
rPA	Regulation probe A	P1
rPb	Regulation probe B	nP
Fty	Refrigerant gas type	CO2
Atu	Regulator auto tuning	yes
dPA	Defrost probe A	P2
tdF	Kind of defrost: air, resistors, inversion	Air
trA	Kind of regulation for modulating output 1	AC
tr2	Kind of regulation for modulating output 2	UAL
oA1	Relay 1 configuration	LiG
oA2	Relay 2 configuration	dEF
oA3	Relay 3 configuration	FAn
oA4	Relay 4 configuration	Alr
oA5	Relay 5 configuration	AC
i1F	Digital input 1 configuration	dor
i2F	Digital input 2 configuration	ES
P1C	P1 configuration	ntc
P2C	P2 configuration	ntc
P3C	P3 configuration	nu
P5C	P5 configuration	420
P6C	P6 configuration	PtM
PA4	Pressure value at 4 mA or at 0V (probe P5)	0.0
P20	Pressure value at 20 mA or at 5V (probe P5)	60.0

8.2.2 APP. 2: CO2 - MT DISPLAY CASE, AIR ON AND AIR OFF REGULATION PROBES, 1 DEFROST PROBE, AIR DEFROST, CONTINUOUS REGULATION, ADAPTIVE SUPERHEAT

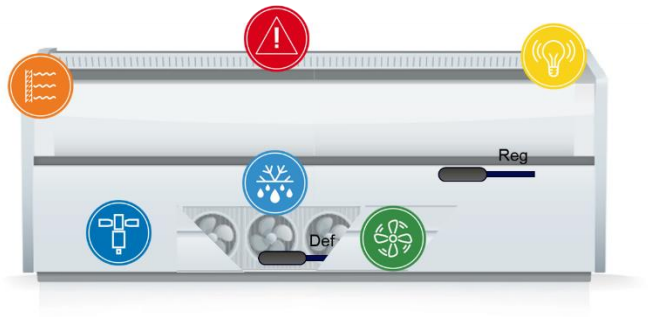
Label	Description	Value
SEt	Set point	3
CrE	Continuous regulation activation	y
rPA	Regulation probe A	P1
rPb	Regulation probe B	P3
Fty	Refrigerant gas type	CO2
Atu	Regulator auto tuning	yes
dPA	Defrost probe A	P2
tdF	Kind of defrost: air, resistors, inversion	Air
trA	Kind of regulation for modulating output 1	AC
tr2	Kind of regulation for modulating output 2	UAL
oA1	Relay 1 configuration	LiG
oA2	Relay 2 configuration	dEF
oA3	Relay 3 configuration	FAn
oA4	Relay 4 configuration	ALr
oA5	Relay 5 configuration	AC
i1F	Digital input 1 configuration	dor
i2F	Digital input 2 configuration	ES
P1C	P1 configuration	ntc
P2C	P2 configuration	ntc
P3C	P3 configuration	ntc
P5C	P5 configuration	420
P6C	P6 configuration	PtM
PA4	Pressure value at 4 mA or at 0V (probe P5)	0.0
P20	Pressure value at 20 mA or at 5V (probe P5)	60.0

8.2.3 APP. 3: CO2 - MT DISPLAY CASE, 1 REGULATION PROBE, 1 DEFROST PROBE, HEATER DEFROST, THERMOSTAT REGULATION, ADAPTIVE SUPERHEAT



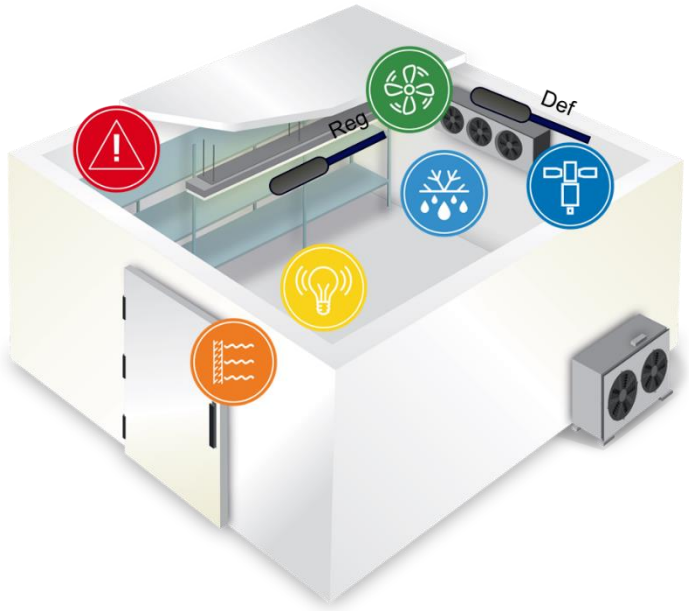
Label	Description	Value
SEt	Set point	3
CrE	Continuous regulation activation	N
rPA	Regulation probe A	P1
rPb	Regulation probe B	nP
Fty	Refrigerant gas type	CO2
Atu	Regulator auto tuning	Yes
dPA	Defrost probe A	P2
tdF	Kind of defrost: air, resistors, inversion	EL
trA	Kind of regulation for modulating output 1	AC
tr2	Kind of regulation for modulating output 2	UAL
oA1	Relay 1 configuration	LiG
oA2	Relay 2 configuration	dEF
oA3	Relay 3 configuration	Fan
oA4	Relay 4 configuration	ALr
oA5	Relay 5 configuration	AC
i1F	Digital input 1 configuration	Dor
i2F	Digital input 2 configuration	ES
P1C	P1 configuration	Ntc
P2C	P2 configuration	Ntc
P3C	P3 configuration	Nu
P5C	P5 configuration	420
P6C	P6 configuration	PtM
PA4	Pressure value at 4 mA or at 0V (probe P5)	0.0
P20	Pressure value at 20 mA or at 5V (probe P5)	60.0

8.2.4 APP. 4: CO2 - LT DISPLAY CASE, 1 REGULATION PROBE, 1 DEFROST PROBE, HEATER DEFROST, CONTINUOUS REGULATION, ADAPTIVE SUPERHEAT



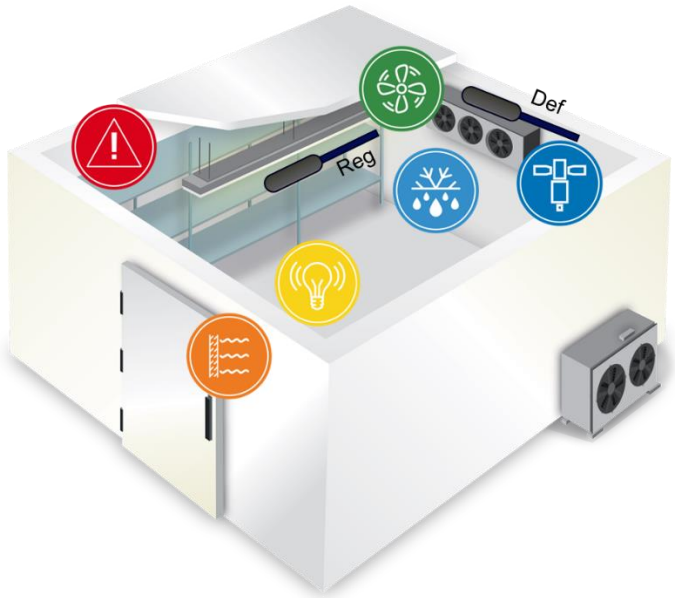
Label	Description	Value
SEt	Set point	3
CrE	Continuous regulation activation	N
rPA	Regulation probe A	P1
rPb	Regulation probe B	nP
Fty	Refrigerant gas type	CO2
Atu	Regulator auto tuning	Yes
dPA	Defrost probe A	P2
tdF	Kind of defrost: air, resistors, inversion	EL
trA	Kind of regulation for modulating output 1	AC
tr2	Kind of regulation for modulating output 2	UAL
oA1	Relay 1 configuration	Lig
oA2	Relay 2 configuration	DEF
oA3	Relay 3 configuration	Fan
oA4	Relay 4 configuration	ALR
oA5	Relay 5 configuration	AC
i1F	Digital input 1 configuration	DOR
i2F	Digital input 2 configuration	ES
P1C	P1 configuration	NTC
P2C	P2 configuration	NTC
P3C	P3 configuration	NU
P5C	P5 configuration	420
P6C	P6 configuration	PtM
PA4	Pressure value at 4 mA or at 0V (probe P5)	0.0
P20	Pressure value at 20 mA or at 5V (probe P5)	60.0

8.2.5 APP. 5: CO2 – MT COLD ROOM, 1 REGULATION PROBE, 1 DEFROST PROBE, HEATER DEFROST, THERMOSTAT REGULATION, ADAPTIVE SUPERHEAT



Label	Description	Value
SEt	Set point	3
CrE	Continuous regulation activation	N
rPA	Regulation probe A	P1
rPb	Regulation probe B	nP
Fty	Refrigerant gas type	CO2
Atu	Regulator auto tuning	Yes
dPA	Defrost probe A	P2
tdF	Kind of defrost: air, resistors, inversion	EL
trA	Kind of regulation for modulating output 1	AC
tr2	Kind of regulation for modulating output 2	UAL
oA1	Relay 1 configuration	Lig
oA2	Relay 2 configuration	DEF
oA3	Relay 3 configuration	Fan
oA4	Relay 4 configuration	ALR
oA5	Relay 5 configuration	AC
i1F	Digital input 1 configuration	DOR
i2F	Digital input 2 configuration	ES
P1C	P1 configuration	NTC
P2C	P2 configuration	NTC
P3C	P3 configuration	NU
P5C	P5 configuration	420
P6C	P6 configuration	PtM
PA4	Pressure value at 4 mA or at 0V (probe P5)	0.0
P20	Pressure value at 20 mA or at 5V (probe P5)	60.0

8.2.6 APP. 6: CO2 – LT COLD ROOM, 1 REGULATION PROBE, 1 DEFROST PROBE, HEATER DEFROST, THERMOSTAT REGULATION, ADAPTIVE SUPERHEAT



Label	Description	Value
SEt	Set point	-18
CrE	Continuous regulation activation	N
rPA	Regulation probe A	P1
rPb	Regulation probe B	NP
Fty	Refrigerant gas type	CO2
Atu	Regulator auto tuning	YES
dPA	Defrost probe A	P2
tdF	Kind of defrost: air, resistors, inversion	EL
trA	Kind of regulation for modulating output 1	AC
tr2	Kind of regulation for modulating output 2	UAL
oA1	Relay 1 configuration	LiG
oA2	Relay 2 configuration	DEF
oA3	Relay 3 configuration	FAN
oA4	Relay 4 configuration	ALR
oA5	Relay 5 configuration	AC
i1F	Digital input 1 configuration	Dor
i2F	Digital input 2 configuration	ES
P1C	P1 configuration	NTC
P2C	P2 configuration	NTC
P3C	P3 configuration	NU
P5C	P5 configuration	420
P6C	P6 configuration	PtM
PA4	Pressure value at 4 mA or at 0V (probe P5)	0.0
P20	Pressure value at 20 mA or at 5V (probe P5)	60.0

8.3 HOW TO LOAD THE PROPER APPLICATION MAP

1. Enter “**Prg**” menu
2. Select the parameter **MAP**
3. Set it according to the application between 1 and 6
4. Push “**Set**” icon.
5. Controller will reset and load the application map, selected by the parameter **MAP**.

8.4 RECOVERY FUNCTION: HOW TO RELOAD AN APPLICATION MAP

1. Enter “**Prg**” menu
2. Select the parameter “**LdM”**
3. Set it from “n” to “y”
4. Push “**Set**” icon.
5. Controller will reset and load the map set in the parameter **MAP**.

8.5 HOW TO OVERWRITE THE CURRENT MAP ON THE APPLICATION MAP

1. Enter “**Prg**” menu
2. Select the parameter **UdM**
3. Set it from “n” to “y”
4. Push “**Set**” icon.
5. Controller will overwrite the values of the current map in the default map, that was selected by the parameter MAP.

9. COMMISSIONING

9.1 XM756D ONLY – 12V STEPPER UNIPOLAR VALVE CONFIGURATIONS AND CONNECTIONS

XM756D manages **12V stepper unipolar** electronic expansion valves.

9.1.1 VALVE CONNECTIONS

***** All the connections between XM756D and valve has to be done with the controller NOT supplied. *****

9.1.2 TYPE OF CABLES AND MAX LENGHT

To connect the valve to the controller, use only shielded cables with section greater than or equal to 0.823 mm² (AWG18).
A twisted shielded cable with the above specification is suggested. Don't connect the shield to any ground, live it floating.

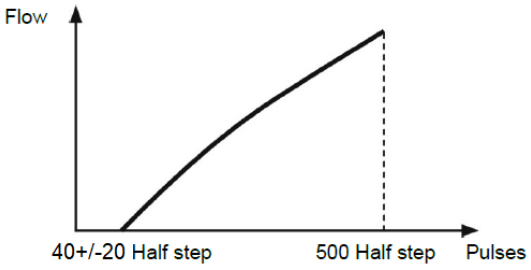
The max distance between an XM controller and a valve **must not exceed 10 m**.

9.1.3 ⚠ VALVE SETTINGS

The valve main parameters must be set before connecting it to the XM756D
Configuration has to be done via the following parameters of the XM756D, look at the technical bulletin of the valve to set them properly.

HFS: **Valve operating mod**: (FUL: Full step – HLF: Half step): it defines the type of movement: half step or full step. Using the half step the number of steps is duplicated.
LSt: **Number of integer steps at which valve starts to open:** it is the zero point of the valve at which the regulation start operating.
NOTE with HFS = FUL the step valve value has to be divided by 10 before setting LSt.
With HFS = HLF the step valve value has to be divided by 20 before setting LSt
Ust: **Maximum number of integer steps**: it's the number of steps of the valve.
NOTE with HFS = FUL the step valve value has to be divided by 10 before setting USt.
With HFS = HLF the step valve value has to be divided by 20 before setting USt
Est: **Number of integer extra-steps of valve**. It's used to close completely.
NOTE with HFS = FUL this value is applied as it is.
With HFS = HLF this value is multiplied by 2 before being applied. See below example
SR: **Step rate (Full step):** it step rate (full step/s) of the valve.
NOTE with HFS = FUL this value is applied as it is.
With HFS = HLF this value has to be divided by 2 before setting SR parameter. See below example

EXAMPLE – READ IT CAREFULLY BEFORE SETTING XM756D
Unipolar valve with following default data:



VALVE DATA	XM756D SETTING	COMMENT
Step mode: half step	HFS = HLF	It's a half step valve, so parameter HFS = HLF
Total number of steps: 500 half step (250 full step)	USt = 25	Value of UST = total number of half steps divided by 20. (500:20 = 25)
Valve start to open at 40±20 half steps	LSt = 1	Valve start opening at 40±20, so using the worst case to avoid leakage, it starts at 20 half steps. LST = number of half steps divided by 20, (20:20 = 1) **NOTE: if the result of the division is below 1, set LSt = 0.** This will not affect the regulation accuracy.
Fully close position 520 pulses (half step)	Est= 10	The mechanical number of half steps are 520, so to close completely the valve 20 extra half steps have to be done. This value has to be divided by 2 before setting ESt
Pulsing rate: 30-90 pulse (half step) per sec.	SR = 60	An average value has been used.

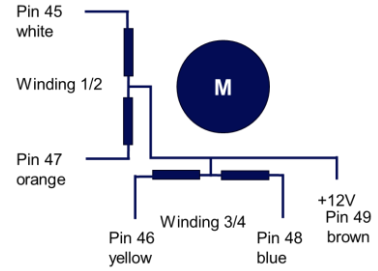
9.1.4 ⚠ VALVE WIRING

1. **Before connecting the valve, set properly the controller as explained in the above chapter.**
2. **Switch off the controller, before connecting the valve. Do the connection with controller off, following the instructions of valve producer.**
3. **Switch the controller on**

5-6 WIRES VALVES (UNIPOLAR)

Connection numbering	SPORLAN TYPE OEV	COPELAND EXM EXL
45 (W1)	ORANGE	WHITE
46 (W3)	RED	ORANGE
47 (W2)	YELLOW	YELLOW
48 (W4)	BLACK	BLUE
49 (+12V Common)	GRAY	BROWN

Example connection of Copeland EXM/L valve



PIN (Winding number)	OPENING → / CLOSING ←							
	1	2	3	4	5	6	7	8
45 (W1)	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
46 (W3)	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
47 (W2)	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
48 (W4)	OFF	OFF	OFF	OFF	OFF	ON	ON	ON

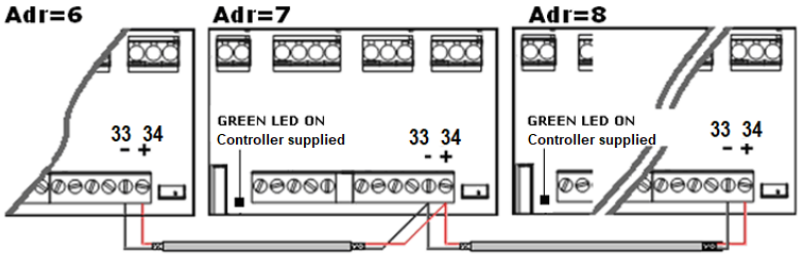
9.1.5 ABSOLUTE MAXIMUM CURRENT

XM756D is able to drive a wide range of 12V unipolar stepper valves, max current is 400mA

NOTE: the electrical power absorption of the valve can be unrelated to refrigeration power that valve has. Before using the XM756D, read the technical manual of the valve supplied by the manufacturer and check the maximum current used to drive the valve in order to verify that they are lower than those indicated above.

9.2 CREATING A LAN

9.2.1 LAN CONNECTION

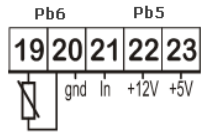


Follow next steps to create a LAN connection, which is a necessary condition to perform synchronized defrost (also called master-slave functioning):

1) Connect a shielded cable between terminals [**33**] [-] and [**34**] [+] for a **maximum of 8 sections**;
2) The **Adr** parameter is the number to identify each electronic board. **Address duplication is not permitted**, in this case the synchronized defrost and the communication with monitoring system is not guaranteed (the **Adr** is also the ModBUS address). For example, a correct configuration is the following:

The max distance allowed is 10m

9.2.2 SENSORS FOR SUPERHEAT CONTROL



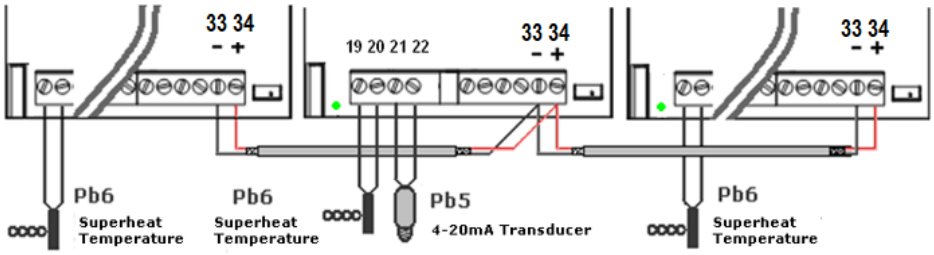
Temperature probe: Pb6 terminals [**19**] - [**20**] without any polarity.

Select the kind of sensor with **P6C** parameter.

Pressure transducer: Pb5 terminals:
[**21**] = input of the signal; [**22**] = Power Supply for 4to20mA transducer; [**20**] = GND; [**23**] = +5Vdc power supply for ratiometric pressure transducer.

Select the configuration of the transducer with parameter **P5C**.

9.2.3 HOW TO USE ONLY ONE PRESSURE TRANSDUCER ON MULTIPLEXED APPLICATIONS



A working LAN connection is required (green LED lit on all XM759D boards of the same LAN). Connect and configure a pressure transducer only on **one** XM759D of the network.
Afterwards, the value of pressure read by the unique transducer connected will be available to each device connected to the same LAN.

Some parameters have to be checked:
[1] Superheat temperature probe: Ntc, Ptc, Pt1000 with parameter **P6C**. The sensor has to be fixed at the end of the evaporator.
[2] Pressure transducer: [4 to 20mA] or ratiometric **P5C = 420** or **5Vr** with parameter **P5C.**

[3] Range of measurement: check the parameter of conversion **PA4** and **P20** that are related to the transducer.
TRANSDUCER:PP60 [0/60Bar] correct setup is relative pressure with PA4 = 0.0 and P20 = 60.0

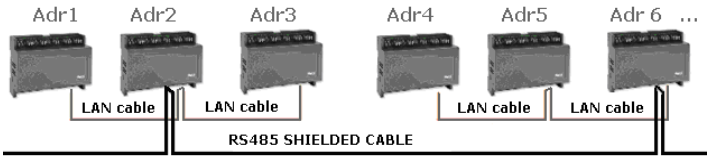
Example of virtual pressure with unique [4 to 20mA] or [0 to 5V] transducer:

Param.	**XM759D_1** without transducer	**XM759D _2 +** with transducer	**XM759D _3+** without transducer
LPP	LPP = n	LPP = Y	LPP = n
P5C	LAN	P5C= 420 or 0-5V	LAN or not connect the probe
PA4	Not used	0.0 bar	Not used
P20	Not used	60.0 bar	Not used

9.3 HOW TO CONNECT MONITORING SYSTEM

1) Terminals[**35**] [gnd] [**36**] [-] and [**37**] [+].
2) Use shielded twisted cable. For example Belden® 8762 o 8772 or cat 5 cables.
3) Maximum distance 1Km.
4) Don't connect the shield to the earth or to GND terminals of the device, avoid accidental contacts by using insulating tape.

Only one device for each LAN has to be connected to the RS485 connection.



The **Adr** parameter is the number to identify each electronic board. **Address duplication is not permitted**, in this case the synchronized defrost and the communication with monitoring system is not guaranteed (the **Adr** is also the ModBUS address).

9.4 DIGITAL INPUTS

1) The terminals from [**30**] to [**32**] are all free of voltage;
2) Use shielded cable for distance higher than one meter; Max length of digital input wires: 10m

For each input, has to be configured: the polarity of activation, the function of the input and the delay of signaling.

The parameters to perform this configuration are **i1P**, **i1F**, **i1d** respectively for polarity, functioning and delay for digital input 1, the corresponding i2P, i2F i2d for digital input 2.

9.5 ANALOG OUTPUTS (41-42 OR 43-44)

- Selectable between 4 to 20mA and 0 to 10Vdc.
- Use CABCJ15 to perform the connections (

9.6 ⚠ ELECTRONIC VALVE SETTINGS

Some parameters have to be checked:
[1] Superheat temperature probe: Ntc, Ptc, Pt1000 with parameter **P6C**. The sensor has to be fixed at the end of the evaporator.
[2] Pressure transducer: [4 to 20mA] or ratiometric **P5C = 420** or **5Vr** with parameter **P5C.**
[3] Range of measurement: check the parameter of conversion **PA4** and **P20** that are related to the transducer.
TRANSDUCER: [0-60bar]] the correct setup is PA4 = 0.0 and P20 = 60.0.

Example of virtual pressure with unique [4 to 20mA] or [0 to 5V] transducer:

Param.	XM759D_1 without transducer	XM759D _2 with transducer	XM759D _3 without transducer
Adr	n	n + 1	n + 2
LPP	LPP = n	LPP = Y	LPP = n
P5C	LAN or not connect the probe	P5C= 420 or 0-5V	LAN or not connect the probe
PA4	Not used	-0.5 bar	Not used
P20	Not used	7.0 bar	Not used

[4] From EEV submenu: select the correct kind of gas with **FTY parameter.**
[5] Use the following parameters to setup the right valve driving, according to the valve datasheet from the manufacturer.

9.7 SHARING COMMANDS THROUGH THE LAN: SEC PARAMETER

The parameter "section" **SEC** allows to define if a command can be shared via LAN or depends on the setting of each single XM700 according to the following table.
NOTE: the cell contains the name of the parameter enabling the sharing of the command, with SEC = LOC.

	Commands sent through the LAN according to SEC setting	LOCALE MODE: SEC = LOC			GLOBALE MODE SEC = GLB		
		Keyboard	*Digital input*	*RTC*	*Keyboard*	*Digital input*	*RTC*
1	**DEFROST start**	**LMd**	**LMd**	**LMd**	**Yes**	**Yes**	**Yes**
2	**SET synchronization**	**LSP**	**-**	**-**	**Yes**	**-**	**-**
3	**Display synchronization**	**-**	**-**	**-**	**-**	**-**	**-**
4	**OnOff synchronization**	**LOF**	**LOF**	**-**	**Yes**	**Yes**	**-**
5	**Light synchronization**	**LLi**	**LLi**	**LLi**	**Yes**	**Yes**	**Yes**
6	**AUX output synchronization**	**LAU**	**LAU**	**-**	**Yes**	**Yes**	**-**
7	**Energy Saving synchronization**	**LES**	**LES**	**LES**	**Yes**	**Yes**	**Yes**

wHE

EXAMPLE:
To send a command to in all the devices connected to the LAN: enter programming mode, set **SEC = gLb,**. exit from programming menu and send the command via keyboard or digital input.
The command will be shared among the controllers connected to the LAN.

⚠ **To restore the normal operativity,** set SEC = LOC

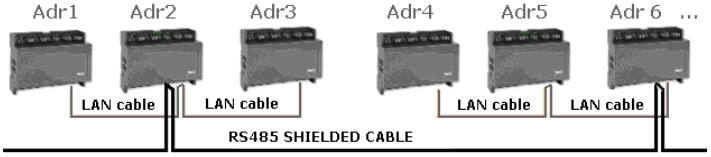
9.8 CLOCK SETTING AND RTC ALARM RESET

If the clock is present: [**EdF = rtC**] enable the defrost from rtc [**Ld1** to **Ld6**].
Note: the **rtC** clock menu is present also on the second level of parameters. **Warning**: if the board shows the **rtF** alarm, the device has to be changed.

9.9 SYNCHRONIZED DEFROST

The synchronized defrost allows to manage multiple defrost from different boards connected through the LAN. In this way, the boards can perform the defrosts at the same time with the possibility to end them in a synchronized way.

The **LSn** and **LAn** parameter are only to show the actual settings (read only). Se the following example of configuration*:*



DAILY DEFROST FROM RTC: : [cPb = y] & [EdF = rtC]

IdF Parameter: for safety reason force the value of **Idf** at +1 respect to the interval between two **Ld** parameters. The **IdF** timer is reinitialized after defrost and at every power-on.
DEFROST START: at the time selected by the parameters **Ld1** to **Ld6** or **Sd1** to **Sd6**.
DEFROST END: if the probes reach the **dtE** temperature or for maximum **MdF** time.
SAFETY and RtC or RtF ALARM: with clock alarm the device will use the parameter **IdF, dtE** and **MdF**.

WARNING: don't set [EdF = rtC] and [CPb = n].

MULTIMASTER DEFROST: all the probes with clock
Table for example

Par.	Unit A (RTC)	Unit B (RTC)	Unit C (RTC)
Adr	n	N + 1	N + 2
EdF	rtC (clock)	rtC (clock)	rtC (clock)
IdF	9 hours safety	9 hours safety	9 hours safety
MdF	45 min safety	45 min safety	45 min safety
dtE	12°C safety	12°C safety	12°C safety
Ld1	06:00 1°	06:00 1°	06:00 1°
Ld2	14:00 2°	14:00 2°	14:00 2°
Ld3	22:00 3°	22:00 3°	22:00 3°

10. TEMPERATURE CONTROLLING

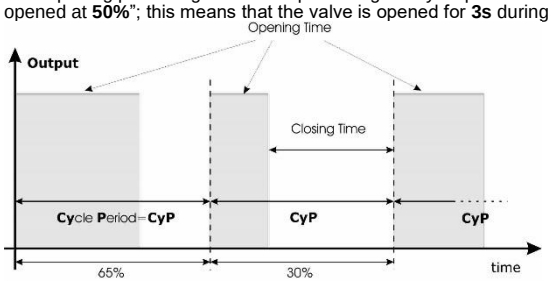
10.1 XM750D – STANDARD REGULATION: THE SOLENOID VALVE

The regulation is performed according to the temperature measured by the thermostat probe that can be physical probe or virtual probe obtained by a weighted average between two or three probes (see below parameter) with a positive differential from the set point. If the temperature increases and reaches set point plus differential (Hy) the solenoid valve is opened and then it is closed when the temperature reaches the set point value again.
In case of fault in the thermostat probe the opening and closing time of solenoid valve is configured by "**Con**" and "**CoF**" parameters.

10.2 XM756D AND XM759D: STANDARD REGULATION AND CONTINUOUS REGULATION: EEV MANAGEMENT

The regulation can be performed in two ways:

- The first way (**STANDARD REGULATION**) maintains the temperature set point (SET) via a classic thermostatic action using set point and differential (Hy). During activation time the EEV is modulated with PWM signal (XM679K) or varying the opening percentage of the valve orifice (XM756D) to get a proper SH control.
  Example of PWM modulation of a pulse EEV to get the proper SH.
  With opening percentage we mean percentage of cycle period where valve is open. For example, if **CyP=6s** (standard value) by saying: "The valve is opened at **50%**"; this means that the valve is opened for **3s** during cycle period and it is closed for other 3s.

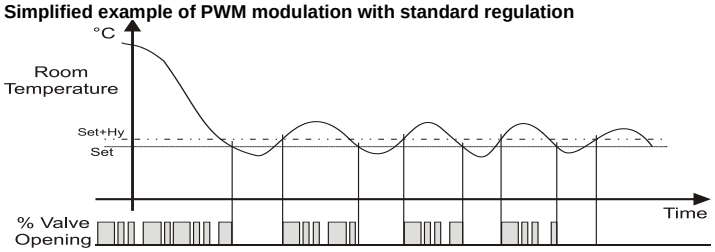


- The second way, called **CONTINUOUS REGULATION,** permits to use the valve to realize a high performance temperature regulation with a good factor of superheat precision. **This second possibility, it can be used only in centralized plants, and it is available only for XM756D and XM759D with electronic expansion valve.**

10.2.1 STANDARD REGULATION ((CRE = N)

Controller will take care to maintain the temperature at the target set point SET, with a differential of **Hy** degrees.
During the cooling action the EEV valve is properly managed to reach the target superheat (SSH) using a PID based algorithm.

Simplified example of PWM modulation with standard regulation



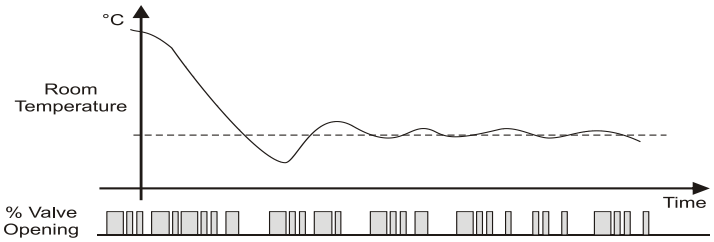
Regulation principles
1. Temperature regulation is ON/OFF and it depends on the SET point and HY parameter (dfferential) Valve is closed when the temperature reaches the set point and open when the temperature is higher than set point + differential.
2. The superheat is regulated to be closer to its set point.
3. Regulation pauses can be realized using **Sti** and **Std** parameters (during these pauses the valve is closed).

10.2.2 CONTINUOUS REGULATION (CRE = Y)

In this case, there is a continuous temperature and SH control, without any pauses, to get the target temperature set point and modulating properly the superheat at the same time.

Also the temperature is controlled using a PID based algorithm where the parameter **HyP** parameter is the proportional band (suggested values **Hy=8-12K, 14-00°F)** and **Int** is the integral time for room temperature regulation (suggested values **int=150-250s).**
Increasing **int** parameter the PI regulator become slow in reaction and of course is true vice versa. To disable the integral part of regulation you should set **int=0**.

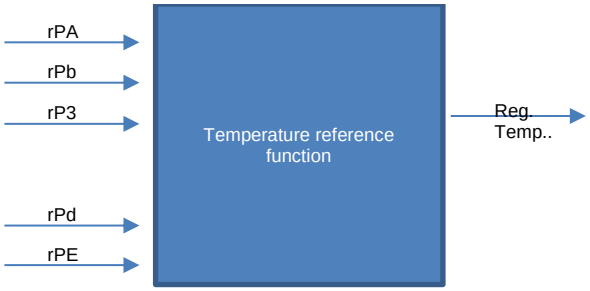
Simplified example of PWM modulation with continuous regulation



PAUSES FOR MEDIUM TEMPERATURE APPLICATIONS
In medium temperature regulation it's important to pause the refrigerant injection, to allow the system to clean the evaporator from brine.
Pauses can be realized using **Sti** and **Std** parameters (during these pauses the valve is closed).
A suggested setting **Sti = 2 and Std = 10,** this means that the cooling action will stop for 10min every 2 hours.
Pauses interval and length can be adjusted according to operating conditions.

10.3 TEMPERATURE PROBE REFERENCE FOR REGULATION

Up to 3 temperature probe can be used for the temperature regulation.
It's possible to set the probes used for temperature regulation. Up to 3 Temperature inputs Pb1, Pb2, Pb3, Pb4, Pb6, can be used.



To support above function, the parameters rPA, rPb, rP3, are used.
Which temperature probe methods of combine is set by par. rPd among the following: Average, Minimum, Maximum, First, or Mix.

rPd = rPA It's the probe defined in the rPA parameter
rPd = rAb Mix – this is currently done with "rPE" parameter.
rPd = AUr: Average– average of all valid probes defined as Regulation Probe by par. (rPA, rPb, rP3,)
rPd = LoE: Minimum – minimum of all valid probes defined as Regulation Probe by par. (rPA, rPb, rP3)
rPd = HiE Maximum – maximum of all valid probes defined as Regulation Probe by par. (rPA, rPb, rP3)

10.3.1 SENSORS FAILURE

In case of multiple temperature sensor regulation: (rPd = rAb, AUr, LoE or HiE), and with sensor failure, the remaining sensors are used for the regulation.
In case of all sensors failure, the valve opens at PEO percentage

10.4 DUAL TEMPERATURE APPLICATIONS

Controller can have up to 6 pre-set regulation.
The preset regulation is set in the parameter MAP.
By digital input or supervising system is possible to enable the second regulation mode, set in the parameter MP1.
In this way a dual temp case can be easily set and controlled.

10.4.1 SECOND MAP FUNCTION BY DIGITAL INPUT CONFIGURATION

By setting on digital input among i1F, i2F, i3F as the "nt" the map set in the parameter MP1 is loaded when the digital input is enabled.

11. SUPERHEAT REGULATION: SELF ADAPTIVE OR MANUAL OPERATING MODE – XM756D AND XM759D

In the XM700 series the superheat regulation is an integrated part of the temperature control.

11.1 GENERAL CONSIDERATIONS: SELF ADAPTIVE OR MANUAL SH CONTROL

The controller is able to regulate the superheat in manual or self adaptive mode, according to the value of the parameter **ATU, autotuning enabling.**

- With **ATU = n: the manual SH regulation is performed**
- With **ATU = y: the self adaptive SH regulation is performed**

11.1.1 SELF ADAPTIVE SH CONTROL – ATU = YES

The parameter **ATU = y** enables the self adaptive superheat regulation: controller operates to maintain the superheat set point set in the parameter SSH, according to the load and environmental conditions present in a given time on the evaporator.
With this conditions, controller automatically adjusts internal parameters to reach and keep superheat set point according to the kind of application and the response of the system.

11.1.2 MANUAL SH CONTROL - ATU = NO

NOTE: this kind of regulation is suggested for skilled technician with a good knowledge of regulation principle.
The parameter **ATU = n** enables the manual superheat regulation.
Controller has inside a PID algorithm with the following main parameters:

- **SSH** **Superheat set point** [0.1 ÷ 25.5°K] [1°F ÷ 45°F] it's the target superheat set point (Suggested value 8÷12K or 14-20F)
- **Pb** **Proportional band:** (0.1 ÷ 60.0K / 1÷108°F) proportional band for SH regulation, used with with Atu= no. (Suggested value 8÷20K or 15-40F)
- **PbH** **Dead band for superheat regulation:** it's a band across the SH set point, inside this band the valve opening percentage is not updated. (Suggested value 0.2÷1.0K or 0.3-2.0F)
- **rS** **Band Offset:** (-12.0 ÷ 12.0°C / -21÷21°F) PI band offset;
- **inC** **Integration time:** (0 ÷ 255s) PI integration time; for SH regulation with Atu= no. (Suggested value 80÷150s). **NOTE:** this value is inversely proportional: the lower it is, the bigger is its effect
- **dFC** **Derivative time:** (0 ÷ 255s) PID derivative time for SH regulation with Atu= no. (Suggested value 0÷5s) **NOTE:** not exceed the 10s.

the setting of the above parameters will lead the controller action.

11.2 OTHER MAIN PARAMETERS RELATED TO THE SUPERHEAT CONTROL

There are other parameters related to the SH control that can help in getting a good regulation, matching the internal algorithms with a real application:

11.2.1 PRESSURE STABILIZER – ANP PARAMETER

For a good SH regulation, it's important to use a stable value of the pressure. This function is provided by the **AnP** parameter, that uses an average value of the pressure to calculate the superheat. It's useful in condensing unit applications or when the pressure regulation is not stable.
Suggested values:

From 1-5 evaporators for each racks: AnP = 5-6
From 6-30 evaporators for each racks: AnP = 3-4
More than 30 evaporators for each racks: AnP = 1-2

NOTE: avoid values higher than 10.

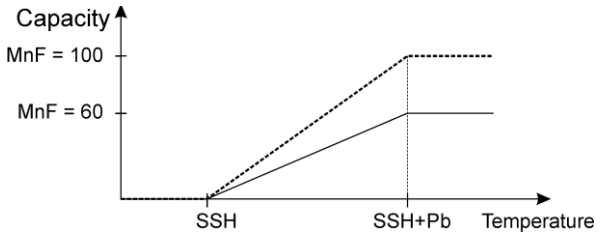
11.2.2 VALVE SMOOTHER

The reaction of the valve is also important for a good superheat control, for this reason it's possible to set it with the **SLb** parameter.
It allows to smooth the reaction of the valve when the superheat changes fast.
Suggested values:

5÷20s; 5s for installation with more than 30 cabinets,
15s with few cabinets

11.3 VALVE CAPACITY REDUCING – MNF PARAMETER

Thanks to the parameter MnF it's possible to reduce the capacity of the valve, to fine tune the valve to the evaporator.
The regulation band is not affected from the modification of the MnF parameter.
See below the behaviour of the capcity of the valve, when the MnF parameter is adjusted.



12. DEFROST

12.1 DEFROST INTERVALS: PARAMETER EDF

There 4 ways to set the interval between defrosts, depending on the parameter **EdF**

EdF = rtc the defrost is started at the time set in the menu RTC (real time clock). It can be set up to six defrosts a day, divided by workday, parameters **Ld1..Ld6,** and holidays, parameters **Sd1…Sd6,** furthermore for each defrost can be set its max duration (**Md1…Md6**) and the end defrost temperature: **dE1¸dE6** for first probe and **dS1÷dS6** for second probe.

EdF = in: the defrost interval is set by parameter **idF,** the defrost max duration in set in the parameter MdF, and the end defrost temperature dtE (dtS for defrost with 2 evaporator probe)**.**

EdF = Aut: controller performs "On Demand": this algorithm has been developed for plug in application, not suggested for remote display case. See below chapter for details.

EdF = Sd "Smart Defrost": suggested for medium temperature applications. Baseline for defrost interval is the parameter **idF,** the defrost max duration in set in the parameter **MdF**, and the end defrost temperature **dtE** (**dtS** for defrost with 2 evaporator probe)**.** The **IdF** timer is updated only if compressor/solenoid valve is on and the evaporator temperature is below the parameter **SdF** that is the temperature threshold below which the interval is counted.

NOTE: before starting defrost the controller checks that the temperature read by defrost probe is lower than the end defrost temperature, in case it is higher the defrost is skipped.

12.2 KIND OF DEFROST: PARAMETER tdF

The type of defrost is set by parameter tdF among the following possibilities:

tdF = Air: natural defrost. For Medium Temperature Applications
Defrost is done by stopping the compressor or injection valve. The fan behavior, during defrost depends on the parameter FnC. Suggested configuration FnC = c-Y or o-Y to have them running during defrost. Defrost relay, if set, remains off.

tdF = EL: defrost with electrical heaters. For Low or Medium Temperature Applications
Defrost is done by stopping the compressor or injection valve. The fan behavior, during defrost depends on the parameter FnC. Suggested configuration FnC = c-n or o-n to have them stopped during defrost. Defrost relay is activated.

tdF = rt defrost with pulsed electrical heaters. For Low or Medium Temperature Applications – suggested for cold rooms and walk-ins.
Defrost is done by stopping the compressor or injection valve. The fan behavior, during defrost depends on the parameter FnC. Suggested configuration FnC = c-n or o-n to have them stopped during defrost. The defrost heaters are thermostatically controlled around Srt and Srt-Hyr. If the evaporator temperature remains higher than Srt threshold for more than tod time the defrost is stopped. The defrost is also stopped if evaporator temperature reaches the dtE value or the MdF timer expires.

tdF = in: hot gas defrost. **For Low or Medium Temperature Applications** Defrost is done using the hot gas produced by the compressor and passed into the evaporator through a suitable circuit. During defrost the compressor/solenoid relay is activated. If the EEV valve, if present is open at **OHg** value. The fan behavior, during defrost, depends on the parameter FnC. Suggested configuration FnC = c-n or o-n to have them stopped during defrost. Defrost relay is on.

12.3 DEFROST TERMINATION

There are several ways to stop the defrost:

a. **Defrost termination based on time:**
   1. Controller without **RTC**: if the evaporator probe is not present (dPA = nu; dPb = nu) the defrost stops after MdF minutes.
   2. Controller **with RTC:** if the evaporator probe is not present (dPA = nu; dPb = nu), it's possible to set for each daily defrost (workday **Ld1..Ld6,** holiday **Sd1…Sd6),** its own duration (**Md1…Md6).**

b. **Defrost termination based on temperature:**

1. Controller without **RTC**: if **dPA** and **dPb** are present and **d2P=y** the instrument stops the defrost when **dPA** is higher than **dtE** temperature and **dPb** is higher than **dtS** temperature. However the defrost stops after MdF minutes, (max duration time).
2. Controller **with RTC:** with the evaporator probe present (dPA different from nu), it's possible to set for each daily defrost (workday **Ld1..Ld6,** holiday **Sd1…Sd6),** its own end defrost temperature (**dE1..dE6** for the first evaporator probe and **Sd1..Sd6** for the second evaporator probe**).** However the defrost stops after **Md1…Md6** minutes, max duration time for each defrost.

c. **Defrost termination based on external device: digital input set as "dEn"**
With one digital input (i1F…i4F) set as end defrost "**dEn",** the defrost is stopped when the the digital input is activated.
NOTE: with digital input always activated the defrost is not performed.

At the end of defrost starts the drip time that is controlled through the "**Fdt**" parameter.
During this time the regulation is stopped.

12.4 END DEFROST OPTIMIZATION – A SMART WAY TO SAVE ENERGY

Via **od2** parameter (**defrost duration optimization**) it's possible to optimized defrost duration**.**
The controller needs a temperature probe placed on the evaporator, to monitor the presence of ice during defrost phase. It's suggested to place the probe immediately after the injection point or where ice tends to form. The defrost termination is established by the controller according to the behavior of the evaporator temperature. However, defrost will be ended in any case when the evaporator reaches dtE (dtS for second defrost probe) temperature.
NOTE: The optimized defrost is suggested for low temperature applications with defrost heaters.

12.5 MINIMUM DEFROST TIME

The "**ndt**" parameter, sets the minimum defrost duration, when the defrost is ended by evaporator temperature probe.
The **ndt** time is taken in account everytime the defrost is trigged, independently form the value of end defrost temperature probe and end defrost digital input status.

13. PUMP DOWN BEFORE DEFROST

Before defrost is possible to perform a pump down to empty the evaporator. The **Pdn** parameter sets the pump down duration (0 to 255 min)
By the parameter **Pdt** it's possible to set the type of pump down among the following:

- With **Pdt = nu,** the pump down is not enabled.

- With **Pdt = Fan**, when a defrost trigger is given:
  - Compressor relay will be open
  - EEV valve (if present):
    - will be closed with CrE = n, y
    - will be open with CrE =EUP or EU5
  - Fan will be forced to run for Pdn time

- With **Pdt = F-C,** when a defrost trigger is given:
  - EEV valve (if present):
    - will be closed with CrE = n, y
    - will be open with CrE =EUP or EU5
  - Compressor relay and Fan will be forced to run for Pdn time

14. FANS

14.1 CONTROL WITH RELAY

The fan control mode is selected by means of the "**FnC**" parameter:
C-n = running with the solenoid valve, OFF during the defrost;
C-y = running with th1e solenoid valve, ON during the defrost;
O-n = continuous mode, OFF during the defrost;
O-y = continuous mode, ON during the defrost;

An additional parameter "**FSt**" provides the setting of temperature, detected by the evaporator probe, above which the fans are always OFF.
This can be used to make sure circulation of air only if his temperature is lower than set in "**FSt**".
After the defrost the fan remains off for the Fnd time

14.1.1 FAN AND DOOR

When the door is open (par. i1F…i4F = dor activated) the status of the fan is set on the parameter odC.
With the following possibilities:
a. **no** = normal: no changes
b. **FAn** = Fan OFF; **F_C** = Compressor and fan OFF.
c. **CPr** = Compressor OFF
If the door remains opened, after the delay time set through parameter d1d..d4d, the door alarm is enabled and the fan can restart if rrd = y.
It's possible to delay the fan restart when the dor is closed by the parameter **Fd2,** fand delay after door closing.

14.1.2 AIR ANTI-STRATIFICATION FUNCTION FOR COLD ROOMS AND PLUG INS

If evaporator fans are running in parallel with the cooling action (odC = C-n or C-y), it's possible to have them running when the cooling action is off to avoid air stratification. By means of the **Fon** and **FoF** parameters the fans can carry out on and off cycles even if the cooling action is paused.
When the evaporator stops the fans go on working for the Fon time. With Fon=0 the fans remain always off, when the cooling action is paused.
During the Energy Saving mode the anti-stratification function is regulated by the parameters Fo1 (on time) and FF1 (off time).

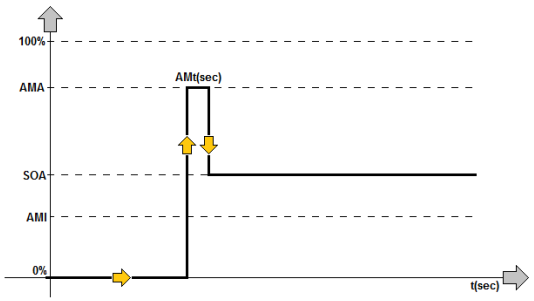
14.2 HOW TO CONTROL THE FAN SPEED WITH ANALOG OUTPUT (IF PRESENT)

The analog output follows the status of the fan relay, defined by the parameters **FnC, Fnd, odC** etc.
With an analog output (0-10V or PWM or 4-20mA) it's possible to set the fan speed.
The control can be done using a fix fan speed or modulating it.

14.2.1 trA = UAL: FIX FAN SPEED

Analog output follows the status of the relay set as fan, according to FnC parameter.
This mode allows to activate the analog output at a fixed percentage value, pre-set and configured via the SOA parameter.

Min and Max limits for the analog output are set in the parameters AMi and AMA.
When the fan starts, the output will reach the maximum value established by the AMA parameter for the time defined by the AMt parameter (seconds).



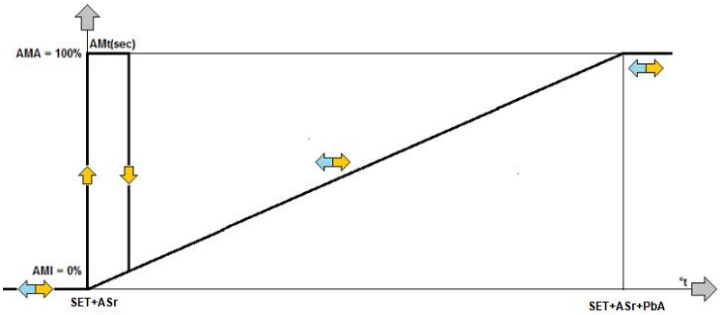
14.2.2 trA = rEg: PROPORTIONAL FAN SPEED

The analog output follows the status of the fan relay, defined by the parameters **FnC, Fnd, odC** etc.

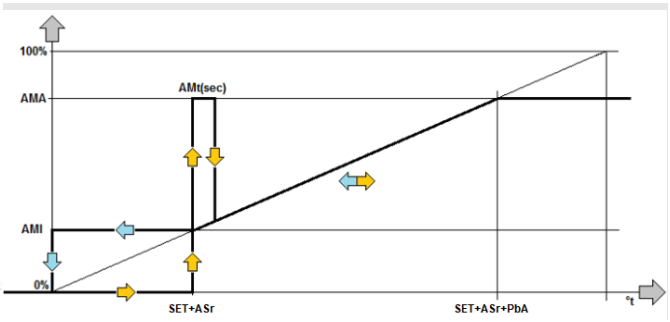
The fan output works in a proportional way within the **PbA** operating band.
The reference probe is established by the **FAP** parameter
The set point used by the regulator is calculated as follows: **SET + ASr = SETF**
Where SET is the actual value of the cell regulation set (local including Energy Saving or from supervision).
The proportional band of the PbA fans is always positioned above **SETF**.
The fan output is activated at the minimum value **AMi** when the temperature detected by the fan probe is equal to **SETF** and rises to the maximum value **AMA** when the temperature reaches the value **SETF+PbA**.

When the temperature exceeds the value defined by **SETF+PbA** the output remains stable at the maximum value **AMA**.
When the temperature is lower than the value defined by **SETF** the output remains stable at the minimum **AMI** value until the calculated percentage is greater than 0, then the output is deactivated.
When the fan starts, the output will reach the maximum value established by the AMA parameter for the time defined by the AMt parameter (seconds).

Below are shown as an example, two functioning diagrams



AMI = 0%, AMA=100%



AMI=30%, AMA=80%

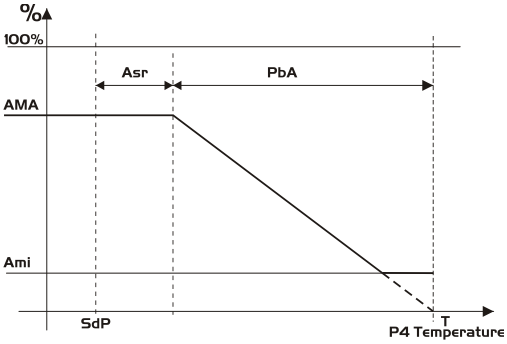
15. ANTI SWEAT HEATERS

15.1 ANTI SWEAT HEATERS WITH A RELAY (oAx= AC)

If one of the relay outputs, oA1…oA5, is configured as AC="HotCables", the relay is used for the anti-sweat heater function.
Without additional resources, the AC relay output is varied cyclically with a fixed period time of 60 minutes and the **ON time is defined by the AMt parameter** (minutes).
If the AMt parameter is null (=0) then the AC output will always remain off.
:

15.2 ANTI SWEAT HEATERS WITH A RELAY, AN ANALOG OUTPUT AND THE REGULATION PROBE

If an analog output is configured for the Hot Cables function trA = AC, the P4 probe (glass probe) is present (local or remote), the regulation is carried out by cyclically varying the relay output with a fixed period time of 60 minutes and the ON time in proportion to the value of the analog output: ON time = (60 * AO%) / 100.
Where the value of the analog output are given by the below graph.



Where
SdP = Default Dew Point value
Asr = Dew-point offset
PbA = regulation band

NOTE: it's possible to receive the dew-point from **XWEB5000** system: in this case the **SdP** parameter is overwritten when valid value for dew-point is received from XWEB. In case of XWEB link is lost, **SdP** is the value that will be used for safety.

15.2.1 LAN AND ANTI SWEAT HEATER MANAGEMENT

Probe 4 should be placed on a showcase glass.
For alle the controllers connected to the LAN only one probe 4 (P4) can be used, and then its value can be shared among the LAN with the following setting.

HOW TO WORK WITH PROBE 4 THROUGH THE LAN:

Param.	**XM579D_1** Without probe 4	**XM579D _2 +** with probe 4	**XM579D _3+** Without probe 4
Adr	n	n + 1	n + 2
LCP	LCP = n	LCP = Y	LCP = n
P4C	LAN or not connect the probe	P4C = NTC, PtC or PtM	LAN or not connect the probe
trA	trA = AC if the device has the analog output		
oAx	oAx = AC if the device will use the AUX relay for regulation		

NOTE oAx = parameter to configure the relays: oA1…oA5

16. CLEANING MODE FUNCTION BY DIGITAL INPUT CONFIGURATION

With a digital input set as "**cLn**" its' possible to set the "status clean".
The function has the same basic features of the stand by function, but with the following differences:
a. By the parameter **LcL** (no, yES) it's possible to set if the light is on or off during cleaning mode.
This parameter **LcL** can be override by light button or by Light on/off Modbus command.
b. By the parameter **FcL** (no, yES)) it's possible to set if the fan is on or off during cleaning mode.
In case of fan on, the FSt parameter (fan stop temperature) is override.

16.1.1 DISPLAY

During the Cleaning Status, the display shows the "cLn" message.

17. AUXILIARY OUTPUT

The auxiliary output is switch ON and OFF by means of the corresponding digital input or by pressing and releasing the down arrow key.

18. PARAMETER LIST

REGULATION - rEG

SEC **LAN mode selection Loc =** Local or **ALL = global**
Set **Temperature set point** (LS÷US)
Hy **Differential:** (0,1÷25,5°C; 1÷45°F): Intervention differential for set point, always positive. Solenoid valve Cut IN is Set Point Plus Differential (Hy). Solenoid valve Cut OUT is when the temperature reaches the set point. It's used with CrE = n
HYP **Proportional band for room temperature regulation:** (0,1÷25,5°C; 1÷45°F) it's used with CrE = Yes
Int **Integral time for room temperature regulation:** (0 ÷ 255 s) integral time for room temperature PI regulator. 0= no integral action;
CrE **Regulation mode:** (n, Y, EUP EU5)
n= standard thermostatic regulation, cooling cut is at SET+ Hy, cooling cut out at SET;
Y= continuous regulation. Use it only in centralized plants;
EUP: the EEV is activated with a PI algorithm, according to parameters HYP and Int, with the target to maintain room set point temperature, SH it's not taken in account. Useful when a secondary fluid is used as refrigerant, to modulate the flow;
EU5 the EEV is activated with a PI algorithm, according to parameters HYP and Int, target is to maintain saturation temperature, detected by pressure probe and converted, at the set point value. SH it's not taken in account. Useful when the EEV is used as back pressure valve
LS **Minimum set point limit:** (-100°C÷SET; -212°F÷SET) Sets the minimum acceptable value for the set point.
US **Maximum set point limit:** (SET÷150°C; SET÷302°F) Set the maximum acceptable value for set point.
OdS **Outputs activation delay at start up:** (0÷255 min) This function is enabled at the initial start up of the instrument and inhibits any output activation for the period of time set in the parameter. (AUX and Light can work)
AC **Anti-short cycle delay:** (0÷60 min) interval between the solenoid valve stop and the following restart.
CCt **Compressor ON time during continuous cycle:** (0.0÷24.0h; resolution 10min) Allows to set the length of the continuous cycle: compressor stays on without interruption for the CCt time. Can be used, for instance, when the room is filled with new products.
CCS **Set point for continuous cycle:** (-100÷150°C / -212÷302°F) it sets the set point used during the continuous cycle.
Con **solenoid valve ON time with faulty probe:** (0÷255 min) time during which the solenoid valve is active in case of faulty thermostat probe. With COn=0 solenoid valve is always OFF.
CoF **solenoid valve OFF time with faulty probe:** (0÷255 min) time during which the solenoid valve is off in case of faulty thermostat probe. With COF=0 solenoid valve is always active.

DISPLAY - rEG

PrU **Pressure mode:** (rE or Ab) it defines the mode to use the pressure. !!! **WARNING** !!! the setting of PrU is used for all the pressure parameters. If PrU=rE all pressure parameters are in relative pressure unit, if PrU=AbS all pressure parameters are in absolute pressure unit.
PMU **Pressure measurement unit:** (bAr – PSI) it selects the pressure measurement units.
PMd **Way of displaying pressure :** (tEM - PrE) it permits showing the value measured by pressure probe with **tEM=** temperature or by **PrE=** pressure;
rES **Resolution**: (in = 1°C/1°F; dE = 0.1 °C/01°F) allows decimal point display;
Lod **Instrument display**: (nP; P1; P2, P3, P4, P5, P6, tEr, dEF) it selects which probe is displayed by the instrument. **P1, P2, P3, P4**, **P5**, **P6**, **tEr=** virtual probe for thermostat, **dEF=** virtual probe for defrost.
rEd **Remote display**: (nP; P1; P2, P3, P4, P5, P6, tEr, dEF) it selects which probe is displayed by the X-REP. **P1, P2, P3, P4**, **P5**, **P6**, **tEr=** virtual probe for thermostat, **dEF=** virtual probe for defrost.
dLy **Display delay:** (0 ÷24.0 m; resolution 10s) when the temperature increases, the display is updated of 1 °C/1°F after this time.
rPA **Regulation probe A:** (nP; P1; P2, P3, P4, P6) first probe used to regulate room temperature. If rPA=nP the regulation is performed with real value of rPb.
rPb **Regulation probe B:** (nP; P1; P2, P3, P4, P5) second probe used to regulate room temperature. If rPb=nP the regulation is performed with real value of rPA
rP3 **Regulation probe 3:** (nP; P1; P2, P3, P4, P6) third probe used to regulate room temperature, with rPd = Aur or Min or MA or FrS
rPd **Temperature Regulation Strategy:** (rPA, rAb, Aur, LoE, HiE)
rPA: probe set in the parameter rPA
rAb: virtual probe: mix of temperatures of rPA and rPb according to par. rPE
Aur: average of all valid probes defined as Regulation Probe
LoE: minimum value of all valid probes defined as Regulation Probe
HiE: maximum of all valid probes defined as Regulation Probe
rPE **Regulation virtual probe percentage:** (0÷100%) it defines the percentage of the rPA respect to rPb. The value used to regulate room temperature is obtained by:
value_for_room = (rPA*rPE + rPb*(100-rPE))/100

MAP **Map used during standard operation (C-1, C-2. C-3, C-4, C-5, C-6**)

MP1 **Alternate Map enabled by digital input or Modbus command** (**C-1, C-2. C-3, C-4, C-5, C-6**) It sets the alternate application enabled by digital input or Modbus command among the six possible maps
LdM **Re-charge the default map (no, yES):** it allows to restore the values of the map set in MAP on the operative map.
UdM **Update the default map (no, yES):** it allows to overwrite the values of operative map on the default map set in the MAP parameter.
LCL **Light on during cleaning mode** (n, y)
FCL **Fan on during cleaning mode** (n, y)

ELECTRONIC EXPANSION VALVE SUBMENU – EEU – ***ONLY FOR XM756D AND XM759D***

FtY **Kind of gas:**

LABEL	REFRIGERANT	OPERATING RANGE
r22	r22	-50-60°C/-58÷120°F
134	r134A	-50-60°C/-58÷120°F

290	r290 – Propane	-50-60°C/-58÷120°F
404	r404A	-70-60°C/-94÷120°F
47A	r407A	-50-60°C/-58÷120°F
47C	r407C	-50-60°C/-58÷120°F
47F	r407F	-50-60°C/-58÷120°F
410	r410A	-50-60°C/-58÷120°F
448	r448A	-45-60°C/-69÷120°F
449	r449A	-45-60°C/-69÷120°F
450	r450A	-45-60°C/-69÷120°F
452	R452A	-50-60°C/-58÷120°F
507	r507	-70-60°C/-94÷120°F
513	r513A	-45-60°C/-69÷120°F
CO2	r744 - Co2	-50-60°C/-58÷120°F
15b	r515b	-50-60°C/-58÷120°F
54A	r454A	-50-60°C/-58÷120°F
54b	r454B	-50-60°C/-58÷120°F
54C	r454C	-50-60°C/-58÷120°F
55A	r455A	-40-60°C / -40-120°F
4yF	r1234yf	-50-60°C/-58÷120°F
4EE	r1234yf	-50-60°C/-58÷120°F

Atu **Adaptive SH regulation enabling** (No; yES) This parameter enables the self adaptive regulation of the superheat.
SSH **Superheat set point:** [0.1°C ÷ 25.5°C] [1°F ÷ 45°F] it's the value used to regulate superheat
SHy **Differential for low superheat function:** this value is used by X-WEB with XeCO2 function. When the monitoring system enable the low superheat SHy is subtracted to the SSH set point (-12.0÷12.0°C)
Pb **Proportional band:** (0.1 ÷ 60.0K / 1÷108°F) PI proportional band for SH regulation with Atu= no. (Suggested value 8÷20K or 15-40F)
PbH **Dead band for superheat regulation:** it's a band across the SH set point, inside this band the valve opening percentage is not updated. (Suggested value 0.2÷1.0K or 0.3-2.0F)
rS **Band Offset:** (-12.0 ÷ 12.0°C / -21÷21°F) PI band offset;
inC **Integration time:** (0 ÷ 255s) PI integration time; for SH regulation with Atu= no. (Suggested value 80÷150s)
dFC **Derivative time:** (0 ÷ 255s) PID derivative time for SH regulation with Atu= no. (Suggested value 0÷5s)
PEO **Probe Error opening percentage:** (0÷100%) if a probe error occurs, valve opening percentage is **PEo**;
OHg **Opening Percentage during hot gas defrost:** (0÷100%) Opening valve percentage when hot gas defrost is active.
LnF **Minimum opening percentage at normal Functioning:** (0÷100%) during regulation it sets the minimum valve opening percentage; (0÷MnF%)
MnF **Maximum opening percentage at normal Functioning:** (LnF÷100) during regulation it sets the maximum valve opening percentage;
MrE **Valve manual positioning: n** = the valve follows automatic regulation, **y =** the opening percentage of the valve can be manually set via parameter **Fot.**
Fot **Forced opening percentage:** (0÷100%) With **MrE = y,** it permits to force the valve opening to a specified value.
WARNING !!!! to obtain the correct superheat regulation you have to set **MrE=n**;
MOP **Maximum evaporating temperature threshold:** (LOP÷60°C/LOP÷140°F) if evaporating temperature exceeds maximum evaporating temperature value, instrument signals situation with MOP alarm.
dMP **Delay for Maximum Operating Pressure threshold alarm signalling:** (0 ÷ 255s) when a MOP alarm occurs it's signalled after dMP time
LOP **Minimum evaporating temperature threshold:** (-100°C÷MOP; -148°÷MOP) if the evaporating temperature comes down to this value a low pressure alarm is signalled with LOP alarm.
dLP **Delay for Minimum Operating Pressure threshold alarm signalling:** (0 ÷ 255s) when a LOP alarm occurs it's signalled after dMP time
LPL **Lower Pressure Limit for superheat regulation:** (PA4 ÷ P20 bar / psi) when suction pressure comes down to LPL the regulation is performed with a LPL fixed value for pressure, when pressure comes back to LPL the normal pressure value is used.
AAS **Low superheat alarm with "XeCO2 function active: n =** no superheat alarm, **Y=** Low superheat alarm is still signalled
HSH **High Superheat alarm:** (LSH ÷ 80.0°C / LSH ÷ 144°F) when superheat exceeds this value an high superheat alarm is signalled after interval **SHd**
LSH **Low Superheat alarm:** (0.0 ÷ HSH °C / 0÷HSH °F) when superheat goes down to this value a low superheat alarm is signalled after interval **SHd**
dHS **High superheat alarm activation delay:** (0.0 ÷ 42.0 min: resolution 10s) when a high superheat alarm occurs, the time dHS has to pass before alarm signalling;
dLS **Low superheat alarm activation delay:** (0.0 ÷ 42.0 min: resolution 10s) when a low superheat alarm occurs, the time SHd has to pass before alarm signalling;
FrC **Fast-recovery Constant:** (0÷100 s) permits to decrease integral time when SH is below the set-point. If **FrC=0** fast recovery function is disabled.
AnP **Pressure filter** (0÷100) It uses the last average values of the pressure to calculate the superheat.
E.I. with **AnP = 5** controller uses the average pressure in the last 5sec to calculate the SH.
NOTE: avoid values higher than 10
Ant **Temperature filter** (0÷100) It uses the last average values of the temperature to calculate the superheat.
E.I. with **Ant = 5** controller uses the average temperature in the last 5sec to calculate the SH.
NOTE: avoid values higher than 10
SLb **Reaction time** (0÷255s): time to update the valve opening percentage.
EI. With SLb = 24: the valve open percentage is updated every 24s. (Suggested values 5÷20s; 5s for installation with more than 30 cabinets, 15s with few cabinets)
CyP **Cycle Period:** (1 ÷ 15s) it permits to set cycle time; - *XM759D only*
HFS: **Valve operating mode – *XM756D only***: (FUL: Full step – HLF: Half step): it defines the type of movement: half step or full step. Using the half step the number of steps is duplicated.
LSt: **Number of integer steps at which valve starts opening – *XM756D only*:** it is the zero point of the valve at which the regulation start operating.
NOTE with HFS = FUL the step valve value has to be divided by 10 before setting LSt.
With HFS = HLF the step valve value has to be divided by 20 before setting LSt
Ust: **Maximum number of integer steps – *XM756D only***: it's the number of steps of the valve.
NOTE with HFS = FUL the step valve value has to be divided by 10 before setting USt.
With HFS = HLF the step valve value has to be divided by 20 before setting USt
Est: **Number of integer extra-steps of valve – *XM756D only***. It's used to close completely the valve.
NOTE with HFS = FUL this value is applied as it is.
With HFS = HLF this value is multiplied by 2 before being applied.
SR: **Step rate (Full step) – *XM756D only*:** it step rate (full step/s) of the valve.
NOTE with HFS = FUL this value is applied as it is.
With HFS = HLF this value has to be divided by 2 before setting SR parameter.
GtC **Minimum Interval to enable calibration cycles with extra steps ESt – *XM756D only*:** [0 ÷ GtH hour)] Indicates the number of hours after which the valve calibration is enabled (with extra steps ESt) when the regulation closes the valve at 0%.
GtH **Interval between automatic valve calibration cycles – *XM756D only*:** [GtC ÷ 255 (ore)]
Sti **Regulation pause interval : (0.0÷24.0 hours: tens of minutes)** after regulating continuously for **Sti** time, the regulation is paused for **Std** time in order to prevent ice creation. It's used in Medium temperature applications (Suggested values 1.0÷2.0h)
Std **Stop duration :** (0÷60 min.) it defines stop regulation time after **Sti.** (Suggested values 5÷15min)

DEFROST - dEF

dPA **defrost Probe A:** (nP; P1; P2, P3, P4, P6) first probe used for defrost. If rPA=nP the regulation is performed with real value of dPb.
dPb **defrost Probe B:** (nP; P1; P2, P3, P4, P6) second probe used for defrost.
tdF **Defrost type**: (Air, EL, rt; in)
Air = Air defrost (defrost relay is not switched on during defrost)**. For Medium Temperature Applications**
EL = defrost with electrical heaterd; **For Low or Medium Temperature Applications**
rt = defrost with pulsed electrical heaters. **For Low or Medium Temperature Applications – suggested for cold rooms and walk-ins**
in = hot gas defrost; **For Low or Medium Temperature Applications**
EdF **Defrost mode**: (rtc – in- Aut)
rtc= defrost activation via RTC parameters, see RTC paragraph; **(only if RTC is present)**
in= defrost is made every **idF** interval

AUt = on demand defrost. this algorithm has been developed for plug in application
Sd ="Smart Defrost": suggested for medium temperature applications. Baseline for defrost interval is the parameter **idF,** the defrost max duration in set in the parameter **MdF**, and the end defrost temperature **dtE** (**dtS** for defrost with 2 evaporator probe**).** The **IdF** timer is updated only if compressor/solenoid valve is on and the evaporator temperature is below the parameter **SdF** that is the temperature threshold below which the interval is counted

SdF **Set point for SMARTFROST: (-30*30 °C/ -22*86 °F)** evaporator temperature which allows the IdF counting (interval between defrosts) in SMARTFROST mode.
Srt **Heater set point during defrost:** (-55.0 ÷ 150.0°C; -67 ÷ 302°F) if **tdF=EL** during the defrost the defrost relay perform an ON/OFF regulation with **Srt** as set point.
Hyr **Differential for heater**: (0.1°C ÷ 25.5°C , 1°F ÷ 45°F) the differential for heater;
tod **Time out for heater:** 0 ÷ 255 (min.) if the defrost probe temperature is bigger than **Srt** for all **tod** time the defrost ends altough the defrost probe temperature is lower than dtE or dtS. It permits to reduce defrost duration;
d2P **Defrost with two probes:** (n – Y) **n=** only the dPA probe is used to defrost management; **Y=** defrost is managed with **dPA** probe and **dPb** probe. Defrost can performed only if both probe value are lower than dtE for dPA probe and dtS for dPb probe;
dtE **Defrost termination temperature (Probe A):** (-55,0÷50,0°C; -67÷122°F) (Enabled only when the evaporator probe is present) sets the temperature measured by the evaporator probe **dPA** which causes the end of defrost;
dtS **Defrost termination temperature (Probe B):** (-55,0÷50,0°C; -67÷122°F) (Enabled only when the evaporator probe is present) sets the temperature measured by the evaporator probe **dPb** which causes the end of defrost;
IdF **Interval between defrosts:** (0÷120h) Determines the time interval between the beginning of two defrost cycles;
idE **Time to next defrost log into not volatile memory**
no: time to next defrost is not logged into no volatile memory, this means controller will use the idF interval after a power off. **E.I.** idF = 8: controller performs a defrost every 8h. If controller is switched off, independently from when last defrost happened, at power on it will do the first defrost after 8 hours.
yES: time to next defrost is logged into no volatile memory, this means controller will use it after a power off. **E.I.** idF = 8: controller performs a defrost every 8h. If controller is switched off 6 hours after last defrost, at power on it will do the first defrost after 2 hours (6+2 = 8). It is useful in places subjected to frequent power outages.
ndt **Minimum duration of defrost:** (0÷MdF min) it sets the minimum defrost duration, independently form the temperature reached by the end defrost probes;
MdF **Maximum duration of defrost:** (ndt÷255 min) When **dPA** and **dPb** aren't present, it sets the defrost duration, otherwise it sets the maximum duration for defrost;
dSd **Start defrost delay**: (0 ÷ 255 min) This is useful when different defrost start times are necessary to avoid overloading the plant.
dFd **Display during defrost: rt** = real temperature; **it** = temperature reading at the defrost start; **Set** = set point; **dEF** = "dEF" label;
dAd **Defrost display time out:** (0÷255 min) Sets the maximum time between the end of defrost and the restarting of the real room temperature display.
Fdt **Drain down time:** (0÷255 min.) time interval between reaching defrost termination temperature and the restoring of the control's normal operation. This time allows the evaporator to eliminate water drops that might have formed due to defrost.
Hon **Heating elements on after dripping phase:** (0.0 to 24h00min, res. 10 min) the heating elements stay on for this time after finishing the dripping phase.
dPo **First defrost after start-up: y** = Immediately; **n** = after the IdF time
dAF **Defrost delay after continuous cycle:** (0÷23.5h) time interval between the end of the fast freezing cycle and the following defrost related to it.

Pdt **Pump down type (nu, FAn, F-C)**
nu: pump down disabled
FAn : pump down enabled. Fan is activated for pump down duration, compressor relay/solenoid valve is switched off with CrE=n/Y o or activated with CrE=EUP or EU5.
F-C: pump down enabled. Fan and compressor relay are activated for pump down duration. See above for solenoid valve behaviour.
Pdn **Pump down duration** (0÷255min)
od2 **Defrost Optimization: (n;Y)** n = function disabled; Y = function enabled. The controller needs a temperature probe placed on the evaporator (dPA different from nu), to monitor the presence of ice during any defrost phase. It's suggested to place the probe immediately after the injection point or where ice tends to form. The defrost termination is established by the controller according to the behavior of the evaporator temperature. However defrost will be ended in any case when the evaporator reaches dtE (dtS for second defrost probe) value.
The optimized defrost is suggested for low temperature applications with defrost heaters.

FAN – FAn Group

FAP **Fan probe A:** (nP; P1; P2, P3, P4, P5) first probe used for fan. If FPA=nP the regulation is performed with real value of FPB;
FnC **Fan operating mode: C-n** = running with the solenoid valve, OFF during the defrost; **C-y** = running with the solenoid valve, ON during the defrost; **O-n** = continuous mode, OFF during the defrost; **O-y** = continuous mode, ON during the defrost;
Fnd **Fan delay after defrost:** (0÷255 min) The time interval between the defrost end and evaporator fans start.
FCt **Temperature differential avoiding short cycles of fans (**0.0°C ÷ 50.0°C; 0°F ÷ 90°F) If the difference of temperature between the evaporator and the room probes is more than the value of the Fct parameter, the fans are switched on;
FSt **Fan stop temperature:** (-50÷110°C; -58÷230°F) setting of temperature, detected by evaporator probe, above which the fan is always OFF.
FHy **Differential to restart fan:** (0.1°C ÷ 25.5°C) (1°F ÷ 45°F) when stopped, fan restarts when fan probe reaches FSt-FHy temperature;
Fo2 **Evaporator fan offset in energy saving**: (-12.0 to 12.0°C; -21 to 21°F) offset used by evaporator fan regulator during energy saving mode.
tFE **Fan regulation by temperature during defrost** (n, y)
Fon **Fan ON time:** (0÷15 min) **with** Fnc = C_n or C_y, (fan activated in parallel with compressor). it sets the evaporator fan ON cycling time when the compressor is off. With Fon =0 and FoF ≠ 0 the fan are always off, with Fon=0 and FoF =0 the fan are always off.
FoF **Fan OFF time:** (0÷15 min) **with** Fnc = C_n or C_y, (fan activated in parallel with compressor). it sets the evaporator fan off cycling time when the compressor is off. With Fon =0 and FoF ≠ 0 the fan are always off, with Fon=0 and FoF =0 the fan are always off.

Fo1 **Evaporator fan ON time in energy saving mode (with compressor OFF)** (0 to 255 min) used when energy saving status is active.
FF1 **Evaporator fan OFF time in energy saving mode (with compressor OFF):** (0 to 255 min) used when energy saving status is active.
Fd2 **Evaporator fan delay after closing door: (0 to 255 sec)** delay before activating evaporator fan and after closing the door

MODULATING OUTPUT - *OPTIONAL*

CM1 **Modulating output 1 configuration (term.42-44): (tEn, cur, PUM) tEn:** 0-10V analog output; **cur:** 4-20mA analog output; **PUM:** PWM modulating output.
trA **Kind of regulation for modulating output1:** (UAL – rEG – AC - oA8) it selects the functioning for the PWM output.
UAL= the output is at SOA value;
rEG= the output is regulated with fan algorithm described in fan section;
AC= anti-sweat heaters control. See chapter 15.2 Anti sweat heaters with a relay, an analog output and the regulation probe
oA8 = it has to be used with CM1 = tEn. The output is at 0 or 10V and can be used to manage externa relay. The function of the relay can be set by the oA8 parameter.
SOA **Fixed value for analog output:** (0 ÷ 100%) value for the output if **trA=UAL**; Used to manage speed of EC fan.
SdP **Default value for Dew point**: (-55,0÷50,0°C; -67÷122°F) default value of dew point used when there is no supervising system (XWEB5000). Used only when **trA=AC**;
ASr **Dew-point offset (trA=AC) / Differential for modulating fan regulation (trA=rEG)**: (-25.5°C ÷ 25.5°C) (-45°F ÷ 45°F);
PbA **Proprortional band for analog output 1:** (0.1°C ÷ 25.5°C) (1°F ÷ 45°F)
With trA = rEg: PbA definee the proportional band for fan speed
With trA = AC: PbA defines the regulation band for anti-sweat heaters management
AMi **Minimum value for analog output:** (0÷AMA)
AMA **Maximum value for analog output:** (Ami ÷ 100)
AMt **Anti-sweat heaters cycle period (trA=AC)/ Time with fan at maximum speed (trA=rEG):** (0÷255 s) when the fan starts, during this time the fan is at maximum speed;
CM2 **Modulating output 2 configuration (term.41-42) : (tEn, PUM) tEn:** 0-10V analog output; **PUM:** PWM modulating output.
tr2 **Kind of regulation for modulating output2:** (UAL – rEG – AC - oA8) it selects the functioning for the PWM output.
Kind of regulation for modulating output1: (UAL – rEG – AC oA8) it selects the functioning for the PWM output.
UAL= the output is at SOA value;
rEG= the output is regulated with fan algorithm described in fan section;
AC= anti-sweat heaters control. See chapter 15.2 Anti sweat heaters with a relay, an analog output and the regulation probe
oA8 = it has to be used with CM2 = tEn. The output is at 0 or 10V and can be used to manage externa relay. The function of the relay can be set by the oA8 parameter.
SO2 **Fixed speed for fan:** (0 ÷ 100%) value for the output if **tr2=UAL**; Used to manage speed of EC fan.
SP2 **Default value for Dew point – Analog output 2**: (-55,0÷50,0°C; -67÷122°F) default value of dew point used when there is no supervising system (XWEB). Used only when **tr2=AC**;

AS2 **Dew-point offset (tr2=AC) / Differential for modulating fan regulation (tr2=rEG)**: (-25.5°C ÷ 25.5°C) (-45°F ÷ 45°F);
Pb2 **Proportional band for modulating output 2** (0.1°C ÷ 25.5°C) (1°F ÷ 45°F)
With tr2 = rEg: Pb2 definee the proportional band for fan speed
With tr2 = AC: Pb2 defines the regulation band for anti-sweat heaters management
2oL **Minimum value for analogue output 2** (0÷2oH)
2oH **Maximum value for analogue output 2** (2oL÷100)
2At **Anti-sweat heaters cycle period (tr2=AC)/ Time with fan at maximum speed (tr2=rEG):** (0÷255 s) when the fan starts, during this time the fan is at maximum speed;

ALARMS - ALr

rAL **Probe for temperature alarm:** (nP - P1 - P2 - P3 - P4 - P5 – tEr) it selects the probe used to signal alarm temperature
ALC **Temperature alarm configuration: rE** = High and Low alarms related to Set Point; **Ab** = High and low alarms related to the absolute temperature.
ALU **High temperature alarm setting:** (ALC= rE, 0 **÷** 50°C or 90°F / ALC= Ab, ALL ÷ 150°C or 302°F) when this temperature is reached and after the **ALd** delay time the **HA** alarm is enabled.
ALL **Low temperature alarm setting:** (ALC = rE , 0 **÷** 50 °C or 90°F / ALC = Ab , - 55°C or - 67°F **÷** ALU) when this temperature is reached and after the **ALd** delay time, the **LA** alarm is enabled.
AHy **Differential for temperature alarm**: (0.1°C ÷ 25.5°C / 1°F ÷ 45°F) Intervention differential for recovery of temperature alarm;
ALd **Temperature alarm delay:** (0÷255 min) time interval between the detection of an alarm condition and the corresponding alarm signalling.
rA2 **Probe for second temperature alarm:** (nP - P1 - P2 - P3 - P4 - P5 – tEr) it selects the probe used to signal alarm temperature
A2U **Second high temperature alarm setting:** (A2L ÷ 150°C or 302°F) when this temperature is reached and after the **A2d** delay time the **HA2** alarm is signalled.
A2L **Second Low temperature alarm setting:** (- 55°C or - 67°F **÷** A2U) when this temperature is reached and after the **A2d** delay time, the **LA2** alarm is signalled.
A2H **Differential for second temperature alarm**: (0.1°C ÷ 25.5°C / 1°F ÷ 45°F) Intervention differential for recovery of second temperature alarm;
A2d **Second temperature alarm delay:** (0÷255 min) time interval between the detection of second temperature alarm condition and the corresponding alarm signalling.
dAO **Delay of temperature alarm at start-up:** (0min÷23h 50min) time interval between the detection of the temperature alarm condition after the instrument power on and the alarm signalling.
EdA **Alarm delay at the end of defrost:** (0÷255 min) Time interval between the detection of the temperature alarm condition at the end of defrost and the alarm signalling.
dot **Temperature alarm exclusion after door open:** (0 ÷ 255 (min.)
tbA **Disabling alarm relay by pressing a key**: (n; Y)

OUTPUT CONFIGURATION - oUt

oA1 relay at term. 15-16 configuration; see values below.
oA2 relay at term. 13-14 configuration; see values below.
oA3 relay at term. 17-18 configuration; see values below.
oA4 relay at term. 1-2-3 configuration; see values below.
oA5 relay at term. 11-12 configuration; see values below.
oA8 Analog output 1 (term. 43-44) set as trA = oA8 or Analog output 2 (term. 41-42) set as tr2 = oA8; see values below.
nP = not used.
CPr= relay works as a compressor or solenoid valve relay;
CP2= relay works as second compressor
dEF= relay works as defrost relay;
Fan= relay works as a Fan relay;
ALr= activation with alarm conditions;
LiG= light activation;
AUS= auxiliary relay, it can be switched ON/OFF also by key;
OnF= ON/OFF functioning,
AC = anti sweat heaters
db = dead band regulation (**not compatible with CrE=y**);
ES = the output is activated when the Energy Saving status is on – It could be used to manage low fan speed during energy saving
HEt = rail heater
AOP **Alarm relay polarity: cL=** normally closed; **oP=** normally opened;
iAU **Auxiliary output is unrelated to ON/OFF device status: n=** if the instrument is switched off also the auxiliary output is switched off; **Y=** the auxiliary output state is unrelated to the ON/OFF device status

DIGITAL INPUTS

i1P **Digital input 1 polarity (term.31-32) :** (cL – oP) **CL**: the digital input is activated by closing the contact; **OP**: the digital input is activated by opening the contact.
i1F **Digital input 1 function(term.31-32:**
nu = not used;
EAL= external alarm;
bAL= serious external alarm;
PAL= pressure switch activation;
dor= door open;
dEF= defrost activation;
AUS= auxiliary activation;
LiG= light activation;
OnF= switch on/off the instrument;
FHU= not used;
ES= activate energy saving;
nt = second map enabling;
cLn = clean function enabling
dEn = defrost stop,
CP1 = compressor 1 safety,
CP2 = compressor 2 safety;
StC = Stop cooling,
d1d **Time interval/delay for digital input alarm:** (0÷255 min.) Time interval to calculate the number of the pressure switch activation when i1F=**PAL**. If I1F=**EAL** or **bAL** (external alarms), "**d1d**" parameter defines the time delay between the detection and the successive signalling of the alarm. If **i1F=dor** this is the delay to activate door open alarm
i2P **Digital input 2 polarity (term. 30-31):** See i1P functions
i2F **Digital input 2 function(term. 30-31):** See i1F functions
d2d **Time interval/delay for digital input alarm:** (0÷255 min.) See d1d functions.
i3P **Digital input 3 polarity (term. 25-26, only if P3C=nP):** See i1P functions
i3F **Digital input 3 function(term. 25-26, only if P3C=nP): :** See i1F functions
d3d **Time interval/delay for digital 3 input alarm:** (0÷255 min.)**:** See d1d functions.
i4P **Digital input 3 polarity (term. 24-25, only if P4C=nP):** See i1P functions
i4F **Digital input 4 function(term. 24-25, only if P4C=nP):** See i1F functions
d4d **Time interval/delay for digital input 4 alarm:** (0÷255 min.) See d1d functions.
nPS **Pressure switch number:** (0 ÷15) Number of activation of the pressure switch, during the "**d1d**" or "**d2d**" or "**d3d**" or "**d4d**" interval, before signaling the alarm event **E.I.** With i2F= PAL, if the nPS activation in the d2d time is reached, the controller is locked, switch off and on the instrument to restart normal regulation.
odc **Compressor and fan status when open door: no** = normal; **Fan** = Fan OFF; **CPr** = Compressor OFF; **F_C** = Compressor and fan OFF.
rrd **Outputs restart after door open alarm: no =** outputs not affected by the door open alarm; **yES =** outputs restart with the door open alarm;

RTC SUBMENU - ***OPTIONAL***

CbP **Clock Presence** (n÷y): it permits to disable or enable the clock;

Hur **Current hour** (0 ÷ 23 h)
Min **Current minute** (0 ÷ 59min)
dAY **Current day** (Sun ÷ SAt)
Hd1 **First weekly holiday** (Sun ÷ nu) Set the first day of the week which follows the holiday times.
Hd2 **Second weekly holiday** (Sun ÷ nu) Set the second day of the week which follows the holiday times.
Hd3 **Third weekly holiday** (Sun ÷ nu) Set the third day of the week which follows the holiday times.
ILE **Energy Saving cycle start during workdays**: (0 ÷ 23h 50 min.) During the Energy Saving cycle the set point is increased by the value in HES so that the operation set point is SET + HES.
dLE **Energy Saving cycle length during workdays**: (0 ÷ 24h 00 min.) Sets the duration of the Energy Saving cycle on workdays.
ISE **Energy Saving cycle start on holidays**. (0 ÷ 23h 50 min.)
dSE **Energy Saving cycle length on holidays** (0 ÷ 24h 00 min.)
HES **Temperature increase during the Energy Saving cycle** (-30÷30°C / -54÷54°F) sets the increasing value of the set point during the Energy Saving cycle.
Ld1÷Ld6 Workday defrost start (0 ÷ 23h 50 min.) These parameters set the beginning of the 6 programmable defrost cycles during workdays. Ex. When **Ld2** = 12.4 the second defrost starts at 12.40 during workdays.
Sd1÷Sd6 Holiday defrost start (0 ÷ 23h 50 min.) These parameters set the beginning of the 6 programmable defrost cycles on holidays. Ex. When **Sd2** = 3.4 the second defrost starts at 3.40 on holidays.
Md1÷Md6 Maximum duration of defrosts (0 ÷ 255min.) These parameters set the maximum duration of the 6 programmable defrost cycles.. Ex. With Md**2** = 30 the second defrost lasts at max 30min..
dE1÷dE6 End defrost temperatures (-100 ÷ 150°C/ -148÷302°F) These parameters set the temperature to stop the 6 programmable defrost cycles.. Ex. With dE**2** = 6.0 the second defrost ends when defrost probe reaches 6°C degrees.
dS1÷dS6 End defrost temperatures for second probe (-100 ÷ 150°C/ -148÷302°F) These parameters set the temperature detected by the second defrost probe to stop the 6 programmable defrost cycles.. Ex. With **dS2** = 6.0 the second defrost ends when second defrost probe reaches 6°C degrees.

ENERGY SAVING

HES **Temperature increase during the Energy Saving cycle :** (-30÷30°C / -54÷54°F) sets the increasing value of the set point during the Energy Saving cycle.
PEL **Energy saving activation when light is switched off:** (n÷Y) n= function disabled; Y= energy saving is activated when the light is switched off and vice versa;

LAN MANAGEMENT

LMd **Defrost synchronization: y**= the section sends a command to start defrost to the other controllers, **n=** the section don't send a global defrost command
dEM **Type of defrost end: n=** the end of defrost is independent for the controller connected to the LAN; **y=** the end of the defrost is synchronized for the controller connected to the LAN;
LSP **L.A.N. set-point synchronization**: **y**= the set-point, when modified, is updated to the same value for all the other controller connected to the LAN; **n**= the set-point value is modified only in the local controller
LdS **L.A.N. display synchronization**: **y**= the value displayed by the section is sent to all the other controllers; **n**= the display value is not shared through the LAN
LOF **L.A.N. On/Off synchronization** this parameter states if the On/Off command will be shared through the LAN: **y**= the On/Off command is sent to all the other sections; **n**= the On/Off command acts only on the local section
LLi **L.A.N. light synchronization** this parameter states if the light command of the section will act on all the other ones too: **y**= the light command is sent to all the other sections; **n**= the light command acts only in the local section
LAU **L.A.N. AUX output synchronization** this parameter states if the AUX command of the section will act on all the other ones too: **y**= the AUX command is sent to all the other sections; **n**= the AUX command acts only in the local section
LES **L.A.N. energy saving synchronization** this parameter states if the energy saving command of the section will act on all the other ones too: **y**= the Energy Saving command is sent to all the other sections; **n**= the Energy Saving command acts only in the local section
LSd **Remote probe display:** this parameter states if the section has to display the local probe value or the value coming from another section: **y**= the displayed value is the one coming from another section (which has parameter LdS = y); **n**= the displayed value is the local probe one.
LPP **Remote pressure probe: n=** the value of pressure probe is read from local probe; **Y=** the value of pressure probe is sent via LAN;
LCP **P4 probe sent via LAN** (n, y)
StM **Cooling request shared via LAN: n=** not used; **Y=** a generic cooling request coming from LAN activates the solenoid valve, fan and SH control;
ACE **Cold request shared via LAN even if the compressor is blocked:** (n, y)

PROBE CONFIGURATION

P1C **Probe 1 configuration:** (nP – Ptc – ntc – CPC – PtM) **nP=** not present; **PtC=** Ptc; **ntc=** NTC; **CPC** = NTC_US **PtM=** Pt1000;
OF1 **Probe 1 calibration:** (-12.0**÷**12.0°C/ -21**÷**21°F) allows to adjust possible offset of the thermostat probe.
P2C **Probe 2 configuration:** (nP – Ptc – ntc – CPC – PtM) **nP=** not present; **PtC=** Ptc; **ntc=** NTC; **CPC** = NTC_US **PtM=** Pt1000;
OF2 **Probe 2 calibration:** (-12.0**÷**12.0°C/ -21**÷**21°F) allows to adjust possible offsets of the evaporator probe.
P3C **Probe 3 configuration:** (nP – Ptc – ntc – CPC – PtM) **nP=** not present; **PtC=** Ptc; **ntc=** NTC; **CPC** = NTC_US **PtM=** Pt1000;
OF3 **Probe 3 calibration:** (-12.0**÷**12.0°C/ -21**÷**21°F) allows to adjust possible offset of the probe 3.
P4C **Probe 4 configuration:** (nP – Ptc – ntc – CPC – PtM) **nP=** not present; **PtC=** Ptc; **ntc=** NTC; **CPC** = NTC_US **PtM=** Pt1000;
OF4 **Probe 4 calibration:** (-12.0**÷**12.0°C/ -21**÷**21°F) allows to adjust possible offset of the probe 4.
P5C **Probe 5 configuration – *XM756D, XM759D only* :** (nP – Ptc – ntc – CPC - PtM – LAn - 420 – 5Vr) **nP=** not present; **PtC=** Ptc; **ntc=** NTC; **CPC** = NTC_US; **LAN=**prove read by LAN **PtM=** Pt1000; **420=** 4÷ 20mA; **5Vr=** 0÷5V ratiometric;
OF5 **Probe 5 calibration– *XM756D, XM759D only*:** (-12.0**÷**12.0°C/ -21**÷**21°F) allows to adjust possible offset of the probe 5.
P6C **Probe 6 configuration– *XM756D, XM759D only*:** (nP – Ptc – ntc – CPC – PtM) **nP=** not present; **PtC=** Ptc; **ntc=** NTC; **CPC** = NTC_US **PtM=** Pt1000;
OF6 **Probe 6 calibration– *XM756D, XM759D only*:** (-12.0**÷**12.0°C/ -21**÷**21°F) allows to adjust possible offset of the probe 6.
PA4 **Probe value at 4mA or At 0V– *XM756D, XM759D only*:** (-1.0 ÷ P20 bar / -14 ÷ PSI) pressure value measured by probe at 4mA or at 0V **Referred to Pb5**
P20 **Probe value 20mA or At 5V– *XM756D, XM759D only*:** (PA4 ÷ 68.9 bar / 999 psi) pressure value measured by probe at 20mA or at 5V **Referred to Pb5**

COMMUNICATION – COM

Adr **RS485 serial address** (1÷247)**:** Identifies the instrument address when connected to a ModBUS compatible monitoring system.
bAu **It sets the baud rate among: (9.6** = 9.6 bit/s; **19.2** = 19.2 bit/s; **38.4** = 38.4 bit/s; **57.6** = 57.6 bit/s; **115** = 115 bit/s;)
PAr **Parity control** (no; odd; EvE) **no=**no parity control**; odd=**odd parity control**; EvE=**even parity control
FM **Parameter read only (Std =** standard: parameters can be modified; **ro** = read only mode; parameters can be read but not modified by Wiamate or monitoring system).
NOTE: if FM is set as "ro" the parameters can not be modified any longer. To modify the parameters first set FM = Std by keyaboard and then modify them by Wizmate or Monitoring system.

USER INTERFACE – UI

b1F **Light Button enabled in stand-by** (no, yes)
PSU **Password setting for level Pr2** (0÷999) it allows to set the PSW to access Pr2 menu. NOTE the PSW, once set, can be modified only by this parameter. It's important to save it in a proper way.

INFORMATION – INF

EMU **Previous versions emulation (**2V8 , 3V8 , 4V2, 5V4) It allows the controller to be used in a LAN of controllers with previous versions:
2V8 = it emulates version 2.8
3V8 = it emulates version 3.8
4V2 = it emulates version 4.2
5V4 = it emulates version 5.4
rEL **Release software:** (read only) Software version of the microprocessor.
SrL **Software subrelease:** (read only) for internal use
FdY **Firmware release date: day** - Read Only - Official release date
FMn **Firmware release date: month** - Read Only - Official release date
FYr **Firmware release date: year** - Read Only - Official release date

Ptb **Parameter table:** (read only) it shows the original code of the Copeland Controls parameter map.
Pr2 **Access to the protected parameter list** (read only).

19. DIGITAL INPUTS

The XM700 series can support up to 4 free of voltage contact configurable digital inputs (depending on the models). They are configurable via i#F parameter

19.1 DIGITAL INPUTS POLARITY

The digital inputs polarity depends on "**i1P**", "**i2P**", "**i3P**", "**i4P**", parameters: **CL** : the digital input is activated by closing the contact; **OP** : the digital input is activated by opening the contact.

19.2 GENERIC ALARM (EAL)

As soon as the digital input 1, 2, 3 or 4 is activated the unit will wait for "**d1d**" or "**d2d**" or "**d3d**" or "**d4d**" time delay before signalling the "**EAL**" alarm message. The outputs status don't change. The alarm stops just after the digital input is de-activated.

19.3 SERIOUS ALARM MODE (BAL)

When the digital input is activated, the unit will wait for "**d1d**" or "**d2d**" or "**d3d**" or "**d4d**" delay before signalling the "**BAL**" alarm message. The relay outputs are switched OFF. The alarm will stop as soon as the digital input is de-activated.

19.4 PRESSURE SWITCH (PAL)

If during the interval time set by "**d1d**" or "**d2d**" or "**d3d**" or "**d4d**" parameter, the pressure switch has reached the number of activation of the "**nPS**" parameter, the "**CA**" pressure alarm message will be displayed. The compressor and the regulation are stopped. When the digital input is ON the compressor is always OFF. **If the nPS activation in the d1d… d4d time is reached, switch off and on the instrument to restart normal regulation.**

19.5 DOOR SWITCH INPUT (dor)

It signals the door status and the corresponding relay output status through the "**odc**" parameter: **no** = normal (any change); **Fan** = Fan OFF; **CPr** = Compressor OFF; **F_C** = Compressor and fan OFF. Since the door is opened, after the delay time set through parameter **d1d… d4d**, the door alarm is enabled, the display shows the message "**dA**" and **the regulation restarts after rrd time.** The alarm stops as soon as the external digital input is disabled again. With the door open, the high and low temperature alarms are disabled.

19.6 START DEFROST (DEF)

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

19.7 RELAY AUX ACTUATION (AUS)

This function allows to turn ON and OFF the auxiliary relay by using the digital input as external switch.

19.8 RELAY LIGHT ACTUATION (LIG)

This function allows to turn ON and OFF the light relay by using the digital input as external switch.

19.9 REMOTE ON/OFF (ONF)

This function allows to switch ON and OFF the instrument.

19.10 ENERGY SAVING INPUT (ES)

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

19.11 MAP SWITCHING (NT)

In this configuration, the digital input activates the map selected by the MP1 parameter.
The "MAP CHANGE" ModBus command has higher priority compared to the digital input.

19.12 CLEANING FUNCTION ACTIVATION (CLN)

In this configuration, the digital input activates the CLEANING function. It can be activated only if the device is ON.
This function has the following characteristics:

- the display visualizes the "CLn" label
- The light status depends on the LCL parameter (no/yes), however the light can be modified both via button and ModBus command.
- The fans status depends on the FCL parameter (no/yes), furthermore they are not thermo-regulated (par.FST).

The "CLEANING MODE" ModBus command has higher priority compared to the digital input.

19.13 DEFROST END (dEn)

The digital input ends the defrost cycle in progress. The drip time will follow the defrost end. A further defrost request with the digital input active won't be managed.

19.14 COMPRESSOR 1 ALARM (CP1)

The digital input signals a safety issue for compressor 1. The compressor 1 is stopped while the "CP1" message is flashing on the display alternated with main visualization. The alarm recovers when the digital input is disabled.

19.15 COMPRESSOR 2 ALARM (CP2)

The digital input signals a safety issue for compressor 2. The compressor 2 is stopped while the "CP12 message is flashing on the display alternated with main visualization. The alarm recovers when the digital input is disabled.

19.16 STOP COOLING (STC)

This function is useful when the controller manages 1 evaporator connected to a condensing unit. When the compressor of the condensing unit it's not available, also the refrigerant injection is stopped.

20. USE OF THE PROGRAMMING "HOT KEY"

The XM units can UPLOAD or DOWNLOAD the parameter list from its own E2 internal memory to the **"Hot Key"** and vice-versa through a TTL connector.
A 64 Hot Key has to be used (P.N. DK00000300)

20.1 DOWNLOAD (FROM THE "HOT KEY" TO THE INSTRUMENT)

1. Turn OFF the instrument by means of the ON/OFF key ,insert the **"Hot Key"** and then turn the unit ON.
2. Automatically the parameter list of the **"Hot Key"** is downloaded into the controller memory, the "**doL**" message is blinking. After 10 seconds the instrument will restart working with the new parameters. At the end of the data transfer phase the instrument displays the following messages: "**End**" for right programming. The instrument starts regularly with the new programming. "**Err**" for failed programming. In this case turn the unit off and then on if you want to restart the download again or remove the "**Hot key**" to abort the operation.

20.2 UPLOAD (FROM THE INSTRUMENT TO THE "HOT KEY")

1. When the XM unit is ON, insert the "**Hot key**" and push swipe the main screens till **"UPL"** message is display. Touch the keyboard to start the upload.
2. The UPLOAD begins; the "**uPL**" message is blinking.
3. At the end of the data transfer phase the instrument displays the following messages:

"**End** " for right programming.
"E**rr**" for failed programming. In this case push "SET" key if you want to restart the programming again or remove the not programmed "**Hot key**".

4. Remove the **"Hot Key".**

21. DISPLAY MESSAGES

	Display	Causes	Notes
		KEYBOARD	
1	**nod**	No display: the keyboard is trying to work with another board that is not working or not present	Press for 3 sec UP arrow, enter the **SEC** menu and select **LOC** entry.
2	**Pon**	Keyboard is unlocked	
3	**PoF**	Keyboard is locked	
4	**rSt**	Alarm reset	Alarm output deactivated
5	**noP, nP nA**	Not present (configuration) Not available (evaluation)	
6	**noL**	The keyboard is not able to communicate with the XM759D	Verify the connection. Call the Service
		ALARM FROM PROBE INPUT	
6	**P1 P2 P3 P4 P5 P6 PPF CPF**	Sensor brake down, value out of range or sensor incorrectly configured **P1C**, **P2C** to **P6C**. **PPF** can be showed by slaves of pressure that don't receive the value of pressure. **CPF** is showed when the remote probe 4 is not working.	**P1**: the cooling output works with **Con** and **COF**, With defrost probe on error the defrost is performed only at interval. For **P5**, **P6** and **PPF**: the percentage of the valve opening is fixed at **PEO** value.
		TEMPERATURE ALARM	
7	**HA**	Temperature alarm from parameter ALU on probe **rAL**.	Outputs unchanged.
8	**LA**	Temperature alarm from parameter ALL on probe **rAL**.	Outputs unchanged.
9	**HA2**	Second high temperature alarm	Outputs depends on setting.
10	**LA2**	Second low temperature alarm	Outputs depends on setting.
		DIGITAL INPUT ALARM	
13	**dA**	Door open alarm from input **i1F**, **i2F** or **i3F** = after delay **d1d**, **d2d** or **d3d**.	Cooling relay and fan follow the **odc** parameter. Cooling restart as specified on **rrd** parameter.
14	**EA**	Generic alarm from digital input **i1F**, **i2F**, **i3F** = **EAL**.	
15	**CA**	Severe alarm of regulation lock from digital input **i1F**, **i2F**, **i3F** = **bAL**.	Regulation output OFF.
16	**PAL**	Pressure switch lock **i1F**, **i2F** o **i3F** = **PAL**.	All the outputs are OFF.
	CP1	Compressor 1 safety alarm	Compressor 1 off, other output unchanged
	CP2	Compressor 2 safety alarm	Compressor 2 off, other output unchanged
		ELECTRONIC VALVE ALARM	
17	**LOP**	Minimum evaporating temperature threshold for **LOP** parameter.	The valve output increases its opening of **dML** quantity every second for XM756D or every CYP for XM759D
18	**MOP**	Maximum evaporating temperature threshold for MOP parameter.	The valve output decreases its opening of **dML** quantity every second for XM756D or every CYP for XM759D.
19	**LSH**	Low superheating from **LSH** parameter and **SHd** delay.	The valve will be closed; the alarm will be showed after **SHd** delay.
20	**HSH**	High superheating from **HSH** parameter and **SHd** delay.	Only display.
		CLOCK ALARM	
21	**rtC**	Clock settings lost.	Defrost will be performed with **IdF** till restoring the settings of RTC.
22	**rtF**	Clock damaged.	Defrost will be performed with **IdF**.
		OTHERS	
23	**EE**	EEPROM serious problem.	Output OFF.
24	**Err**	Error with upload/download parameters.	Repeat the operation.
25	**End**	Parameters have been correctly transferred.	
26	**dEF**	Defrost is progress	
27	**cLn**	Cleaning function active	

21.1 ALLARM RECOVERY

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

22. DEFAULT SETTING VALUES: XM756D – XM759D

Application 1	CO2 - MT display case, 1 regulation probe, 1 defrost probe, Air defrost, continuous regulation, adaptive superheat
Application 2	CO2 - MT display case, AIR ON and AIR OFF regulation probes, 1 defrost probe, Air defrost, continuous regulation, adaptive superheat
Application 3	CO2 - MT display case, 1 regulation probe, 1 defrost probe, Heater defrost, thermostat regulation, adaptive superheat
Application 4	CO2 - LT display case, 1 regulation probe, 1 defrost probe, Heater defrost, continuous regulation, adaptive superheat
Application 5	CO2 – MT cold room, 1 regulation probe, 1 defrost probe, Heater defrost, thermostat regulation, adaptive superheat
Application 6	CO2 – LT cold room, 1 regulation probe, 1 defrost probe, Heater defrost, thermostat regulation, adaptive superheat

		Application 1		Application 2		Application 3		Application 4		Application 5		Application 6	
Parameter	**Description**	**Value**	**Level**	**Value**	**Level**	**Value**	**Level**	**Value**	**Level**	**Value**	**Level**	**Value**	**Level**
SEC	LAN mode selection : Local or Global	LOC	Pr1	LOC	Pr1	LOC	Pr1	LOC	Pr1	LOC	Pr1	LOC	Pr1
SEt	Set point	3	Pr1	3	Pr1	3	Pr1	-18	Pr1	3	Pr1	-18	Pr1
HY	Differential	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2
HYP*	Proportional band for room temperature regulation	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2
Int*	Integral time for room temperature regulation	200	Pr2	200	Pr2	200	Pr2	200	Pr2	200	Pr2	200	Pr2
CrE*	Continuous regulation activation	y	Pr2	y	Pr2	n	Pr2	y	Pr2	n	Pr2	n	Pr2
LS	Minimum set point	-10	Pr2	-10	Pr2	-10	Pr2	-30	Pr2	-10	Pr2	-30	Pr2
US	Maximum set point	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2
odS	Outputs activation delay at start up	1	Pr2	1	Pr2	1	Pr2	1	Pr2	1	Pr2	1	Pr2
AC	Anti-short cycle delay	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
CCt	Continous cycle duration	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
CCS	Continuous cycle set point	1.0	Pr2	1.0	Pr2	1.0	Pr2	-20.0	Pr2	1.0	Pr2	-20.0	Pr2
Con	Compressor ON time with faulty probe	5	Pr2	5	Pr2	5	Pr2	5	Pr2	5	Pr2	5	Pr2
CoF	Compressor OFF time with faulty probe	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2
PrU*	Pressure Mode	rE	Pr2	rE	Pr2	rE	Pr2	rE	Pr2	rE	Pr2	rE	Pr2
PMU*	Pressure measurement unit	bAr	Pr2	bAr	Pr2	bAr	Pr2	bAr	Pr2	bAr	Pr2	bAr	Pr2
PMd*	Pressure displaying mode: temperature or pressure	PrE	Pr2	PrE	Pr2	PrE	Pr2	PrE	Pr2	PrE	Pr2	PrE	Pr2
rES	Resolution: decimal, integer	dE	Pr2	dE	Pr2	dE	Pr2	dE	Pr2	dE	Pr2	dE	Pr2
Lod	Local display: default display	tEr	Pr2	tEr	Pr2	tEr	Pr2	tEr	Pr2	tEr	Pr2	tEr	Pr2
rEd	Remote display: default display	tEr	Pr2	tEr	Pr2	tEr	Pr2	tEr	Pr2	tEr	Pr2	tEr	Pr2
dLy	Display delay	00:00	Pr1	00:00	Pr1	00:00	Pr1	00:00	Pr1	00:00	Pr1	00:00	Pr1
rPA	Regulation probe A	P1	Pr2	P1	Pr2	P1	Pr2	P1	Pr2	P1	Pr2	P1	Pr2
rPb	Regulation probe B	np	Pr2	P3	Pr2	np	Pr2	np	Pr2	np	Pr2	np	Pr2
rP3	Regulation probe 3	nP	Pr2	nP	Pr2	nP	Pr2	nP	Pr2	nP	Pr2	nP	Pr2
rPd	Temperature Regulation Strategy	rPA	Pr2	rAb	Pr2	rPA	Pr2	rPA	Pr2	rPA	Pr2	rPA	Pr2
rPE	Virtual probe percentage (rPd=rAb)	50	Pr2	50	Pr1	50	Pr2	50	Pr2	50	Pr2	50	Pr2
MAP	Map selection	C-1	Pr2	C-1	Pr2	C-1	Pr2	C-1	Pr2	C-1	Pr2	C-1	Pr2
MP1	Map selection loaded by digital input	C-1	Pr2	C-1	Pr2	C-1	Pr2	C-1	Pr2	C-1	Pr2	C-1	Pr2
LCL	Light on during cleaning mode	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2
FCL	Fan on during cleaning mode	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2
Fty*	Refrigerant gas type	CO2	Pr2	CO2	Pr2	CO2	Pr2	CO2	Pr2	CO2	Pr2	CO2	Pr2
Atu*	Regulator auto tuning	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2
SSH*	Superheat set point	8.0	Pr1	8.0	Pr1	8.0	Pr1	6.0	Pr1	8.0	Pr1	6.0	Pr1
SHy*	Differential for low superheat	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
Pb*	Regulation proportional band	10.0	Pr2	10.0	Pr2	10.0	Pr2	10.0	Pr2	10.0	Pr2	10.0	Pr2
PbH*	Death band for superheat regulation	0.1	Pr2	0.1	Pr2	0.1	Pr2	0.1	Pr2	0.1	Pr2	0.1	Pr2
rS*	Band Offset	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
inC*	PID integration time	160	Pr2	160	Pr2	160	Pr2	160	Pr2	160	Pr2	160	Pr2
dFC*	PID derivation constant time	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
PEO*	Valve open percentage with SH probe fault	40	Pr2	40	Pr2	40	Pr2	40	Pr2	40	Pr2	40	Pr2
OHg*	Opening percentage during hot gas defrost	50	Pr2	50	Pr2	50	Pr2	50	Pr2	50	Pr2	50	Pr2
LnF*	Minimum open percentage for stepper valve	10.0	Pr2	10.0	Pr2	10.0	Pr2	10.0	Pr2	10.0	Pr2	10.0	Pr2
MnF*	Maximum open percentage for stepper valve	100	Pr2	100	Pr2	100	Pr2	100	Pr2	100	Pr2	100	Pr2
MrE*	Allows to set the manual operation of the valve	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
Fot*	Absolute value of steps to which valve 1 must be brought in manual operation	50	Pr2	50	Pr2	50	Pr2	50	Pr2	50	Pr2	50	Pr2
MOP*	Maximum value threshold of evaporating temperature	5.0	Pr2	5.0	Pr2	5.0	Pr2	-5	Pr2	5.0	Pr2	-5	Pr2
dMP*	Delay for high evaporating temperature alarm activation (MOP)	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2
LOP*	Minimum value threshold of suction pressure	-25.0	Pr2	-25.0	Pr2	-25.0	Pr2	-40	Pr2	-25.0	Pr2	-40	Pr2
dLP*	Delay for low evaporating temperature alarm activation (LOP)	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2
AAS*	Low superheat alarm with "SH Optimization" function active	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
HSH*	Threshold for maximum superheat alarm	40	Pr2	40	Pr2	40	Pr2	40	Pr2	40	Pr2	40	Pr2
LSH*	Threshold for minimum superheat alarm	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2
dHS*	Delay for high superheat alarm	60	Pr2	60	Pr2	60	Pr2	60	Pr2	60	Pr2	60	Pr2
dLS*	Delay for low superheat alarm	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2
SLb*	Reaction time (interval for valve PID managment)	5	Pr2	5	Pr2	5	Pr2	5	Pr2	5	Pr2	5	Pr2
CYP*	Duty cycle for ON-OFF valve	6	Pr2	6	Pr2	6	Pr2	6	Pr2	6	Pr2	6	Pr2
HFS**	Valve mode: Full step - Half	HLF	Pr2	HLF	Pr2	HLF	Pr2	HLF	Pr2	HLF	Pr2	HLF	Pr2
LSt**	Minimum number of full steps	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
Ust**	Maximum number of full steps	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
Est**	Number of full extra-steps of valve	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
SR**	Step rate, full step	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2
GtC**	Interval for complete valve closing with extrasteps	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
GtH**	Interval between cycles reset the valve	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
Sti*	Time for compressor ON before regulation break	2.0	Pr2	2.0	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2
Std*	Time for compressor OFF for regulation breack	10	Pr2	10	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
dPA	Defrost probe A	P2	Pr2	P2	Pr2	P2	Pr2	P2	Pr2	P2	Pr2	P2	Pr2
dPb	Defrost probe B	nP	Pr2	nP	Pr2	nP	Pr2	nP	Pr2	nP	Pr2	nP	Pr2
tdF	Kind of defrost: air, resistors, inversion	Air	Pr2	Air	Pr2	EL	Pr2	EL	Pr2	EL	Pr2	EL	Pr2
EdF	Defrost mode: Clock or interval	rtc	Pr1	rtc	Pr1	rtc	Pr1	rtc	Pr1	rtc	Pr1	rtc	Pr1
SdF	Evaporator Temperature set point for Smart defrost	-1	Pr2	-1	Pr2	-1	Pr2	-10	Pr2	-1	Pr2	-10	Pr2
Srt	Heater set point during defrost	7.0	Pr2	7.0	Pr2	7.0	Pr2	7.0	Pr2	7.0	Pr2	7.0	Pr2
Hyr	Differential for heater	0.5	Pr2	0.5	Pr2	0.5	Pr2	0.5	Pr2	0.5	Pr2	0.5	Pr2
tod	Time out for heater (if temp > Srt)	5	Pr2	5	Pr2	5	Pr2	5	Pr2	5	Pr2	5	Pr2
d2P	Defrost with two probes	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
dtE	First defrost termination temperature	6.0	Pr2	6.0	Pr2	6.0	Pr2	6.0	Pr2	6.0	Pr2	6.0	Pr2
dtS	Second defrost termination temperature	6.0	Pr2	6.0	Pr2	6.0	Pr2	6.0	Pr2	6.0	Pr2	6.0	Pr2
idF	Interval between defrosts	8	Pr2	8	Pr2	8	Pr2	8	Pr2	8	Pr2	8	Pr2
Ndt	Minimum Defrost Time	10	Pr2	10	Pr2	5	Pr2	5	Pr2	5	Pr2	5	Pr2

		Application 1		Application 2		Application 3		Application 4		Application 5		Application 6	
MdF	Maximum defrost duration	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2
dSd	Delay for defrost on call	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
dFd	Visualization during defrost	it	Pr2	it	Pr2	it	Pr2	it	Pr2	it	Pr2	it	Pr2
dAd	Visualization delay for temperature after defrost	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2
Fdt	Dripping time	0	Pr2	0	Pr2	2	Pr2	2	Pr2	2	Pr2	2	Pr2
Hon	Drain heater enabled after draining time (par. Fdt)	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
dPo	Defrost at power ON	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
dAF	Delay defrost after freezing	00:10	Pr2	00:10	Pr2	00:10	Pr2	00:10	Pr2	00:10	Pr2	00:10	Pr2
Pdt	Pump down type	nu	Pr2	nu	Pr2	FAn	Pr2	FAn	Pr2	FAn	Pr2	FAn	Pr2
Pdn	Durata Pump down	0	Pr2	0	Pr2	1	Pr2	1	Pr2	1	Pr2	1	Pr2
od2	Optimized defrost	no	Pr2	no	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2
FAP	Sonda controllo ventole A	P2	Pr2	P2	Pr2	P2	Pr2	P2	Pr2	P2	Pr2	P2	Pr2
FnC	Fan operating mode	O-y	Pr1	O-y	Pr1	O_n	Pr1	O_n	Pr1	O_n	Pr1	O_n	Pr1
Fnd	Fan delay after defrost	0	Pr1	0	Pr1	3	Pr1	3	Pr1	3	Pr1	3	Pr1
FCt	Temperature differential to avoid short cycles of fans	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2
FSt	Fan stop temperature	15	Pr2	15	Pr2	15	Pr2	2	Pr2	15	Pr2	2	Pr2
FHy	Fan stop hysteresis	3.0	Pr2	3.0	Pr2	3.0	Pr2	3.0	Pr2	3.0	Pr2	3.0	Pr2
Fo2	Fan regulation offset during Energy Saving	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
tFE	Fan regulation by temperature in defrost	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
Fon	Fan ON time	3	Pr2	3	Pr2	3	Pr2	3	Pr2	3	Pr2	3	Pr2
FoF	Fan OFF time	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2
Fo1	Fan ON time during Energy Saving	3	Pr2	3	Pr2	3	Pr2	3	Pr2	3	Pr2	3	Pr2
FF1	Fan OFF time during Energy Saving	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2
Fd2	Evaporator fan delay after closing door	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2	10	Pr2
CM1	Modulating output 1 configuration	ten	Pr2	ten	Pr2	ten	Pr2	ten	Pr2	ten	Pr2	ten	Pr2
trA	Kind of regulation for modulating output 1	AC	Pr2	AC	Pr2	AC	Pr2	AC	Pr2	AC	Pr2	AC	Pr2
SOA	Fixed speed for fan	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
SdP	Default Dew Point value	15	Pr2	15	Pr2	15	Pr2	15	Pr2	15	Pr2	15	Pr2
ASr	Differential for fan / offset for anti sweat heater	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2
PbA	Proportional band for modulating output	10.0	Pr2	10.0	Pr2	10.0	Pr2	10.0	Pr2	10.0	Pr2	10.0	Pr2
AMi	Minimum output for modulating output	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
AMA	Maximum output for modulating output	100	Pr2	100	Pr2	100	Pr2	100	Pr2	100	Pr2	100	Pr2
AMt	1:Time with fan at maximum speed (s) - 2: Time heaters on (min)	2	Pr2	2	Pr2	2	Pr2	15	Pr2	2	Pr2	15	Pr2
CM2	Modulating output 2 configuration	tEn	Pr2	tEn	Pr2	tEn	Pr2	tEn	Pr2	tEn	Pr2	tEn	Pr2
tr2	Kind of regulation for modulating output 2	UAL	Pr2	UAL	Pr2	UAL	Pr2	UAL	Pr2	UAL	Pr2	UAL	Pr2
SO2	Fixed speed for fan	50	Pr2	50	Pr2	50	Pr2	50	Pr2	50	Pr2	50	Pr2
AS2	Differential for fan / offset for anti sweat heater	3.0	Pr2	3.0	Pr2	3.0	Pr2	3.0	Pr2	3.0	Pr2	3.0	Pr2
Pb2	Proportional band for modulating output	10.0	Pr2	10.0	Pr2	10.0	Pr2	10.0	Pr2	10.0	Pr2	10.0	Pr2
2oL	Minimum value for analogue output 2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
2oH	Maximum value for analogue output 2	100	Pr2	100	Pr2	100	Pr2	100	Pr2	100	Pr2	100	Pr2
2At	Interval with analogue output 2 forced at its maximum value	2	Pr2	2	Pr2	2	Pr2	2	Pr2	2	Pr2	2	Pr2
rAL	Probe for temperature alarm	tEr	Pr2	tEr	Pr2	tEr	Pr2	tEr	Pr2	tEr	Pr2	tEr	Pr2
ALC	Temperature alarm configuration : relative / absolute	Ab	Pr2	Ab	Pr2	Ab	Pr2	Ab	Pr2	Ab	Pr2	Ab	Pr2
ALU	High temperature alarm setting	15	Pr1	15	Pr1	15	Pr1	5	Pr1	15	Pr1	5	Pr1
ALL	Low temperature alarm setting	-10	Pr1	-10	Pr1	-10	Pr1	-30	Pr1	-10	Pr1	-30	Pr1
AHy	Differential for temperature alarm	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2
ALd	Temperature alarm delay	15	Pr1	15	Pr1	15	Pr1	15	Pr1	15	Pr1	15	Pr1
rA2	Probe for temperature alarm 2	nP	Pr2	nP	Pr2	nP	Pr2	nP	Pr2	nP	Pr2	nP	Pr2
A2U	High temperature alarm 2 setting	150	Pr2	150	Pr2	150	Pr2	150	Pr2	150	Pr2	150	Pr2
A2L	Low temperature alarm 2 setting	-40	Pr2	-40	Pr2	-40	Pr2	-40	Pr2	-40	Pr2	-40	Pr2
A2H	Differential for temperature alarm 2	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2	2.0	Pr2
A2d	Temperature alarm delay 2	15	Pr2	15	Pr2	15	Pr2	15	Pr2	15	Pr2	15	Pr2
dAo	Delay of temperature alarm at start-up	01:00	Pr2	01:00	Pr2	01:00	Pr2	01:00	Pr2	01:00	Pr2	01:00	Pr2
EdA	Alarm delay at the end of defrost	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2
dot	Temperature alarm exclusion after door open	20	Pr2	20	Pr2	20	Pr2	20	Pr2	20	Pr2	20	Pr2
tbA	Silencing alarm relay with buzzer	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2
oA1	Relay 1 configuration	LiG	Pr2	LiG	Pr2	LiG	Pr2	LiG	Pr2	LiG	Pr2	LiG	Pr2
oA2	Relay 2 configuration	dEF	Pr2	dEF	Pr2	dEF	Pr2	dEF	Pr2	dEF	Pr2	dEF	Pr2
oA3	Relay 3 configuration	FAn	Pr2	FAn	Pr2	FAn	Pr2	FAn	Pr2	FAn	Pr2	FAn	Pr2
oA4	Relay 4 configuration	Alr/AC	Pr2	Alr/AC	Pr2	Alr/AC	Pr2	Alr/AC	Pr2	Alr/AC	Pr2	Alr/AC	Pr2
oA5	Relay 5 configuration	AC/CPr	Pr2	AC/CPr	Pr2	AC/CPr	Pr2	AC/CPr	Pr2	AC/CPr	Pr2	AC/CPr	Pr2
oA8	Modulating output configuration (if CoM = oA8)	nP	Pr2	nP	Pr2	nP	Pr2	nP	Pr2	nP	Pr2	nP	Pr2
AOP	Alarm relay polarity	CL	Pr2	CL	Pr2	CL	Pr2	CL	Pr2	CL	Pr2	CL	Pr2
iAU	Auxiliary output indipendent from ON/OFF state	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
i1P	Digital input 1 polarity	cL	Pr2	cL	Pr2	cL	Pr2	cL	Pr2	cL	Pr2	cL	Pr2
i1F	Digital input 1 configuration	dor	Pr1	dor	Pr1	dor	Pr1	dor	Pr1	dor	Pr1	dor	Pr1
d1d	Digital input 1 activation delay	15	Pr1	15	Pr1	15	Pr1	15	Pr1	15	Pr1	15	Pr1
i2P	Digital input 2 polarity	CL	Pr2	CL	Pr2	CL	Pr2	CL	Pr2	CL	Pr2	CL	Pr2
i2F	Digital input 2 configuration	ES	Pr1	ES	Pr1	ES	Pr1	ES	Pr1	ES	Pr1	ES	Pr1
d2d	Digital input 2 activation delay	0	Pr1	0	Pr1	0	Pr1	0	Pr1	0	Pr1	0	Pr1
i3P	Digital input 3 polarity	CL	Pr2	CL	Pr2	CL	Pr2	CL	Pr2	CL	Pr2	CL	Pr2
i3F	Digital input 3 configuration	nU	Pr2	nU	Pr2	nU	Pr2	nU	Pr2	nU	Pr2	nU	Pr2
d3d	Digital input 3 activation delay	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
i4P	Digital input 4 polarity	CL	Pr2	CL	Pr2	CL	Pr2	CL	Pr2	CL	Pr2	CL	Pr2
i4F	Digital input 4 configuration	nU	Pr2	nU	Pr2	nU	Pr2	nU	Pr2	nU	Pr2	nU	Pr2
d4d	Digital input 4 activation delay	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2	0	Pr2
nPS	Number of pressure switch activation before lock	5	Pr2	5	Pr2	5	Pr2	5	Pr2	5	Pr2	5	Pr2
OdC	Compressor and fan status when open door	F-C	Pr2	F-C	Pr2	F-C	Pr2	F-C	Pr2	F-C	Pr2	F-C	Pr2
rrd	Outputs restart after door open alarm	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2
CbP	Clock presence	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2
Hur	Current hour	- - -	Pr1	- - -	Pr1	- - -	Pr1	- - -	Pr1	- - -	Pr1	- - -	Pr1
Min	Current minutes	- - -	Pr1	- - -	Pr1	- - -	Pr1	- - -	Pr1	- - -	Pr1	- - -	Pr1
dAY	Current day	- - -	Pr1	- - -	Pr1	- - -	Pr1	- - -	Pr1	- - -	Pr1	- - -	Pr1
Hd1	First weekly day	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2
Hd2	Second weekly day	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2
Hd3	Third weekly day	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2
iLE	Energy saving cycle start during workdays	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
dLE	Energy saving cycle length during workdays	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
iSE	Energy saving cycle start during holidays	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2

		Application 1		Application 2		Application 3		Application 4		Application 5		Application 6	
dSE	Energy saving cycle length during holidays	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
Ld1	Workdays First defrost start	6.0	Pr1	6.0	Pr1	6.0	Pr1	6.0	Pr1	6.0	Pr1	6.0	Pr1
Ld2	Workdays Second defrost start (minimum as Ld1)	13.0	Pr1	13.0	Pr1	13.0	Pr1	13.0	Pr1	13.0	Pr1	13.0	Pr1
Ld3	Workdays Third defrost start (minimum as Ld2)	21.0	Pr1	21.0	Pr1	21.0	Pr1	21.0	Pr1	21.0	Pr1	21.0	Pr1
Ld4	Workdays Fourth defrost start (minimum as Ld3)	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2
Ld5	Workdays Fifth defrost start (minimum as Ld4)	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2
Ld6	Workdays Sixth defrost start (minimum as Ld5)	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2
Sd1	Holidays First defrost start	6.0	Pr1	6.0	Pr1	6.0	Pr1	6.0	Pr1	6.0	Pr1	6.0	Pr1
Sd2	Holidays Second defrost start (minimum as Sd1)	13.0	Pr1	13.0	Pr1	13.0	Pr1	13.0	Pr1	13.0	Pr1	13.0	Pr1
Sd3	Holidays Third defrost start (minimum as Sd2)	21.0	Pr1	21.0	Pr1	21.0	Pr1	21.0	Pr1	21.0	Pr1	21.0	Pr1
Sd4	Holidays Fourth defrost start (minimum as Sd3)	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2
Sd5	Holidays Fifth defrost start (minimum as Sd4)	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2
Sd6	Holidays Sixth defrost start (minimum as Sd5)	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2
Md1	First defrost Maximum duration	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2
Md2	Second defrost Maximum duration	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2
Md3	Third defrost Maximum duration	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2
Md4	Fourth defrost Maximum duration	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2
Md5	Fifth defrost Maximum duration	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2
Md6	Sixth defrost Maximum duration	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2	30	Pr2
dE1	First End defrost Temperature (First probe)	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2
dE2	Second End defrost Temperature (First probe)	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2
dE3	Third End defrost Temperature (First probe)	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2
dE4	Fourth End defrost Temperature (First probe)	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2
dE5	Fifth End defrost Temperature (First probe)	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2
dE6	Sixth End defrost Temperature (First probe)	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2
dS1	First End defrost Temperature (Second probe)	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2
dS2	Second End defrost Temperature (Second probe)	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2
dS3	Third End defrost Temperature (Second probe)	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2
dS4	Fourth End defrost Temperature (Second probe)	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2
dS5	Fifth End defrost Temperature (Second probe)	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2
dS6	Sixth End defrost Temperature (Second probe)	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2	8.0	Pr2
HES	Temperature increasing during Energy Saving	0.0	Pr1	0.0	Pr1	0.0	Pr1	0.0	Pr1	0.0	Pr1	0.0	Pr1
PEL	Energy saving activation when Light switched off	yes	Pr2	yes	Pr1	yes	Pr1	yes	Pr1	yes	Pr1	yes	Pr1
LMd	Defrost Synchronisation	y	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2
dEM	Defrost end Synchronisation	y	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2
LSP	SET-POINT Synchronisation	n	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
LdS	Display Synchronisation (temperature sent via LAN)	n	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
LOF	ON/OFF Synchronisation	n	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
LLi	Light Synchronisation	y	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2	yes	Pr2
LAU	AUX Synchronisation	n	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
LES	Energy Saving Synchronisation	n	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
LSd	Remote probe displaying	n	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
LPP	Pressure value sent in LAN	n	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
LCP	P4 value sent in LAN	n	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
StM	Cooling request from LAN enable compressor relay	n	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
ACE	Cold Calling in LAN always enabled (even if the compressor block)	n	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2	no	Pr2
P1C	P1 configuration	ntc	Pr2	ntc	Pr2	ntc	Pr2	ntc	Pr2	ntc	Pr2	ntc	Pr2
OF1	P1 calibration	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
P2C	P2 configuration	ntc	Pr2	ntc	Pr2	ntc	Pr2	ntc	Pr2	ntc	Pr2	ntc	Pr2
OF2	P2 calibration	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
P3C	P3 configuration	nu	Pr2	ntc	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2
OF3	P3 calibration	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
P4C	P4 configuration	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2	nu	Pr2
OF4	P4 calibration	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
P5C*	P5 configuration	420	Pr2	420	Pr2	420	Pr2	420	Pr2	420	Pr2	420	Pr2
OF5*	P5 calibration	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
P6C*	P6 configuration	PtM	Pr2	PtM	Pr2	PtM	Pr2	PtM	Pr2	PtM	Pr2	PtM	Pr2
OF6*	P6 calibration	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
PA4*	Pressure value at 4 mA or at 0V (probe P5)	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2	0.0	Pr2
P20*	Pressure value at 20 mA or at 5V (probe P5)	60.0	Pr2	60.0	Pr2	60.0	Pr2	60.0	Pr2	60.0	Pr2	60.0	Pr2
Adr	Modbus address	1 - Pr1											
bAU	Baudrate for COM1	9.6 - Pr2											
Par	Parity control for COM1	no - Pr2											
B1F	Operating Mode for COM1												
FM	Button 1 enabled in stand-by	Std - Pr2											
PSU	Password for level Pr2	0 - Pr1											
EMU	Emulation previous version : 2V8 , 3V8 , 4V2	nu - Pr2											
rEL	Release code firmware (only read)	0 - Pr2											
SrL	sub-release firmware (only read)	0 - Pr2											
FdY	Firmware release date: day	Pr2											
FMn	Firmware release date: month	Pr2											
Fyr	Firmware release date: year	Pr2											
Ptb	Map EEPROM ID	1 - Pr2											
Pr2	MENU PR2 ACCESS (protected parameter)	Pr1											

* Only for XM756D, XM759D
** Only for XM756D

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