CONTROLLERS FOR MULTIPLEXED CABINETS WITH STEPPER DRIVER INSIDE

XM678D

CONTENTS

1. GENERAL WARNING

1.1 ⚠ PLEASE READ BEFORE USING THIS MANUAL

- This manual is part of the product and should be kept near the instrument for easy and quick reference.
- The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
- Check the application limits before proceeding.

1.2 ⚠ SAFETY PRECAUTIONS

- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning: disconnect all electrical connections before any kind of maintenance.
- Fit the probe where it is not accessible by the End User. The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor or to "Dixell S.r.l." (see address) with a detailed description of the fault.
- Consider the maximum current which can be applied to each relay (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining.
- In case of applications in industrial environments, the use of mains filters (our mod. FT1) in parallel with inductive loads could be useful.

2. GENERAL DESCRIPTION

The **XM678D** is a microprocessor based controller for multiplexed cabinets suitable for applications on medium or low temperature. It can be inserted in a proprietary LAN with 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 **XM678D** is provided with 6 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 an alarm output and with the **stepper valve driver**. The device is also equipped with six probe inputs: for temperature control, for control the defrost end temperature, for display and the fourth can be used for application with virtual probe or for inlet/outlet air temperature measurement. Moreover, fifth and sixth probe are used to evaluate and control the superheat. Finally, the **XM678D** is equipped with the three digital inputs (free contact) fully configurable by parameters.

The device is equipped with the HOTKEY connector that permits to be programmed in a simple way. The optional direct serial output **RS485** (ModBUS compatible) permits a simple XWEB interfacing. **RTC** is available as options. The HOTKEY connector can be used to connect **X-REP** display (Depending on the model).

3. INSTALLATION AND MOUNTING

This device can operate without any user interface, but normal application is with Dixell CX660 keyboard.

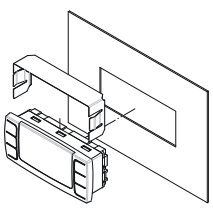


Figure 1a

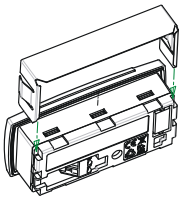


Figure 1b

The **CX660 keyboard** shall be mounted on vertical panel, in a 29x71 mm hole, and fixed using the special bracket supplied as shown in figure 1. The temperature range allowed for correct operation is 0÷60 °C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let air circulate by the cooling holes.

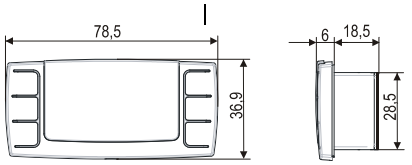


Figure 1c

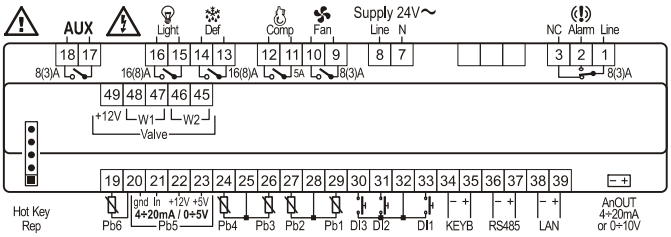
4. WIRING DIAGRAM AND CONNECTIONS

4.1 IMPORTANT NOTE

XM device is provided with disconnectable 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 relays 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.

4.2 XM678D



4.3 VALVE CONNECTIONS AND CONFIGURATION

!!!!!!!!! WARNING !!!!!!!!!!!!!

To avoid possible problems, before connecting the valve configure the driver by making the right changes on the parameters. Select the kind of motor (**tEU parameter**) and check if the valve is present in **tEP parameter table** reported here below.

!!!!! In any case, the unique and valid reference has to be considered the datasheet made by valve manufacturer. Dixell cannot be considered responsible in case of valve damaging due to wrong settings!!!!!!

tEP	Model	LSt (steps*10)	uSt (steps*10)	CPP (mA*10)	CHd (mA*10)	Sr (step/s)
0	**Manual settings**	Par	Par	Par	Par	Par
1	Alco EX4-EX5-EX6	5	75	50	10	500
2	Alco EX7	10	160	75	25	500
3	Alco EX8 500 step/s	10	260	80	50	500
4	Danfoss ETS-25/50	7	262	10	10	300
5	Danfoss ETS-100	10	353	10	10	300
6	Danfoss ETS-250/400	11	381	10	10	300
7	Sporlan SEI .5 ÷ 11	0	159	16	5	200
8	Sporlan SER 1.5 ÷ 20	0	159	12	5	200
9	Sporlan SEI 30	0	319	16	5	200
10	Sporlan SER(I) G,J,K	0	250	12	5	200
11	Sporlan SEI-50	0	638	16	5	200
12	Sporlan SEH(I)-100	0	638	16	5	200
13	Sporlan SEH(I)-175	0	638	16	5	200

If you can see your valve on the table, please select the valve through **tEP parameter.** In this way, you can be sure of a right configuration. About the connection, please pay attention to the following table to have a quick reference on the connection mode for valves of different manufacturer

4 WIRES VALVES (BIPOLAR)

Connection numbering	ALCO EX4/5/6/7/8	SPORLAN SEI-SEH-SER	DANFOSS ETS
4	BLUE	WHITE	BLACK
2	BROWN	BLACK	WHITE
3	BLACK	RED	RED
1	WHITE	GREEN	GREEN

5-6 WIRES VALVES (UNIPOLAR)

Connection numbering	SPORLAN	SAGINOMIYA
4	ORANGE	ORANGE
2	RED	RED
3	YELLOW	YELLOW
1	BLACK	BLACK
5 – Common	GRAY	GRAY

AFTER MAKING THE CONNECTION, PLEASE SWITCH OFF AND ON THE CONTROLLER IN ORDER TO BE SURE OF THE RIGHT POSITIONING OF THE VALVE.

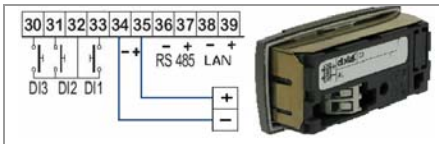
4.4 ABSOLUTE MAXIMUM POWER

XM678D is able to drive a wide range of stepper valves, on the following table are indicated the maximum values of current that the actuator can supply to the stepper wiring. The **TF20D dixell** transformer has to be used.

NOTE: the electrical power absorption of the valve can be unrelated to refrigeration power that valve has. Before using the actuator, please 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 below.

VALVE TYPE		
	BIPOLAR VALVES (4 wires)	**Maximum Current 0.9A**
	UNIPOLAR VALVES (5-6 wires)	**Maximum Current 0.33A**

4.5 KEYBOARD DISPLAY CX660



The **XM678D** board can operate also without keyboard.

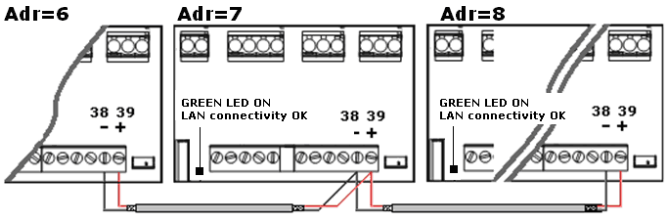
Polarity:
Terminal [34 -]
Terminal [35 +]

In case of long distance, use shielded cable

4.6 SYNCHRONIZED DEFROST – MAXIMUM 8 SECTIONS

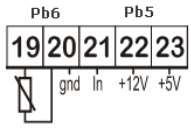
To create a LAN connection to perform synchronized defrost (also called master-slave functioning):

1) connect a shielded cable between terminals 38 [-] and 39 [+] 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:



If the LAN is well connected, the green LED will be ON. If the LED blinks then the connection is wrongly configured.

4.7 SENSORS FOR SUPERHEAT CONTROL



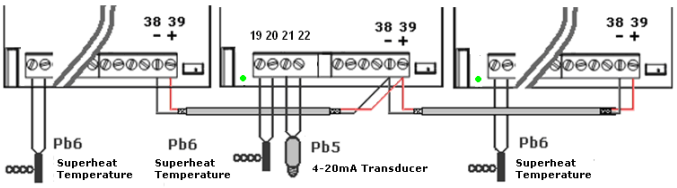
Temperature probe: Pb6 terminals 19-20 without any polarity.

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

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

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

4.8 HOW TO USE ONLY ONE PRESSURE TRANSDUCER ON MULTIPLEXED APPLICATIONS



You need a working LAN connection (green LED ON on all XM678D boards of the same LAN). Connect and configure the pressure transducer to **one** XM678D.
Now, the value of pressure read by the unique transducer connected will be used by each devices connected to the same LAN.

In order to read the value of pressure you can press UP ARROW to have access to fast selection menu and to see the value of:

dPP = measured pressure (only on master device);
dP5 = value of temperature obtained from pressure→ temperature conversion;
rPP = pressure value read from remote location (only for slave devices);

Examples of error messages:

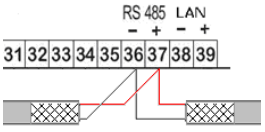
dPP = Err → the local transducer read a wrong value, the pressure is out of the bounds of the pressure transducer or the P5C parameter is wrong. Check all these things and eventually change the transducer;

rPF → the remote pressure transducer is on error situation. Check the status of the board GREEN LED, if the LED is OFF the LAN is not working, otherwise check the remote transducer;

LAST CHECKS ABOUT SUPERHEAT

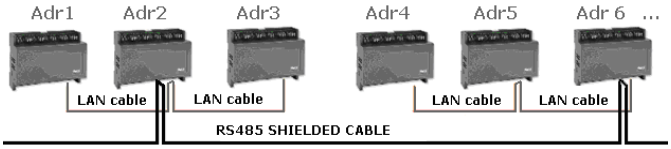
On the fast access menu:
dPP is the value read by the gauge;
dP6 is the value read by the temperature probe, temperature of the gas on the outlet section of the evaporator;
SH is the value of the superheat. The nA or err messages mean that the superheat has no sense in that moment and its value is not Available;

4.9 HOW TO CONNECT MONITORING SYSTEM



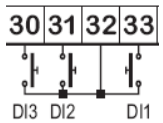
1) Terminals 36 [-] and 37 [+].
2) Use shielded twisted cable. For example Belden® 8762 o 8772 or cat 5 cables.
3) Maximum distance 1Km.
4) Don't connect the shield to the earth or to GND terminals of the device, avoid accidental contacts by using insulating tape.

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).

4.10 DIGITAL INPUTS

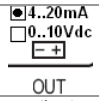


1) The terminals from 30 to 33 are all free of voltage;
2) Use shielded cable for distance higher than one meter;

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 is i1P, i1F, i1d respectively for polarity, functioning and delay. The i1P can be: cL = active when closed; oP = active when opened. The i1F parameter can be: EAL= external alarm, Bal=serious lock alarm, PAL=pressure switch alarm, dor=dor switch, dEF=external defrost , AUS= auxiliary activation command, LiG= light activation, OnF= board On/OFF, FHU=don't use this configuration, ES=day/night, HdY=don't use this configuration. Then there is i1d parameter for delay of activation. For the others digital inputs there are a set of the same parameters: i2P,i2F,i2d,i3P,i3F,i3d .

4.11 ANALOG OUTPUT

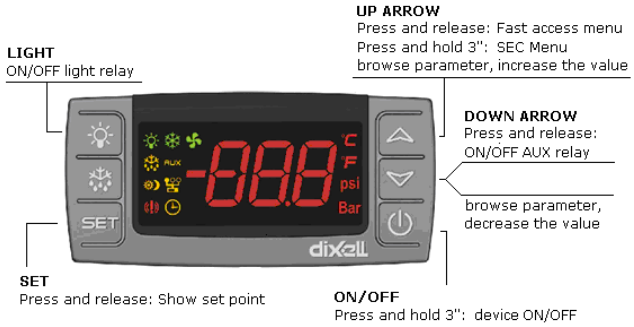


- Selectable between 4..20mA and 0..10Vdc.
- Use CABCJ15 to perform the connections

It's located near the terminal 39 on 2 pin connector. It's possible to use the output to control anti-sweat heaters through a chopped phase controller XRPW500 (500watt) or family XV..D or XV..K.

5. USER INTERFACE

5.1 DIRECT COMMAND INTERFACE



5.2 ICONS

Cooling output				
Light ->				<- Fan
Defrost ->		AUX	<- Auxiliary relay	
Energy saving ->			<- Multimaster Enabled	
Generic alarm->			<- Clock / time	

With icon ON the output is actived, while with blinking icon there is a delay.

MEASUREMENT UNIT

°C , Bar and (time) are ON depending on the selection.

DURING PROGRAMMING: blink the measurement units of temperature and pressure

5.3 KEYBOARD COMMANDS

LIGHT relay: press light button.
AUX relay: press down arrow.
Manual defrost: press and hold for 3" the defrost button.
ON/OFF: press for 3" the ON/OFF button (fi the function is enabled).
ES: press for 3" the Energy saving button (fi the function is enabled).

Double commands

+	Press and hold for about 3" to lock (Pon) or unlock (PoF) the keyboard.
SET +	Pressed togheter to exit from programming mode or from menu; on submenus rtC and EEV this combination allow to come back to previous level.
SET +	Pressed togheter for 3" allow to access to first level of programming mode

5.4 HOW TO MODIFY THE SET POINT FOR AIR TEMPERATURE REGULATION

The thermostat set point is the value that will be used to regulate the air temperature. The regulation output is controlled by the electronic valve or by the relay

BEGIN	SET	Press SET button for 3 seconds, the measurement units blink togheter.
Value modification	or	With the arrows it's possible to change the value within the LS and US parameters value
EXIT	SET	By pressing SET it is possible to confirm the value that will blink for about 2".

In any case, it is possible to wait for about 10" to exit. In order to show the air temperature set is sufficient to press and release the SET button, the value is showed for about 60".

6. HOW TO PROGRAM THE PARAMETERS (PR1 AND PR2)

The device provide 2 programming levels: **Pr1** with direct access and **Pr2** protected with a password (intended for experts)

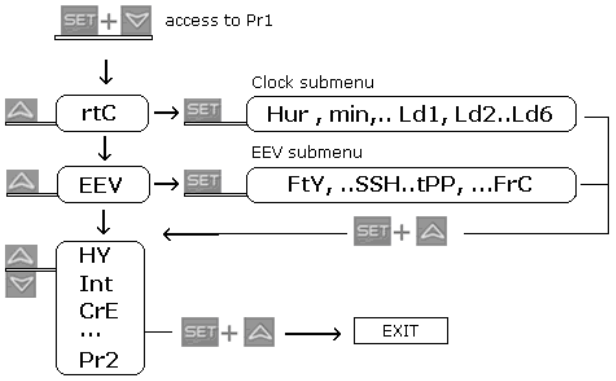
ACCESS to Pr1	SET +	Press and hold for about 3" to have access to 1° programming level.
Select item	o	Select the parameter or submenu using the arrows
Show value	SET	Press **SET** button
Modify	o	Use the arrows to modify the limits
Confirm	SET	Press **SET** key, the value blinks for 3", then the display shows next parameter
EXIT	SET +	Instantaneous exit from the programming mode, otherwise wait for about 10" .

6.1 HOW TO HAVE ACCESS TO "PR2"

To enter "Pr2" programming menu:

1. access to a "Pr1" menu by pressing [SET+ DOWN arrow] together for 3 ", the first label will be showed;
2. press DOWN arrow till the "**Pr2**" label will be showed; press SET;
3. The blinking "**PAS**" label will be showed, wait some seconds;
4. Will be showed "0 - - " with blinking 0: insert the password [**321**] using the keys UP and DOWN and confirming with SET key.

GENERAL STRUCTURE: The first two item rtC and EEV are related to submenus with others parameters.



[SET+UP arrow] on **rtc** or **EEV** submenus allow coming back to parameter list,

[SET+ UP arrow] on parameter list allow immediate exit.

6.2 HOW TO MOVE PARAMETER FROM PR1 TO PR2 AND VICEVERSA

Enter on Pr2; select the parameter; press together SET+DOWN; a left side LED ON gives to the parameter the presence on Pr1 level, a left side LED OFF means that the parameter is not present on Pr1 (Only PR2).

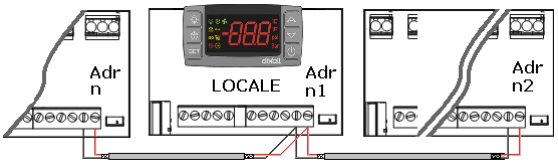
7. FAST ACCESS MENU

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.

ACESS TO FAST ACCESS MENU		By press and release the up arrow. The duration of the menu in case of inactivity is about 3 minutes. The values that will be showed depends on the configuration of the board.
Use *or* *Arrows to select an entry,* *then press* SET *to see the value or to go on with other value.*		**HM** Access to clock menu or reset of the RTC alarm; **An** Value of analog output; **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. **L°t** Minimum room temperature; **H°t** Maximum room temperature; **dPr** Virtual probe for room temperature regulation [rPA and rPb]; **dPd** Virtual probe for defrost management [dPA and dPb]; **dPF** Virtual probe for fan management [FPA and FPb]; **rSE** Real thermoregulation set point: the value includes the sum of SET , HES and/or the dynamic set point if the functions are enabled.
EXIT	SET +	Pressed together or wait the timeout of about 60"

8. MENU FOR MULTIMASTER FUNCTION: SEC

The function "section" **SEC** is enabled with icon ON, it allows entering on the remote programming mode from a keyboard not physically connected to the board through the LAN functionality.



BEGIN		Press UP arrow for about 3 ", the icon will be ON
Display	**SEC**	Menu to change the section
	SET	Press to confirm and will be showed the following list:

Or	**LOC**	Local board
	ALL	Selection ALL = all the boards connected to the LAN
	SE1	Board with 1° Adr *
	SEn	….
	SE8	Board with 8° Adr *
		Select an entry and press SET to confirm
EXIT	SET + UP	Press SET and UP togheter for about 10 seconds

* the boards are indexed by mean of the Adr.

EXAMPLE:

a- If you are willing to program the same SET for all the boards without moving from keyboard to keyboard: select and confirm **ALL**, exit from Multimaster menu and modify the SET.

b- If you are willing to program a parameter of board with Adr 35, select the section 35 press SET and proceed with the modification.

c- Is showed the alarm [**nod**], go to Multimaster menu and activate the LOC section.

⚠ **AT THE END OF THE PROGRAMMING PROCEDURE, SELECT THE SECTION "LOC". IN THIS WAY THE ICON WILL BE SWITCHED OFF!!**

9. COMMISSIONING

9.1 CLOCK SETTING AND RTC ALARM RESET

Parameter configuration: **CbP=Y** enable the clock, **EdF=rtc** enable the defrost from rtc Ld1..Ld6.

BEGIN	UP	UP arrow (press once) to access the fast access menu
Display	**HM** identify the clock RTC submenu; press SET	
Display	**HUr=** hour → press SET to confirm/modify **MIn=** minutes → press SET to confirm/modify …… don't use others parameters if present.	
EXIT	SET + UP	Press for about 10". The operation resets the RTC alarm

Note: the rtC clock menu is present also on the second level of parameters.
Warning: the board shows the rtF alarm, the device has to be changed.

9.2 ⚠ 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..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: [-0.5/7Bar] or [0.5/8Bar abs] the correct setup is relative pressure with PA4=-0,5 and P20=7.0. The [0.5/12Bar abs] the correct setup is relative pressure with PA4=-0.5 and P20=11.00.

Example of virtual pressure with unique 4..20mA or 0-5V transducer:

Param.	**XM6x8D_1** Without transducer	**XM6x8D_2 +** with transducer	**XM6x8D_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.

tEU **Type of Stepper motor:** (uP- bP) it permits to select the kind of valve. **uP=** 5-6 wires unipolar valves; **bP=** 4 wires bipolar valves; **!!!!! WARNING !!!!! by changing this parameter the valve has to be reinitialized.**

tEP **Predefined valve selection:** (0÷10) if **tEP=0** the user has to modify all the parameters of configuration in order to use the valve. If **tEP is different from 0** the device performs a fast configuration of the following parameters: **LSt, uSt, Sr, CPP, CHd**. To select the right number please read the following table:

tEP	Model	LSt (steps*10)	uSt (steps*10)	CPP (mA*10)	CHd (mA*10)	Sr (step/s)
0	**Manual settings**	Par	Par	Par	Par	Par
1	Alco EX4-EX5-EX6	5	75	50	10	500
2	Alco EX7	10	160	75	25	500
3	Alco EX8 500 step/s	10	260	80	50	500
4	Danfoss ETS-25/50	7	262	10	10	300
5	Danfoss ETS-100	10	353	10	10	300
6	Danfoss ETS-250/400	11	381	10	10	300
7	Sporlan SEI .5 ÷ 11	0	159	16	5	200
8	Sporlan SER 1.5 ÷ 20	0	159	12	5	200
9	Sporlan SEI 30	0	319	16	5	200
10	Sporlan SER(I) G,J,K	0	250	12	5	200
11	Sporlan SEI-50	0	638	16	5	200
12	Sporlan SEH(I)-100	0	638	16	5	200
13	Sporlan SEH(I)-175	0	638	16	5	200

If **tEP is different from 0** previous configuration of **LSt,uSt,Sr,CPP and CHd are overwritten.**

LSt **Minimum number of steps:** (0 ÷ USt) It permits to select the minimum number of steps. At this number of steps the valve should be closed. So it's necessary the reading of manufacturer datasheet to set correctly this parameter. It's the minimum number of steps to stay in advised range of functioning; **!!!!! WARNING !!!!! by changing this parameter the valve has to be reinitialized. The device perform this procedure automatically and restart its normal functioning when the programming mode ends;**

USt **Maximum number of steps:** (LSt÷800*10) It permits to select the maximum number of steps. At this number of steps the valve should be completely opened. Read the datasheet provided by manufacturer of the valve to set correctly this parameter. It's the maximum number of steps to stay in advised range of functioning; **!!!!! WARNING !!!!! by changing this parameter the valve has to be reinitialized. The device perform this procedure automatically and restart its normal functioning when the programming mode ends;**

Sr **Step rate** (10÷600 step/sec) it's the maximum speed to change step without losing precision (=losing steps). It's advised to stay under the maximum speed;

CPP **Current per phase (only bipolar valves):** (0÷100*10mA) it's the maximum current per phase used to drive valve. It's used **only with bipolar valves**

CHd **Holding current per phase (only bipolar valves):** (0÷100*10mA) it's the current per phase when the valve is stopped for more than 4 minutes. It's used **only with bipolar valves**

9.3 ⚠ ELECTRONIC VALVE FUNCTIONING

ON/OFF TEMPERATURE REGULATION CRE=n

1. The **HY** parameter is a differential [2°C default];
2. the temperature regulation is ON/OFF with valve stop at set point;
3. The superheat is regulated to be closer to its set point;
4. With more pauses normally also the humidity is bigger.
5. Regulation pauses can be realized using **Sti** and **Std** parameters (during these pauses the valve is closed);

COUNTINUOUS REGULATION OF THE TEMPERATURE CRE=Y:

1. The **HY** parameter become temperature band for PI control. A default good value is **5°C.**
2. The regulation of injection is continuous and the cooling output is always on. The icon ❄ is always ON excluding the defrost phase..
3. The superheat is regulated following the SSH parameter.
4. Regulation pauses can be realized using **Sti** and **Std** parameters (during these pauses the valve is closed);
5. increasing the **Int** integral time it is possible to decrease the speed of reaction of the regulator on the HY band.

COUNTINUOUS REGULATION OF THE TEMPERATURE CRE=Y:

1. The **HY** parameter become temperature band for PI control. A default good value is **5°C.**
2. The regulation of injection is continuous and the cooling output is always on. The icon ❄ is always ON excluding the defrost phase;
3. The superheat is not regulated because the valve is at the end of the evaporator. At the beginning of the evaporator there is another valve;
4. Regulation pauses can be realized using **Sti** and **Std** parameters (during these pauses the valve is closed);
5. increasing the **Int** integral time it is possible to decrease the speed of reaction of the regulator on the HY band.

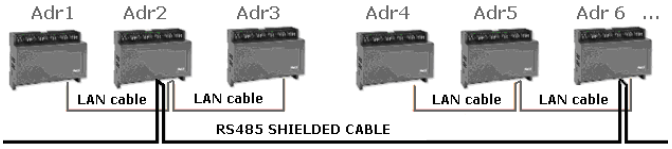
9.4 SYNCHRONIZED DEFROST

The synchronized defrost allow to manage multiple defrost from different boards connected through the LAN connection. In this way, the boards can perform simultaneous defrosts with the possibility to end them in a synchronized way.

⚠ The **Adr** parameter cannot be duplicated because in this case the defrost cannot be correctly managed.

BEGIN	SET + DOWN	Press for 3 seconds, the **rtC** or other will be showed. The measurement units blinks.
Find Adr	DOWN	Press more than once the DOWN arrow to find the **Adr** parameter, the press **SET**.
Modify Adr	UP or DOWN	Set the value of **Adr** parameter, then press SET to confirm the parameter
EXIT	SET + UP	Press the two keys together to exit from menu or wait for about 10 seconds.

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



DAILY DEFROST FROM RTC: cbP=Y e 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÷Ld6 or Sd1÷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)
cbP	Y	Y	Y
IdF	9 hours safety	9 hours safety	9 hours safety
MdF	45min 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. 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" 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)	
		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..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 ouput 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	
8	**LA**	Temperature alarm from parameter ALL on probe rAL	
9	**HAd**	Alarm from parameter dLU on probe defrost probe [dPa / dPb]	
10	**LAd**	Alarm from parameter dLU on probe defrost probe [dPa / dPb]	
11	**HAF**	Alarm from parameter FLU on probe defrost probe [FPa / FPb]	
12	**LAF**	Alarm from parameter FLL on probe defrost probe [FPa / FPb]	
		DIGITAL INPUT ALARM	
13	**dA**	Door open alarm from input i1F, i2F or i3F = after delay d1d,2d or d3d.	Cooling relay and fan follow the odc parameter. Cooling restart as specified on rrd parameter.
14	**EA**	Generic alarm from digital input i1,2,3F=EAL	
15	**CA**	Severe alarm of regulation lock from digital input i1,2,3F=bAL	Regulation output OFF
16	**PAL**	Pressure switch lock i1F, i2F o i3F = PAL.	All the output are OFF
		ELECTRONIC VALVE ALARM	
17	**LOP**	Minimum operating pressure threshold from LOP parameter.	The valve outuput increases its opening of dML quantity every second.
18	**MOP**	Maximum operating pressure threshold from MOP parameter.	The valve outuput decreases its opening of dML quantity every second.
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	

10.1 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.

11. 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. Using **HOTKEY the Adr will not changed**.

11.1 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.

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

1. When the XM unit is ON, insert the "**Hot key**" and push è key; the **"uPL"** message appears.
2. The UPLOAD begins; the "**uPL**" message is blinking.
3. Remove the **"Hot Key".** At the end of the data transfer phase the instrument displays the following messages:
   "**end** " for right programming.
   "**err**" for failed programming. In this case push "SET" key if you want to restart the programming again or remove the not programmed "**Hot key**".

12. CONTROLLING LOADS

12.1 THE COOLING OUTPUT

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 probes following the formula:

value_for_room_regulation = (rPA*rPE + rPb*(100-rPE))/100

If the temperature increases and reaches set point plus differential 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.

12.2 STANDARD REGULATION AND CONTINUOUS REGULATION

The regulation can be performed in three ways: the goal of the first way (**standard regulation**) is reaching the best superheat via a classic temperature regulation obtained using hysteresis. The second way, permits to use the valve to realize an 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 with electronic expansion valve** by selecting **CrE=Y** parameter. The third kind of regulation has been thought to be used with vales called evaporator valves (**CrE=EUP**), in this configuration the valve is placed at the end of the evaporator. In any case, the regulation is performed via PI regulator that gives the opening percentage to the valve.

Standard regulation: [CRE = n]
In this case, the **Hy** parameter is the differential for standard ON/OFF regulation. In this case the **int** parameter is neglected.

Continuous regulation [CRE = Y]
In this case, the **Hy** parameter is the proportional band of PI in charge of room temperature regulation and we advise to used at least **Hy=5.0°C/10°F**. The **int** parameter is the integral time of the same PI regulator. 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**.

Evaporator valves [CRE = EUP]
In this case, the system perform a regulation of the temperature without thinking about the superheat (in fact the valve is at the end of the evaporator). The Hy parameter is the proportional band for the temperature regulation and **int** is the integral time for the regulation. In this situation there is no superheat regulation.

12.3 DEFROST

Defrost starting
In any case, the device check the temperature read by configured defrost probe before starting defrost procedure, after that:
- (If RTC is present)Two defrost modes are available through the "**tdF**" parameter: defrost with electrical heater and hot gas defrost. The defrost interval is controlled by parameter "**EdF**": (EdF = rtc) defrost is made in real time depending on the hours set in the parameters **Ld1..Ld6** in workdays and in **Sd1…Sd6** on holidays; (EdF = in) the defrost is made every "**IdF**" time;
- defrost cycle starting can be operated locally (manual activation by means of the keyboard or digital input or end of interval time) or the command can come from the Master defrost unit of the LAN. In this case the controller will operate the defrost cycle following the parameters it has programmed but, at the end of the drip time, will wait that all the other controllers of the LAN finish their defrost cycle before to re-start the normal regulation of the temperature according to **dEM** parameter;
- Every time any of the controller of the LAN begin a defrost cycle it issue the command into the network making all the other controllers start their own cycle. This allows a perfect synchronization of the defrost in the whole multiplexed cabinet according to **LMd** parameter;
- Selecting **dPA** and **dPb** probes and by changing the **dtP** and **ddP** parameters the defrost can be started when the difference between dPA and dPb probes is lower than dtP for all ddP time. This is useful to start defrost when a low thermal exchange is detected. If **ddP=0** this function is disabled;

Defrost ending
- When defrost is started via rtc, the maximum duration of defrost is obtained from **Md** parameter and the defrost end temperature is obtained from **dtE** parameter (and **dtS** if two defrost probes are selected).
- If **dPA** and **dPb** are present and **d2P=y** the instrument stops the defrost procedure when **dPA** is higher than **dtE** temperature and **dPb** is higher than **dtS** temperature;

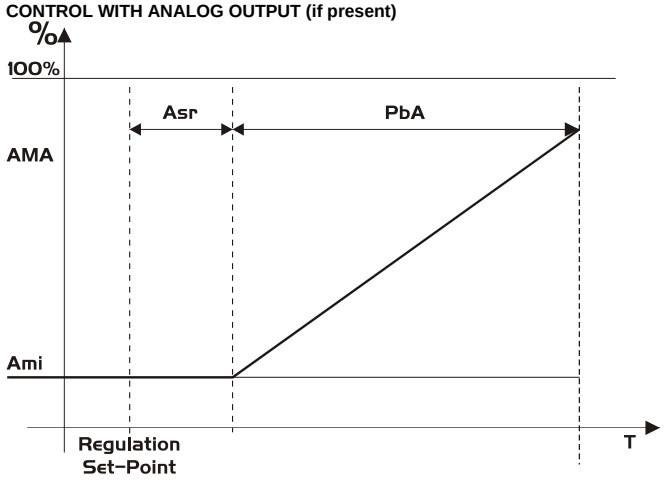
At the end of defrost the drip time is controlled through the "**Fdt**" parameter.

12.4 FANS

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**".

CONTROL WITH ANALOG OUTPUT (if present)



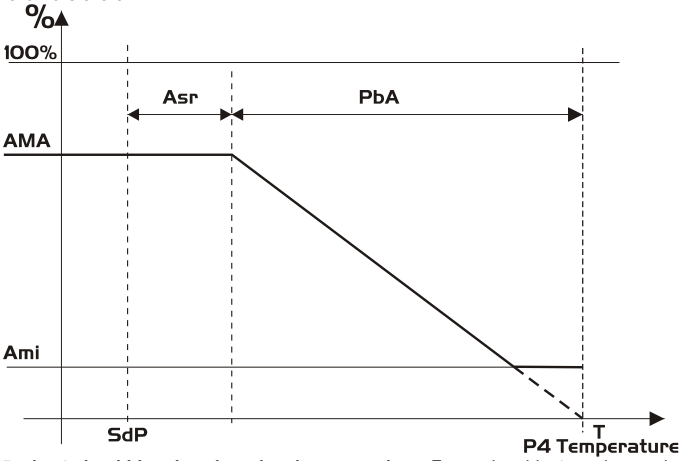
The modulating output (**trA=rEG**) works in proportional way (excluding the first **AMt** seconds where the fans speed is the maximum. 10seconds is the minimum value). The regulation set point is relative to regulation set point and is indicated by **ASr**, the proportional band is always located above **SET+ASr** value and its value is **PbA**. The fan are at minimum speed (**AMi**) when the temperature read by fan probe is **SET+ASr** and the fan is at maximum speed (**AMA**) when the temperature is **SET+ASr+PbA**.

12.5 ANTI SWEAT HEATERS

The anti-sweat heater regulation can be performed with on board relay (if **OA6=AC**) or with the analog output (if present by setting **trA=AC**). However the regulation can be performed in two ways:

- Without real dew-point information: in this case the default value for dew-point is used (**SdP** parameter).
- Receiving dew-point from **XWEB5000** system: 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;

The best performance can be obtained using probe 4. In this case, the regulation follow the chart:



Probe 4 should be placed on the showcase glass. For each cabinet can be used only one probe 4 (P4) sending its value to the others section that are connected to the LAN.

HOW TO WORK WITH PROBE 4 THROUGH THE LAN:

Param.	XM6x8D_1 Without probe 4	XM6x8D_2 + with probe 4	XM6x8D_3+ Without probe 4
Adr	n	n + 1	n + 2
LPP	LPC=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		
OA6	OA6=AC if the device will use the AUX relay for regulation		

HOW TO WORK WITHOUT PROBE 4:

Param.	XM6x8D Without probe 4
P4C	nP
AMt	% of ON

In this case, the regulation is performed by switching on and off the auxiliary relay on a 60 minutes time base. The ON time will be the **AMt** value, so that the relay will be ON for **AMt** minutes and OFF for **60-AMt** minutes.

In case of P4 error or if P4 is absent the output is at **AMA** value for the **AMt** time then the output is at 0 value for the time **255-AMt** time performing a simple PWM modulation.

12.6 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.

13. TECHNICAL DATA

CX660 keyboard
Housing: self extinguishing ABS. **Case:** CX**660** facia 35x77 mm; depth 18mm
Mounting: panel mounting in a 29x71 mm panel cut-out
Protection: IP20; **Frontal protection:** IP65; **Power supply:** from **XM600** power module; **Display**: 3 digits, red LED, 14,2 mm high; **Optional output:** buzzer

Power modules
Case: 8 DIN; Connections: Screw terminal block ≤ 1,6 mm^2 heat-resistant wiring and 5.0mm Faston or screw terminals
Power supply: 24Vac. **Power absorption:** 20VA max.
Inputs: up to 6 NTC/PTC/Pt1000 probes; **Digital inputs**: 3 free of voltage
Relay outputs: ***Total current on loads MAX. 16A***
Solenoid Valve: relay SPST 5A, 250Vac; **defrost:** relay SPST 16 A, 250Vac
fan: relay SPST 8 A, 250Vac; **light:** relay SPST 16 A, 250Vac; **alarm:** SPDT relay 8 A, 250Vac; **Aux:** SPST relay 8 A, 250Vac
Outputs for valve: bipolar or unipolar valves
Optional output (AnOUT) DEPENDING ON THE MODELS:
- **PWM / Open Collector outputs:** PWM or 12Vdc max 40mA
- **Analog output:** 4÷20mA or 0÷10V

Serial output: RS485 with ModBUS - RTU and LAN
Data storing: on the non-volatile memory (EEPROM).
Kind of action: 1B. **Pollution grade:** normal **Software class:** A. **Operating temperature:** 0÷60 °C. **Storage temperature:** -25÷60 °C. **Relative humidity:** 20÷85% (no condensing).
Measuring and regulation range:
NTC probe: -40÷110°C (-58÷230°F).
PTC probe: -50÷150°C (-67 ÷ 302°F)
Pt1000 probe: -100 ÷ 100°C (-148 ÷ 212°F)
Resolution: 0,1 °C or 1°C or 1 °F (selectable). **Accuracy (ambient temp. 25°C)**: ±0,5 °C ±1 digit

DEFAULT PARAMETER MAP

The numbers of the first column are simple indexes that are unrelated to the position on the device menu. The total amount of parameters can be different depending on the applications. **SUBMENUS**: the parameters O1..O24 of the clock belongs to **rtC** label; V1..V30 **ELECTRONIC VALVE** belongs to EEV.

	LABEL	VALUE	DESCRIPTION	RANGE
	Rtc		**CLOCK AND DEFROST** By pressing SET it's possible to enter on RTC submenu	
	CbP	Y	Clock presence	n(0) – Y(1)
	Hur	- - -	Hour	- - -
	Min	- - -	Minutes	- - -
	DAy	- - -	Day of the week	Sun(0) - SAt(6)
	Hd1	nU	First weekly day	Sun(0) - SAt(6) - nu(7)
	Hd2	nU	Second weekly day	Sun(0) - SAt(6) - nu(7)
	Hd3	nU	Third weekly day	Sun(0) - SAt(6) - nu(7)
	ILE	0.0	Energy saving cycle start during workdays	0 - 23.5(143) (hours.10min)
	dLE	0.0	Energy saving cycle length during workdays	0 ÷ 24.0(144) (hours.10min)
	ISE	0.0	Energy saving cycle start during holidays	0 - 23.5(143) (hours.10min)
	dSE	0.0	Energy saving cycle length during holidays	0 ÷ 24.0(144) (hours.10min)
	HES	0.0	Temperature increasing during Energy Saving cycle (Day/Night)	[-30.0°C ÷ 30.0°C] [-54°F ÷ 54°F]
	Ld1	6.0	Workdays First defrost start	0.0 ÷ 23.5(143) - nu(144) (hours.10min)
	Ld2	13.0	Workdays Second defrost start	Ld1 ÷ 23.5(143) - nu(144) (hours.10min)
	Ld3	21.0	Workdays Third defrost start	Ld2 ÷ 23.5(143) - nu(144) (hours.10min)
	Ld4	nU	Workdays Fourth defrost start	Ld3 ÷ 23.5(143) - nu(144) (hours.10min)
	Ld5	nU	Workdays Fifth defrost start	Ld4 ÷ 23.5(143) - nu(144) (hours.10min)
	Ld6	nU	Workdays Sixth defrost start	Ld5 ÷ 23.5(143) - nu(144) (hours.10min)
	Sd1	6.0	Holidays First defrost start	0.0 ÷ 23.5(143) - nu(144) (hours.10min)
	Sd2	13.0	Holidays Second defrost start	Sd1 ÷ 23.5(143) - nu(144) (hours.10min)
	Sd3	21.0	Holidays Third defrost start	Sd2 ÷ 23.5(143) - nu(144) (hours.10min)
	Sd4	nU	Holidays Fourth defrost start	Sd3 ÷ 23.5(143) - nu(144) (hours.10min)
	Sd5	nU	Holidays Fifth defrost start	Sd4 ÷ 23.5(143) - nu(144) (hours.10min)
	Sd6	nU	Holidays Sixth defrost start	Sd5 ÷ 23.5(143) - nu(144) (hours.10min)
	EEU		**ELECTRONIC VALVE** by pressing SET you can enter electronic expansion valve submenu	
	Fty	404	Kind of gas	R22(0) - 134(1) - 404(2) - 407(3) - 410(4) - 507(5) - CO2(6)
	SSH	8.0	Superheat set point	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
	Pb	6.0	Proportional band, the valve changes its opening on the band [SSH,SSH+Pb]. At SSH value of superheat the valve will be at 0 % (without integral contribution) and at SSH+Pb value of superheat the valve will be at MnF. For values bigger than SSH+Pb the valve is completely opened	[0.1°C ÷ 60.0 °C] [1°F ÷ 108 °F]
	inC	120	Integration time for superheat regulation	[-12.0°C ÷ 12.0°C] [-12°C ÷ 12°C] [-21°F ÷ 21°F]
	PEO	50	Valve opening in case of error on probes P5 or P6.	0 ÷ 255 s
	OPE	85	Start opening percentage for the time SFd.	0 ÷ 100
	SFd	1.3	Duration of soft start phase with opening at OPE.	0 ÷ 42.0(252) (min.10sec)
	OPd	100	Post defrost opening percentage for all the time Pdd	0 ÷ 100
	Pdd	1.3	Duration of post defrost phase	0 ÷ 42.0(252) (min.10sec)
	MnF	100	Maximum percentage of opening admitted	0 ÷ 100
	Fot	nU	*Manual opening* ***WARNING it must be Fot=nU to have regulation***	0÷100 - nu
	PA4	-0.5	*SETTING*: Value of pressure at 4 mA for current probe (4÷20mA) or value at 0V for ratiometric probes. The value is absolute or relative depending on PrU parameter	BAR : [PrM=rEL] -1.0 ÷ P20 [PRM=Abs] 0.0 ÷ P20 PSI : [PrM=rEL] -14 ÷ P20 [PRM=Abs] 0 ÷ P20 dKP : [PrM=rEL] -10 ÷ P20 [PRM=Abs] 0 ÷ P20
	P20	11.0	*SETTING*: Value of pressure at 20 mA for current probe (4÷20mA) or value at 5V for ratiometric probes. The value is absolute or relative depending on PrU parameter	BAR : [PrM=rEL] PA4 ÷ 50.0 [PrM=AbS] PA4 ÷ 50.0 PSI : [PrM=rEL] PA4 ÷ 725 [PrM=AbS] PA4 ÷ 725 dKP : [PrM=rEL] PA4 ÷ 500 [PrM=AbS] PA4 ÷ 500
	LPL	-0.5	EXPERT: under this value of pressure, the pressure read by P5 is forced to the value of LPL to stabilize the regulation.	PA4 ÷ P20
	MOP	11.0	Maximum operating pressure threshold and valve closing of dML value	LOP ÷ P20
	LOP	-0.5	Minimum operating pressure threshold and valve opening of dML value	PA4 ÷ MOP
	dML	30	Percentage of closing [MOP] or opening [LOP] of the valve every second	0 ÷ 100
	MSH	60.0	Maximum superheat alarm threshold. If the value of superheat is bigger than MSH for all the time SHd the display show the message MSH	[LSH ÷ 80,0°C] [LSH ÷ 144°F]
	LSH	2.0	Minimum superheat alarm threshold. If the value of superheat is lower than LSH for all the time SHd the display show the message LSH. **As soon as the value of superheat is lower than LSH value the valve close immediately without waiting the time SHd to avoid evaporator flooding**	[0.0 ÷ MSH °C] [0 ÷ MSH °F]
	SHy	0.5	Hysteresys for superheat alarm (MSH-SHy) and (LSH+SHy)	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
	SHd	3.0	Delay of superheat alarm signalling	0 ÷ 42.0(252) (min.10sec)
	FrC	0	Integration additive constant	0 ÷ 100
	tEU	bP	Kind of valve: uP=unipolar (5-6 wires) bP=bipolar (4 wires)	uP- bP
	tEP	nU	Predefined valve selection: 0=nu=manual settings	nu ÷ 10
	LSt	0	Minimum number of steps where the valve can be considered as completely closed	0 ÷ "USt" (* 10)

	USt	0	Maximum number of steps that can be performed	"LSt" ÷ 800 (* 10)
	Sr	10	Step rate: is the speed to change step. A too high value cause a wrong driving	10 ÷ 600 (steps/sec)
	CPP	0	Current per phase during bipolar valve driving	0 ÷ 100 (* 10mA)
	CHd	0	Current per phase to maintain the actual position (Holding current)	0 ÷ 100 (* 10mA)
			REGULATION	
	Hy	5.0	If CrE=n then HY is hysteresis for ON/OFF thermoregulation. If CrE=Y or CrE=EUP then HY is proportional band for temperature PI controller, on these cases the value should be greater than 5°C.	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
	Int	150	This value is considered only when CrE=Y or CrE=EUP. It's the integral time for thermoregulation. High values mean slower regulation	0 ÷ 255 s
	CrE	Y	With CrE=Y or CrE=EuP the regulation become PI, Hy become a band and Int an integral time	n(0) – Y(1)
	LS	**-30.0**	Minimum set point	[-55.0°C ÷ SET] [-67°F ÷ SET]
	US	**20.0**	Maximum set point	[SET ÷ 150.0°C] [SET ÷ 302°F]
	odS	**0**	Outputs activation delay at start up	0 ÷ 255 (min.)
	AC	**0**	Anti-short cycle delay	0 ÷ 60 (min.)
	CCt	**0.0**	Continous cycle duration	0 ÷ 24.0(144) (hour.10min)
	CCS	**0.0**	Continuous cycle set point	[-55.0°C ÷ 150,0°C] [-67°F ÷ 302°F]
	Con	**15**	Compressor ON time with faulty probe	0 ÷ 255 (min.)
	CoF	**30**	Compressor OFF time with faulty probe	0 ÷ 255 (min.)
	CF	**°C**	Measurement unit: Celsius , Fahrenheit	°C(0) - °F(1)
	PrU	**rE**	Pressure Mode	rE(0) - Ab(1)
	PMU	**bAr**	Pressure measurement unit	bAr(0) – PSI(1) - MPA(2)
	rES	dE	Resolution (only °C) : decimal, integer	tEM(0) - PrE(1)
	Lod	tEr	Local display: default display	dE(0) - in(1)
	rEd	tEr	Remote display: default display	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) - P5(5) - P6(6) – tEr(7) - dEF(8)
	dLy	0	Display delay	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) - P5(5) - P6(6) – tEr(7) - dEF(8)
	rPA	P1	Regulation probe A	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) – P6(5)
	rPb	nP	Regulation probe B	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) – P6(5)
	rPE	100	Virtual probe percentage (room temperature)	0÷100
			DEFROST	
	dPA	P2	Defrost probe A	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) – P6(5)
	dPb	nP	Defrost probe B	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) – P6(5)
	dPE	100	Virtual probe percentage (defrost temperature)	0÷100
	tdF	EL	Defrost kind: EL= defrost with heater, in=hot gas defrost	EL - in
	EdF	In	Defrost mode: rtc= clock with Ld1, Ld2..., parameters in= interval IdF on hours	rtc – in
	dtP	0.1	Difference between two probes to activate the defrost	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
	ddP	60	Delay before activation of defrost from difference (**dtP**)	0÷60min
	d2P	n	End defrost control with two probes	n – Y
	dtE	8.0	End defrost temperature on probe dPA	[-55.0°C ÷ 50.0°C] [-67°F ÷ 122°F]
	dtS	8.0	End defrost temperature on probe dPb	[-55.0°C ÷ 50.0°C] [-67°F ÷ 122°F]
	idF	6	Defrost interval if EdF=in (interval) while if EdF=rtc as safety. It works as safety also for clock alarm RTC-RTF. If idF=0 the defrost can be activated only manually, through RS485, from external contact or from LAN	0 ÷ 120 (ore)
	MdF	45	Maximum duration for defrost if the dTE temperature is not reached (or dTE + dTS with two probes).	0 ÷ 255 (min.)
	dSd	0	Defrost start delay after request	0 ÷ 255 (min.)
	dFd	rt	Display during defrost: rt=real temperature for Lod probe, it=initial temperature, dEF=label, Set=set point value.	rt - it - SEt – dEF
	dAd	30	Display delay	0 ÷ 255 (min.)
	Fdt	0	Drain down time after the defrost. The fan and the thermoregulation output are OFF during this time.	0 ÷ 255 (min.)
	dPo	N	Defrost at power-on	n – Y
	dAF	0.0	Defrost delay after continuous cycle	0 ÷ 24.0 (ore.10min)
			FAN	
	FPA	P2	Fan probe A	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) – P6(5)
	FPb	nP	Fan probe B	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) – P6(5)
	FPE	100	Virtual probe percentage (fan management)	0÷100
	FnC	O-n	Fan operating mode	C-n - O-n - C-y - O-y
	Fnd	10	Fan delay after defrost	0 ÷ 255 (min.)
	FSt	10.0	Fan stop temperature	[-55.0°C ÷ 50.0°C] [-67°F ÷ 122°F]
	FHy	1.0	Fan stop differential	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
	tFE	n	Thermostatic fan functioning during defrost	0 ÷ 255 (min.)
	Fod	0	Fan activation time after defrost (without compressor)	0 ÷ 255 (min.)

	Fon	0	Fan ON time	0 ÷ 15 (min.)
	FoF	0	Fan OFF time	0 ÷ 15 (min.)
	trA	UAL	Kind of regulation for modulating output: UAL= manual value; rEG=fan regulation; AC=anti-sweat control	UAL - rEG – AC
	SOA	0	Manual value of the analog output when **trA=UAL**	AMi ÷ AMA
	SdP	30.0	Default Dew Point value (or safety value in case of XWEB link lost)	[-55.0°C ÷ 50.0°C] [-67°F ÷ 122°F]
	ASr	1.0	Differential for fan / offset for anti sweat heater	[-25.5°C ÷ 25.5°C] [-45°F ÷ 45°F]
	PbA	5.0	Proportional band for modulating output	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
	AMi	0	Minimum output for modulating output	0 ÷ AMA
	AMA	100	Maximum output for modulating output	AMi ÷ 100
	AMt	10	Time with fan at maximum speed or ON time for relay on Anti-sweat regulation. If intended for fan the timebase is on seconds, for anti-sweat regulation the timebase is on minutes	10÷60s or 10÷60 min
			ALARM	
	rAL	tEr	Probe for room temperature alarm	nP - P1 - P2 - P3 - P4 – P6 - tEr
	ALC	rE	Room temperature alarm configuration: relative to set point or absolute	rE – Ab
	ALU	15.0	High room temperature alarm setting	[0.0°C ÷ 50.0°C o ALL ÷ 150.0°]
	ALL	15.0	Low room temperature alarm setting	[0.0°C ÷ 50.0°C o -55,0°C ÷ ALU]
	AHy	1.0	Differential for room temperature alarm	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
	ALd	15	Room Temperature alarm delay	0 ÷ 255 (min.)
	dLU	50.0	High temperature alarm setting (defrost probe). Always absolute	dLL ÷ 150.0°] [dLL ÷ 302°F]
	dLL	-50.0	Low temperature alarm setting (defrost probe) Always absolute	[-55,0°C ÷ dLU] [-67°F ÷ dLU°F]
	dAH	1.0	Differential for temperature alarm (defrost probe)	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
	ddA	15	Temperature alarm delay (defrost probe)	0 ÷ 255 minuti
	FLU	50.0	High temperature alarm setting (fan probe) Always absolute	[FLL ÷ 150.0°] [FLL ÷ 302°F]
	FLL	-50.0	Low temperature alarm setting (fan probe) Always absolute	[-55,0°C ÷ FLU] [-67°F ÷ FLU°F]
	FAH	1.0	Differential for temperature alarm (fan probe)	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
	FAd	15	Temperature alarm delay (fan probe)	0 ÷ 255 minuti
	dAo	1.3	Delay of temperature alarm at start-up	0 ÷ 24.0 (ore.10minuti)
	EdA	20	Alarm delay at the end of defrost	0 ÷ 255 minuti
	dot	20	Temperature alarm exclusion after door open	0 ÷ 255 minuti
	Sti	nU	Stop regulation interval	"nu" 0÷ 24.0 (ore.10minuti)
	Std	5	Stop duration	1 ÷ 255 minuti
	tbA	y	Silencing alarm relay by pressing a key	n – Y
			OUTPUT CONFIGURATION: Cpr=cooling output, dEF=defrost, FAn=fan, ALr=alarm, LiG=light, AUS=auxiliary, dB=hot– ONF= ON/OFF, AC anti-sweat	
	Oa7	AC	Sixth relay output configuration	nu-CPr - dEF - FAn - ALr - LiG - AUS – db – onf - AC
	CoM	Cur	Modulating output configuration	CUr - tEn
	AOP	cL	Alarm relay polarity	OP – CL
	iAU	n	Auxiliary output independent from ON/OFF state	n – Y
			DIGITAL INPUTS EAL=external alarm, Bal=serious alarm, PAL=pressure switch, dor=door switch, dEF=external defrost, AUS= auxiliary relay, LiG=light relay, OnF= On/OFF, FHU=don't use this config, ES=day/night, HdY=don't use this config.	
	i1P	CL	Digital input 1 polarity	OP – CL
	i1F	dor	Digital input 1 configuration	EAL - bAL - PAL - dor - dEF - AUS - LiG - OnF - Htr - FHU - ES – Hdy
	d1d	15	Digital input 1 activation delay	0 ÷ 255 (min.)
	i2P	CL	Digital input 2 polarity	OP – CL
	i2F	LiG	Digital input 2 configuration	EAL - bAL - PAL - dor - dEF - AUS - LiG - OnF - Htr - FHU - ES – Hdy
	d2d	5	Digital input 2 activation delay	0 ÷ 255 (min.)
	i3P	CL	Digital input 3 polarity	OP – CL
	i3F	ES	Digital input 3 configuration	EAL - bAL – PAL - dor - dEF - AUS - LiG - OnF - Htr - FHU - ES – Hdy
	d3d	0	Digital input 3 activation delay	0 ÷ 255 (min.)
	nPS	15	Number of pressure switch activation before lock	0÷15
	OdC	F-C	Compressor and fan status when open door	no - FAn - CPr - F-C
	rrd	15	Outputs restart after door open alarm	0 ÷ 255 (min.)
			ENERGY SAVING	
	ESP	P1	Energy saving probe selection	nP - P1 - P2 - P3 - P4 – P6 - tEr
	HES	0.0	Temperature increasing during Energy Saving	[-30.0°C ÷ 30.0°C] [-54°F ÷ 54°F]
	PEL	nU	Energy saving activation when Light switched off	nu(0) – LIG(1) - AUS(2) - LEA(3)
			LAN MANAGEMENT	
	LMd	y	Defrost Synchronization	n – Y

	dEM	y	Defrost end Synchronization	n – Y
	LSP	n	SET-POINT Synchronization	n – Y
	LdS	n	Display Synchronization (temperature sent via LAN)	n – Y
	LOF	n	ON/OFF Synchronization	n – Y
	LLi	y	Light Synchronization	n – Y
	LAU	n	AUX Synchronization	n – Y
	LES	n	Energy Saving Synchronization	n – Y
	LSd	n	Remote probe displaying	n – Y
	LPP	y	Pressure probe through the LAN	n – Y
	LCP	n	Probe 4 through the LAN	n – Y
	StM	n	Cooling request from LAN enable compressor relay	n – Y
			PROBE CONFIGURATION NTC (10KΩ a 25°C), Ptc (806Ω a 0°C)	
	P1C	ntc	P1 configuration	nP - Ptc - ntc – PtM
	Ot	0	P1 calibration	[-12,0°C ÷ 12,0°C]
	P2C	ntc	P2 configuration	nP - Ptc - ntc – PtM
	oE	0	P2 calibration	[-12,0°C ÷ 12,0°C]
	P3C	nP	P3 configuration	nP - Ptc - ntc – PtM
	O3	0	P3 calibration	[-12,0°C ÷ 12,0°C]
	P4C	nP	P4 configuration	nP - Ptc - ntc – PtM – LAN
	O4	0	P4 calibration	[-12,0°C ÷ 12,0°C]
	P5C	420	P5 configuration	nP - Ptc - ntc - PtM - 420 - 5Vr –LAN
	o5	0	P5 calibration	[-12,0°C ÷ 12,0°C]
	P6C	PtM	P6 configuration	nP - Ptc - ntc - PtM
	o6	0	P6 calibration	[-12,0°C ÷ 12,0°C]
			SERVICE	
	CLt	- - -	ON/OFF percentage (C.R.O.)	(read only)
	tMd	- - -	Time remaining before next defrost activation (only for interval defrost)	(read only)
	LSn	Auto	Number of devices in LAN	1 ÷ 8 (read only)
	LAn	Auto	List of address of LAN devices	1 ÷ 247 (read only)
	Adr	1	Modbus address	1 ÷ 247
	rEL	2.0	Firmware release	(read only)
	Ptb	- - -	Parameter table	(read only)
	Pr2	- - -	PR2 menu access	

dixell S.r.l.
32010 Pieve d'Alpago (BL) ITALY - Z.I. Via dell'Industria, 27
Tel +39.0437.9833 - Fax +39.0437.989313
www.dixell.com - dixell@dixell.com
EMERSON Climate Technologies