

DIGITAL CONTROLLER WITH DEFROST AND FANS MANAGEMENT

XW03K – CX40

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1 GENERAL WARNINGS

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.
- Dixell Srl reserves the right to change the composition of its products, even without notice, ensuring the same and unchanged functionality.

1.2 SAFETY PRECAUTIONS

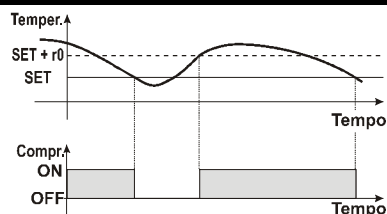
- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning: disconnect all electrical 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.p.A." (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 **XW03K** is microprocessor based controller, suitable for applications on medium or low temperature ventilated refrigerating units. It has to be connected by means of a two-wire cable (Ø 1mm) at a distance of up to 10 meters to the keyboard **CX40**. It has 2 relay outputs to control compressor and fan. The device is also provided with 2 NTC probe inputs, the first one for temperature control and the second one to be located onto the evaporator, to control the defrost termination temperature and to managed the fan and it's provided with a configurable digital input. With the HOTKEY it's possible to program the instrument in a quick and easy way.

3 REGULATION

The regulation is performed according to the temperature measured by the thermostat probe with a positive differential from the set point: if the temperature increases and reaches set point plus differential the compressor is started and then turned off when the temperature reaches the set point value again.



In case of fault in the thermostat probe the start and stop of the compressor are timed through parameters "Cy" and "Cn".

4 DEFROST

Defrost is performed through a simple stop of the compressor. Parameter "id" is used to control the interval between defrost cycles, its maximum length by parameter **Md** and two defrost modes: timed or controlled by the evaporator's probe. At the end of defrost dripping time is started, its length is set in the **dt** parameter. With **dt=0** the dripping time is disabled.

5 FANS

With **F1** or **F2** parameters it can be selected the fans functioning.

- **F1** is used when **SET > do**
- **F1** is used when **SET < do**
- **F1** or **F2 =cn** → will switch ON and OFF with the compressor and **not run** during defrost
- **F1** or **F2 =on** → fans will run even if the compressor is off, and not run during defrost

After defrost, there is a timed fan delay allowing for drip time, set by means of the "**Fd**" parameter.

- **F1** or **F2 =cy** → fans will switch ON and OFF with the compressor and **run** during defrost
- **F1** or **F2 =oY** → fans will run continuously also during defrost.

An additional parameter "**FS**" provides the setting of temperature, detected by the evaporator probe, above which the fans are always OFF. This is used to make sure circulation of air only if his temperature is lower than set in "**FS**".

5.1.1 Cyclical activation of the fans with compressor off

When **F1** or **F2 = cn** or **cY** (fans in parallel to the compressor), by means of the **Fn** and **FF** parameters the fans can carry out on and off cycles even if the compressor is switched off. When the compressor is stopped the fans go on working for the **Fn** time. With **Fn =0** the fans remain always off, when the compressor is off.

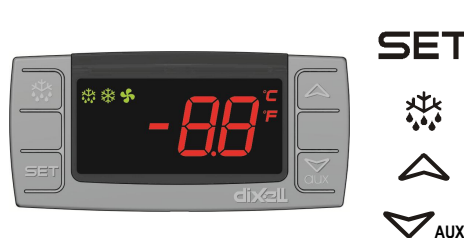
5.2 FANS AND DIGITAL INPUT

When the digital input is configured as door switch **iF=do**, fans and compressor status depends on the **dC** parameter value:

- **dC=no** → normal regulation;
- **dC=Fn** → fans OFF;
- **dC=cP** → compressor OFF;
- **dC=Fc** → compressor and fans OFF.

When **rd=y**, the regulation restart with door open alarm.

6 FRONT PANEL COMMANDS – CX40 KEYBOARD



To display target set point, in programming mode it selects a parameter or confirm an operation

To start a manual defrost

In programming mode it browses the parameter codes or increases the displayed value
In programming mode it browses the parameter codes or decreases the displayed value

KEYS COMBINATION

- SET+▲ To lock or unlock the keyboard
- SET+▼ To enter in programming mode
- SET+▲ To return to room temperature display

LED	MODE	SIGNIFICATO
	On	Compressor enabled
	Flashing	Anti-short cycle delay enabled (AC parameter)
	On	Defrost in progress
	Flashing	Dripping in progress
	On	Fans output enabled
	Flashing	Fans delay after defrost
	On	Measurement unit
	Flashing	Programming mode
	On	Measurement unit
	Flashing	Programming mode

6.1 HOW TO SEE THE SET POINT

1. Push and immediately release the **SET** key, the set point will be showed;
2. Push and immediately release the **SET** key or wait about 5s to return to normal visualisation.

6.2 HOW TO CHANGE THE SETPOINT

1. Push the **SET** key for more than 2 seconds to change the Set point value;
2. The value of the set point will be displayed and the "°C" or "°F" LED starts blinking;
3. To change the Set value push the ▲ or ▼ arrows.
4. To memorise the new set point value push the **SET** key again or wait 10s.

6.3 HOW TO START A MANUAL DEFROST

Push the **DEF** key for more than 2 seconds and a manual defrost will start

6.4 HOW TO CHANGE A PARAMETER VALUE

To change the parameter's value operate as follows:

1. Enter the Programming mode by pressing the **SET+▼** keys for 3s ("°C" or "°F" LED starts blinking).
2. Select the required parameter. Press the "**SET**" key to display its value
3. Use ▲ or ▼ to change its value.
4. Press "**SET**" to store the new value and move to the following parameter.

To exit: Press **SET+▲** or wait 15s without pressing a key.

NOTE: the set value is stored even when the procedure is exited by waiting the time-out to expire.

6.5 HIDDEN MENU

The hidden menu includes all the parameters of the instrument.

HOW TO ENTER THE HIDDEN MENU

1. Enter the Programming mode by pressing the **SET+▼** keys for 3s ("°C" or "°F" LED starts blinking).
2. Released the keys, then push again the **SET+▼** keys for more than 7s. The L2 label will be displayed immediately followed from the **Hy** parameter.

NOW YOU ARE IN THE HIDDEN MENU.

3. Select the required parameter.
4. Press the "**SET**" key to display its value
5. Use ▲ or ▼ to change its value.
6. Press "**SET**" to store the new value and move to the following parameter.

To exit: Press **SET+▲** or wait 15s without pressing a key.

NOTE1: if there is no parameter in L1, after 3s the "nP" message is displayed. Keep the keys pushed till the L2 message is displayed.

NOTE2: the set value is stored even when the procedure is exited by waiting the time-out to expire.

10 ELECTRICAL CONNECTIONS

XW03K is provided with Minifit 2, 2 poles, for probes and the keyboard, JST 2 poles for digital input. Disconnectable screw terminal blocks are used for power supply and loads, for cables with a cross section up to 2.5 mm². 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.

NOTE: the maximum current allowed for all the loads is 16A.

10.1 PROBES

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.

11 HOW TO USE THE HOT KEY

11.1 HOW TO PROGRAM THE HOT KEY FROM THE INSTRUMENT (UPLOAD)

1. Program one controller with the front keypad.
2. When the controller is ON, insert the "Hot key" and push $\triangle$ key; the "uP" message appears followed a by flashing "Ed"
3. Push "SET" key and the "Ed" will stop flashing.
4. Turn OFF the instrument remove the "Hot Key", then turn it ON again.

NOTE: the "Er" message is displayed for failed programming. In this case push again a key if you want to restart the upload again or remove the "Hot key" to abort the operation.

11.2 HOW TO PROGRAM AN INSTRUMENT USING HOT KEY (DOWNLOAD)

1. Turn OFF the instrument.
2. Insert a **programmed "Hot Key"** into the 5 PIN receptacle and then turn the Controller ON.
3. Automatically the parameter list of the "Hot Key" is downloaded into the Controller memory, the "do" message is blinking followed a by flashing "Ed".
4. After 10 seconds the instrument will restart working with the new parameters.
5. Remove the "Hot Key".

NOTE: the "Er" message is displayed for failed programming. In this case push again a key if you want to restart the upload again or remove the "Hot key" to abort the operation.

12 ALARM SIGNALLING

Mess.	Cause	Outputs
"P1"	Room probe failure	Compressor output according to "Cy" e "Cn"
"P2"	Evaporator probe failure	Defrost end is timed
"HA"	Maximum temperature alarm	Outputs unchanged
"LA"	Minimum temperature alarm	Outputs unchanged
"EA"	External alarm	Outputs unchanged
"CA"	Serious external alarm	All outputs OFF
"dA"	Door Open	Compressor and fans restarts

12.1 ALARM RECOVERY

Probe alarms "P1" and "P2" 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" and "LA" automatically stop as soon as the temperature returns to normal values.

Alarms "EA" and "CA" (with iF=bL) recover as soon as the digital input is disabled.

13 TECHNICAL DATA

Keyboards

Housing: self extinguishing ABS

Case: facia 75x36 mm; depth 23mm

Mounting: panel mounting in a 71x29mm panel cut-out

Protection: IP20; **Frontal protection:** IP65

Connections: Screw terminal block ≤ 2.5 mm²

Power supply: from XW03K power module

Display: 2 digits, red LED, 14.2 mm high

Optional output: buzzer.

Power module XW60K

Dimension: 131x67mm

Connections:

Probes: Room, Evaporator: JST, 2 poles

Digital input: D1, Minifit terminals, 2 poles

Uscita tastiera: JST, 2 poles

Hot key: JST, 5 poles

Power supply, compressor relay, fan relay: screw terminal blocks type CPM Stelvio 2 poles for each load

Power supply: 230Vac or . 110Vac $\pm 10\%$ or 24Vac

Power absorption: 4VA max

Inputs: 2 NTC probes

Digital inputs: 1 free voltage

Relay outputs: **Total current on loads MAX. 16A**

Compressor: relay SPST 16(5) A, 250Vac; EN60730: 100K cycles

Fan: relay SPST 16(5) A, 250Vac

Data storing: on the non-volatile memory (EEPROM)

Kind of action: 1B

Pollution degree: normal

Software class: A

Operating temperature: 0 to 60°C (32 to 140°F)

Storage temperature: -25 to 60°C (-13 to 140°F)

Relative humidity: 20 to 85% (no condensing)

Measuring and regulation range:

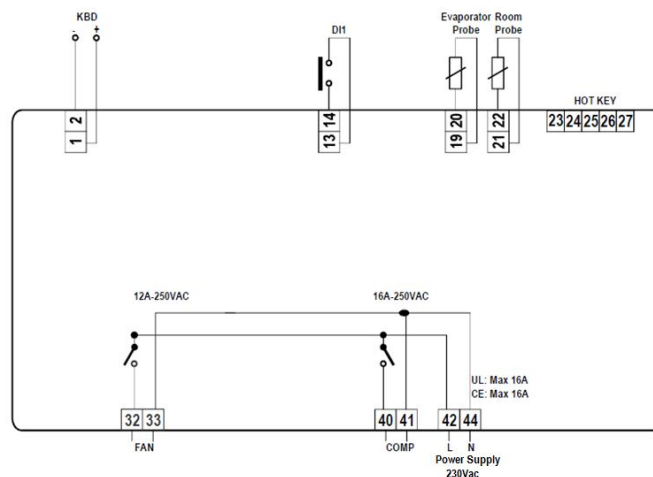
NTC probe: -40 to 99°C (-58 to 230°F)

Resolution: 0.1°C or 1°C or 1°F (selectable)

Accuracy (ambient temp. 25°C): $\pm 0.5^\circ\text{C} \pm 1$ digit

14 CONNECTIONS

14.1 XW03K – 20+8A– 110VAC OR 230VAC



NOTE: Model at 120Vac, connect power supply to 42-44 terminals

15 DEFAULT SETTING VALUES

LABEL	DESCRIPTION	RANGE	°C	°F	LEVEL
REGULATION					
St	Set point	LS+US	0	32	-
Hy	Differential	0.1 + 25°C/1 + 45°F	4	7	Pr1
LS	Minimum Set Point	-55°C+SET/-67°F+SET	-25	-13	Pr2
US	Maximum Set Point	SET+99°C/SET+99°F	10	50	Pr2
ot	First probe calibration	-9.9+9.9°C/-17+17°F	0	0	Pr1
P2	Second probe presence	n – Y	Y	yes	Pr1
oE	Second probe calibration	-9.9+9.9°C/-17+17°F	0	0	Pr2
od	Outputs activation delay at start up	0 ÷ 99 min	1	1	Pr2
AC	Anti-short cycle delay	0 ÷ 50 min	5	5	Pr1
Cy	Compressor ON time faulty probe	0 ÷ 99 min	15	15	Pr2
Cn	Compressor OFF time faulty probe	0 ÷ 99 min	15	15	Pr2
DISPLAY					
CF	Measurement units	°C – °F	°C	°F	Pr2
rE	Resolution (only for °C)	dE – in	in	In	Pr1
dy	Display delay	0 ÷ 15 min	1	1	Pr2
DEFROST					
dE	Defrost termination temperature	-55+50°C/-67+99°F	5	41	Pr1
do	Set for defrost relay activation with td=Ar	-55+50°C/-67+99°F	0	32	Pr1
id	Interval between defrost cycles	0 ÷ 99 hours	6	6	Pr1
Md	Maximum length for defrost	0 ÷ 99 min.	30	30	Pr1
dF	Display during defrost	rt – in – SP – dF	It	It	Pr2
FANS					
F1	Fans operating mode (Set=>do)	cn – on – cY – oY	Cy	Cy	Pr1
F2	Fans operating mode (Set<do)	cn – on – cY – oY	Cn	Cn	Pr1
Fd	Fans delay after defrost	0 ÷ 99 min	2	2	Pr1
FS	Fans stop temperature	-55+50°C/-67+99°F	5	41	Pr2
Fn	Fan on time with compressor off	0+15 (min.)	1	1	Pr1
FF	Fan off time with compressor off	0+15 (min.)	3	3	Pr1
ALARMS					
AL	Minimum temperature alarm	-55°C+ALU/-67°F+ALU	-55	-55	Pr1
AU	Maximum temperature alarm	ALL+99°C / ALL+99°F	99	99	Pr1
Ad	Temperature alarm delay	0 ÷ 99 min	99	99	Pr2
dA	Exclusion of temperature alarm at startup	0 ÷ 99 min	99	99	Pr2
DIGITAL INPUT					
iP	Digital input polarity	cL – oP	CL	CL	Pr1
iF	Digital input configuration	EA – bA – do – dF – Au – Hc	EL	EL	Pr1
di	Digital input delay	0 ÷ 99 min	5	5	Pr1

LABEL	DESCRIPTION	RANGE	°C	°F	LEVEL
dC	Compressor and fan status when open door	no /Fn / cP / Fc	Fn	Fn	Pr2
rd	Regulation with door open	n - Y	y	Y	Pr2
OTHER					
d1	Thermostat probe display	Read Only	-	-	Pr2
d2	Evaporator probe display	Read Only	-	-	Pr1
rL	Firmware release	Read Only	-	-	Pr2
Pt	Parameter code table	Read Only	-	-	Pr2



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