XW777K – VGW870

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.
- Dixell S.r.l. 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.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

Model **XW777K** is microprocessor based controller suitable for applications on medium or low temperature refrigerating units. It has to be connected by means of a 3-wire cable (∅ 1mm) at a distance of up to 30 meters to the keyboard **VGW870**.
It is provided with up to 6 relay outputs to control compressor, evaporator fans, defrost, light and alarm.
It is also provided with 4 NTC or PT1000 probe inputs, one for temperature control, one to control the defrost end temperature of the evaporator and the third and fourth to log temperatures or to display another temperature.
The HOT KEY output allows connecting the unit, by means of the external module XJ485-CX, to a network line **ModBUS-RTU** compatible such as the Dixell monitoring units of X-WEB family. It allows programming the controller by means the HOT-KEY programming keyboard.
The instrument is fully configurable through special parameters that can be easily programmed through the keyboard.
Furthermore it is able of logging a temperatures detected by the probes and its status.
It is provided with USB output to download the data. The data are collected into standart text format (.txt) file and can be easily read with a standard spreadsheet program such as Microsoft Excel ®.

3 TECHNICAL FEATURES

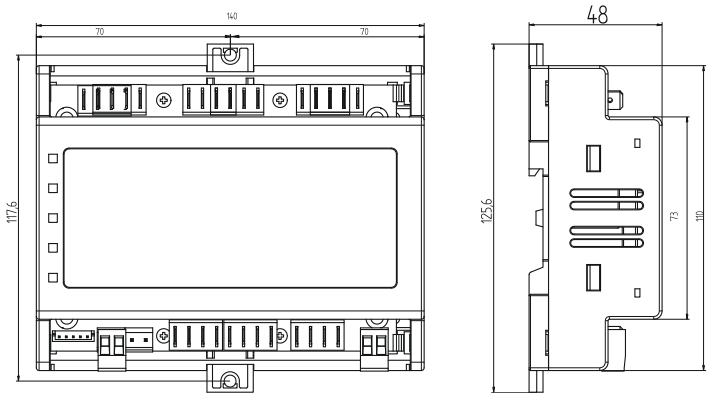
Power module XW777K
Case: 8 DN: 140X176X148
Connections:
Disconnectable screw terminal blocks ≤ 2.5 mm² for probes and digital input.
6.3mm Faston for loads and power supply
Power supply: 230Vac or. 110Vac ± 10% or 24Vac
Power absorption: 10VA max
Inputs: 4 NTC or PT1000 probes
Digital inputs: 1 free voltage
Relay outputs: ***Total current on loads MAX. 20A***
Compressor: relay SPST 20(8) A, 250Vac
Fan: relay SPST 8(3) A, 250Vac
Light: relay SPST 8A, 250Vac
Auxiliary: relay SPST 8A, 250Vac
Defrost: relay SPST 8A, 250Vac
Alarm: relay SPST 1A, 250Vac
Serial DATA output/input: USB connector
Serial output for monitoring: TTL type
Communication protocol: Modbus - RTU
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 110°C (-58 to 230°F)
PT1000 probe: -100 to 150°C (-148 to 302°F)
Resolution: 0.1°C or 1°C or 1°F (selectable)
Accuracy (ambient temp. 25°C): ±0.5°C ±1 digit
Internal real time clock with rechargeable battery
Clock battery back up: up to 3 months
Data memory capacity: 35000 samples
Samples recording delay: 1 to 15 min

VGW870 LCD display
Case: 156X82X36
Connections: The connection between the controller and the VGW870 must be implemented using a BELDEN 8772 cable (3xAWG20).
Max distance between XGW870 and XW777K: 30m, using shielded cable, and separated and far enough from power cables.
Power supply: from the controller XW777K
Power absorption: 10VA max
Resolution: 240x96 pixel LCD graphic display.
Panel or wall mounted.

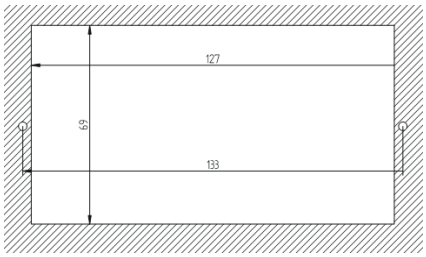
4 INSTALLATION AND MOUNTING

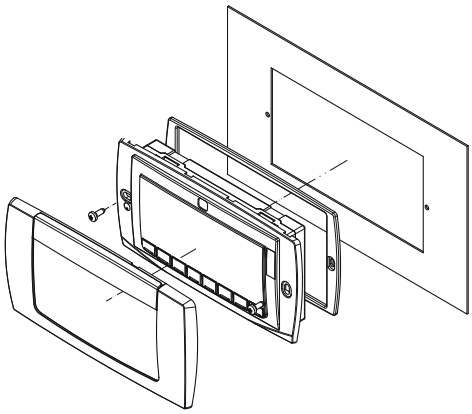
The controller **XW777K** shall be mounted in a din rail
It must be connected to the keyboard by means of a two-wire cable (∅ 1mm). The temperature range allowed for correct operation is 0 to 60°C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let the air circulate by the cooling holes.

4.1 XW777K – 8 DIN CASE - DIMENSIONS



VGW870 DIMENSIONS AND MOUNTING





5 ELECTRICAL CONNECTIONS

XW777K is provided with disconnect-able screw terminal blocks for probes digital input and keyboard.
To connect, power supply and relays, **XW777K** is provided with Faston connections (6.3mm). Heat-resistant cables have to be used.
Before connecting cables make sure the power supply complies with the instrument's requirements. Separate the probe and digital input 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.
Max distance for digital inputs and probe are 15m, use shielded twisted cable for digital inputs and for extension on the probe cables.
NOTE: the maximum current allowed for all the loads is 20A.

5.1 PROBE CONNECTIONS

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.

5.2 BACK UP BATTERY CONNECTION

On terminals 36(+) and 37(-) can be connected an external 6VDC accumulator, to maintain the main controller on, also in case of blackout.
Controller charges the accumulator, when connected.
An accumulator with 50Ah, full loaded, has a discharge time of 50h.
Accumulator 12Ah, charge time is :
- Worst case: 12 days (all the relays always on, Back light of the keyboard on)
- Average case: 8 days (2 relays on, 2 off, backlight working at 50%)

5.3 DEVICE OPERATIONS IN CASE OF POWER FAILURE, IF A BACK UP BATTERY IS CONNECTED

5.3.1 Power failure without temperature alarm

If the controller is connected to the battery, during a power failure:
1. The alarm LED icon will be lit.
2. The alarm relay will be activated according to the **Aro** parameter.
3. Every 5s the buzzer will ring 3 times during 1s.

The buzzer will be muted after pressing any button. It will restart ringing after the **bon** time if the power failure keeps on lasting. After pushing **SET** button, the controller will display the temperature for 5s.

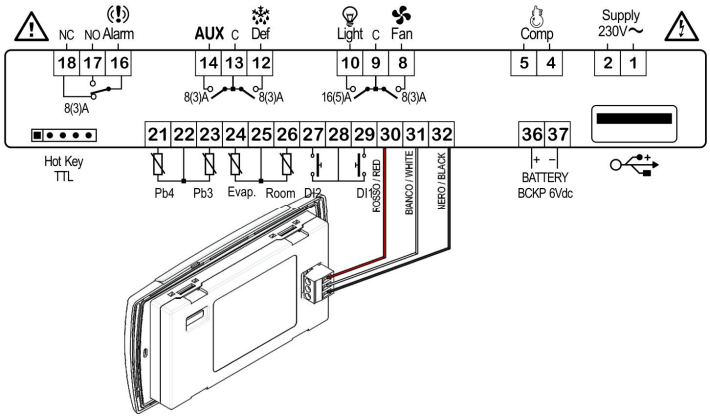
5.3.2 Power failure and temperature alarms

If a temperature alarm happens during a power failure:
1. The alarm LED icon will be lit.
2. The buzzer will ring continuously.
3. The displays will shows: real temperature for 1s, alarm label for 1s and remains off for 5s.

The buzzer will be muted for the **bon** time after pressing any button.

6 CONNECTIONS

6.1 XW777K AND VGC870

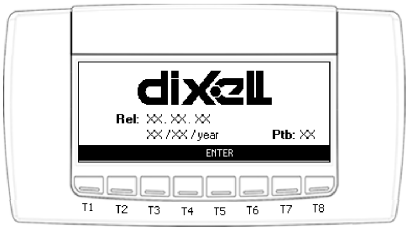


7 TTL/RS485 SERIAL LINE

The TTL connector allows, by means of the external module TTL/RS485 **(XJ485CX)**, to connect the unit to a network line **ModBUS-RTU** compatible as the dixell monitoring system XJ500 (Version 3.0). The same TTL connector is used to upload and download the parameter list of the "**HOT-KEY**". The instruments can be ordered wit the serial output RS485 (Optional).

8 USER INTERFACE

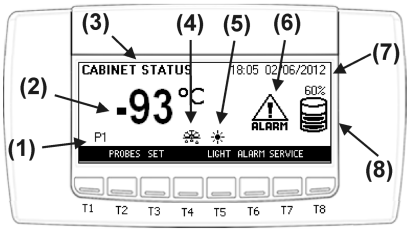
8.1 WELCOME SCREEN AFTER POWER ON



Where:
- **Rel:** release firmware XW777K / product family / release EEPROM
- **Ptb:** parameter map release

Push the ENTER key to enter the standard visualization. Note that the controller will start the regulation after power on.

8.2 HOME SCREEN



SYMBOL LEGEND

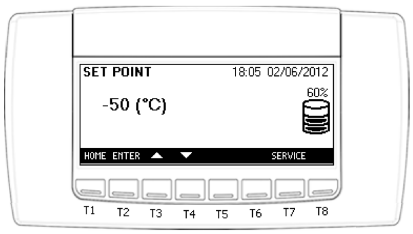
(1)	Probe displayed (P1, P2, P3 or P4)
(2)	Probe temperature measurement
(3)	Frame information
(4)	Defrost icon appear when a defrost is running
(5)	Light icon appear when light output is activated
(6)	the alarm icon will flash when an alarm is present
(7)	Time (hh:mm) and date DD/MM/YYYY (format depending on EU parameter)
(8)	Percentage of memory used and data log: both percentage and icon will be present only if the data log function is activated.

KEYS

PROBES (T2)	To change the displayed probe. **NOTE:** it browses only between the present probes.
SET (T3)	**Set point:** to enter the Set point modification menu.
LIGHT (T5)	To switch the light on or off (not active when in OFF state)
ALARM (T6)	**Alarm:** to enter the alarm menu
SERVICE (T7)	**Service:** to enter the Service menu

9 HOW TO SEE AND MODIFY THE SETPOINT

9.1 SETPOINT SCREEN



1. Push and immediately release the **SET** key: the display will show the Set point value, the labels of the alarm and light will be switched off;
2. While the SET label will be displayed as for the following picture:
3. Push and immediately release the **HOME** key or wait for 60 sec to display the probe value again.

9.2 HOW TO CHANGE THE SETPOINT

1. Push the **ENTER** key for more than 2 sec to change the Set point value;
2. The value of the set point will be displayed;
3. To change the Set value push the **UP** or **DOWN** buttons within 60 sec.
4. To memorise the new set point value push the **ENTER** button again or wait for 60 sec.

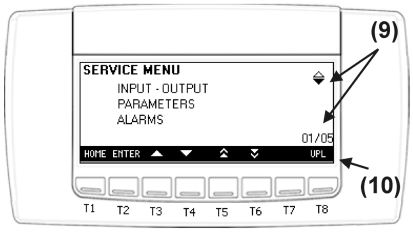
10 SERVICE MENU

The service menu collects the main functions of the controller.
From the Service menu is possible to:
- See the input and output values and their related graphics.
- Enter the programming parameter MENU
- Set the administrator password

- Permit the user to access some menus
- Access the SELF TEST menu
- Set the instrument language.
- Set the real time clock
- Control defrost operations
- Copying all the parameter values into an HOT-KEY (upload operation)

10.1 SERVICE MENU SCREENS

From the main display screen push the SERVICE button and the SERVICE menu is entered.
See the below picture where the first service screen is displayed:



SYMBOL LEGEND

(9)	**How many pages are present on this screen (in the form pag-num / pag-total)**
(10)	**UPL button**

KEYS

UP (T3)	To move through items
DOWN (T4)	To move through items
NEXT (T5)	To move through the available pages.
PREVIOUS (T6)	To move through the available pages.
UPL (T8)	To copy all parameter values into an HOT-KEY

The Service sub-menus are the following (arranged in a maximum of 4 for each screen):

MENU	SCREEN
INPUT-OUTPUT	1
PARAMETERS	1
ALARMS	1
DATA	2
RESET DATA AND ALARMS	2
SELF TEST	2
CHANGE PASSWORD	3
PASSWOR PROTECTION	3
CLOCK	3
LANGUAGE	4
DEFROST ACTIVATION	4
DEFROST INFORMATION	4
ON-OFF	5
INFORMATION	5

Select one of them with the **UP** or **DOWN** keys or browse between service screens by using **NEXT** and **PREVIOUS** keys, then push the **ENTER** key to enter the selected sub-menu.

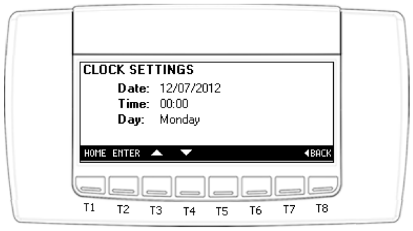
11 HOW TO SET TIME AND DATE: CLOCK MENU

In the **CLOCK MENU** it is possible to set the Reak Time Clock.

Procedure:

1. Enter the **SERVICE** menu.
2. Select **CLOCK** sub-menu and press the **ENTER** button.
3. Select the date or time field to modify and then press the **ENTER** button.
4. Set the new value by using the **UP** and **DOWN** buttons.
5. Confirm the new value by pressing the ENTER button.
6. Move on the other fields (date or time) by using **UP** and **DOWN** buttons.
7. Exit the menu by pressing the available buttons (**HOME** or **BACK**).

NOTE: to memorize, data, alarms and to enable the automatic energy saving cycle the real time clock has to be set.

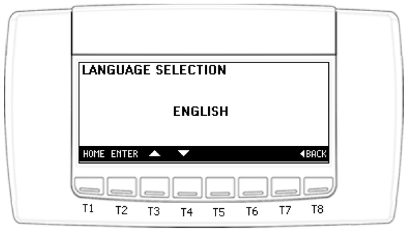


12 HOW OT SET THE LANGUAGE: LANGUAGE MENU

In the **LANGUAGE MENU** it is possible to set the Reak Time Clock.

Procedure:

1. Enter the **SERVICE** menu.
2. Select **LANGUAGE** sub-menu and press the **ENTER** button.
3. Press the **ENTER** button.
4. Set the new language by using the **UP** and **DOWN** buttons.
5. Push the **ENTER** button to confirm.
6. Exit the menu by pressing the available buttons (**HOME** or **BACK**).



13 HOW TO SEE THE VALUES OF PROBES AND LOADS: INPUT-OUTPUT SCREENS

In the **INPUT-OUTPUT MENU** it is possible to see the probe temperatures the digital input and the output status.

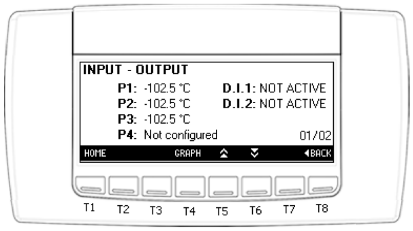
Procedure:

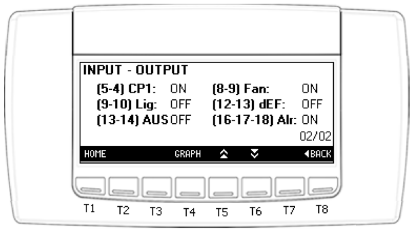
1. Enter the **SERVICE** menu
2. Select **INPUT-OUTPUT** sub-menu
3. Push the **ENTER** key.

Use **NEXT** and **PREVIOUS** buttons to browse between screens.

The **INPUT-OUTPUT** sub-menu will display the probe values, the digital input status and the output status in the following layout:

SUB-MENU	SCREEN
PROBES AND DIGITAL INPUTS	1
OUPUTS STATUS	2





KEYS

GRAPH (T4)	To enter the graphic menu

14 HOW TO USE THE PROGRAMMING "HOT KEY"

14.1.1 PROGRAM AN INSTRUMENT BY USING A HOT-KEY (DOWNLOAD)

1. Turn OFF the instrument.
2. Insert a **pre-programmed** "**HOT-KEY**" **into the 5-PIN receptacle** and then turn the Controller ON.
3. The parameter list of the "**HOT-KEY**" will be automatically downloaded into the Controller memory.
   a) **Hot download completed** will be displayed if everything goes well..
   b) **Hot download error** will be displayed if it was a problem
4. Remove the "**HOT-KEY**".

NOTE: the message "**Hot download error**" is displayed 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.

14.1.2 PROGRAM A HOT-KEY FROM AN INSTRUMENT (UPLOAD)

1. Program one controller with the front keypad.
2. When the controller is ON, enter SERVICE menu, insert the "**HOT-KEY**" and push **UPL** button;
3. The following messages will be displayed:
   a) **Hot Key upload completed** if everything went well..
   b) **Hot Key upload error** will be displayed if it was a problem
4. Remove the "**HOT-KEY**".

NOTE: the "**Hot upload error**" message appears in case of a failed programming operation. In this case push again **UPL** button if you want to restart the upload again or remove the "**HOT-KEY**" to abort the operation.

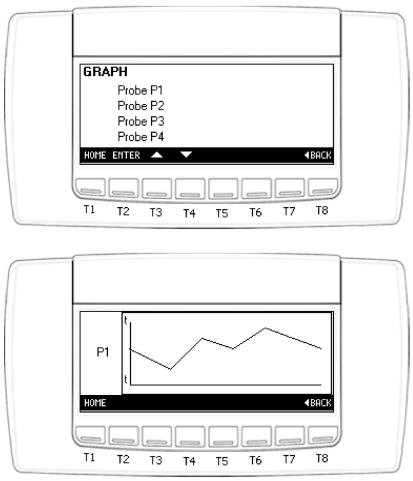
15 GRAPHICS MENU

In the **GRAPHICS MENU** it is possible to see the temperature trend of every present probe.

Procedure:

1. Press the **GRAPH button**.

2. Select the probe to view with the **UP** and **DOWN** buttons from the list and then confirm with the **ENTER** button.
3. Move between available graphics by using **NEXT** and **PREVIOUS** buttons.
4. Exit the menu by pressing the available buttons (**HOME** or **BACK**).



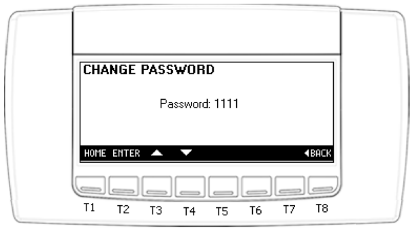
NOTE: it is possible to see the last 100 recorded samples. The total interval of time depends on the delay between samplings.

16 CHANGE PASSWORD MENU

In the **CHANGE PASSWORD MENU** it's possible to set the administrator PASSWORD. Before accessing this menu, the user will have to enter the actual password (see par. 16).

Procedure:

1. Enter the **SERVICE** menu
2. Select the **CHANGE PASSWORD** sub-menu and press the **ENTER** button.
3. Set the new administrator password value with **UP** and **DOWN** buttons.
4. Confirm the new value by pressing the **ENTER** button.
5. The "Configuration" icon will disappear and the new password will be set.
6. Exit the menu by pressing the available buttons (**HOME** or **BACK**).



17 PASSWORD PROTECTION MENU

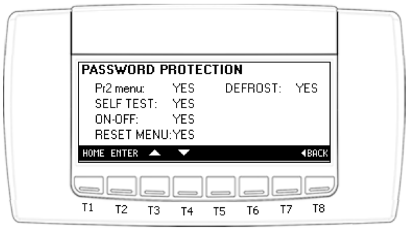
In the **PASSWORD PROTECTION MENU** it is possible to lock the access to the:

- Pr2 Parameter menu;
- SELF TEST menu.
- ON-OFF menu.
- RESET DATA AND ALARM menu.
- DEFROST menu.

Before accessing this menu, the user will have to enter the actual password (see par. 16).

Procedure:

1. Enter the **SERVICE** menu
2. Select **PASSWORD PROTECTION** sub-menu and press the **ENTER** button.
3. Select the item to protect by using **UP** and **DOWN** buttons.
4. Press the **ENTER** button.
5. Modify the required protection by using **UP** and **DOWN** buttons.
6. Push the **ENTER** button to confirm.
7. Exit the menu by pressing the available buttons (**HOME** or **BACK**).



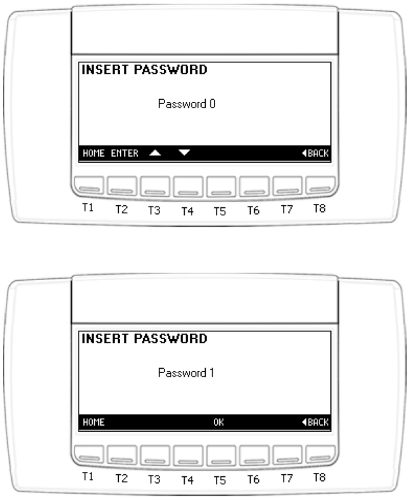
18 INSERT PASSWORD MENU

If a menu or submenu requests the administrator password to access, the following screen will be displayed.

Procedure:

1. Push the **ENTER** key.
2. Use the **UP** and **DOWN** keys to set the password
3. Push the **ENTER** key to confirm it
4. The following message is displayed
5. Push the **OK** button (visible only if the inserted password is correct) to enter the protected menu.

A master-password is available, its value is 881.

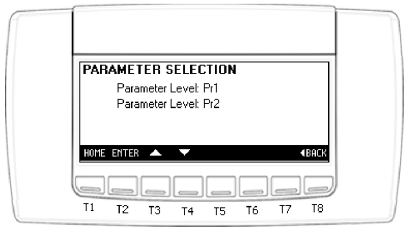


19 PROGRAMMING

In the **PROGRAMMING MENU** it is possible to modify the working parameters.

Procedure:

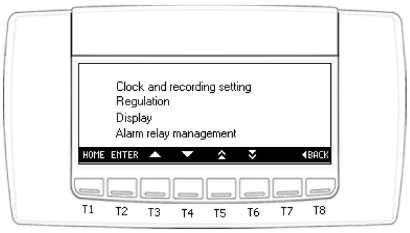
1. Enter the **SERVICE** menu
2. Select **PARAMETERS** sub-menu
3. Push the **ENTER** key and the programming menu will be entered.
4. Use **UP** or **DOWN** buttons to select the required level.
5. Press **ENTER** button to enter the selected menu.



Parameters are collected in two menus:
Pr1: menu of parameters without password. Select Pr1 and press **ENTER** key to access to it.
Pr2: menu of all the parameters. It can be protected by password (see par. 17). In this case follow the procedure of par.16 to access this menu.

20 Parameters grouping

The parameters are collected in sub-menu according to the following interface.



Procedure:
Select a group of parameters by using **UP** or **DOWN** buttons.
Push the **ENTER** key and the programming menu will be entered

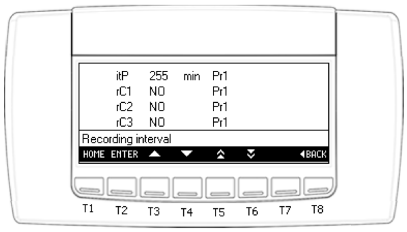
These groups of parameters are available:

SUBMENU	SCREEN
CLOCK AND RECORDING SETTING	1
REGULATION	1
PROBE INPUTS	1
DISPLAY	1
DEFROST	2
FANS	2
TEMPERATURE ALARMS FOR REGULATION PROBE P1	2
TEMPERATURE ALARMS FOR LOGGING PROBE P3	2
TEMPERATURE ALARMS FOR LOGGING PROBE P4	3
ALARM RELAY MANAGEMENT	3
DIGITAL INPUTS	3
SET CURRENT TIME AND WEEKLY HOLIDAYS	3

SET ENERGY SAVING TIMES	4
SET DEFROST TIMES	4
OTHER	4

NOTE: some submenus could be absent depending on the model.

To enter a specific submenu, select it with **UP** and **DOWN** keys and then press the **ENTER** key. After that, the related parameters, with their actual value, will be displayed. The below picture is an example of the first submenu (**CLOCK AND RECORDING SETTING**)



Where:

- **The first column** shows the label of the parameters.
- **The second column** shows their actual value.
- **The third column** shows if the parameters are in Pr1 or Pr2 level. NOTE that this columun is ONLY present when the Pr2 level is accessed.
- **The last row**, the one above the key description, contains the parameter description.
- **The number on the high right angle** is the number of the displayed screen.

To modify a parameter:

1. Push the **ENTER** key and then use the **UP** and **DOWN** keys to modify the value.
2. Then push the **ENTER** key to store the new value and move to the following parameter.

NOTE:

- The Pr2 or Pr1 message is present only in Pr2 menu.
- It is possible to modify the level of each parameter changing Pr2 → Pr1 or vice versa.
- Pushing the **BACK** button the PARAMETER SELECTION screen will be displayed.

21 SELF TEST MENU

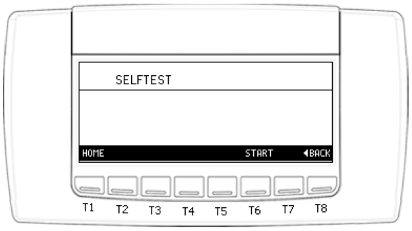
In the **SELF TEST MENU** it is possible to quickly test the I/O lines of the controller. Before accessing this menu, the user will have to enter the actual password (see par. 16).

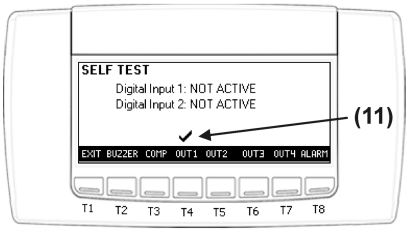
Procedure:

1. Enter the **SERVICE** menu.
2. On the **SELF TEST** sub-menu press the **START** button.
3. The activation and deactivation of any output (only ONE AT A TIME is permitted) will be made by pressing the relative button (**OUTx**).
4. The activation and deactivation of the buzzer (when present) is made by pressing the relative button.
5. The digital outputs status will be updated depending on their phisical level.
6. Exit the menu by pressing the **EXIT** button.

NOTES:

- **The outputs will stay energized until a different button will be pressed.**
- **All outputs will be de-energized after exiting the SELF TEST MENU or after elapsing a safety interval of time of 60 sec.**
- **The buzzer will only sound; no activation icon will be displayed above the buzzer button.**





SYMBOL LEGEND

(11)	**The activation icon indicates that the relative output is energized.**

22 ALARMS

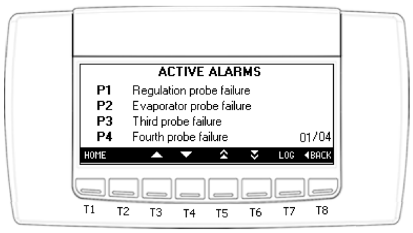
The controller can store in its internal memory the last 20 alarms, together with their start and finish time. If any alarm is present, the **HOME** screen will display the relative icon (see symbol legend (5) on par. 8.2). To see the stored alarms, follow the following procedure.

22.1 ACTIVE ALARMS MENU

There are a couple of ways to access the ACTIVE ALARM menu:

- By using the **ALARM** key from the **HOME** screen.
- By selecting the **ALARM** submenu from the SERVICE screen

After accessing the menu **ALARMS**, the following screen will appear: all the active alarms will be displayed and it will be possible to select each of them to have more information.



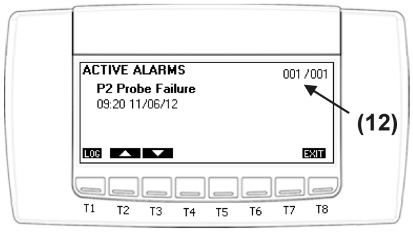
KEYS

LOG (T7)	To directly enter the stored alarm menu.

The first column shows the alarm code, while the second column shows the alarm description.
Select an alarm by using the **UP** and **DOWN** or move through screens by using **NEXT** and **PREVIOUS** keys, then push the **ENTER** key to access the **ALARM ACTIVE** menu, as shown in the following picture. To directly enter the stored alarms, push the **LOG** key.

22.2 ACTIVE ALARM LOG MENU

This menu contains all the information concerning the active alarms.
In the high right angle, the total number of active alarms is displayed..



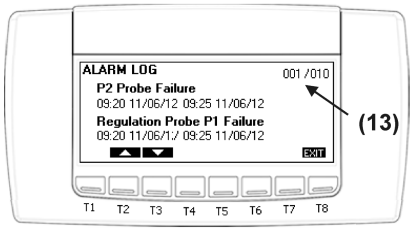
SYMBOL LEGEND

(12)	**Alarm selected / Total number of active alarms**

It's possible to move through the active alarms by pressing the **UP** and **DOWN** keys.

22.3 ALARM LOG MENU

Push the **LOG** key in the **ACTIVE ALARMS** screen to enter the **ALARM LOG** menu. In this menu, all the stored alarms (one for each screen) can be analized.



SYMBOL LEGEND

(13)	**Alarm selected / Total number of logged alarms**

For each alarm the starting time and date and the finish time and date are recorded.
Push the **EXIT** key to come back to the **ACTIVE ALARMS MENU**.

23 ALARM SIGNALS

Message	*Cause*	*Outputs*
"P1"	Regulating probe TR3 failure	Alarm output ON; Compressor output according to parameters **Con** and **CoF**.
"P2"	EVP Probe Failure	Alarm output ON; Other outputs unchanged
"P3"	Logging probe TL1 failure	Alarm output ON; Other outputs unchanged
"P4"	Logging probe TL2 failure	Alarm output ON; Other outputs unchanged
"HA1"	TR3 High Alarm	Alarm output ON; Other outputs unchanged
"LA1"	TR3 Low Alarm	Alarm output ON; Other outputs unchanged
"HA3"	High temperature alarm probe TL1	Alarm output ON; Other outputs unchanged
"LA3"	Low temperature alarm probe TL1	Alarm output ON; Other outputs unchanged
"HA4"	High temperature alarm probe TL2	Alarm output ON; Other outputs unchanged
"LA4"	Low temperature alarm probe TL2	Alarm output ON; Other outputs unchanged
"dA"	Door Open Alarm	Compressor and fans depend on "**rrd**"
"EA"	External Alarm	Output unchanged.
"CA"	Serious Alarm	All outputs OFF.

The alarm message is displayed until the alarm condition is recovery.
All the alarm messages are showed alternating with the room temperature except for the "P1" which is flashing.

23.1 SILENCING BUZZER

Once the alarm signal is detected the buzzer can be silenced by pressing any key. Buzzer is mounted in the keyboard and it is an option.

23.2 "EE" ALARM

The **dixell** instruments are provided with an internal check for the data integrity. The "EE" alarm flashes when a failure in the memory data occurs. In such cases the alarm output is enabled.

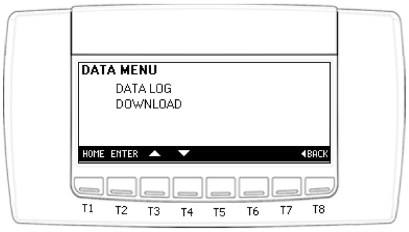
23.3 ALARM RECOVERY

Probe alarms: "**P1**" (probe1 faulty), "**P2**", "**P3**" and "**P4**"; they automatically stop 10 sec after the probe restarts normal operation. Check connections before replacing the probe.
Temperature alarms "**HA1**", "**LA1**", "**HA3**", "**LA3**", "**HA4**" and "**LA4**" 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.

24 DATA MENU

The data menu is immediately accessible by the **SERVICE** screen, by selecting the **DATA** item.
The data menu has 3 submenus:

- **DATA LOG**, which contains all the data recorded by the controller.
- **DOWNLOAD**, which permits to export the data to an **USB** drive.

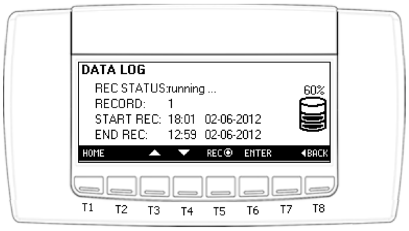


24.1 DATA LOG MENU

This menu contains all the data intervals recorded by the controller.
Procedure:

1. Select **DATA LOG** from **DATA MENU** by using **UP** and **DOWN** keys.
2. Push the **ENTER** key and the menu will be entered.

The logged data will have the following layout:



KEYS

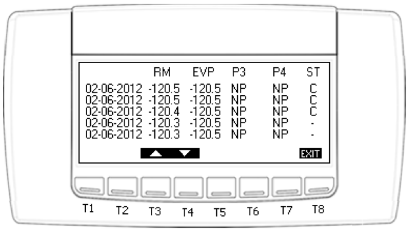
REC (T5)	Used to start and stop the logging of data (when enabled from parameter).
ENTER (T6)	Used to show the logged data related to the selected RECORD.

Where

- **REC STATUS:** it shows the recording status.
- **RECORD:** to selected an available interval of time.
- **START REC:** it is the beginning of the selected interval of time.
- **END REC:** it is the finish of the selected interval of time.

24.2 VIEW DATA MENU

This menu shows all the data belonging to the selected RECORD. It is possible to scroll all the recorded data by using **UP** and **DOWN** keys. The **HOURGLASS** icon will appear on the left screen button side until the display is collecting the data to show.



KEYS

UP	Used to move through items.
DOWN	Used to move through items.

RM, EVP, P3, P4: value of probe P1, P2, P3 and P4 (when they are present).
In case of probe failure the label "ERR" will be displayed. In case of probe absence (**PxP=n**) the label "NP" will be displayed.

ST: status of the controller/loads. See the following table:

"-"	it is working with no load activated
OFF	it is working in stand by mode
D	a defrost is running
C	the compressor is working

24.3 EXPORT MENU

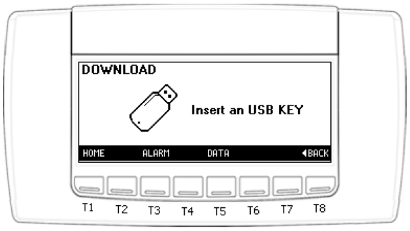
To access this menu select the **DOWNLOAD** submenu from the **DATA MENU**. This menu gives the possibility to export all recorded data into an external USB mass storage device. The following screen will appear until an USB drive will be detected.

To download the data into the USB drive follow this:

1. Insert an USB drive.
2. Press the **ALARM** or **DATA** button to export the related values.
3. Wait for the process to finish. During this time the controller will starts sending data to the USB drive.

IMPORTANT: during the download phase DO NOT remove the USB mass storage device: this action could damage the database and USB drive itself.

4. The **"V"** symbol will appear and a confirmation message will be displayed in case of a successful download operation. This visualization lasts for 60 sec or until the HOME or BACK button is pressed, after that the **DATA MENU** screen will be restored.
5. An **"ERROR"** message will displayed in case of a failure. This visualization lasts for 60 sec or until the HOME or BACK button is pressed, after that the **DATA MENU** screen will be restored.
6. Remove the USB mass storage device or try to repeat the download operation.

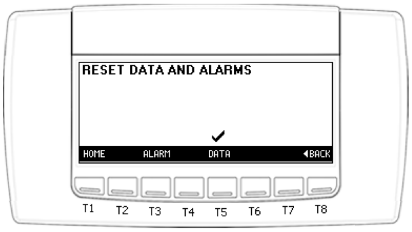


25 RESET DATA AND ALARM MENU

From the **SERVICE MENU** it is possible to select the **RESET MENU** and cancel all the recorded values from the internal database.

Procedure:

1. Enter the **SERVICE** menu.
2. Select **RESET DATA AND ALARM** sub-menu and press the **ENTER** button.
3. Insert the required password and confirm.
4. Select the item to reset by using **ALARM** or **DATA** buttons.
5. Wait for the process to finish.
6. At the end of the process the "**V**" icon will appear.
7. Exit the menu by pressing the available buttons (**HOME** or **BACK**).

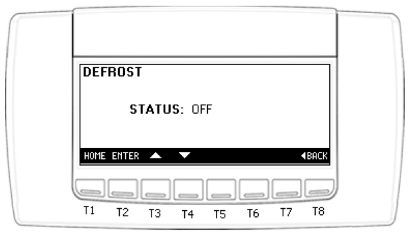


26 DEFROST ACTIVATION MENU

In the **DEFROST ACTIVATION MENU** it is possible to force a manual defrost.

Procedure:

1. Enter the **SERVICE** menu.
2. Select **DEFROST ACTIVATION** sub-menu and press the **ENTER** button.
3. Press the **ENTER** button.
4. Set the new defrost status by using the **UP** and **DOWN** buttons.
5. Push the **ENTER** button to confirm.
6. A new defrost operation will start or finish depending on the new status.
7. Exit the menu by pressing the available buttons (**HOME** or **BACK**).

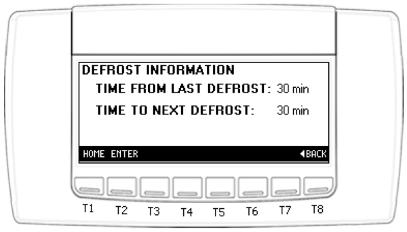


27 DEFROST INFORMATION MENU

In the **DEFROST INFORMATION MENU** it is possible to control the defrost operations.

Procedure:

1. Enter the **SERVICE** menu.
2. Select **DEFROST INFORMATION** sub-menu and press the **ENTER** button.
3. The information related to the last and the next defrost will be displayed.
4. Exit the menu by pressing the available buttons (**HOME** or **BACK**).



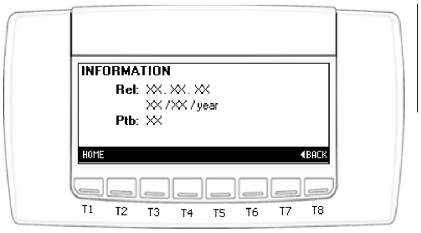
28 INFORMATION MENU

In the **INFORMATION MENU** it is possible to find the followin controller related information:

- Release firmware: **XW777K** / **product family** / **release EEPROM**.
- Release date in the format: **dd/mm/yy**
- EEPROM release

Procedure:

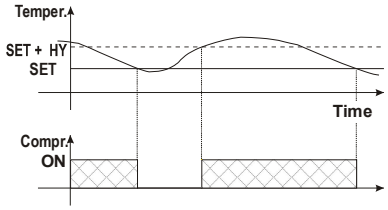
1. Enter the **SERVICE** menu.
2. Select **INFORMATION** sub-menu and press the **ENTER** button.
3. Exit the menu by pressing the available buttons (**HOME** or **BACK**).



29 CONTROLLING LOADS

29.1 COMPRESSOR

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 "**COn**" and "**COF**".

29.2 DEFROST

Two defrost modes are available through the "**tdF**" parameter: defrost through electrical heater (**tdF = EL**) and hot gas defrost (**tdF = in**).
The defrost interval depends on the presence of the RTC (optional). If the RTC is present is controlled by means of parameter "**EdF**":

- with EdF=in the defrost is made every "**IdF**" time – standard way for controller without RTC.
- with EdF = "rtc", the defrost is made in real time depending on the hours set in the parameters **Ld1..Ld6** on workdays and in **Sd1…Sd6** in holidays;

Other parameters are used to control defrost cycles: its maximum length (MdF) and two defrost modes: timed or controlled by the evaporator's probe (P2P).
At the end of defrost dripping time is started, its length is set in the Fdt parameter. With Fdt =0 the dripping time is disabled.

29.3 CONTROL OF EVAPORATOR FANS

The fan control mode is selected by means of the "**FnC**" parameter:
FnC = C_n: fans will switch ON and OFF with the compressor and **not run** during defrost;
FnC = o_n 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 "**Fnd**" parameter.
FnC = C_Y fans will switch ON and OFF with the compressor and **run** during defrost;
FnC = o_Y fans will run continuously also during defrost

An additional parameter "**FSt**" 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 "FSt".

29.3.1 Forced activation of fans

This function managed by the **Fct** parameter is designed to avoid short cycles of fans, that could happen when the controller is switched on or after a defrost, when the room air warms the evaporator.
Functioning: 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. With Fct=0 the function is disabled.

29.3.2 Cyclical activation of the fans with compressor off.

When Fnc = c-n or c-Y (fans in parallel to the compressor), by means of the Fon and FoF 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 Fon time. With Fon =0 the fans remain always off, when the compressor is off.

29.4 AUXILIARY OUTPUT CONFIGURATION

The functioning of the auxiliary relay (terminals. 20-21) can be set by the **oA4** parameter, according to the kind of application. In the following paragraph the possible setting:

29.4.1 Auxiliary thermostat

I.E.. anti condensing heater) with the possibility of switching it on and off also by keyboard

Parameters involved:

- **ACH** Kind of regulation for the auxiliary relay: **Ht:** heating; **cL:** cooling**;**
- **SAA** Set point for auxiliary relay
- **SHy** Differential for auxiliary relay
- **ArP** Probe for auxiliary relay
- **Sdd** Auxiliary output off during defrost

By means of these 5 parameters the functioning of the auxiliary relay can be set.. The differential is given by the **SHy** parameter.
The auxiliary relay can be switched on also by the AUX button. In this case it remains on till it's manually switched off.

NOTE: Set **Oa4 =AUS** and **ArP= nP** (no probe for auxiliary output).
In this case the relay 20-21 can be activated only by pushing the AUX button of the keyboard.

29.4.2 On/off relay – oA4 = onF

In this case the relay is activated when the controller is turned on and de-activated when the controller is turned off.

29.4.3 Neutral zone regulation

With **oA4 = db** the relay 20-21 can control a heater element to perform a neutral zone action.
oA4 cut in = SET-HY
oA4 cut out = SET

29.4.4 Second compressor

With **oA4 = CP2**, the relay 20-21 operates as second compressor: it is activated in parallel with the relay of the first compressor, with a possible delay set in the **AC1** parameter. Both the compressors are switched off at the same time.

29.4.5 Alarm relay

With **oA4 = ALr** the relay 20-21 operates as alarm relay. It is activated every time an alarm happens. Its status depends on the **tbA** parameter: if "**tbA = y**", the relay is silenced by pressing any key.
If "**tbA = n**", the alarm relay remains on until the alarm condition recovers.

29.4.6 Night blind management during energy saving cycles

With **oA4 = HES,** the relay 20-21 operates to manage the night blind: the relay is energised when the energy saving cycle is activated , by digital input, frontal button or RTC (optional)

29.5 LIGHT

The light status depends on the status of the door switch.
In any case it can be activated by the **LIGHT** button on the keyboard.

30 PARAMETER LIST

CLOCK AND RECORDING SETTING

itP **Recording interval** (1÷255min)
rC1 **First probe recording enable**
y = recording enabled; **n** = recording disabled
rC2 **Second probe recording enable**
y = recording enabled; **n** = recording disabled
rC3 **Third probe recording enable**
y = recording enabled; **n** = recording disabled
rC4 **Fourth probe recording enable**
y = recording enabled; **n** = recording disabled
rCb **Start recording SET key enabling**
y = by the SET key is possible to start/stop recording.
n = recording is always enabled
EU **Date format**
EU = European: dd/mm/yyyy
US = USA: mm/dd/yyyy
rSd **Data erase** (no÷y)
rSA **Alarms erase** (no÷y)

REGULATION

SET **Set point** (LS÷US) It's the target temperature set point that the controller has to maintain.
Hy **Differential:** (0.1 to 25.5°C; 1 to 45°F) differential for set point, always positive. Compressor Cut IN is Set Point plus Differential (**HY**). Compressor Cut OUT is when the temperature reaches the set point.
LS **Minimum set point limit:** (-100.0°C to SET; -67°F to SET) Sets the minimum acceptable value for the set point.
US **Maximum set point limit:** (SET to 150°C; SET to 302°F) Set the maximum acceptable value for set point.

PROBE INPUTS

ot **Regulation probe calibration (term. 25-26):** (-12.0 to 12.0°C; -21 to 21°F) allows to adjust possible offset of the thermostat probe.
P2P **Evaporator probe presence (term. 24-25): n** = not present: the defrost stops only by time;
y = present: the defrost stops by temperature and time.
oE **Evaporator probe calibration:** (-12.0 to 12.0°C; -21 to 21°F) allows to adjust possible offsets of the evaporator probe.
P3P **Third probe presence (term. 22-23): n**= not present; **y=** present.
o3 **Third probe calibration:** (-12.0 to 12.0°C; -21 to 21°F) allows to adjust possible offsets of the third probe.
P4P **Fourth probe presence (term. 21-22): n**= not present; **y=** present.
o4 **Fourth probe calibration:** (-12.0 to 12.0°C; -21 to 21°F) allows to adjust possible offsets of the fourth probe.
odS **Outputs activation delay at start up:** (0 to 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 to 30 min) interval between the compressor stop and the following restart.
AC1 **2nd compressor delay at start up** (0÷255s) Used only with oA3 or oA4 = cP2 Time interval between the switching on of the first compressor and the second one.

Con Compressor ON time with faulty probe: (0 to 255 min) time during which the compressor is active in case of faulty thermostat probe. With **Con=0** compressor is always OFF.

COF Compressor OFF time with faulty probe: (0 to 255 min) time during which the compressor is off in case of faulty thermostat probe. With **CoF=0** compressor is always active.

DISPLAY

CF Temperature measurement unit: °C = Celsius; °F = Fahrenheit. When the measurement unit is changed the SET point and the values of the regulation parameters have to be modified

rES Resolution (for °C): (in = 1°C; de = 0,1°C) allows decimal point display.
dE = 0.1°C; **in** = 1 °C.

rEd Remote display: it select which probe is displayed by the Visograph: (P1; P2, P3, P4, SET, dtr): **P1** = Thermostat probe; **P2** = Evaporator probe; **P3** = Third probe(only for model with this option enabled); **P4** = Fourth probe, **SET** = set point; **dtr** = percentage of visualization.

dLy Display delay: (0.0 to 20min00sec; res. 10 sec) when the **temperature changes**, the display is updated of 1°C or 1°F after this time.

dtr Percentage of the second and first probe for visualization when rEd = dtr (0÷100; 100 = P1, 0 = P2): if rEd = dtr it allows to set the visualization according to the percentage of the first and second probe, as for the following formula (dtr(P1-P2)/100 + P2).

DEFROST

EdF Defrost mode (only for controller with RTC):
rtc = **Real Time Clock mode**. Defrost time follows **Ld1÷Ld6** parameters on workdays and **Sd1÷Sd6** on holidays.
in = **interval mode**. The defrost starts when the time "**idF**" is expired.

tdF Defrost type: EL = electrical heater; in = hot gas

dtE Defrost termination temperature: (-100.0 to 150.0°C; -67 to 302°F) (Enabled only when the evaporator probe is present) sets the temperature measured by the evaporator probe which causes the end of defrost.

IdF Interval between defrosts: (1 to 120 h) determines the time interval between two defrost cycles.

MdF (Maximum) duration of defrost: (0 to 255 min) When **P2P = n**, no evaporator probe, it sets the defrost duration, when **P2P = y**, defrost end based on temperature, it sets the maximum length for defrost.

dSd Start defrost delay: (0÷99min) 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 to 255 min) sets the maximum time between the end of defrost and the restarting of the real room temperature display.

Fdt Drip time: (0120 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.

FANS

FnC Fan operating mode:
C-n = running with the compressor, OFF during the defrost;
C-y = running with the compressor, 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 to 255 min) this is time interval between the defrost end and evaporator fans start.

Fct Temperature differential avoiding short cycles of fans (0÷59°C; Fct=0 function disabled). 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: (-100 to 150°C; -67 to 302°F) setting of temperature, detected by evaporator probe, above which the fan is always OFF.

Fon Fan ON time: (0 to 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 to 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.

AUXILIARY THERMOSTAT CONFIGURATION (terms. 13-14) – OA4 = AUS

ACH Kind of regulation for auxiliary relay: **Ht** = heating; **CL** = cooling

SAA Set Point for auxiliary relay: (-50,0÷110,0°C; -58÷230°F) it defines the room temperature set point to switch auxiliary relay.

SHy Differential for auxiliary output: (0,1 ÷ 25,5°C / 1÷255 °F) Intervention differential for auxiliary output set point.
With ACH = cL AUX Cut in is SAA + SHy; . AUX Cut out is SAA
With ACH = Ht AUX Cut in is SAA - SHy; . AUX Cut out is SAA

ArP Probe selection for auxiliary: nP = no probe, the auxiliary relay is switched only by button; **P1 =** Probe 1 (Thermostat probe); **P2 =** Probe 2 (evaporator probe); **P3 =** Probe 3 (display probe); **P4 =** Probe 4 fourth probe.

Sdd Auxiliary relay off during defrost: n = the auxiliary relay operates during defrost.
y = the auxiliary relay is switched off during defrost.

TEMPERATURE ALARMS FOR REGULATION PROBE P1

A1C Temperature alarm configuration:
rE = High and Low alarms related to Set Point
Ab = High and low alarms related to the absolute temperature.

A1U High temperature alarm for P1:
A1C = rE, 0 to 50°C or 0 to 90°F.
A1C = Ab, A1L to 150°C or A1L to 302°F.
When this temperature is reached and after the **A1d** delay time the **HA1** alarm is enabled.

A1L Low temperature alarm for P1:
A1C = rE, 0 to 50°C or 0 to 90°F;
A1C = Ab, -100°C to A1U or -67°F to A1U.
When this temperature is reached and after the **A1d** delay time, the **LA1** alarm is enabled.

A1H Differential for temperature alarm recovery: (0.1 to 25.5°C; 1 to 45°F) differential for temperature alarm recovery..

A1d Temperature alarm delay: (0 to 255 min) time interval between the detection of an alarm condition and the corresponding alarm signalling.

d1o Delay of temperature alarm at start-up: (0.0 to 23h50min, res. 10 min) time interval between the detection of the temperature alarm condition after the instrument power on and the alarm signalling.

TEMPERATURE ALARMS FOR LOGGING PROBE P3

A3U High temperature alarm for P3: (A3L to 150°C or A3L to 302°F)
When this temperature is reached and after the **ALd** delay time the **HA3** alarm is enabled.

A3L Low temperature alarm for P3: (-100°C to A3U or -67°F to A3U)
When this temperature is reached and after the **A3d** delay time, the **LA3** alarm is enabled.

A3H Differential for temperature alarm 3 recovery: (0.1 to 25.5°C; 1 to 45°F) differential for temperature alarm recovery..

A3d Temperature alarm 3 delay: (0 to 255 min) time interval between the detection of an alarm condition and the corresponding alarm signalling.

d3o Delay of temperature alarm 3 at start-up: (0.0 to 23h50min, res. 10 min) time interval between the detection of the temperature alarm condition after the instrument power on and the alarm signalling.

TEMPERATURE ALARMS FOR LOGGING PROBE P4

A4U High temperature alarm for P4: (A4L to 150°C or A4L to 302°F)
When this temperature is reached and after the **ALd** delay time the **HA3** alarm is enabled.

A4L Low temperature alarm for P4: (-100°C to A4U or -67°F to A4U)
When this temperature is reached and after the **A3d** delay time, the **LA3** alarm is enabled.

A4H Differential for temperature alarm 4 recovery: (0.1 to 25.5°C; 1 to 45°F) differential for temperature alarm recovery..

A4d Temperature alarm 4 delay: (0 to 255 min) time interval between the detection of an alarm condition and the corresponding alarm signalling.

d4o Delay of temperature alarm 4 at start-up: (0.0 to 23h50min, res. 10 min) time interval between the detection of the temperature alarm condition after the instrument power on and the alarm signalling.

ALARM RELAY MANAGEMENT – ONLY WITH BATTERY-BACKUP CONNECTED

tbA Alarm relay disabling (n, Y)
n = silencing disabled; alarm relay stays on till alarm condition lasts.
Y = silencing enabled; alarm relay is switched OFF by pressing a key during an alarm.

Aro Alarm relay activation with power failure: (n, Y)
n = the alarm relay is never activated during a power failure.
Y = the alarm relay is activated during a power failure.

ALF Alarm relay activation for all the alarms: (n, Y)
n = the alarm relay is activated only in case of a temperature alarm or regulation probe failure.
Y = the alarm relay is activated for all the alarms.

bon Time of buzzer restart after muting, in case of alarm duration: (0÷30min) when 0 the buzzer is always off after muting.

AoP Alarm relay polarity: it set if the alarm relay is open or closed when an alarm happens. **CL**= terminals closed during an alarm; **oP** = terminals open during an alarm

AUXILIARY RELAYS

oA4 Fifth relay configuration (13-14): dEF, FAn: do not select it!. **ALr**: alarm; **Lig**: light; **AuS**: Auxiliary relay; **onF**: always on with instrument on; **db=** neutral zone; **cP2 =** second compressor; !;. **HES:**. night blind

AoP Alarm relay polarity: it set if the alarm relay is open or closed when an alarm happens. **CL**= terminals 1-2 closed during an alarm; **oP** = terminals 1-2 open during an alarm

DIGITAL INPUTS

i1P Digital input 1 polarity (28-29): oP: the digital input is activated by opening the contact; **CL:** the digital input is activated by closing the contact.

i1F Digital input configuration (28-29): EAL= external alarm: "EA" message is displayed; **bAL**= serious alarm "CA" message is displayed. **PAL**= pressure switch alarm, "CA" message is displayed; **dor**= door switch function; **dEF**= activation of a defrost cycle; **AUS**=not enabled; **Htr**= kind of action inversion (cooling – heating); **FAn= not set it; ES**= Energy saving; **HdF** = Holiday defrost (enable only with RTC); **onF =** to switch the controller off.

did (0÷255 min) **with i1F= EAL or i1F = bAL digital input alarm delay (28-294):** delay between the detection of the external alarm condition and its signalling.
with i1F= dor: door open signalling delay
with i1F= PAL: time for pressure switch function: time interval to calculate the number of the pressure switch activation.

i2P 2nd digital input polarity (27-28): oP: the digital input is activated by opening the contact; **CL:** the digital input is activated by closing the contact.

i2F 2nd digital input configuration: EAL= external alarm: "EA" message is displayed; **bAL**= serious alarm "CA" message is displayed. **PAL**= pressure switch alarm, "CA" message is displayed; **dor**= door switch function; **dEF**= activation of a defrost cycle; **AUS**=not enabled; **Htr**= kind of action inversion (cooling – heating); **FAn= not set it; ES**= Energy saving; **HdF** = Holiday defrost (enable only with RTC); **onF =** to switch the controller off.

d2d (0÷255 min) **with i2F= EAL or i2F= bAL 2nd digital input alarm delay (27-28):** delay between the detection of the external alarm condition and its signalling.
with i2F= dor: door open signalling delay
with i2F= PAL: time for pressure switch function: time interval to calculate the number of the pressure switch activation.

nPS Pressure switch number: (0 ÷15) Number of activation of the pressure switch, during the "**did**" interval, before signalling the alarm event (I2F= PAL).
If the nPS activation in the did time is reached, 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 doA alarm: no= outputs not affected by the doA alarm; **yES =** outputs restart with the doA alarm.

HES Temperature increase during the Energy Saving cycle:
(-30,0°C÷30,0°C) it sets the increasing value of the set point during the Energy Saving cycle.

TO SET CURRENT TIME AND WEEKLY HOLIDAYS (ONLY FOR MODELS WITH RTC)

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.

N.B. Hd1,Hd2 can be set also as **"nu"** value (Not Used).

TO SET ENERGY SAVING TIMES (ONLY FOR MODELS WITH RTC)

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.)

TO SET DEFROST TIMES (ONLY FOR MODELS WITH RTC)

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.

N.B. :To disable a defrost cycle set it to "nu"(not used). ***Ex.*** *If* ***Ld6****=nu* ***;*** *the sixth defrost cycle is disabled*

OTHER

Adr **RS485 serial address:** (1 to 247) identifies the instrument address when connected to a ModBUS compatible monitoring system.

PbC **Type of probe:** it allows to set the kind of probe used by the instrument. **Pt1** = Pt1000 probe, **ntC** = NTC probe.

rEL **Release software:** (read only) Software version of the microprocessor.

Ptb **Parameter table:** (read only) it shows the original code of the parameter map.

31 DIGITAL INPUTS

The free voltage digital inputs are programmable by the "**i1F**" and i2F parameters.

GENERIC ALARM (i1F or i2F = EAL)

As soon as the digital input is activated the unit will wait for "**did**" 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.

SERIOUS ALARM MODE (i1F or i2F = bAL)

When the digital input is activated, the unit will wait for "**did**" delay before signalling the "**CA**" alarm message. The relay outputs are switched OFF. The alarm will stop as soon as the digital input is de-activated.

PRESSURE SWITCH (i1F or i2F = PAL)

If during the interval time set by "**did**" 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 did time is reached, switch off and on the instrument to restart normal regulation.**

DOOR SWITCH INPUT (i1F or i2F = 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 "**did**", the door alarm is enabled, the display shows the message "**dA**" and **the regulation restarts is rtr = yES.** 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.

START DEFROST (i1F or i2F = dEF)

It starts 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.

SWITCH THE AUXILIARY RELAY (i1F or i2F = AUS)

With oA3 or oA4 = AUS the digital input switched the status of the auxiliary relay

INVERSION OF THE KIND OF ACTION: HEATING-COOLING (i1F or i2F=Htr)

This function allows to invert the regulation of the controller: from cooling to heating and viceversa.

ENERGY SAVING (i1F = 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.

HOLIDAY DEFROST (i1F or i2F = HDF) –ONLY FOR MODELS WITH RTC

This function enabled the holiday defrost setting.

ON OFF FUNCTION (i1F or i2F = onF)

To switch the controller on and off.

DIGITAL INPUTS POLARITY

The digital input polarity depends on the "**i1P**" and **"i2P"** parameters.
i1P or i2P =CL: the input is activated by closing the contact.
i1P or i2P=OP: the input is activated by opening the contact

32 DEFAULT SETTING VALUES

Label	Name	Range	Value	Level
	Clock and recording setting			
itP	Recording interval	1-255 min	15	Pr1
rC1	First probe recording enable	Yes / No	YES	Pr2
rC2	Second probe recording enable	Yes / No	NO	Pr2
rC3	Third probe recording enable	Yes / No	YES	Pr2
rC4	Forth probe recording enable	Yes / No	YES	Pr1
rCb	Start recording SET key enabling	Yes / No	NO	Pr1
EU	Date formate	EU/US	EU	Pr1
rSd	Data erase	Yes / No	Yes	Pr2
rSA	Alarm erase	Yes / No	Yes	Pr2
	Regulation			
Set	Set point	LS ÷US	2.0	Pr1
Hy	Hysterese	0,1-25,5 °C / 1-45 °F	1.0	Pr2
LS	Min setting	-100 - 25	-90.0	Pr2
US	Max setting	+25 - +150	10.0	Pr2
	Probe input			
Ot	Regulation probe calibration	12°C to -12°C	0.0	Pr2
P2P	Evaporator probe presence	Yes / No	YES	Pr2
oE	Evaporator probe calibration	12°C to -12°C	0.0	Pr2
P3P	Third probe presence	Yes / No	NO	Pr2
o3	Third probe calibration	12°C to -12°C	0.0	Pr2
P4P	Fourth probe presence	Yes / No	NO	Pr2
O4	Fourth probe calibration	12°C to -12°C	0.0	Pr2
odS	Outputs activation delay at start up	0-255 min	0	Pr2
AC	Forced stop time after compressor run	0-30 min	3	Pr2
AC1	2nd compressor delay at start up	0-255 sec	0	Pr2
Con	Run time with error on temperature sensor	0-255 min	10	Pr2
COF	Stop time with error on temperature sensor	0-255 min	5	Pr2
	Display			
CF	Temperature measurement unit	°C / F	°C	Pr2
rES	Resolution (in=1°C, dE=0,1°C)	in / dE	dE	Pr1
rEd	Remote display	TR3/TL1/TL2/Evap.	P1	Pr2
dLy	Display delay	0-22min	0:00	Pr2
	Defrost			
EdF	Kind of interval for defrost	rtc ÷in	in	Pr2
tdF	Defrost type	EL=el. heater; in= hot gas	EL	Pr2
dtE	Defrost terminate temperature	-55 - +150 °C	8.0	Pr2
IdF	Time between defrost	1-120 hour	8	Pr2
MdF	Max defrost time	0-255 min	30	Pr2
dSd	Start defrost delay	0÷99min	0	Pr2
dFd	Displaying during defrost (rt=real temperature, it= intial temperature, Set=set point, dEF=dEF label)	rt/it/Set/dEF	rt	Pr2
dAd	Max dispaly delay after defrost	0-255 min	20	Pr2
	Fans			
Fnc	Fans operating mode (C-n=run comp. Off defrost, C-y=run comp. On defrost, O-n=continous.Off defrost, O-y=continous. On defrost)	C-n/C-y/O-n/O-y	O-n	Pr2
Fnd	Fan delay after defrost end	0-255 min	5	Pr2
Fct	Differential of temperature for forced activation of fans	0÷50°C	0.0	Pr2
Fst	Fan stop temperature Fan stop above the spcified temperature	-55 - +150 °C	2.0	Pr2
Fon	Fan ON time. Only function if FNC is C-n or C-y	0-15 min	10	Pr2
FoF	Fan OFF time. Only function if FNC is C-n or C-y	0-15 min	5	Pr2
	AUXILIARY OUTPUT CONFIGURATION			
ACH	Kind of action for auxiliary relay	CL; Ht	CL	Pr2
SAA	Set Point for auxiliary relay	-50,0÷110°C / -58÷230°F	0.0	Pr2
SHy	Differential for auxiliary relay	0,1÷25.5°C/ 1÷255°F	1.0	Pr2
ArP	Probe selection for auxiliary relay	nP / P1 / P2 / P3/P4	nP	Pr2
Sdd	Auxiliary relay operating during defrost	n÷y	NO	Pr2
	Temperature alarms for regulation probe TR3			
A1C	Temperature alarm configuration. Ab=Absolut - rE=alarm + set	Ab / rE	Ab	Pr2
A1U	Alarm for max temperature	°C	5.0	Pr2
A1L	Alarm for min temperature	°C	-90.0	Pr2
A1H	Differential for temperature alarm recovery	0,1 - 25,5°C	2.0	Pr2
A1d	Temperature alarm delay	0-255 min	15	Pr2
d1o	Cancelling time of temperature alarm at start up	0-23h 50min	1:30	Pr2
	Temperature alarms for logging temperature P3			
A3U	Alarm for max temperature	°C	5.0	Pr2
A3L	Alarm for min temperature	°C	-90.0	Pr2
A3H	Differential for temperature alarm recovery	0,1 - 25,5°C	2.0	Pr2
A3d	Temperature alarm delay	0-255 min	15	Pr2
d3o	Cancelling time of temperature alarm at start up	0-23h 50min	1:30	Pr2
	Temperature alarms for logging temperature P4			
A4U	Alarm for max temperature	°C	5.0	Pr2
A4L	Alarm for min temperature	°C	-90.0	Pr2
A4H	Differential for temperature alarm recovery	0,1 - 25,5°C	2.0	Pr2
A4d	Temperature alarm delay	0-255 min	15	Pr2
d4o	Cancelling time of temperature alarm at start up	0-23h 50min	1:30	Pr2
	Alarm relay management			
tbA	Alarm relay disabling	Yes / No	YES	Pr2
Aro	Alarm relay activation with power failure	Yes / No	YES	Pr2
ALF	Alarm relay activation for all the alarms	Yes / No	YES	Pr2
bon	Time of buzzer restart after muting	0-30 min	5	Pr1
AoP	Alarm relay polarity	CL/OP	CL	Pr2
	Configurable relay			

oA4	5th Relay configuration		AUS	Pr2
	Digital inputs			
i1P	Digital input polarity. Activated when opening or when closing	oP / CL	CL	Pr2
i1F	Digital input configuration (EAL=ext. Alarm, bAL=serious alarm, dor=door switch)	EAL/bAL/dor	dor	Pr2
did	Digital input delay. i1F=dor: door opening signalling delay	0-255 min	5	Pr2
i2P	Digital input polarity (13-19)	oP=opening;CL=closing	CL	Pr2
i2F	Digital input configuration (13-19)	EAL, bAL, PAL, dor; dEF; Htr, AUS	EAL	Pr2
d2d	Digital input alarm delay (13-19)	0÷255min	15	Pr2
Nps	Number of activation of pressure switch	0 ÷15	15	Pr2
odc	Compressor status when door is open (No= normal, FAn=Fan off, CPr=Compr. Off, F_C=Fan and compr. off)	no/FAn/CPr/F_C	Fan	Pr2
rrd	Outputs restart after doA alarm	Yes / no	YES	Pr2
HES	Temperature increase during energi saving cycle	-30 - +30°C	0.0	Pr2
	Defrost time with RTC			
Hd1	First weekly holiday	Sun÷ SAt – nu	Sun	Pr2
Hd2	Second weekly holiday	Sun÷ SAt – nu	Sun	Pr2
ILE	Energy Saving cycle start during workdays	0 ÷ 23h 50 min.	0:00	Pr2
dLE	Energy Saving cycle length during workdays	0 ÷ 24h 00 min.	0:00	Pr2
ISE	Energy Saving cycle start on holidays	0 ÷ 23h 50 min.	0:00	Pr2
dSE	Energy Saving cycle length on holidays	0 ÷ 24h 00 min.	0:00	Pr2
Ld1	1st workdays defrost start	0 ÷ 23h50 min - nu	nu	Pr2
Ld2	2nd workdays defrost start	0 ÷ 23h50 min - nu	nu	Pr2
Ld3	3rd workdays defrost start	0 ÷ 23h50 min - nu	nu	Pr2
Ld4	4th workdays defrost start	0 ÷ 23h50 min - nu	nu	Pr2
Ld5	5th workdays defrost start	0 ÷ 23h50 min - nu	nu	Pr2
Ld6	6th workdays defrost start	0 ÷ 23h50 min - nu	nu	Pr2
Sd1	1st holiday defrost start	0 ÷ 23h50 min - nu	nu	Pr2
Sd2	2nd holiday defrost start	0 ÷ 23h50 min - nu	nu	Pr2
Sd3	3rd holiday defrost start	0 ÷ 23h50 min - nu	nu	Pr2
Sd4	4th holiday defrost start	0 ÷ 23h50 min - nu	nu	Pr2
Sd5	5th holiday defrost start	0 ÷ 23h50 min - nu	nu	Pr2
Sd6	6th holiday defrost start	0 ÷ 23h50 min - nu	nu	Pr2
	Other			
Adr	Serial address	1-247	1	Pr1
PbC	Probe type	Pt1 / NtC	NtC	Pr2
rEL	Release software (for internal reference)	-	2.0	Pr2
Ptb	Parameter table: (for internal reference)	-	-	Pr2

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