Precision Water Chillers

PURIFICATION SOLUTIONS

NPC 280 - 400 60 Hz UL

OPERATING AND MAINTENANCE MANUAL
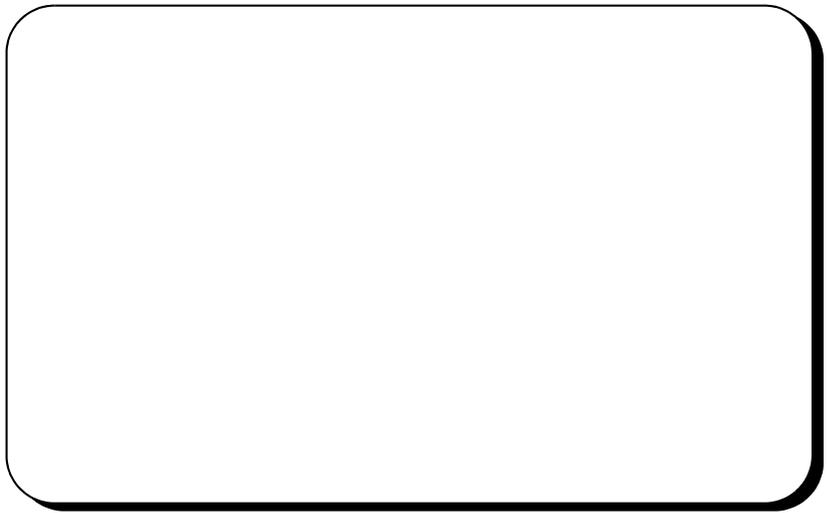
CONTENTS

CHAPTER 1

ICHILL ELECTRONIC BOARD

1.1 User interface; Leds and buttons

NOT ENABLED FUNCTION

ON it displays the size of circuit n°1
blinking with the led of circuit n°2 it means you are entering in programming mode

NOT ENABLED FUNCTION

ON: unit in chiller mode.
OFF: unit in stand by

NOT ENABLED FUNCTION

Auxiliary output circuit 2

Auxiliary output circuit 1

ON it displays the size of circuit n°2
blinking with the led of circuit n°1 it means you are entering in parameters programming mode

NOT ENABLED FUNCTION

ON enter in menu.

ON unit in recovery

1.2 Display

The display of the control is divided into three zones.

Top-left zone

The top-left zone shows the evaporator outlet water temperature.

Bottom-left zone

The bottom-left zone shows no value.

Right zone

Signalling icons.

1.2.1 The icons of the display

ICON	ICON STATUS	MEANING
°C	ON	Celsius degrees (If viewed)
	OFF	Fahrenheit degree (If not viewed)
⚠	ON	General alarm
	BLINKING	Alarm without icon
bar	ON	Bar pressure
	OFF	PSI pressure
🕒	ON	Normal function; it displays the time in the bottom part of the displays. During the programming mode; it displays the time based parameters.
	BLINKING	In function menu indicates the defrost delay counting
1	ON	Compressor 1 active
	BLINKING	Compressor 1 delay counting
2	ON	Compressor 2 active.
	BLINKING	Compressor 2 delay counting
3	ON	Compressor 3 active.
	BLINKING	Compressor 3 delay counting
4	ON	Compressor 4 active
	BLINKING	Compressor 4 delay counting
5	ON	Compressor 5 active
	BLINKING	Compressor 5 delay counting
6	ON	Compressor 6 active
	BLINKING	Compressor 6 delay counting
🔥	ON	Antifreeze resistance active
	OFF	Antifreeze resistance off
Flow!	ON	Flow alarm
	OFF	Normal operation (without flow alarm)
🔄	ON	Pump on
	OFF	Pump off
❄	ON	Condensing fans on
	OFF	Condensing fans off

1.3   Function of the buttons

BUTTON	ACTION	FUNCTION
cir1 (▲)	Press once	With **Cir1** on it shows on the display the values of the circuit n°1 probes. With **Cir2** on it shows on the display the values of the circuit n° 2.
	During the programming: press once	It scrolls the parameter codes or increases their value.
	During the programming: press for 1 sec.	press once to display the programming level Pr2; press twice to display the programming level Pr3.
☀		NOT ENABLED FUNCTION.
❄	Press once	Turn the chiller on or off, if the unit is on led is on. The led is blinking if there is a POWER ON delay or during the pump-down.
✋		NOT ENABLED FUNCTION
(heat recovery)	Press once	Allows the chiller unit operation with heat recovery. When unit operating in heat recovery modality, the led near the button is on.
⏱/menu	Press once	Enter the function menu
	Press for 3 sec.	Enter the time setting menu (control with the clock)
	During the prog.: press once	To exit from a group of parameter.
SET	Press once	Displays the set point in chiller mode (SetC label)
	Press for 3 sec.	Modify the chiller set
	During the prog.: press once	Select a parameter and confirm value
	Press when a probe label in bottom display appears	Modify the displaying from circuit 1 to circuit 2 and vice-versa.
cir2 (▼)	Press once	With **Cir1** on it shows on the display the values of the circuit n°1 probes. With **Cir2** on it shows on the display the values of the circuit n° 2.
	During the prog.: press once	It scrolls the parameter codes or decreases their value.

1.3.1   Button function in combination

BUTTONS	ACTION	FUNCTION
cir2 (▼) + SET	Press for 3 seconds	Enter the programming.
	In Pr3 level: keep SET pressed, then press and release cir2 (▼)	Select the parameter level visibility Pr1 / Pr2 / Pr3
cir1 (▲) + SET	Press once	Exit the programming
SET + ⏱/menu	In Pr3 level: keep SET pressed, then press and release ⏱/menu .	Defines if the parameter can be changed or not in the other levels.

1.4   Symbols and leds of the display

Off Auxiliary relay exit n° 2 not active.	
On Auxiliary relay exit n° 2 active.	
Ⅱ	

Ⅰ	
On Auxiliary relay exit n° 1 active.	
Off Auxiliary relay exit n° 1 not active.	

NOT ENABLED FUNCTION

Led1
Led2
Led3
Led4
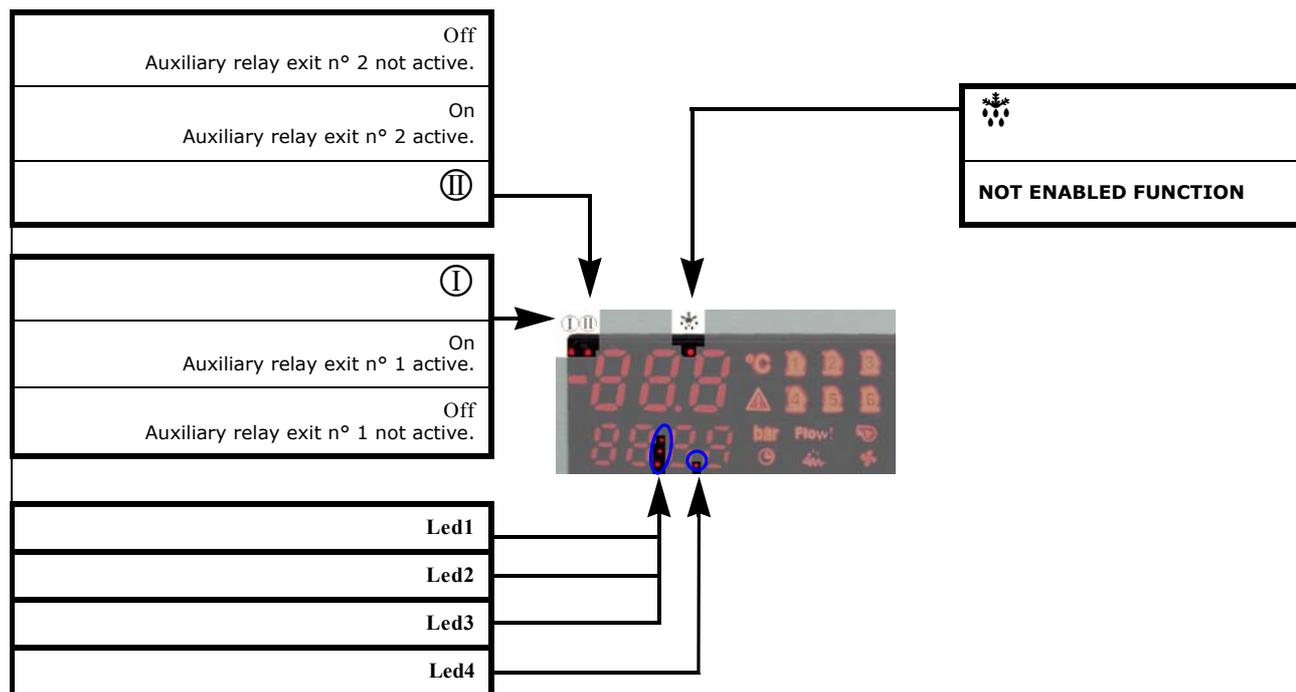
- **Led n° 1 - 2 (Control with clock)**
  If the bottom display shows the time, the clock icon is on and the led n° 1 / 2 blink.
- **Led in Parameter programming:**

Level "Pr1":

Led n°1 and Led n°2 blinking	the parameter is shown but not modifiable

Level "Pr2":

all led off	the parameter is not visible in Pr1 level
led n° 1 / 2 blinking and led n° 3 on	the parameter can be modify in Pr2, but not in Pr1
led n° 1 / 2 / 3 blinking	the parameter is visible but not modifiable neither in Pr2, nor in Pr1
led n° 3 on	the parameter is visible even in Pr1 level

Level "Pr3":

all leds off	the parameter is visible only in Pr3
led n° 4 on	the parameter is visible only in Pr2
led n° 3 and led n° 4 on	the parameter is visible only in Pr1 and Pr2
led n° 4 blinking	the parameter is visible and not modifiable in Pr2
led n° 3 and led n° 4 blinking	the parameter is visible and not modifiable in Pr2 and in Pr1

1.5 Remote terminal

For the function of the buttons and of the led see 1.2 "Display" , 1.3 "Function of the buttons" and 1.4 "Symbols and leds of the display" .

It is possible to connect in parallel up to 2 remote terminals. The remote terminals can be interfaced with a shiels cable for a maximum length of 150mt.

If there is no communication between the instrument and the remote, the top display shows "**noL**" (no link).

Failure to connect the remote terminal when the remote terminal parameter is enabled will cause the appearance of signal ATR1(2) on the controller display.

1.6 Visualization during an alarm

In the bottom of the display it will be viewed the alarm code, while above you will see the temperature/pressure blinking. The icon of the general alarm will start blinking.

1.6.1 Alarm icons

There are four icons for the alarm signalling:

⚠	Generic alarm
Flow!	Flow alarm
H⊙	High pressure alarm
L⊙	Low pressure alarm

1.7 How to switch off the buzzer

Automatic switching off: when the alarm ends.

Manual switching off: press and release one of the six buttons; the buzzer will stop even if the alarm is not ended.

1.8 First start up

Starting up the unit for the first time, on the display could be viewed the message "rtC" and the temperature; it is necessary to set the clock.

If the checking probes are not connected, or are damaged, on the display it will be viewed their specific alarm.

However it is possible to continue with the setting of the clock or the programming.

1.9 How to set the clock (OPTIONAL)

1. Press the button ⏱ for some seconds, the bottom of the display will show the message "**Hour**" while the up one will show the memorized hour

2. Press the button **SET**: the time will start blinking.

3. Set the time with the buttons **cir1** ▲ and **cir2** ▼.
   Confirm with the button **SET**; the display shows the next parameter.

4. Repeat the operation 2.and 3. for the other parameters of the clock:
   - **Min**: minutes (0÷60)
   - **UdAy**: day of the week (**Sun** = Sunday, **Mon** = Monday, **tuE** = Tuesday, **UEd** = Wednesday, **tHu** = Thursday, **Fri** = Friday, **SAt** = Saturday).
   - **dAy**: day of the month (0÷31)
   - **MntH**: month (1÷12)
   - **yEAr**: year (00÷99)

1.10 Programming with the "Hot Key"

1.10.1 How to program the control with a programmed key (Download)

Turn off the control:

1. Insert the hot key.
2. Turn on the instrument.
3. The download of the data starts.

During the download the regulation is locked and the bottom display shows the "**dOL**" label blinking.

The top display shows the message:

"**End**" If the programming procedure in completely OK (after 15 seconds the regulation starts automatically).

"**Err**" If the programming procedure has found an error.

> **ATTENTION**
>
> *If the programming procedure has found an error the control must be switched off and turned on to repeat the programming, or to start the regulation.*

1.10.2 How to memorize the parameters of the control in the key (Upload)

Turn on the control:

1. Insert the key.
2. Enter the function menu pressing ⏱ (see paragraph *"1.17 Function menu, button "\""*).
3. Select the function **UPL**: bottom display.
4. Press **SET**.
   The upload starts.

During the upload the bottom display shows the message "**UPL**" blinking.

At the end of the upload it will appear:

"**End**" If the programming procedure in completely OK

"**Err**" If the programming procedure has found an error.

To exit the **UPL** function press the button ⏱ or wait for the time-out.

1.11 Programming by keyboard

The parameters of the electronic control are grouped and divided into three levels:

1. USER (**Pr1**);
2. MAINTENANCE (**Pr2**).
3. MANUFACTURER (**Pr3**).

The USER level (**Pr1**) allows to enter only the user parameters, the MAINTENANCE (**Pr2**) / MANUFACTURER (**Pr3**) allows to enter the setting parameters of the machine.

The parameter of the three levels are settled during the design phase.

However it is possible to move the parameters from the higher level (e.g. Maintenance **Pr2**) to the lower (e.g. User **Pr1**), see *"1.11.2 How to move a parameter from a level to another one"*.

> **ATTENTION**
>
> *All levels are protected by a password.*
> *The USER password is 23.*
> *The MAINTENANCE password is 32.*
> *The MANUFACTURER password is 69.*

The parameters are so subdivided:

LABEL	ACTION
ALL	View all parameters
ST	View only the parameters of the Thermoregulation
dP	View only the parameters of the Display Visualization
CF	View only the parameters of the Configuration
SD	View only the parameters of the dynamic Set Point (**NOT ENABLED FUNCTION**)
ES	View only the energy saving and start up parameters (**NOT ENABLED FUNCTION**)
	View only the parameters of the second set-point
CO	View only the parameters of the Compressors
US	View only the auxiliary exit parameters (**NOT ENABLED FUNCTION**)
FA	View only the parameters of the Fans
Ar	View only the antifreeze resistance parameters
DF	View only the defrosting parameters (**NOT ENABLED FUNCTION**)
rC	View only the parameters of the recovery (**NOT ENABLED FUNCTION**)
AL	View only the parameters of the Alarms
Pr	Password

ATTENTION

The parameters of the "CF" configuration can be modify only when the unit is in Stand-by mode.

1.11.1 Access to the parameters

To enter the "Pr1" menu parameters (user level):

1. Press for 3 sec. the buttons [SET] + [cir2] the top display shows the label "**PAS**" and the bottom display the label "**Pr1**". The programming can start when the leds cr1-cr2 of the buttons [cir1] + [cir2] switch on.

To enter the "Pr2" menu parameters (maintenance level):

1. Repeat the procedure to enter "**Pr1**" menu.
2. Press [cir1] for 2 sec., on the bottom display appears the label "**Pr2**".

To enter the "Pr3" menu parameters (manufacturer level):

1. Repeat the procedure to enter "**Pr2**" menu.
2. Press [cir1] for 2 sec., the bottom display shows the label "**Pr3**".

It is necessary to insert the password.

After following the procedure described above and entering the programming, the label **Pr1**, **Pr2** or **Pr3** (according to the model) will appear.

Press the button [SET], the top display shows "**0**" blinking.

To move the password use the buttons [cir1] or [cir2].

If the password is wrong it must be wrote again. If the password is right press [SET] to view the parameters. The top display shows the first label "**ALL**".

To choose the labels press [cir1] or [cir2] and than [SET]. The bottom display shows the label and the code of its first parameter, the top display shows its value.

ATTENTION

Some parameters can be views but not modified. If the parameter can not be modify the Led n°1 and n°2 blink. For further information see "1.4 Symbols and leds of the display".

To exit the programming and enter the normal visualization press together the buttons [SET] + [cir1].

1.11.2 How to move a parameter from a level to another one

Move a parameter from "Pr2" level to "Pr1"level:

1. Enter the menu parameters "**Pr2**".
2. Choose the parameter. If the led n°3 is off it means that the parameter is visible and modifiable only in "Pr2" (see *"1.4 Symbols and leds of the display"*).
3. Keep pushed [SET].
4. Press and release once [cir2], the led n° 3 is turned on: now the parameter can be modify even in "Pr1".
5. Keep pushed [SET] to move the parameter from "Pr1" to "Pr2". Press and release once [cir2]. The led n° 3 is turned off and the parameter can be viewed only in "Pr2".

How to move a parameter from level "Pr3" to "Pr2" / "Pr1":

1. Enter the menu parameters "**Pr3**".

2. Choose the parameter. If all led are turned off, it means that the parameter is visible and modifiable only in "Pr3" (see *"1.4 Symbols and leds of the display"*).

3. Keep pushed **SET** .

4. Press and release once **cir2**, the led n° 3 and n° 4 are turned on: now the parameter can be viewed and modified even in "Pr2" and "Pr1".

5. Keep pushed **SET** : the parameter can now be viewed from "Pr1" and "Pr2" level to "Pr3" level.

6. Press and release once **cir2**, the led n° 3 is turned off and the parameter can be viewed and modified in "Pr2".

7. Keep pushed **SET** to move the parameter from "Pr2" to "Pr3".

8. Press and release once **cir2**, the led n° 4 is turned off and the parameter can be viewed and modified only in "Pr3".

1.11.3 How to set the visibility of a parameter and lock its modifiability

"Pr1"level:

1. Enter "Pr3" programming level;

2. Choose the parameter and keep pushed the button **SET** ;

3. Press and release once **menu**; the n° 3 blinks. Now the parameter can be viewed in "Pr1", but it can br modified.

"Pr2"level:

1. Enter "Pr3" programming level;

2. Choose the parameter and keep pushed the button **SET** ;

3. Press and release once **menu**; the led n° 4 blinks. Now the parameter can be viewed in "Pr2" but it can br modified. If the leds n° 3 and 4 blink, the parameters can be visualized in "Pr1" and "Pr2", but they can not be modified.

NOTE

To set the visibility and the modifiability of a parameter in "Pr1" and "Pr2" keep pressed **SET** *, than press and release* **menu** *: when the leds n° 3 and 4 are turned on the parameter can be viewed and modified.*

1.11.4 How to change the value of a parameter

1. Enter the programming;

2. Press together **SET** + **cir2** for 3 sec.

3. Choose the parameter.

4. To modify the value press **SET** .

5. Modify the value using **cir1** or **cir2** .

6. Press **SET** to memorize the new value and go to the code of the next parameter.

7. To exit the programming press **SET** + **cir1** or wait for 240 sec. without pressing any button.

NOTE

The new value is memorized even if you exit the programming because of the time out, without pressing **SET** *.*

1.12 How to modify the password

To change a password you must know the previous one.

1. Enter the "**Pr1**", "**Pr2**" (maintenance level) or "**Pr3**" (manufacturer level) programming level.

2. Select a label.

3. Select the function "Pr1 - 1", "Pr2 - 2" or "Pr3 - 3": the bottom display shows "Pr1", "Pr2" or "Pr3" and the value 1, 2 or 3, while the top display shows the current one.

4. Press **SET** to enable the modification, the top display shows the password blinking.

5. With the buttons **cir1** or **cir2** write the new password and press **SET** to set the new value.

6. The top display will blink for some seconds and than it will show the next parameter.

7. Exit the programming pressing **SET** + **cir1** or wait for the time out without pressing any button.

NOTE

*In "**Pr2**" level you can modify the password of "**Pr1**" level.*

NOTE

*In "**Pr3**" level you can modify the passwords of "**Pr1**" and "**Pr2**" levels.*

1.13 Values shown on the display

As default, in normal condition, the display shows the circuit 1 information.

The displayed circuit is indicated from the corresponding LED Cir1 (circuit n° 1) on, near the button , or Cir2 (circuit n° 2) on near the button .

1.13.1 How to display the values inside a circuit

When the led Cir1 is on, press or to display the values checked by the circuit n° 1.

When the led Cir1 is on, press or to display the values checked by the circuit n° 2.

To each value corresponds a label with the temperature and pressure values showed by the displays (see the top/bottom display visualization table).

1.13.2 How to move the visualization of the values from circuit n° 1 to circuit n° 2

To move from a circuit to another one use or and select an identification label of a circuit, press .

1.14 Personalization of the display visualization

Setting the parameters of the label "dP" it is possible to personalize the values of the temperatures and of the pressures read out in the bottom and top display.

1.14.1 How to personalize the default visualization of the top display

1. Set the values of the parameter "**dP03**" at 0 (configurable visualization)
2. Choose the value that must be viewed and set the value of the "dP01" parameter between 1 and 19

DP parameter value	Description	associated Label
dP01=00	No visualization	None
dP01=01	NTC temperature probe of the evaporator water inlet	EIn
dP01=02	NTC temperature probe of the evaporator water outlet 1 and 2	Out1 circuit n° 1 Out2 circuit n° 2
dP01=03	NTC temperature probe of the common evaporator water outlet	EOut
dP01=04	NTC temperature probe of the condenser water inlet	CIn
dP01=05	NTC temperature probe of the common condenser water inlet	CIn1 circuit n° 1 CIn2 circuit n° 2
dP01=06	NTC temperature probe of the condenser water outlet	Cou1 circuit n° 1 Cou2 circuit n° 2
dP01=07	NTC temperature probe of the common condenser water outlet	COut
dP01=08	NTC temperature probe of the external air dynamic setpoint	Et
dP01=09	NTC temperature probe of the free cooling water inlet	FCIn
dP01=10	NTC temperature probe of the free cooling external air value	FCEt
dP01=11	NTC temperature probe of the remote terminal 1	trt1
dP01=12	NTC temperature probe of the remote terminal 2	trt2
dP01=13	NTC temperature probe of the combined defrost	dEF1 circuit n° 1 dEF2 circuit n° 2
dP01=14	Defrost probe circuit 2	dEF2
dP01=15	Tank probe (tanH label)	btUS
dP01=16	NTC temperature probe of the condenser	Cdt1 circuit n° 1 Cdt2 circuit n° 2
dP01=17	Condensing pressure probe 4÷20mA - 0.5V	CdP1 circuit N° 1 CdP2 circuit N° 2
dP01=18	Evaporating pressure probe 4÷20mA - 0.5V	LP1 circuit N° 1 LP2 circuit N° 2
dP01=19	Clock	🕐

1.14.2 How to personalize the default visualization of the bottom display

1. Set the values of the parameter "**dP03**" at 0 (configurable visualization)

2. Choose the value that must be viewed setting the value of the parameter "**dP02**" between 1 and 19

DP parameter value	Description	associated Label
dP02=00	no visualization	None
dP02=01	evaporator water inlet NTC temperature probe	EIn
dP02=02	Evaporator water outlet n° 1 and n° 2 NTC temperature probe	Out1 circuit n° 1 Out2 circuit n° 2
dP02=03	common evaporator water outlet NTC temperature probe	EOut
dP02=04	condenser water inlet NTC temperature probe	CIn
dP02=05	common condenser water inlet NTC temperature probe	CIn1 circuit n° 1 CIn2 circuit n° 2
dP02=06	condenser water outlet n° 1 and n° 2 NTC temperature probe	Cou1 circuit n° 1 Cou2 circuit n° 2
dP02=07	common condenser water outlet NTC temperature probe	Cout
dP02=08	External air NTC temperature probe	Et
dP02=09	free cooling water inlet NTC temperature probe	FCIn
dP02=10	free cooling external air value NTC temperature probe	FCEt
dP02=11	remote terminal n° 1 NTC temperature probe	trt1
dP02=12	remote terminal n° 2 NTC temperature probe	trt2
dP02=13	Combined defrosting NTC temperature probe	dEF1 circuit N° 1 dEF2 circuit N° 2
dP02=14	defrost probe circuit 2	dEF2
dP02=15	tank probe (tanH label)	btUS
dP02=16	Condensing NTC temperature probe	Cdt1 circuit n° 1 Cdt2 circuit n° 2
dP02=17	Condensing pressure probe 4÷20mA - 0.5V	CdP1 circuit N° 1 CdP2 circuit N° 2
dP02=18	Evaporating pressure probe 4÷20mA - 0.5V	LP1 circuit N° 1 LP2 circuit N° 2
dP02=19	Clock	🕐

1.14.3 Forced read - out of the top and bottom display

The electronic control can automatically view some parameter (temperature and pressure) by default.

To force the default visualization of the display you must:

1. set the "**dP03**" parameter with a value different from 0 (configurable visualization)

2. choose the values that have to be viewed setting the value of the "**dP03**" parameter between 1 and 3

Setting of the parameter	Top Display	Bottom Display
dP03 = 1	circuit n° 1 and n° 2: temperature of the evaporator water inlet. Label EIn	circuit n° 1: temperature of the evaporator water outlet n° 1. Label OuT1 circuit n° 2: temperature of the evaporator water outlet n° 2. Label OuT2
dP03 = 2	circuit n° 1: temperature of the condenser water inlet of circuit n° 1. Label CIn1 circuit n° 2: temperature of the condenser water inlet of circuit n° 2. Label CIn2	circuit n° 1: temperature of the condenser water outlet of circuit n° 1 label COu1 circuit n° 2: temperature of the condenser water outlet of circuit n° 2. Label COu2

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Setting of the parameter	Top Display	Bottom Display
dP03 = 3	circuit n° 1: high temperature condensing probe. Label Cdt1. Pressure: label CdP1 circuit n° 2: high temperature condensing probe. Label Cdt2. Pressure: label CdP2	circuit n° 1: evaporating pressure probe. Label LP1 circuit n° 2: evaporating pressure probe. Label LP2

1.15 Unit start up and stop

The unit can be started up and stopped from:

- Keyboard
- Time table (if clock board is present)
- Digital input configured as remote ON/OFF

1.15.1 Unit start up and stop by keyboard

Press ❄ button to start up or stop the unit:

- if parameter **CF78** =0 in chiller modality

When the unit is running, the led near the corresponding button is on.

1.15.2 Unit start up and stop from time table

See paragraph *"1.20 Programming the time table (if the clock has been installed)"*.

1.15.3 Unit start up and stop from digital input

From digital input configured as remote ON/OFF, that is able to commute the unit operation on/off.

The digital input overrides the keyboard command, you can use the keyboard to start up and turn off the unit only if the digital input is not active.

When you disconnect the digital input, the control goes back to the status before its activation.

1.16 How to set the unit in stand-by

The electronic control is in stand-by when the led near ❄ button is off.

When the unit is turned off from chiller mode, the stand-by mode is activated.

Also in stand-by the electronic control allows to:

- display the measured values
- manage alarm situations by displaying and signalling.

1.16.1 Choose the operation mode from analogue input

NOTE
This procedure is possible only if a probe is set as environment.

With CF78=0 and the external air temperature of the NTC probe lower than CF80+CF81, pressing ❄ you enter in chiller mode. On the

contrary with an external air temperature of the NTC probe lower than CF80, pressing ☀ you enter the heat-pump mode.

With CF78=1 and the external air temperature of the NTC probe higher than CF80+CF81, pressing ☀ you enter the chiller mode. On the

contrary with an external air temperature of the NTC probe lower than CF80, pressing ❄ you enter the heat-pump mode.

1.17 Function menu, button "🕛"

Enter the function menu

Press and release 🕛 (menu).

Exit the function menu

Press and release 🕛 or wait the time out.

Entering the function menu allows to:

1. Display and reset the present alarms
   ALrM function

2. Reset the compressor overload alarms
   COtr function

CO1r	Reset the compressor overload alarm n° 1
CO2r	Reset the compressor overload alarm n° 2
CO3r	Reset the compressor overload alarm n° 3
CO4r	Reset the compressor overload alarm n° 4
CO5r	Reset the compressor overload alarm n° 5
CO6r	Reset the compressor overload alarm n° 6

3. Display and clear the alarm historic
   ALOG function

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4. Upload the parameters from the control to the key

   UPL function

5. Enable or disable the operation of one circuit from keyboard

   CrEn function

Cr1E	deactivation of the circuit n°1
Cr2E	deactivation of the circuit n°2

6. Enable or disable the operation of one compressor from keyboard

   COEn function

CO1n	Operation status of the compressor n°1
CO2n	Operation status of the compressor n°2
CO3n	Operation status of the compressor n°3
CO4n	Operation status of the compressor n°4
CO5n	Operation status of the compressor n°5
CO6n	Operation status of the compressor n°6

7. Display the temperature of compressor outlet

   COdt function **(when the compressor outlet temperature probe is present)**

CO1t	Value of the temperature compressor discharge probe n°1
CO2t	Value of the temperature compressor discharge probe n°2
CO3t	Value of the temperature compressor discharge probe n°3
CO4t	Value of the temperature compressor discharge probe n°4
CO5t	Value of the temperature compressor discharge probe n°5
CO6t	Value of the temperature compressor discharge probe n°6

8. Display and reset the hours of operation of controlled loads

   Hour function

CO1H	Compressor n°1 working hours
CO2H	Compressor n°2 working hours
CO3H	Compressor n°3 working hours
CO4H	Compressor n°4 working hours
CO5H	Compressor n°5 working hours
CO6H	Compressor n°6 working hours
EP1H	Working hours of the evaporator water pump, air/air unit with fun
EP2H	Working hours of the support evaporator water pump
CP1H	Working hours of the condenser water pump
CP2H	Working hours of the support condenser water pump

9. Display and reset the starting number of each compressor

   COSn function

C1S	Compressor n°1 starting time
C2S	Compressor n°2 starting time
C3S	Compressor n°3 starting time
C4S	Compressor n°4 starting time
C5S	Compressor n°5 starting time
C6S	Compressor n°6 starting time

10. Display the proportional outlet operation percentage for the control of condensing fan speed

    Cond function **(if present)**

Cnd1	Management of the circuit n° 1 condensing fans
Cnd2	Management of the circuit n° 2 condensing fans

11. Display the operation percentage of the 4 proportional exits 0 ÷ 10 Volt

    Pout function

Pou1	Proportional exit for the management of the actuators/servomotor or for the pilotage of the external relays n° 1
Pou2	Proportional exit for the management of the actuators/servomotor or for the pilotage of the external relays n° 2
Pou3	Proportional exit for the management of the actuators/servomotor or for the pilotage of the external relays n° 3
Pou4	Proportional exit for the management of the actuators/servomotor or for the pilotage of the external relays n° 4

12. Display the temperature of the probes that check the auxiliary exits

uS function (if enabled)

uSt1	value checked by the circuit n°1 auxiliary probe
uSt2	value checked by the circuit n°2 auxiliary probe

To scroll the list of the functions use [cir1] or [cir2] button.

1.17.1 How to view and reset the status of an alarm

1. Enter the functions menu
2. Pressing [cir1] or [cir2] select the **ALrM** function
3. Press [SET].

   If any alarm is on, the pressure of [SET] is not enabled.
4. The bottom display shows the label with the alarm code, while the top display shows the label **rSt** (if the alarm can be reset) or the label **NO** (if the alarm can not be reset).
5. Scroll all alarms using [cir1] or [cir2].
6. Pressing [SET] on the label **rSt** the alarm can be reset. With the same procedure all resettable alarm can be reset. Pressing [SET] on a not resettable alarm (label **NO**) it does not happen anything; to view the next alarm press [cir1] or [cir2].
7. To exit the function **ALrM** and go back to the normal visualization, press [menu] or wait for the time-out.

1.17.2 How to reset a compressor thermal protection alarm

Inside the function **COtr** are displayed all compressor thermal protection alarms of manual reset enabled.

The labels **CO1r - CO2r - CO3r - CO4r - CO5r - CO6r** are present according to the digital input configured as compressor thermal protection alarm.

ATTENTION

*The function **COtr** is present in function menu only if the number of tripping per hour of the compressor thermal protection alarm, set by parameter **AL20**, is reached. When this number is reached the alarm resetting changes from automatic to manual.*

Manual reset alarm:

1. Enter the function menu
2. Pressing [cir1] or [cir2] select the **COtr** function on the bottom display
3. Press [SET], the bottom display shows the label of the compressor thermal protection alarm
4. Pressing [SET] if the alarm in not resettable, it will appear the label **NO**. Anything will happen.
5. Pressing [SET] button near the label **rSt** it is requested the password for resetting, in the bottom display appears the label **ArSt** and in the top display **PAS**.
6. Press [SET]: in the bottom display appears **PAS** and in the top display **0** flashing.

   Insert the password for resetting using [cir1] or [cir2] buttons.

   If the password is correct the label **ArSt** flashes for 3 sec. to confirm the reset, if the password is wrong, the bottom display shows **PAS** and the top display **0** flashing. If the password is not inserted again within 5 sec. the label **CO1r** is automatically displayed again.
7. To exit the function **COtr** and return in normal displaying, press [menu] button or wait for time-out.
8. Repeat the operations 2 - 5 with all compressor thermal protection alarms.

ATTENTION

The password for resetting the compressor thermal protection alarm corresponds to the value of parameter AL46 which is 4.

1.17.3 How to display the alarm history list

The function of displaying the alarms codes can be activated only if there are alarm events.

1. Enter the function menu
2. Select the function **ALOG**
3. Press [SET].

   If any alarm is on, the pressure of [SET] is not enabled.
4. The bottom display shows the label with the alarm code, while the top display shows the label "**n**" and a progressive number from 00 to 99.
5. Scroll the alarms list using [cir1] or [cir2].
6. To exit **ALOG** function and return to the normal visualization press [menu] or wait for the time-out.

1.17.4 How to erase the alarm log list

1. Enter the function menu
2. Using [cir1] or [cir2] select the **ALOG** function on the bottom display.
3. Press [SET].
4. Enter the **ALOG** function and select the label **ArSt**, visible on the bottom display, using [cir1] or [cir2] (the top display shows **PAS**).
5. Press [SET], the bottom display shows **PAS**, while the top display shows **0** blinking.
6. Write the password.
7. If the password is right the label **ArSt** blinks for 5 sec., to confirm the cancellation exit the function menu and go back to the normal visualization.
8. If the password is wrong the display shows again **PAS**.
   You can scroll the alarm list using [cir1] or [cir2] even if the password in wrong.
9. To go back to the normal visualization press [menu] or wait for the time-out time.

ATTENTION

The alarm list contains 100 alarm events. When the memory is full the new alarm will erase the eldest one.

1.17.5 How to upload the parameter from the control to the key

See *"1.10 Programming with the "Hot Key"".*

1.17.6 How to enable or disable a circuit from the keyboard

Using the keyboard it is possible to disable a single cooling circuit in order to allow its maintenance, or to operate with a reduced capacity mode.
To disable the operation of a circuit:

1. Enter the function menu
2. Pressing [cir1] or [cir2] select the **CrEn** function on the bottom display
3. Press [SET]: the bottom display shows **Cr1E** while the top display shows **En**.
4. Pressing [cir1] or [cir2] select the label **Cr1E** or **Cr2E**.
5. Press [SET] for 3 sec. on the label **Cr1E** or **Cr2E**, the top display shows **En** blinking. Pressing [cir1] or [cir2] select the label **diS** (disabled circuit) or **En** (enabled circuit) and press [SET] to confirm the selected function; choose the next circuit.
6. To exit the **CrEn** function and go back to the normal visualization press [menu] or wait for the time-out time.

Visualization of the disabled circuit

When one circuit is set on **diS**, the bottom display shows a label blinking and the value visualized in that moment.
If the circuit n° 1 is on **diS**, the label visualized by the bottom display is **b1dS** = circuit n° 1 disabled.
If the circuit n° 2 is on **diS**, the label visualized by the bottom display is **b2dS** = circuit n° 2 disabled.
The label **b2dS** can be visualized only if the circuit n° 2 is enabled.

1.17.7 How to enable or disable a compressor from the keyboard

It is possible to disable a single compressor inside a circuit, to allow its maintenance, or to insulate it because of its wrong operation.
The labels of the compressors can be viewed in **COEn** function only if their exits have been configured during the programming.

1. Enter the function menu
2. Use [cir1] or [cir2] to select **COEn** function
3. Press [SET] the bottom display shows **CO1E**, while the top display shows **En**.
4. Use [cir1] or [cir2] to select the label **CO2E - CO3E - CO4E - CO5E - CO6E** on the bottom display; the top display shows **En**.
5. Press [SET] for 3 sec. on the label of the compressor that has to be disabled: **CO1E - CO2E - CO3E - CO4E - CO5E - CO6E**, the top display shows **En** blinking. Pressing [cir1] or [cir2] select the function **diS** (not enabled compressor) or **En** (enabled compressor); press [SET] to confirm the set function and go on to the next value.
6. To exit the **COEn** function go back to normal visualization and press [menu] or wait for the time out time.

Visualization of the disabled compressor

When one compressors is set on **diS**, the bottom display shows a label blinking and the value visualized in that moment.
If a compressor is on diS the label viewed on the bottom display is **C1dS** = compressor n° 1 disabled, up to **C6dS** = compressor n° 6 disabled.
The label **C1dS** and **C6dS** can be visualized only if the compressors have been configured.

1.17.8 How to view the compressor discharge probes

The menu function allows to read-out the compressor temperature probes.

1. Pressing [cir1] or [cir2] select the **COdt** function
2. Press [SET]; the **CO1t** label is viewed on the bottom display, the top display shows the temperature.
3. Pressing [cir1] or [cir2] select the **CO1t** or **CO2t** or **CO3t** or **CO4t** or **CO5t** or **CO6t** label to visualize the value of the temperature of compressor n° 1 or 2 or 3 or 4 or 5 or 6.
4. To go back to the normal visualization press [menu] or wait the time-out time.

ATTENTION

The **COdt** *function can be activated only if the digital inputs have been configured (e.g. compressor discharge temperature).*

The display resolution is 0.1°C until the read-out temperature is 99.9, over 100°C it is 1°C.

1.17.9 How to visualize the compressor operating hours

It is possible to visualize the operating hours of a single compressor or of the water pump evaporator / condenser side.

NOTE
The labels of the compressors are available only if their output have been configured during the programming.

The operating hours are displayed on the top display with a resolution of 10 hours (e.g. 2 means 20 hours).

1. Enter the function menu.
2. Press [cir1] or [cir2] and select the **Hour** function
3. Press [SET], the bottom display shows the label of the single compressor, the top display shows the operating hours x 10. The icon [clock] is on.
4. Pressing [cir1] or [cir2] visualize all compressors.
5. To go back to the normal visualization press [menu] o wait for the time-out time.

How to reset the operating hours of the compressors

1. Enter the function menu
2. Inside the **Hour** function pressing [cir1] or [cir2] select the label **CO1H** or **CO2H** or **CO3H** or **CO4H** or **CO6H** or **EP1H** or **EP2H** or **CP1H** or **CP2H**.
3. Press [SET] for 3 sec. on the label **CO1H** or **CO2H** or **CO3H** or **CO4H** or **CO6H**, the top display shows the operating hours blinking (the reset is on), and than 0 to confirm the operation. The display shows the next compressor.
4. Press [SET] for 3 sec. on the label **EP1H** or **EP2H** or **CP1H** or **CP2H**, the top display shows the operating hours blinking (the reset is on), and than **0** to confirm the operation. The display shows the next compressor.
5. To exit the reset function press [menu] or wait for the time-out time.

1.17.10 How to visualize the compressors starts up

It is possible to view the starts up of each compressor.
The labels of the compressors ar available only if their output are configured during the programming.
The operating hours are displayed on the top display with a resolution of 10 hours (e.g. 2 means 20 hours).

1. Enter the function menu.
2. Press [cir1] or [cir2] to select the **COSn** function
3. Press [SET], the top display shows the **C1S** function, the bottom display shows the number of the takes-off x10.
4. Pressing [cir1] or [cir2] view all the configured compressors.
5. To go back to the normal visualization press [menu] or wait for the time-out time.

How to reset the number of the starts-up

1. Enter the function menu.
2. Inside the **COSn** function pressing [cir1] or [cir2] to select the label **C1S** or **C2S** or **C3S** or **C4S** or **C5S** or **C6S**.
3. Press [SET] for 3 sec. on the label **C1S** or **C2S** or **C3S** or **C4S** or **C5S** or **C6S** on the top display, the bottom display shows ten number of the starts-up blinking (the reset is on), and than **0** to confirm the operation. The display shows the next compressor.
4. To go back to the normal visualization press [menu] or wait for the time-out time.

1.17.11 How to view the probes configured to control an auxiliary output relay

It is possible to visualize the probes temperature/pressure value that control the auxiliary outputs.

1. Pressing [cir1▲] or [cir2▼] select the **uS** function

2. Press [SET] the bottom display shows the **uSt1** label (if the auxiliary probe is configured as temperature) or **uSP1** (if the auxiliary probe is configured as pressure), the top display shows the temperature/pressure value.

3. Press [cir1▲] or [cir2▼] to select the label **uSt1**/**uSt2** and to visualize the temperature value, or on **uSP1**/**uSP2** to visualize the auxiliary probe n° 1 or n° 2 pressure value.

4. To go back to the normal visualization press [menu] or wait for the time-out time.

1.18 How to visualize the remote terminal 1 and 2 sensors temperature

Inside the function menu it is possible to visualize the temperature detected by the remote terminal sensor.

The identification label inside the function is **trEM**.

trE1 value measured by the remote terminal n. 1 NTC sensor.

trE2 value measured by the remote terminal n. 2 NTC sensor

1. Press [cir1▲] or [cir2▼] to select **trEM** function

2. Press [SET], the bottom display shows the label **trE1** or **trE2**, while the top display shows the measured temperature value.

3. Select using the keys or the [cir1▲] or [cir2▼] label **trE1** to visualize the remote terminal n. 1 temperature value, or **trE2** to visualize the remote terminal n. 2 temperature value.

4. To go back to the normal display read-out, press the key [menu] or wait for time-out.

<div style="background:green">**ATTENTION**</div>

*The **trEm** function and the **trE1** or **trE2** labels appear in the function menu only if the CF74 parameter (remote terminal 1 configuration) is set to 2 or 3, or if the CF75 parameter (remote terminal 2 configuration) is set to 2 or 3.*

1.19 Other displaying

1.19.1 How to display the set point

1. Press and release [SET] button, the leds indicating the circuits light off and the operating set point is displayed

2. When unit in stand-by the bottom display will show **SetC** (chiller set).
   When unit operating it will show only the set point of the operating status.
   The top display will show the set value.

NOTE
*The label **SetH** is displayed only for units configured as heat pump.*

1.19.2 How to modify the set point

1. Press [SET] button for 3 sec. at least, the leds of circuits light off and the operating set point flashes.

2. To modify the value use [cir1▲] or [cir2▼] buttons.

3. To store the new set point, press [SET] or wait for time-out to exit the programming procedure.

1.19.3 Display read-out on unit stopped by remote control

From a digital input configured as a remote ON/OFF, when the input is active the OFF command is generated (also in the case of units configured as condenserless).

The top display shows "**OFF**" with the decimal places LED flashing.

1.20 Programming the time table (if the clock has been installed)

1. Enter the parameter programming menu.

2. Select the [cir1▲] or [cir2▼] **ES** parameter family and press the key [SET].

3. Within the **ES** family, use the keys [cir1▲] or [cir2▼] to select parameters **ES01÷ES06** which determine the beginning and end off the three periods, then set the desired operating timetable.

1.20.1 How to enable the automatic daily / weekly operation

1. Enter the parameter programming menu.
2. Within the **ES** family, use the keys [cir1] or [cir2] to select parameters **ES07÷ES13** (Monday / Sunday) and set the desired weekly / daily operating mode.

Configuration table of energy saving function (not enabled) and start up / stop

ES07 - ES13 parameters values	0= time band operation disabled 1= operation with band n° 1 enabled 2= operation with band n° 2 enabled 3= operation with bands 1 + 2 enabled 4= operation with band n° 3 enabled 5= operation with bands 1 + 3 enabled 6= operation with bands 2 + 3 enabled 7= operation with bands 1 + 2 + 3 enabled
Energy saving **(not enabled function)** or unit ON/OFF with time bands **X - Y**	where: X with range 0-7 and hour band represents the energy saving **(not enabled function)** where: Y with range 0-7 represents the automatic unit ON/OFF

Example of daily operating mode:

Monday

1. Enter the parameter programming menu:
2. The bottom display shows the parameter **ES07**, while the top display shows **0 - 0**.
3. Press [SET]: **0 - 0** flashes on the top display, use [cir1] or [cir2] to enable the preset time period/s (see configuration table).
4. Press the key [SET] to confirm.
5. Press [SET] + [cir1] to exit the programming mode, or wait for the time-out time without pressing any button.

Example:

MONDAY X = 0 - Y= 1 energy saving operating mode disabled, unit on/off from time period n. 1 enabled.
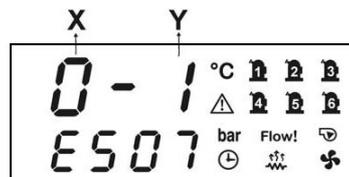
ATTENTION

*The **X** value must always be set to 0 because the energy saving function is not available for these machines.*

Weekly operating mode

Repeat the actions from point 2 to point 5 of the daily operating mode for the other days of the week (**ES08 / ES13**).

1.21 Dynamic setpoint function (NOT ENABLED FUNCTION)

It allows to modify the working setpoint by adding or subtracting a proportional value (the value is set by the parameter **Sd01** for chiller operation / **Sd02** for heat pump operation), based on the 4-20 mA analogue input or the external air temperature.

This function allows to save energy and so the unit can operate even with dangerous external temperature.

The activation of the dynamic setpoint is signalled by the lighting up of the LED next to the key [SET].

NOTE

The setpoint can be visualized only if the chiller or the heat pump operating status has been selected.

If the key [SET] is pressed once the bottom display shows **SEtC** (chiller setting) or **SEtH** (heat pump setting), while the top display shows the set value.

If the dynamic setpoint has been activated and the key [SET] is pressed twice, the bottom display will show the **SEtr** label (actual setting), while the top display will show the setting at which the machine is operating.

The adjustment of the dynamic setpoint is enabled:

- In chiller mode, if the activation parameter **Sd01** different from 0
- In heat pump mode, if the activation parameter **Sd02** different from 0
- If a 4÷20mA sensor has been configured as a current input for dynamic setpoint management, or if an NTC sensor has been configured as an external air temperature sensor for dynamic setpoint management

Pressing the keys [cir1] or [cir2] it is possible to visualize the external air temperature of the circuits on the top display; at the same time the bottom display shows the **Et** label.

1.22 Auxiliary relay function (NOT ENABLED FUNCTION)

Two configurable relay outputs are available for the user, they are not related to the normal unit operation.

These relay outputs can be managed via analogue temperature or pressure inputs (NTC temperature sensor, auxiliary output n. 1 and n. 2, or 4÷20 mA / 0 ÷ 5 Volt ratiometric pressure sensor, auxiliary output n. 1 and n. 2), or they can be managed with all the other possible temperature or pressure configurations. The sensor is selected via parameter **uS02** for n. 1 and **uS06** for n. 2. The function is active for output n. 1 if the **uS01** parameter is other than 0, and for output n. 2 if the **uS05** parameter is other than 0 and at least one relay output has been configured as an auxiliary output.

This function can be enabled with a direct or reverse effect, as explained below:

Direct effect:

If:
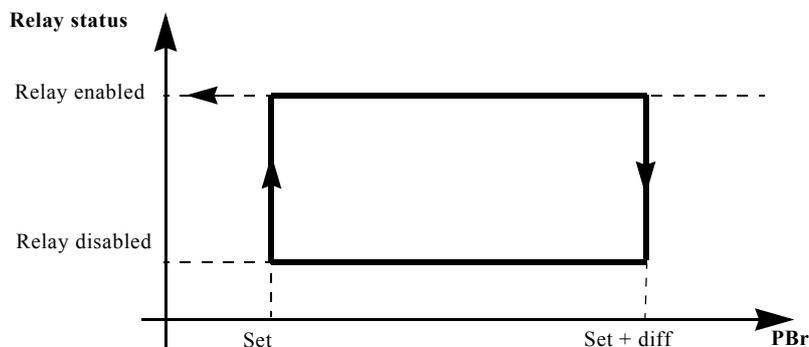
Pbr < set, the relay is enabled

Pbr > set + differential, the relay is disabled

Set < PBr < set + differential, the previous status is maintained

PBr = NTC probe or transducer selected using the parameter **uS02** / **uS06**.

Indirect effect:

If:
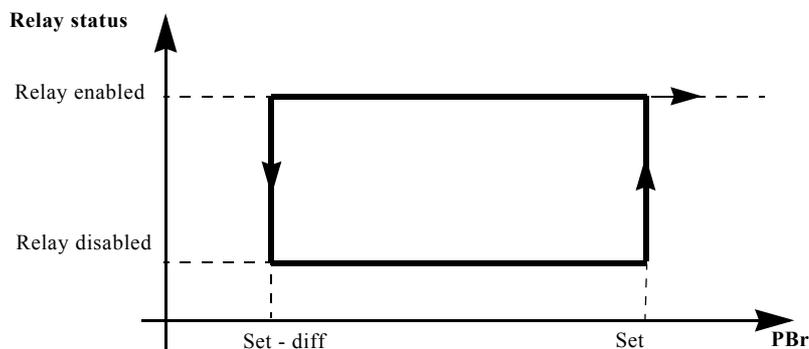
Pbr > set, the relay is enabled

Pbr < set - differential, the relay is disabled

Set - differential < PBr < set, the previous status is maintained

PBr = NTC probe or transducer selected using the parameter **uS02** / **uS06**.

1.23 Compressors operation

The **ST11** parameter defines the type of temperature regulation of the unit, which may be:

- **ST11** = **0** "PROPORTIONAL"
- **ST11** = **1** "NEUTRAL ZONE"
- **ST11** = **2** "PROPORTIONAL INTEGRAL" (not enabled function)

The following graphic shows the operating logic of the ST11 = 0 "PROPORTIONAL" compressors with unit operating in CHILLER mode:

ST01=Chiller Set point
ST07=Chiller Differential
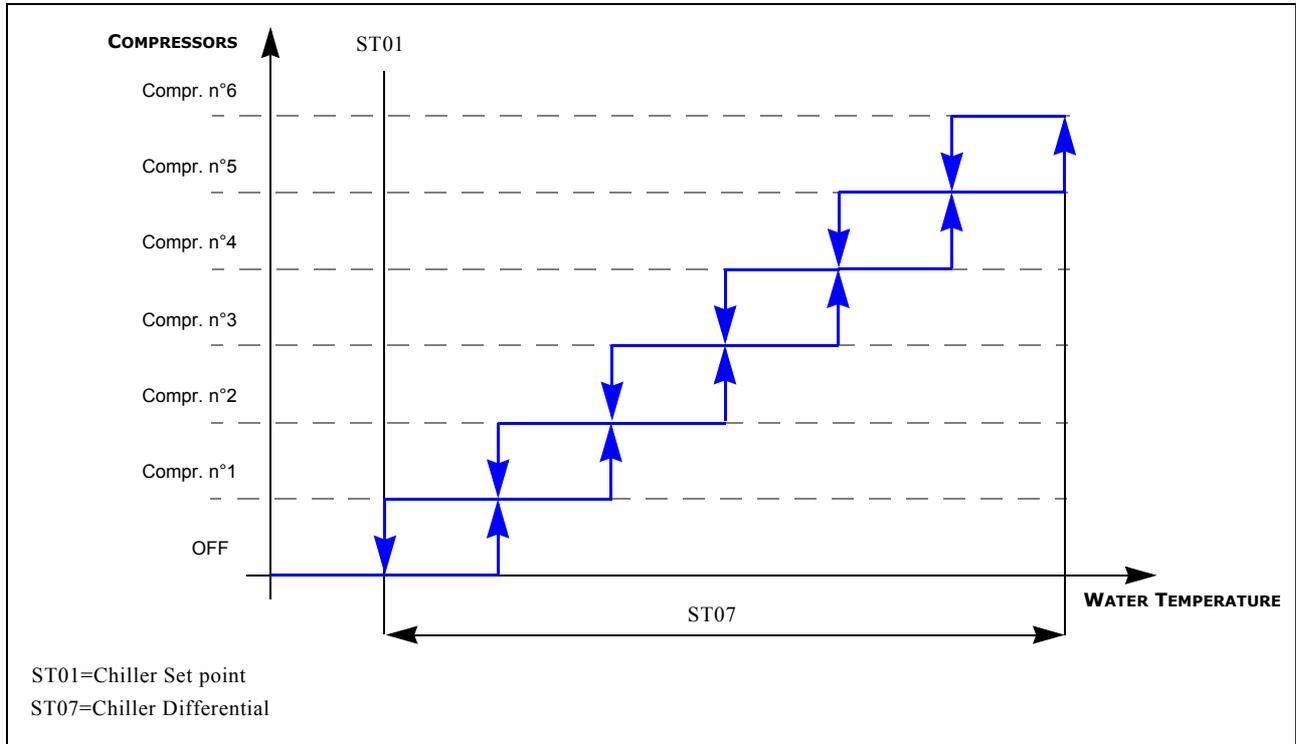
The graphic above shows how an increase or a reduction in the cooling demand determines the switching on or off of the compressors, according to the Proportional temperature regulation logic.

The following graphic shows the operating logic of the ST11 = 1 "NEUTRAL ZONE" compressors with unit operating in CHILLER mode:

NEUTRAL ZONE= Set point (ST01)-[Set point (ST01)+Dif. (ST07)]
CO 3 = Delay time between two compressors.
CO 4 = Off delay time between two compressor.
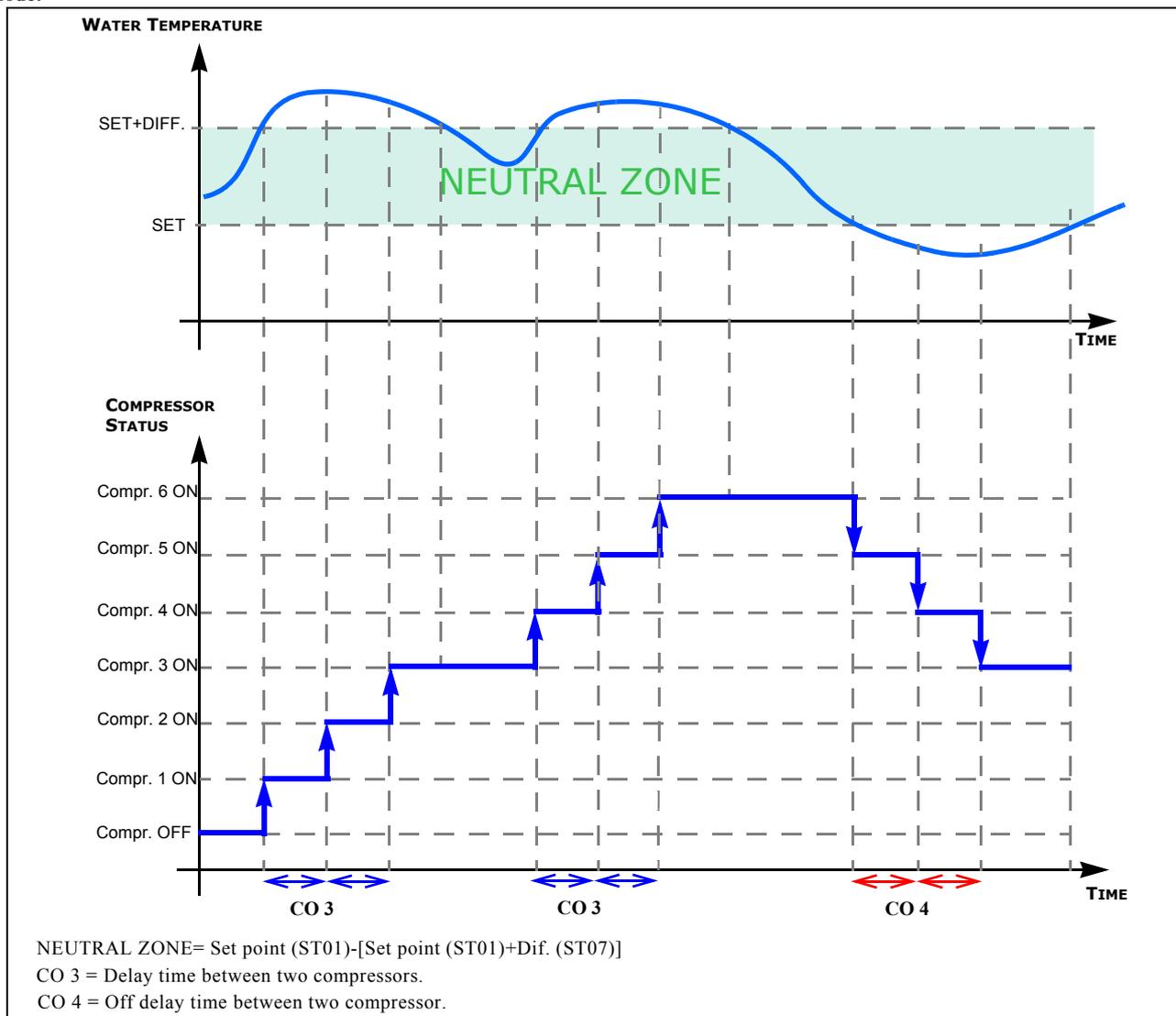
In this way the number of compressor starts-up can be equally distributed among the compressors, to prevent uneven loads, where only few compressors are kept running for long periods while others are switched on only briefly to force the system to reach the setpoint temperature.

Operation of compressors within the neutral zone
A specific function is provided through forced rotation or activation of compressors or capacity steps during operation of loads within the neutral zone Par. CO53 / CO54 to prevent prolonged running of compressors without interruption.

Maximum permanence in neutral zone without activation of resources - with at least one resource enabled
With at least one compressor running, when operation falls within the neutral zone the time set in par. CO53 is calculated; when this interval elapses the activation of a compressor or capacity step is forced.

ATTENTION
Resolution is set in 10-minute steps; if the parameter is set to 0 the function is disabled.

Maximum permanence in neutral zone without rotation of resources
When operation falls within the neutral zone the time set in par. CO54 is calculated; when this interval elapses the currently active compressor is disconnected and, on the basis of the rotation strategy, another compressor is forced to start.

ATTENTION
Resolution is set in hours; if the parameter is set to 0 the function is disabled.

1.24 Heater temperature regulation

1.24.1 Management of defrosting heater

Parameter **Ar06** is used to select the sensor/s that make it possible to manage the defrosting alarm and the relay outputs configured as defrosting heaters of circuits n. 1 and n. 2.

Ar06=0; Temperature regulation and management of the defrosting alarm and of the relay outputs for the circuit n. 1 and n. 2 heaters is disabled.

Ar06 =1; Temperature regulation and management of the defrosting alarm, as well as temperature regulation and management (in parallel) of the relay outputs for the circuit n. 1 and n. 2 heaters are performed ONLY by the NTC sensor configured as evaporator water input

Ar06=2; Temperature regulation and the management of the defrosting alarm and of the relay output for circuit n. 1 heater is performed via the NTC sensor configured as circuit n. 1 evaporator water output.

Temperature regulation and management of the defrosting alarm and of the relay output for circuit n. 2 heater is performed via the NTC sensor configured as circuit n. 2 evaporator water output.

NOTE
It is not possible to control the circuit n. 1 heater relay output via the NTC sensor configured as circuit n. 2 evaporator water output and vice-versa.

Ar06=3; Temperature regulation and management of the defrosting alarm and of the circuit n. 1 and n. 2 heaters relay outputs (controlled in parallel) can be performed via the NTC sensors configured as circuit n. 1 or n. 2 evaporator water output or common output, or, if all three are configured, by the first sensor that detects a bottom temperature than the activation setting.

1.24.2 Temperature regulation of condenser defrosting heaters

It depends on the configuration of the relay outputs configured as circuit n. 1 heater and circuit n. 2 heater, and on the selection of the NTC sensors assigned to control them.

Parameter **Ar08** is used to select the sensor for temperature regulation of the defrosting alarm and of the heaters during operation in chiller and heat pump mode.

Ar08=0; Temperature regulation and management of the defrosting alarm and of the two relay outputs for circuit n. 1 and n. 2 heaters is disabled.

Ar08=1; Temperature regulation and management of the defrosting alarm and the parallel management of the two relay outputs for circuit n. 1 and n. 2 heaters is performed only via the NTC sensor configured as condenser water input

Ar08=2; Temperature regulation and management of the defrosting alarm and of the relay output for circuit n. 1 heaters is performed via the NTC sensor configured as circuit n. 1 condenser water output.

Temperature regulation and management of the defrosting alarm and of the relay output for circuit n. 2 heaters is performed via the NTC sensor configured as circuit n. 2 condenser water output.

NOTE
It is not possible to control the circuit n. 1 heater relay output via the NTC sensor configured as circuit n. 2 condenser water output and vice-versa.

Ar08=3; Temperature regulation and management of the defrosting alarm and of the relay outputs for circuit n. 1 and n. 2 heaters is performed via the NTC sensor configured as circuit n. 1 and n. 2 condenser water output and common output.

NOTE
If configured, the two relay outputs for circuit n. 1 and n. 2 heaters are controlled in parallel only via the NTC sensor configured as common condenser output.

1.24.3 Operation of the defrosting alarm - defrosting heaters from digital input

The management of the defrosting alarm and of the circuit n. 1 heaters relay output is carried out via the active digital input configured as circuit n. 1 defrosting alarm, whereas management of the defrosting alarm and of the circuit n. 2 heaters relay output is carried out via the active digital input configured as circuit n. 2 defrosting alarm.

NOTE
It is not possible to control the circuit n. 1 heaters relay output by the digital input configured as circuit n. 2 defrosting alarm and vice-versa.

On the other hand, it is possible to control in parallel the two relay outputs configured as circuit n. 1 and n. 2 heater relays by a single digital input configured as circuit n. 1 or circuit n. 2 defrosting alarm.

When the alarm is activated by a single digital input configured as circuit n. 1 or circuit n. 2 defrosting alarm, both alarm labels appear on the display.

1.25 Compressors temperature regulation - rotation

In these units the compressor rotation is enabled.

The parameter **CO14** determines the compressor on/off sequence.

CO14=0; Fix sequence. In the two circuits, compressor n. 1 is always activated first, followed by compressor n. 2. Compressor 1 is switched off only if compressor 2 is already off.

CO14=1; Rotation enabled. Base on the number of operating hours, the first compressor to be switched on is the one with the smallest number of operating hours. The first compressor to be switched off is the one with the highest number of hours. On machines with a single capacity step compressor per circuit, the compressor rotation is automatically disabled.

CO14=2; Rotation enabled. Based on the number of starts per hour, the first compressor to be switched on is the one with the least number of starts. The first compressor to be switched off is the one with the smallest number of starts up. On the machines with a single capacity step compressor per circuit, the compressor rotation is automatically disabled.

1.26 Saturation - balancing mode

1.26.1 Saturation mode

CO15=0; Circuit saturation. If the temperature regulation is required, first all the power steps of a circuit are switched on, and than the ones of the other circuit.

Example: let's consider a two-circuit unit with two steps per circuit, i.e. 4 steps in all.

Start-up:

The temperature regulation requires 4 steps: the compressor/s in the two circuits that, based on the value of parameter **CO14**, has/have the lowest number of operating hours or the least number of starts, is/are selected. Once the compressor/s has/have been selected and the associated circuit has been determined, the compressor in that circuit with the smallest number of operating hours or the smallest number of starts up per hour is switched on, followed by the second compressor within the same circuit. The compressors in the other circuit are activated according to the same logic.

Switch-off:

According to the temperature regulation requirements, the circuit with the smallest number of active resources is selected as first. If the number of activated resources is the same, the compressor/s in the two circuits that, based on the value of parameter **CO14**, has/have the highest number of operating hours or the smallest number of starts per hour, is/are selected. The compressor in that circuit with the highest number of operating hours or the least number of starts per hour is switched off, followed by the second one within the same circuit. The compressors in the other circuit are turned off according to the same logic.

1.26.2 Balancing mode

Circuit balancing: the power steps are activated in order that both circuits deliver the same power or that the difference is no more than one step. Parameter **CO15**=1 circuit balancing is significant only provided that there are 2 circuits and 2 steps per circuit.

Example: let's consider a two-circuit unit with two steps per circuit, i.e. 4 steps in all.

Start up:

The temperature regulation requires 4 steps: the compressor/s in the two circuits that, based on the value of parameter **CO14**, has/have the lowest number of operating hours or the lowest number of starts up per hour, is/are selected. If circuit n. 1 is selected, the compressor in circuit n. 1 with the lowest number of operating hours or the lowest number of starts up per hour is switched on, then the compressor in circuit n. 2 with the lowest number of operating hours or the lowest number of starts up per hour is switched on, then back to circuit n. 1, where the second compressor is switched on, followed by the second compressor in circuit n. 2.

Switch-off:

Based on temperature regulation requirements, the circuit with the highest number of compressor operating hours or the lowest number of compressor starts per hour is selected first. If circuit n. 1 is selected, the compressor in circuit n. 1 with the highest number of operating hours or the lowest number of starts up per hour is switched off, then the compressor in circuit n. 2 with the highest number of operating hours or the lowest number of starts up per hour is switched off, then back to circuit n. 1, where the second compressor is switched on, followed by the second compressor in circuit n. 2.

NOTE

After being activated, each compressor must remain on for at least CO01. Shutdowns due to alarms, remote STAND-BY / ON OFF signals, or NTC sensor-controlled defrost cycles or capacity steps are excepted from this rule.

After being disabled, each compressor must remain off for at least CO02.

If the regulator requires the activation of the two compressors / steps according to the fixed sequence or the enabled rotation procedure, start-up between the two is delayed by CO03 seconds.

If the regulator requires the deactivation of the two compressors / steps according to the fixed sequence or the enabled rotation procedure, switch-off between the two compressors / steps is delayed by CO04 seconds.

In the event of a power failure, when the power supply is restored ALL THE OUTPUTS are forced OFF for the time set in CO05.

1.27 Compressors

1.27.1 Compressor start up

The parameter **CO10** is used to select the compressor start-up type:

CO10=0 (direct start)

CO10=1(part-winding start)

CO10=2 (star/delta start)

The relay resources within the **CF** family, that are dedicated to the management of the compressor start-up, must be correctly configured.

When the type of start-up has been selected, if the resources (relay outputs) have been configured incorrectly (oversized or insufficient) a configuration error **ACF6** will appear on the display.

1.28 Switch-off function with pump down (NOT ENABLED FUNCTION)

The pump down procedure is enabled only if the value of the **CO36** parameter is different from **0**.

Non-return valves must be installed in the compressor pipes for the pump down procedure to be available.

If the Pump-Down procedure **CO36** is enabled, the last running compressor in each circuit will be disabled according to the method described below. This procedure is used to prevent the compressors from sucking liquid refrigerant, and getting damaged, during the subsequent machine start-up phase.

At the moment that the last compressor is requested to switch off, the Pump Down procedure starts as follows: first, an electric valve closes the cooling circuit immediately after the condenser.

The compressor is not switched off immediately (as would be the case if the pump-down procedure was disabled) but remains active.

Its operation causes a pressure drop in the suction line closed by the electric valve.

When the set low-pressure threshold is reached the compressor is switched off.

1.28.1 Pump down stopping with low-pressure switch

This function is active if the circuit low pressure switch is configured and values 1 or 3 are attributed to parameter **CO36**, and one relay for each circuit is configured as a circuit n.1 or circuit n. 2 pump-down solenoid (the values of parameter **CO36**=2,4 are valid only if the pump-down pressure switch or a low pressure transducer is used).

According to a switch-off request from the temperature regulation system, before switching off the last compressor in the circuit the solenoid valve is closed. The compressor remains on until the digital low pressure input becomes active or for the maximum time setting of parameter **CO39**. Warning: no low pressure alarm is generated during shutdown with the pump-down procedure; the opening of the low pressure switch contact switches off only the compressor. A minimum pressure alarm may be displayed after the time set in parameter **AL02** has elapsed. If the compressor is switched off due to time-out (time set in parameter **CO39**, which determines the maximum length of time that the compressor may remain on following the deactivation of the solenoid valve) and not to the opening of the low pressure switch contact, for a number of times within an hour in excess of the value set in parameter **AL21** (maximum number of pump-down alarms per hour during switch-off), the alarm is recorded and signalled on the display, the alarm relay is activated and the buzzer sounds. If the switch-off request comes from an active remote OFF input or from the chiller / heat pump key, during the switch-off phase with pump-down the LED associated to the chiller / heat pump operating mode flashes.

Upon the second start-up (call from temperature regulation device), the solenoid valve opens first and 1 second later, if the low pressure switch allows it, the compressors start.

NOTE
In the event of compressor shutdown alarm this procedure is ignored and the compressors switch off immediately.

Switch-off with pump-down in chiller mode only, without pump-down during start-up:

Parameter **CO36** = 3.

The pump-down procedure is inhibited in the heat pump mode. In heat pump mode the circuit pump-down solenoid valve operates in parallel with the compressor.

1.28.2 Pump down function with pump down pressure switch

CO36 = 1 Switch-off with pump-down without pump-down during start-up.

The function is active only if one relay in each circuit is configured as a circuit 1 or circuit 2 pump-down solenoid, and a digital input is configured as a circuit 1 or circuit 2 pump-down pressure switch. Upon a request for switch-off from the temperature regulation system, the solenoid valve is closed before the last compressor in the circuit is switched off. The compressor keeps running until the digital input of the pump-down pressure switch becomes active, or for the maximum length of time set in parameter **CO39**. If the compressor is switched off due to time-out (time set in parameter **CO39**, which determines the maximum length of time that the compressor may remain on following the deactivation of the solenoid valve) and not to the opening of the pump-down pressure switch contact, for a number of times within an hour in excess of the value set in parameter **AL21** (maximum number of pump-down alarms per hour during switch-off), the alarm is recorded and signalled on the display, the alarm relay is activated and the buzzer sounds. If the switch-off request comes from an active remote OFF input or from the chiller / heat pump key, during the switch-off phase with pump-down the LED associated to the chiller / heat pump operating mode flashes.

Upon the next start-up (call from temperature regulation device), the solenoid valve opens first and 1 second later, if the pump-down pressure switch allows it, the compressors start.

NOTE

In the event of compressor shutdown alarm this procedure is ignored and the compressors switch off immediately.

CO36 = 2 start-up and switch-off with pump down.

The function is active only if one relay in each circuit is configured as a circuit 1 or circuit 2 pump-down solenoid, and a digital input is configured as a circuit 1 or circuit 2 pump-down pressure switch (the values of parameter **CO36**= 2, 4 are valid only if a low pressure transducer is used).

Upon a request for switch-off from the temperature regulation system, the solenoid valve is closed before the last compressor in the circuit is switched off. The compressor keeps running until the digital input of the pump-down pressure switch becomes active, or for the maximum length of time set in parameter **CO39**. If the compressor is switched off due to time-out (time set in parameter **CO39**, which determines the maximum length of time that the compressor may remain on following the deactivation of the solenoid valve) and not to the opening of the pump-down pressure switch contact, for a number of times within an hour in excess of the value set in parameter **AL21** (maximum number of pump-down alarms per hour during switch-off), the alarm is recorded and signalled on the display, the alarm relay is activated and the buzzer sounds. If the switch-off request comes from an active remote OFF input or from the chiller / heat pump key, during the switch-off phase with pump-down the LED associated to the chiller / heat pump operating mode flashes.

Upon the next start-up (call from temperature regulation device), the solenoid valve opens first and 1 second later, if the pump-down pressure switch allows it, the compressors activate. If within the **CO39** time the compressors do not activate, a pump down alarm is signalled. In case of alarm the procedure is ignored and the compressors are not switched on. In this case, if parameter **AL23**=0 the compressors may start up again only if the pressure switch contact becomes active, or if parameter **AL23**=1 and the number of activations per hour set in parameter **AL22** have been exceeded, and the alarm has been manually reset.

CO36 = 3 switch-off with pump-down in chiller mode only, without pump-down during start-up.

The pump-down procedure is inhibited in the heat pump mode. In heat pump mode the pump-down solenoid valve operates in parallel with the compressor.

CO36 = 4 switch-off with pump-down in chiller mode only, with pump-down during start-up.

The pump-down procedure is inhibited in the heat pump mode only during switch-off. The pump-down solenoid valve operates in parallel with the compressor.

1.28.3 Pump-down function with low-pressure transducer

CO36 = 1 switch-off with pump-down without pump-down during start-up

The function is active only if one relay is configured as a circuit 1 or circuit 2 pump-down solenoid, and an analogue input is configured as a circuit 1 or circuit 2 low-pressure transducer.

Upon a request for switch-off from the temperature regulation system, the solenoid valve is closed before the last compressor in the circuit is switched off. The compressor keeps running until the low pressure value reaches the switch-off value set in parameter **CO37**. If the compressor is switched off due to time-out (time set in parameter **CO39**, which determines the maximum length of time that the compressor may remain on following the deactivation of the solenoid valve) and not because the set pump-down value has been reached, for a number of times within an hour in excess of the value set in parameter **AL21** (maximum number of pump-down alarms per hour during switch-off), the alarm is recorded and signalled on the display, the alarm relay is activated and the buzzer sounds. If the switch-off request comes from an active remote OFF input or from the chiller / heat pump key, during the switch-off phase with pump-down the LED associated to the chiller / heat pump operating mode flashes.

Upon the next start-up (call from temperature regulation device), the solenoid valve opens first and 1 second later the compressors start.

In case of compressor shutdown alarm the procedure is ignored and the compressors are switched off immediately.

CO35 = 2 start-up and switch-off with pump-down

The function is active only if one relay is configured as a circuit 1 or circuit 2 pump-down solenoid, and an analogue input is configured as a circuit 1 or circuit 2 low pressure transducer.

Upon a request for switch-off from the temperature regulation system, the solenoid valve is closed before the last compressor in the circuit is switched off. The compressor keeps running until the low pressure value reaches the switch-off value set in parameter **CO37**. If the compressor is switched off due to time-out (time set in parameter **CO39**, which determines the maximum length of time that the compressor may remain on following the deactivation of the solenoid valve) and not because the set pump-down value has been reached, for a number of times within an hour in excess of the value set in parameter **AL21** (maximum number of pump-down alarms per hour during switch-off), the alarm is recorded and signalled on the display, the alarm relay is activated and the buzzer sounds. If the switch-off request comes from an active remote OFF input or from the chiller / heat pump key, during the switch-off phase with pump-down the LED associated to the chiller / heat pump operating mode flashes.

Upon the next start-up (call from temperature regulation device), the solenoid valve opens first and 1 second later, if the switch-on value set in parameter **CO37** is reached, the compressors activate. If within the **CO39** time the compressors do not activate, a pump down alarm is signalled. In case of alarm the procedure is ignored and the compressors are not switched on. In this case, if parameter **AL23**=0 the compressors may start up again only if the set value is reached, or if parameter **AL23**=1 and the number of activations per hour set in parameter **AL22** have been exceeded, and the alarm has been manually reset.

CO36 = 3 switch-off with pump-down in chiller mode only, without pump-down during start-up

The pump-down procedure is inhibited in the heat pump mode during switch-off and the pump-down solenoid valve operates in parallel with the compressor.

CO36 = 4 switch-off with pump-down in chiller mode only, with pump-down during start-up

The pump-down procedure is inhibited in the heat pump mode during switch-off and the pump-down solenoid valve operates in parallel with the compressor.

1.29 Compressors unloading function

This procedure is necessary when sudden peaks in cooling demand occur, for instance if the machine is restarted after a long period of inactivity.

Under these conditions the evaporator inlet water temperature might be so high as to require a cooling delivery in excess of system capacity.

The consequent system overload would require the start-up of all the compressors at once, which would be forced to operate in near-limit conditions.

The overburdened compressors would thus be subject to dangerous overheating which would cause the activation of the thermal protections, or the pressure of the refrigerant gas could reach alarm levels which would cause the machine to shut down.

This function is always active and enabled in chiller mode if at least 2 power steps have been configured in a circuit. By power steps we mean at least two compressors or one compressor with capacity steps in each circuit.

This function enables the machine to run (through the switch-off or capacity step operation of the compressors) even when the temperature of the water at the evaporator's inlet is high (summer start-up with hot water accumulation), preventing the possible triggering of high pressure alarms.

The unloading function is managed via an analogue input configured as an evaporator inlet water NTC sensor.

Operation

Function enabled:

With the chiller operating mode selected by a compressor switch-on request from the temperature regulation system, if the evaporator inlet water temperature is identical to or exceeds the value set in **CO40**, after the **CO42** time delay the circuit unloading function is activated. If this function is activated, the **AEUn** label (evaporator unloading function) flashes on the bottom display along with the associated value, and only the power steps set in parameter **CO49** remain on in the circuit.

Function disabled:

If the temperature drops below the value set in **CO40** - differential set in **CO41**, the function is disabled, and if the temperature regulation system requires it, all the available power steps may be switched on.

NOTE
To prevent prolonged operation in unloading mode under temperature conditions ranging from the activation setting and the deactivation differential, when the evaporator water inlet temperature is below the value set in CO40 the time set in parameter CO43 is counted; when this time elapses the function is disabled even if the temperature has not dropped below the value set in CO40 - differential CO41.

1.29.1 Condensation temperature – evaporation pressure

With the operating mode selected by a compressor switch-on request from the temperature regulation system, if the condensation pressure / temperature is identical to or exceeds the value set in **CO44** in chiller mode, the unloading function is activated in the circuit to which the transducer / NTC sensor belongs. If this function is activated, labels **b1Cu** (circuit n. 1 condensation unloading function) and **b2Cu** (circuit n. 2 condensation unloading function) start flashing on the bottom display along with the associated values, and only the power steps set in parameter **CO49** remain on in the circuit.

Example:

Two-circuit unit with three compressors in each circuit.

If parameter **CO49**=2 (i.e. 2 power steps in each circuit), if the unloading function has been activated one compressor is switched off in each circuit.

If compressors with capacity steps are used and the unloading function has been activated, in order to prevent oscillations inside the circuit, once a step has been switched on (capacity step valve set to ON) this step remains on for the minimum time set in the **CO50** parameter, even if the unloading function is no longer required and operation at 100% capacity is requested. If the **CO50** parameter is set to 0 the function is disabled; in this case if the unloading function is no longer required and operation at 100% capacity is requested, capacity step operation is immediately disabled.

Function disabled in chiller mode:

If the condensation pressure / temperature in chiller mode drops below the value set in **CO44** -differential value set in **CO45**, the function is disabled; in this case, if the temperature regulation system requires it, all the available power steps can be switched on.

NOTE
To prevent prolonged operation in unloading mode under temperature / pressure conditions ranging from the activation setting and the deactivation differential, when the condensation pressure / temperature is higher than the value set in CO40 the time set in parameter CO48 is counted; when this time elapses the function is disabled even if the temperature has not dropped below the value set in CO44 - differential CO45.

Function enabled in heat pump mode

The unloading of the compressors is managed by the analogue input configured as circuit 1 evaporation sensor or circuit 2 evaporation sensor. With the operating mode selected by a compressor switch-on request from the temperature regulation system, if the evaporation pressure is identical to or exceeds the value set in **CO46** in chiller mode, the unloading function is activated in the circuit to which the transducer belongs. If this function is activated, labels **b1Cu** (circuit n. 1 condensation unloading function) and **b2Cu** (circuit n. 2 condensation unloading function) start flashing on the bottom display along with the associated values, and only the power steps set in parameter **CO49** remain on in the circuit.

Example:

Two-circuit unit with three compressors in each circuit.

If parameter **CO49** =1 (i.e. 1 power step in each circuit), if the unloading function has been activated two compressors are switched off in each circuit.

If compressors with capacity steps are used and the unloading function has been activated, in order to prevent oscillations inside the circuit, once a step has been switched on (capacity step valve set to ON) this step remains on for the minimum time set in the **CO50** parameter, even if the unloading function is no longer required and operation at 100% capacity is requested. If the **CO50** parameter is set to 0 the function is disabled; in this case if the unloading function is no longer required and operation at 100% capacity is requested, capacity step operation is immediately disabled.

Function disabled in heat pump mode

If the evaporation pressure rises above the value set in **CO46** + differential value set in **CO47**, the function is disabled and, if the temperature regulation system requires it, all the available power steps can be switched on.

NOTE

To prevent prolonged operation in unloading mode under evaporation pressure conditions ranging from the activation setting and the deactivation differential, when the evaporation pressure rises above the value set in CO46 the time set in parameter CO48 is counted; when this time elapses the function is disabled even if the temperature has not dropped below the value set in CO46 + differential CO47.

1.30 Load maintenance request function

This function fixes the number of compressor operating hours after which a maintenance request signal is transmitted

The parameters from **CO26** to **CO31** are the hourcounter sets of compressor 1 to 6. If the hour counter threshold is set on zero, the maintenance signalling function is disabled, whereas the operating hours continue to be recorded.

Compressor maintenance request.

Meaning of the label	**ACP1** (compressor n° 1 maintenance) -…**ACP6** (compressor n° 6 maintenance)
Activation cause	Compressor working hours > control set
Reset	Operation hours reset (in function menu: Hour function)
Restart	Manual
Icon	⚠ flashing
Action	Alarm relays + buzzer enabled

1.31 Condensing fan regulation

At each start, irrespective of the condensing temperature/pressure the fan is supplied with the maximum voltage for a programmed time period (FA03), after which the fan continues to run at the speed set by the speed regulator. FA04 establishes a time lag of several microseconds to compensate for different motor characteristics. If FA01=3 and the proportional regulator requests a fan stop (cut-off) at the time of a compressor start and FA14 is different from 0 for the remaining time the fan well be forced to run at minimum speed. If FA14=0 the function is not enabled. Once the analog output has been selected it is linked to the digital ON/OFF output (if configured): if the analog output >0 the digital output=1; if the analog output is <0 then the digital output =0.

FA01=3 select continuous step ON/OFF

- In the presence of a demand from condensing temperature/pressure/evaporating pressure and on the basis of the selected polarity, the fans can be connected or disconnected.
- In the presence of a demand from condensing temperature/pressure/evaporating pressure and on the basis of the selected polarity, the fans can be connected or disconnected.

Circuit with four ventilation steps

OUTPUT Relay	Step 1	Step 2	Step 3	Step 4
Output Relay step 1	Step 1 ON	Step 1 ON	Step 1 ON	Step 1 ON
Output Relay step 2	Step 2 OFF	Step 2 ON	Step 2 ON	Step 2 ON
Output Relay step 3	Step 3 OFF	Step 3 OFF	Step 3 ON	Step 3 ON
Output Relay step 4	Step 4 OFF	Step 4 OFF	Step 4 OFF	Step 4 ON

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1.32 Recovery function (NOT ENABLED FUNCTION)

The recovery function is enabled if:

1. the **rC01** parameter is other than **0**

2. the unit is operating in chiller mode

3. the recovery key is pressed (recovery key 🕯 on)

4. the condensation pressure / temperature is lower than the **rC06** setting – **rC07** differential setting

5. the necessary resources are configured (digital inputs / outputs)

6. the digital input configured as recovery request is active

The recovery function is disabled if:

1. the **rC01** parameter is set to 0

2. the unit is operating in heat pump, remote OFF or stand-by mode

3. the recovery key is pressed (recovery key 🕯 off)

4. the condensation pressure / temperature is higher than the **rC06** setting

5. the necessary resources are not configured (see configuration error **ACF9**)

6. the digital input configured as recovery request is disabled

Resources needed for circuit n. 1 recovery mode:

- Output configured as circuit n. 1 recovery valve
- Digital input configured as recovery request n. 1
- Circuit n. 1 condensation sensor

Resources needed for circuit n. 2 recovery mode:

- Output configured as circuit n. 2 recovery valve
- Digital input configured as recovery request n. 2
- Circuit n. 2 condensation sensor

1.33 Disabling / enabling of recovery mode from condensation pressure / temperature

The disabling of the recovery function allows the machine to operate in chiller mode + recovery in order to prevent the possible triggering of the high pressure alarm. The recovery function is disabled via the analogue input configured as circuit n. 1 condensation sensor or circuit n. 2 condensation sensor (depending on the value set in parameter **CF07**=0 temperature control or **CF07**=1 pressure control).

1.33.1 Operating principle

Disabling of recovery mode:

With the recovery operating mode selected by a compressor switch-on request from the temperature regulation system, if the condensation pressure / temperature is identical to or exceeds the value set in **rC06** (recovery function disable setting), the recovery disable function is activated in the circuit to which the transducer / NTC sensor belongs. If this function is activated, labels **b1rC** (circuit n. 1 recovery disabled) and **b2rC** (circuit n. 2 recovery disabled) start flashing on the bottom display along with the associated value.

Enabling of recovery mode:

If the condensation pressure / temperature drops below the value set in **rC06** (recovery function disable setting) / differential value set in **rC07** (recovery function enable differential setting), the recovery function is enabled in the circuit to which the transducer / NTC sensor belongs.

Recovery enable/disable remarks:

To prevent prolonged operation in recovery disable mode under temperature / pressure conditions ranging from the deactivation setting and the activation differential, when the condensation temperature / pressure drops below the value set in **rC06** the time set in parameter **rC08** (maximum recovery disable time from condensation temperature / pressure) is counted; when this time elapses the recovery function is enabled even if the temperature has not dropped below the value set in **rC06** / differential value set in **rC07**.

1.34 Configuration of the analogue/digital input/output

1.34.1 Configuration of the analogue inputs PB1 - PB2 - PB7 - PB8 - PB9 - PB10

Parameter	Description
CF08 = Configuration PB1 **CF09 = Configuration PB2** **CF14 = Configuration PB7** **CF15 = Configuration PB8** **CF16 = Configuration PB9** **CF17 = Configuration PB10**	0 = Disabled 1 = Temperature probe PTC for compressor n°1 discharge 2 = Temperature probe PTC for compressor n°2 discharge 3 = Temperature probe PTC for compressor n°3 discharge 4 = Temperature probe PTC for compressor n° 4 discharge 5 = Temperature probe PTC for compressor n° 5 discharge 6 = Temperature probe PTC for compressor n° 6 discharge 7 = Temperature probe NTC for evaporator inlet 8 = Temperature probe NTC for evaporator n° 1 outlet 9 = Temperature probe NTC for evaporator n° 2 outlet 10 = Temperature probe NTC for common evaporator outlet 11 = Temperature probe NTC for common hot water condenser / recovery inlet 12 = Temperature probe NTC for hot water of the condenser / recovery circuit n° 1 inlet 13 = Temperature probe NTC for hot water of the condenser / recovery circuit n° 2 inlet 14 = Temperature probe NTC for hot water of the condenser / recovery circuit n° 1 outlet 15 = Temperature probe NTC for hot water of the condenser / recovery circuit n° 2 outlet 16 = Temperature probe NTC for hot water of the condenser / recovery common outlet 17 = Temperature probe NTC for free cooling water inlet circuit 18 = Temperature probe NTC for free cooling external air temperature 19 = Temperature probe NTC for dynamic setpoint external air / boiler / change over 20 = Temperature probe NTC for combined defrost circuit n° 1 21 = Temperature probe NTC for combined defrost circuit n° 2 22 = Temperature probe NTC for auxiliary output n° 1 23 = Temperature probe NTC for auxiliary output n° 2 24 = tank NTC probe 25 = Temperature probe NTC / pressure 4÷20 mA / ratiometric 0÷ 5Volt condensation circuit n°1 26 = Temperature probe NTC / pressure 4÷20 mA / ratiometric 0÷ 5Volt condensation circuit n°2 27 = Pressure probe 4÷20 mA / ratiometric 0÷ 5Volt evaporation circuit n° 1 28 = Pressure probe 4÷20 mA / ratiometric 0÷ 5Volt evaporation circuit n° 2 29 = Pressure probe 4÷20 mA / ratiometric 0÷ 5Volt auxiliary output n° 1 30 = Pressure probe 4÷20 mA / ratiometric 0÷ 5Volt auxiliary output n° 2 31 = Pressure probe 4÷20 mA dynamic setpoint

1.34.2 Configuration of the analogue inputs PB3 - PB4 - PB5 - PB6

Parameter	Description
CF10 = Configuration PB3 **CF11 = Configuration PB4** **CF12 = Configuration PB5** **CF13 = Configuration PB6**	0 = Disabled 1 = Temperature probe PTC for compressor 1 discharge 2 = Temperature probe PTC for compressor 2 discharge 3 = Temperature probe PTC for compressor 3 discharge 4 = Temperature probe PTC for compressor 4 discharge 5 = Temperature probe PTC for compressor 5 discharge 6 = Temperature probe PTC for compressor 6 discharge 7 = Temperature probe NTC for evaporator inlet 8 = Temperature probe NTC for evaporator outlet n° 1 9 = Temperature probe NTC for evaporator outlet n°2 10 = Temperature probe NTC for common evaporator outlet 11 = Temperature probe NTC for common hot water condenser / recovery inlet 12 = Temperature probe NTC for hot water condenser / recovery inlet circuit n°1 13 = Temperature probe NTC for hot water condenser / recovery inlet circuit n°2 14 = Temperature probe NTC for hot water condenser / recovery outlet circuit n°1 15 = Temperature probe NTC for hot water condenser / recovery outlet circuit n°2 16 = Temperature probe NTC for hot water condenser / recovery common outlet circuit 17 = Temperature probe NTC for free cooling water inlet 18 = Temperature probe NTC for free cooling external air 19 = Temperature probe NTC for external air dynamic setpoint/ boiler / change over 20 = Temperature probe NTC for combined defrost circuit n°1 21 = Temperature probe NTC for free cooling water inlet n°2 22 = Temperature probe NTC for auxiliary output n°1 23 = Temperature probe NTC for auxiliary output n°2 24 = Probe NTC tank 25 = Condenser probe circuit 1 (temperature NTC / pressure 4÷20 mA / ratio-metric 0÷ 5Volt) 26 = Condenser probe circuit 2 (temperature NTC / pressure 4÷20 mA / ratio-metric 0÷ 5Volt) 27 = Evaporator pressure probe circuit 1 (pressure 4÷20 mA / ratio-metric 0÷ 5Volt) 28 = Evaporator pressure probe circuit 1 (pressure 4÷20 mA / ratio-metric 0÷ 5Volt) 29 = Auxiliary output 1 pressure probe control (4÷20 mA / ratio-metric 0÷ 5Volt). 30 = Auxiliary output 2 pressure probe control (4÷20 mA / ratio-metric 0÷ 5Volt). 31 = Dynamic setpoint pressure probe (4÷20 mA)

1.34.3 Configuration of the digital inputs ID1 ÷ ID18

Parameter	Description
CF36 = Configuration ID1 **CF37 = Configuration ID2** **CF38 = Configuration ID3** **CF39 = Configuration ID4** **CF40 = Configuration ID5** **CF41 = Configuration ID6** **CF42 = Configuration ID7** **CF43 = Configuration ID8** **CF44 = Configuration ID9** **CF45 = Configuration ID10** **CF46 = Configuration ID11** **CF47 = Configuration ID12** **CF48 = Configuration ID13** **CF49 = Configuration ID14** **CF50 = Configuration ID15** **CF51 = Configuration ID16** **CF52 = Configuration ID17** **CF53 = Configuration ID18**	0 = Disabled 1 = Remote ON / OFF 2 = Remote chiller / heat pump 3 = Flow switch / Supply fan overload 4 = Flow switch of heated side 5 = Antifreeze heater circuit 1 6 = Antifreeze heater circuit 2 7 = High pressure switch circuit 1 8 = High pressure switch circuit 2 9 = Low pressure switch circuit 1 10 = Low pressure switch circuit 2 11 = Compressor 1 high pressure 12 = Compressor 2 high pressure 13 = Compressor 3 high pressure 14 = Compressor 4 high pressure 15 = Compressor 5 high pressure 16 = Compressor 6 high pressure 17 = Compressor 1 heat protection 18 = Compressor 2 heat protection 19 = Compressor 3 heat protection 20 = Compressor 4 heat protection 21 = Compressor 5 heat protection 22 = Compressor 6 heat protection 23 = Condenser fan heat protection of circuit 1 24 = Condenser fan heat protection of circuit 2 25 = Common condenser fan heat protection 26 = Water pump heat protection of evaporator 1 27 = Water support pump heat protection of evaporator 28 = Water pump overload of condenser 1 29 = Water support pump overload of condenser 30 = Recovery request for circuit 1 31 = Recovery request for circuit 2 32 = Defrost end of circuit 1 33 = Defrost end of circuit 2 34 = Energy Saving 35 = Pressure switch / compressor 1 oil 36 = Pressure switch / compressor 2 oil 37 = Pressure switch / compressor 3 oil 38 = Pressure switch / compressor 4 oil 39 = Pressure switch / compressor 5 oil 40 = Pressure switch / compressor 6 oil 41 = Pump down pressure switch of circuit 1 42 = Pump down pressure switch of circuit 2 43 = Generic alarm from digital input with stop regulation 44 = Digital input of thermoregulation request (motor-condenser unit) 45 = Digital input of cooling request (motor-condenser unit) 46 = Digital input of heating request (motor-condenser unit) 47 = Request / partialisation 1 of compressor 1 (motor-condenser unit) 48 = Request / partialisation 2 of compressor 1 (motor-condenser unit) 49 = Request / partialisation 3 of compressor 1 (motor-condenser unit) 50 = Request compressor n°2 51 = Request / partialisation 1 of compressor 2 (motor-condenser unit) 52 = Request / partialisation 2 of compressor 2 (motor-condenser unit) 52 = Request / partialisation 3 of compressor 2 (motor-condenser unit) 54 = Request compressor n°3 55 = Request / partialisation 1 of compressor 3 (motor-condenser unit) 56 = Request / partialisation 2 of compressor 3 (motor-condenser unit) 57 = Request / partialisation 3 of compressor 3 (motor-condenser unit) 58 = Request compressor n°4 59 = Request / partialisation 1 of compressor 4 (motor-condenser unit) 60 = Request / partialisation 2 of compressor 4 (motor-condenser unit) 61 = Request / partialisation 3 of compressor 4 (motor-condenser unit) 62 = Compressor n°5 request (motor-condenser unit) 63 = Compressor n°6 request (motor-condenser unit)

1.34.4 Configuration of the digital outputs RL1÷ RL14

Parameter	Description

CF54= Configuration RL1
CF55= Configuration RL2
CF56= Configuration RL3
CF57= Configuration RL4
CF58= Configuration RL5
CF59= Configuration RL6
CF60= Configuration RL7
CF61= Configuration RL8
CF62= Configuration RL9
CF63= Configuration RL10
CF64= Configuration RL11
CF65= Configuration RL12
CF66= Configuration RL13
CF67= Configuration RL14
	0 = Disabled
	1 = Alarm
	2 = Evaporator water pump / supply fan
	3 = Support water pump of the evaporator
	4 = Anti-freeze heater / integration heating / boiler circuit n°1
	5 = Anti-freeze heater / integration heating / boiler circuit n°2
	6 = Water pump of the condenser recovery circuit
	7 = Support water pump of the condenser recovery circuit
	8 = 4-way valve for chiller / heat pump inversion of the circuit n°1
	9 = 4-way valve for chiller / heat pump inversion of the circuit n°2
	10 = first step condenser fan ON/OFF control of the circuit n°1
	11 = second step condenser fan ON/OFF control of the circuit n°1
	12 = third step condenser fan ON/OFF control of the circuit n°1
	13 = fourth step condenser fan ON/OFF control of the circuit n°1
	14 = first step condenser fan ON/OFF control of the circuit n°2
	15 = second step condenser fan ON/OFF control of the circuit n°2
	16 = third step condenser fan ON/OFF control of the circuit n°2
	17 = fourth step condenser fan ON/OFF control of the circuit n°2
	18 = Solenoid valve of the pump-down circuit n°1
	19 = Solenoid valve of the pump-down circuit n°2
	20 = Recovery valve circuit n°1
	21 = Recovery valve circuit n°2
	22 = Free cooling ON/OFF valve
	23 = Auxiliary output circuit n°1
	24 = Auxiliary output circuit n°2
	25 = Solenoid valve intermittent for screw compressor n°1
	26 = Solenoid valve intermittent for screw compressor n°2
	27 = Solenoid valve of the liquid injection for compressor n°1
	28 = Solenoid valve of the liquid injection for compressor n°2
	29 = Tank resistance relay
	30 = Direct start-up: compressor n°1 relay
	    PW start: relay PW n°1 of the compressor v1
	    Star-delta start: relay line n°1 of the compressor n°1
	31 = PW start: relay PW n°2 of the compressor n°1
	    Star-delta start: relay line n°2 compressor n°1
	32 = Star centre of the Star-delta start of the compressor n°1
	33 = Capacity step valve n°1 compressor n°1
	34 = Capacity step valve n°2 compressor n°1
	35 = Capacity step valve n°3 compressor n°1
	36 = By-pass gas valve compressor n°1 start
	37 = Direct start: compressor n°2 start
	    PW start: relay n°1 of the compressor n° 2
	    Star-delta start: relay line n°1 of the compressor n°2
	38 = PW start: relay PW n°2 of the compressor n°2
	    Star-delta start: relay line n°2 of the compressor n°2
	39 = Star centre of the Star-delta start of the compressor n°2
	40 = Capacity step valve n°1 compressor n°2
	41 = Capacity step valve n°2 compressor n°2
	42 = Capacity step valve n°3 compressor n°2
	43 = By-pass gas valve compressor n°2 start
	44 = Direct start: compressor n°3 relay
	    PW start: relay PW n°1 of the compressor v3
	    Star-delta start: relay line n°1 of the compressor n°3
	45 = PW start: relay PW n°2 of the compressor n°3
	    Star-delta start: relay line n°1 of the compressor n°3
	46 = Star centre of the Star-delta start of the compressor n°3
	47 = Capacity step valve n°1 compressor n°3
	48 = Capacity step valve n°2 compressor n°3
	49 = Capacity step valve n°3 compressor n°3
	50 = By-pass gas valve compressor n°3 start
	51 = Direct start: compressor n°4 relay
	    PW start: PW n°1 of the compressor n°4
	    Star-delta start: relay line n°1 of the compressor n°4
	52 = PW start: relay PW n°2 of the compressor n°4
	    Star-delta start: relay line n°1 of the compressor n°4
	53 = Star centre of the Star-delta start of the compressor n°4
	54 = Capacity step valve n°1 of the compressor n°4
	55 = Capacity step valve n°2 of the compressor n°4
	56 = Capacity step valve n°3 of the compressor n°4
	57 = By-pass gas valve start of compressor n°4
	58 = Compressor n°5
	59 = Compressor n°6

1.35 Parameters description and setting

ATTENTION

To avoid a wrong machine operation, it is necessary to apply the following indications.

1.35.1 Thermoregulation parameters

ATTENTION

The values of the probes can be displayed using a measurement system other than the manufacturer's factory setting. This operation does not automatically convert the parameter values, which retain the measurement unit set by the manufacturer. To change the measurement unit from one system to the net proceed with the utmost caution and ensure the operation is carried out by skilled personnel.

User parameters

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
ST01	Set point chiller It allows to modify the setpoint of the unit in chiller mode	ST02	ST03	°C °F	dec int	
ST02	Chiller minimum Setpoint It fixes the min. setpoint limit during chiller operation	-30.0 -22	ST01	°C °F	Dec int	
ST03	Chiller maximum Setpoint It fixes the max. setpoint limit during chiller operation	ST01	70.0 158	°C °F	Dec int	
ST04	Set point heat pump It allows to modify the setpoint of the unit in heat pump mode	ST05	ST06	°C °F	Dec int	
ST05	Heat pump minimum Setpoint It fixes the min. setpoint limit during heat pump operation	-30.0 -22	ST04	°C °F	Dec int	
ST06	Heat pump maximum Setpoint It fixes the max. setpoint limit during heat pump operation	ST04	70.0 158	°C °F	Dec int	
ST07	Tripping band of regulation steps during chiller operation	0.1 0	25.0 45	°C °F	Dec int	
ST08	Tripping band of regulation steps during heat pump operation	0.1 0	25.0 45	°C °F	Dec int	
ST09	If fixes the probe for the unit thermoregulation during chiller operation 0= NTC temperature probe - evaporator inlet 1= NTC temperature probe - evaporator 1 outlet 2= NTC temperature probe - evaporator 2 outlet 3= NTC temperature probe - evaporator common outlet 4= temperature probe - remote terminal 1 5= temperature probe - remote terminal 2	0	5			3
ST10	If fixes the probe for the unit thermoregulation during heat pump operation 0= NTC temperature probe - evaporator inlet 1= NTC temperature probe - evaporator 1 outlet 2= NTC temperature probe - evaporator 2 outlet 3= NTC temperature probe - evaporator common outlet 4= temperature probe - remote terminal 1 5= temperature probe - remote terminal 2 6= NTC temperature probe - condenser common water inlet 7= NTC temperature probe - condenser water inlet circuit 1 8= NTC temperature probe - condenser water inlet circuit 2 9= NTC temperature probe - condenser water outlet circuit 1 10= NTC temperature probe - condenser water outlet circuit 2 11= NTC temperature probe - condenser common water outlet **ATTENTION** *If it is necessary to have the same thermoregulation both in chiller and in heat pump operation fix the same value for parameters ST09 and ST10.*	0	11			3
ST11	Set the thermoregulation type: 0= Proportional 1= Neutral Zone 2= Proportional/integral	0	2			0
Pr1	Password	0	999			023

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Parameter	Description	Min.	Max.	Udm	Resolution	Setting
Pr2	Password	0	999			032
Pr3	Password	0	999			069

1.35.2 Display read out parameters

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
Visualization						
dP01	Top display default read-out.	1	19			3
dP02	Bottom display default read-out.	1	19			0
Forced display read out						
dP03	Default forced read out of the top/bottom display. 0= configurable visualization. 1= Top display: Evaporator IN, Bottom display: Evaporator OUT. 2= Top display: Condenser IN, Bottom display: condenser OUT. 3= Top display: temperature/Condensing pressure, Bottom Display: evaporating pressure.	0	3			0
Forced display read out of the remote terminals						
dP04	Top display default read-out of the remote terminals N°1. 0= the read-out depends on the value of the parameters **dP01 - dP02 - dP03.** 1= the top display shows the NTC probe temperature of the remote terminal 1.	0	1			0
dP05	Top display default read-out of the remote terminals N°2. 0= he read-out depends on the value of the parameters **dP01 - dP02 - dP03.** 1=the top display shows the NTC probe temperature of the remote terminal 2.	0	1			0
Pr1	Password	0	999			023
Pr2	Password	0	999			032
Pr3	Password	0	999			069

1.35.3 Configuration parameters

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
Unit						
CF01	Type of unit: 0= Air/air Chiller 1= Air/water Chiller 2= Water/water Chiller	0	2			1
CF02	Unit with heat-pump mode: 0= no 1= yes	0	1			0
CF03	Motor-condenser unit: 0= no 1= yes	0	1			0
Compressors						
CF04	Compressor number of circuit n° 1: 1= 1 compressor 2= 2 compressor 3= 3 compressor 4= 4 compressor	0	4			2
CF05	Compressor number of circuit n° 2: 0= 0 compressor 1= 1 compressor 2= 2 compressor 3= 3 compressor	0	3			2
CF06	Number of capacity control for each compressor: 0= none 1= 1 capacity control 2= 2 capacity control 3= 3 capacity control 4= 4 capacity control	0	4			0

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
	Analogue inputs					
CF07	Operation of the temperature/pressure analogue input. 0= temperature/pressure NTC - 4÷20 mA: The condensing temperature is checked by the NTC probe, while for the checking of the evaporating pressure of circuit n° 1 and n° 2, and of the auxiliary pressure probe n° 1 and n° 2 you have to use a transducer with a 4÷20mA inlet. 1= pressure operation with a 4÷20 mA inlet: To control the evaporating and condensing pressures it is necessary a 4÷20mA transducer 2= temperature/pressure NTC - 0÷5V: The condensing temperature is controlled by the NTC probe, while to control the evaporating pressure of circuit n° 1 and n° 2, and the auxiliary probe n° 1 and n° 2 you have to use a ratio-metric transducer with a 0÷5V inlet. 3= temperature/pressure with a 0÷5V inlet: To control the condensing or the evaporating pressure you have to use a ratio-metric inlet of 0÷5V.	0	3			1
CF08	PB1 configuration If configured as digital input (see *"1.34.1 Configuration of the analogue inputs PB1 - PB2 - PB7 - PB8 - PB9 - PB10"*).	0 o 1	25 c62			0
CF09	PB2 configuration If configured as digital input (see *"1.34.1 Configuration of the analogue inputs PB1 - PB2 - PB7 - PB8 - PB9 - PB10"*).	0 o 1	25 c62			10
CF10	PB3 configuration If configured as digital input (see *"1.34.2 Configuration of the analogue inputs PB3 - PB4 - PB5 - PB6"*).	0 o 1	30 c62			25
CF11	PB4 configuration If configured as digital input (see *"1.34.2 Configuration of the analogue inputs PB3 - PB4 - PB5 - PB6"*).	0 o 1	30 c62			26
CF12	PB5 configuration If configured as digital input (see *"1.34.2 Configuration of the analogue inputs PB3 - PB4 - PB5 - PB6"*).	0 o 1	30 c62			0
CF13	PB6 configuration If configured as digital input (see *"1.34.2 Configuration of the analogue inputs PB3 - PB4 - PB5 - PB6"*).	0 o 1	30 c62			0
CF14	PB7 configuration If configured as digital input (see *"1.34.1 Configuration of the analogue inputs PB1 - PB2 - PB7 - PB8 - PB9 - PB10"*).	0 o 1	25 c62			8
CF15	PB8 configuration If configured as digital input (see *"1.34.1 Configuration of the analogue inputs PB1 - PB2 - PB7 - PB8 - PB9 - PB10"*).	0 o 1	25 c62			9
CF16	PB9 configuration If configured as digital input (see *"1.34.1 Configuration of the analogue inputs PB1 - PB2 - PB7 - PB8 - PB9 - PB10"*).	0 o 1	25 c62			0 19 with antifreeze option
CF17	PB10 configuration If configured as digital input (see *"1.34.1 Configuration of the analogue inputs PB1 - PB2 - PB7 - PB8 - PB9 - PB10"*).	0 o 1	25 c62			0
	Probe Offset					
CF18	PB1 Offset.	-12.0 -21	12.0 21	°C °F	Dec int	
CF19	PB2 Offset.	-12.0 -21	12.0 21	°C °F	Dec int	
CF20	PB3 Offset.	-12.0 -21 -5.0 -72	12.0 21 5.0 72	°C °F bar psi	Dec int dec int	
CF21	PB4 Offset.	-12.0 -21 -5.0 -72	12.0 21 5.0 72	°C °F bar psi	Dec int dec int	
CF22	PB5 Offset.	-12.0 -21 -5.0 -72	12.0 21 5.0 72	°C °F bar psi	Dec int dec int	
CF23	PB6 Offset.	-12.0 -21 -5.0 -72	12.0 21 5.0 72	°C °F bar psi	Dec int dec int	

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
CF24	PB7 Offset.	-12.0 -21	12.0 21	°C °F	Dec int	
CF25	PB8 Offset.	-12.0 -21	12.0 21	°C °F	Dec int	
CF26	PB9 Offset.	-12.0 -21	12.0 21	°C °F	Dec int	
CF27	PB10 Offset.	-12.0 -21	12.0 1	°C °F	Dec int	
CF28	Pressure value at 4mA - 0.5 V transducer PB3.	0.0 0	50.0 725	Bar psi	Dec int	
CF29	Pressure value at 20mA - 5 V transducer PB3.	0.0 0	50.0 725	Bar psi	Dec int	
CF30	Pressure value at 4mA - 0.5 V transducer PB4.	0.0 0	50.0 725	Bar psi	Dec int	
CF31	Pressure value at 20mA - 5 V transducer PB4.	0.0 0	50.0 725	Bar psi	Dec int	
CF32	Pressure value at 4mA - 0.5 V transducer PB5.	0.0 0	50.0 725	Bar psi	Dec int	
CF33	Pressure value at 20mA - 5 V transducer PB5.	0.0 0	50.0 725	Bar psi	Dec int	
CF34	Pressure value at 4mA - 0.5 V transducer PB6.	0.0 0	50.0 725	Bar psi	Dec int	
CF35	Pressure value at 20mA - 5 V transducer PB6.	0.0 0	50.0 725	Bar psi	Dec int	
Digital inputs						
CF36	ID1 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			o7
CF37	ID2 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			o8
CF38	ID3 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			o10
CF39	ID4 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			o3
CF40	ID5 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			o26
CF41	ID6 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			
CF42	ID7 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			o1
CF43	ID8 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			0
CF44	ID9 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			o9
CF45	ID10 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			0
CF46	ID11 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			0
CF47	ID12 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			0
CF48	ID13 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			0
CF49	ID14 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			0
CF50	ID15 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			0
CF51	ID16 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			0
CF52	ID17 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			0
CF53	ID18 configuration (see *"1.34.3 Configuration of the digital inputs ID1 ÷ ID18"*).	0 -o1	c63			0
Relay outputs						
CF54	RL1 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷ RL14"*).	0 -o1	c58			c30
CF55	RL2 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷ RL14"*).	0 -o1	c58			c37

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
CF56	RL3 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷RL14"*).	0 -o1	c58			c44
CF57	RL4 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷RL14"*).	0 -o1	c58			c51
CF58	RL5 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷RL14"*).	0 -o1	c58			
CF59	RL6 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷RL14"*).	0 -o1	c58			0
CF60	RL7 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷RL14"*).	0 -o1	c58			0
CF61	RL8 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷RL14"*).	0 -o1	c58			
CF62	RL9 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷RL14"*).	0 -o1	c58			0
CF63	RL10 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷RL14"*).	0 -o1	c58			0 c4 with antifreeze protection
CF64	RL11 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷RL14"*).	0 -o1	c58			c2
CF65	RL12 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷RL14"*).	0 -o1	c58			
CF66	RL13 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷RL14"*).	0 -o1	c58			0
CF67	RL14 configuration (see *"1.34.4 Configuration of the digital outputs RL1÷RL14"*).	0 -o1	c58			o1
Condensing proportional outputs						
CF68	Circuit n° 1 proportional output signal for condensation control: 0= 0 - 10V 1= 4 ÷ 20Ma 2= = PWM triac control board command for single phase fan.	0	2			0
CF69	Circuit n° 2 proportional output signal for condensation control: 0= 0 - 10V 1= 4 ÷ 20Ma 2= triac control board command for single phase fan.	0	2			0
Modular outputs						
CF70	Proportional output n° 1: 0= not enabled 1= dumper / free cooling mixing valve 2= 3-ways valve for hot water 3= free cooling dumper for air exchanger 4= auxiliary exit ON / OFF outlet for relays driver.	0 o1	4 c22			0
CF71	Proportional output n° 2: 0= not enabled 1= dumper / free cooling mixing valve 2= 3-ways valve for hot water 3=cooling dumper for air exchanger 4= auxiliary exit ON / OFF outlet for relays driver.	0 o1	4 c22			0
CF72	Proportional output n° 3: 0= not enabled 1= dumper / free cooling mixing valve 2= 3-ways valve for hot water 3= cooling dumper for air exchanger 4= auxiliary exit ON / OFF outlet for relays driver.	0 o1	4 c22			0
CF73	Proportional output n° 4: 0= not enabled 1= dumper / free cooling mixing valve 2= 3-ways valve for hot water 3= cooling dumper for air exchanger 4= auxiliary exit ON / OFF outlet for relays driver.	0 o1	4 c22			0
Remote terminal						
CF74	Remote terminal n° 1 configuration: 0= absent 1= NTC probe installed 2= NTC probe not installed	0	2			0 2 with remote terminal kit

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
CF75	Remote terminal n° 2 configuration: 0= absent 1= NTC probe installed 2= NTC probe not installed	0	2			0
CF76	Offset probe NTC of remote terminal n° 1.	-12.0 -21	12.0 21	°C °F	Dec int	
CF77	Offset probe NTC of remote terminal n° 2.	-12.0 -21	12.0 21	°C °F	Dec int	
Operating logic						
CF78	Operating logic: 0= ❄ chiller / ☀ heat pump 1= ☀ chiller / ❄ heat pump	0	1			0
Chiller / heat pump mode selection						
CF79	Chiller / heat pump mode selection 0= keyboard 1= digital input 2= analogue input	0	2			0
Automatic change over						
CF80	Set the automatic change over of the chiller/heat pump mode if the parameter is: **CF80**=2.	-30.0 -22	70.0 158	°C °F	Dec int	
CF81	Differential automatic change over of the chiller/heat pump mode if the parameter is: **CF80**=2.	0.1 0	25.0 45	°C °F	Dec int	
Unit of measurement selection						
CF82	Select °C or °F. 0= °C / °BAR 1= °F / °psi	0	1			
Voltage frequency selection						
CF83	Select the voltage frequency. 0= 50 Hz 1= 60 Hz 2= Continuous voltage **ATTENTION** *With Par. **CF81** = 2 the proportional outputs for fan speed control are not enabled and the frequency alarm is inhibited.*	0	2			
Serial address						
CF84	Serial address	1	247			1
CF85	Release firmware.					8
CF86	Eeprom parameter map					0
Pr1	Password	0	999			023
Pr2	Password	0	999			032
Pr3	Password	0	999			069

1.35.4 Dynamic set point parameters (NOT ENABLED FUNCTION)

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
Sd01	Maximum dynamic Offset in chiller mode Set the max. variation of the set point in chiller mode.	-30.0 -54	30.0 54	°C °F	Dec int	
Sd02	Maximum dynamic Offset in heat pump mode Set the max. variation of the set point in chiller mode.	-30.0 -54	30.0 54	°C °F	Dec int	
Sd03	Set the external air temperature and the dynamic set point in chiller mode	-30.0 -22	70.0 158	°C °F	Dec int	
Sd04	Set the external air temperature and the dynamic set point in heat pump mode	-30 -22	70.0 158	°C °F	Dec int	
Sd05	External air differential and dynamic set point in chiller mode	-30.0 -54	30.0 54	°C °F	Dec int	
Sd06	External air differential and dynamic set point in chiller mode	-30.0 -54	30.0 54	°C °F	Dec int	
Pr1	Password	0	999			023
Pr2	Password	0	999			032
Pr3	Password	0	999			069

1.35.5 Energy saving parameters (NOT ENABLED FUNCTION)
Double set point

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
ES01	Start of the time band n° 1 (0÷24).	0	24.00	Hr	10 Min	0
ES02	End of the time band n° 1 (0÷24).	0	24.00	Hr	10 Min	0
ES03	Start of the time band n° 2 (0÷24).	0	24.00	Hr	10 Min	0
ES04	End of the time band n° 2 (0÷24).	0	24.00	Hr	10 Min	0
ES05	Start of the time band n° 3 (0÷24).	0	24.00	Hr	10 Min	0
ES06	End of the time band n° 3 (0÷24).	0	24.00	Hr	10 Min	0
ES07	Monday energy saving actived. Monday automatic ON/OFF	0 - 0	7 - 7			0-0
ES08	Tuesday energy saving actived. Tuesday automatic ON/OFF	0 - 0	7 - 7			0-0
ES09	Wednesday energy saving actived. Wednesday automatic ON/OFF	0 - 0	7 - 7			0-0
ES10	Thursday energy saving actived. Thursday automatic ON/OFF	0 - 0	7 - 7			0-0
ES11	Friday energy saving actived. Friday automatic ON/OFF	0 - 0	7 - 7			0-0
ES12	Saturday energy saving actived. Saturday automatic ON/OFF	0 - 0	7 - 7			0-0
ES13	Sunday energy saving actived. Sunday automatic ON/OFF	0 - 0	7 - 7			0-0
ES14	Increasing second set point in chiller mode	-30.0 -54	30.0 54	°C °F	Dec int	
ES15	Differential second set point in chiller mode	0.1 0	25.0 45	°C °F	Dec int	
ES16	Increasing second set point in heat pump mode	-30.0 -54	30.0 54	°C °F	Dec int	
ES17	Differential second set point in heat pump mode	0.1 0	25.0 45	°C °F	Dec int	
Pr1	Password	0	999			023
Pr2	Password	0	999			032
Pr3	Password	0	999			069

1.35.6 Compressor parameters

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
CO01	Minimum compressor ON time after the start-up. It sets the minimum time during which the compressor must be on, even if the request stops.	0	250	10 sec	10 sec	12
CO02	Minimum compressor OFF time. It sets the minimum time during which the compressor must be off, even if the start up is required. During this phase the led of the compressor blinks.	0	250	10 sec	10 sec	18
CO03	Delay between the starts up of the compressors/steps. It sets the delay between the starts up of the two compressors, in order to reduce the absorption of the takes off. During this phase the led of the compressor blinks (only for the compressor). Unit furnished with a reduced capacity compressor. It sets the solenoid valve on time that allows a start up at the minimum capacity (see paragraph *"1.27 Compressors"*).	1	250	Sec		10
CO04	Delay between the stops of the compressors/steps. It sets the delay between the stops between the two compressors/ reduced capacity steps.	0	250	Sec		10
CO05	Delay of the compressors starting from power ON. All the loads are delayed in case of frequently power failures, in order to protect the compressor/s.	0	250	10 Sec	10 sec	3
Capacity control (NOT ENABLED FUNCTION)						
CO06	Reduced capacity function: 0= activation ON/OFF with steps 1= continuous activation with steps: direct action 2= continuous activation with steps: inverse action 3= controllo a gradini continuo diretto globale	0	3			0

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
CO07	Start-up with minimum compressor power / automatic start-unloading valve: 0= Enabling of the minimum power only when the compressor starts up (minimum compressor power / automatic start-unloading valve OFF when the compressor is off) 1= Enabling of the minimum power when the compressor starts up and in thermoregulation mode (minimum compressor power / automatic start-unloading valve OFF when the compressor is off) 2= Screw compressors: enabling of the minimum power start up only when the compressor starts up (minimum compressor power / automatic start-unloading valve ON when the compressor is off) 3= Screw compressors: enabling of the minimum power when the compressor starts up and in thermoregulation mode (minimum compressor power / automatic start-unloading valve ON when the compressor is off)	0	3			1
CO08	Relay ON time of the solenoid valve intermittent for screw compressor, with 0 the function is not enabled.	0	250	Sec		000
CO09	Relay OFF time of the solenoid valve intermittent for screw compressor	0	250	Sec		000
Compressor start-up						
CO10	Compressor start up (see paragraph *"1.27 Compressors"*) 0= direct 1= part-winding 2= star-delta.	0	2			0
CO11	With **CO10**= 1 part: part winding start up. Allows to change the time delay between the two relays of the two engine windings. With **CO10**= 2 part: star-delay start up. Allows to change the time in which the of the relay of the line 1 and the relay that closes the centre star connection.	0	100	Dec. of Sec	0.1 sec	000
CO12	With **CO10**= 2 part: star-delta start up. Allows to vary the time from the release of the centre star relay to the link up of the line n° 2 relay.	0	50	Dec. of Sec	0.1 sec	00
CO13	By-pass gas valve start-up time / automatic start-unloading valve (capacity step control).	0	250	sec		000
Rotation - Balancing - Compressors Thermoregulation						
CO14	Compressors rotation (see paragraph *"1.25 Compressors temperature regulation - rotation"*): 0= Fix sequence 1= compressors rotation based on time operating hours 2= compressors rotation based on number of starts-up	0	2			1
CO15	Circuit balancing (see paragraph *"1.26.2 Balancing mode"*) 0= circuit saturation 1= circuit balancing	0	1			1
Evaporator water pump (FUNCTION NOT ENABLED)						
CO16	Operative mode of the evaporator pump / supply fan: 0= the pump and the fans are not managed. 1= Continuous operation: When the unit is running in Chiller or HP mode the pump or the supply fan is running. 2= Compressor request: When a compressor is running also the pump or the supply fan is running. With antifreeze alarm on the compressor stops and the pump go on working.	0	2			1
CO17	ON compressor delay after water pump / supply fan start-up.	1	250	Min		001
CO18	OFF delay evaporator water pump / supply fan after compressor switching OFF. This delay is active even when the unit is turned in stand-by mode.	0	250	Min		001
CO19	Forced rotation operating hours of the evaporator pump.	0	999	10Hr	10Hr	004
CO20	Time during which the pumps work together after forced rotation.	0	250	Sec		002
Condenser water pump (NOT ENABLED FUNCTION)						
CO21	Condenser pump operative mode: 0= no pump 1= Continuous operation: when the unit is running the pump is running too 2= Compressor request: when the compressor is running the pump is running too. With antifreeze alarm on the compressor stops and the pump go on working.	0	2			0
CO22	Free					0
CO23	Condenser pump delay OFF when the compressor turns off. This delay is active even when the unit is turned in stand-by mode.	0	250	Min		000
CO24	Forced rotation operating hours of the condenser pump.	0	999	10Hr	10Hr	000

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
CO25	Pumps time working after condenser pump forced rotation	0	250	Sec		000
Load maintenance						
CO26	Compressor 1 hour counter set (see paragraph *"1.30 Load maintenance request function"*).	0	999	10 Hr	10 Hr	000
CO27	Compressor 2 hour counter set (see paragraph *"1.30 Load maintenance request function"*).	0	999	10 Hr	10 Hr	000
CO28	Compressor 3 hour counter set (see paragraph *"1.30 Load maintenance request function"*).	0	999	10 Hr	10 Hr	000
CO29	Compressor 4 hour counter set (see paragraph *"1.30 Load maintenance request function"*).	0	999	10 Hr	10 Hr	000
CO30	Compressor 5 hour counter set (see paragraph *"1.30 Load maintenance request function"*).	0	999	10 Hr	10 Hr	000
CO31	Compressor 6 hour counter set (see paragraph *"1.30 Load maintenance request function"*).	0	999	10 Hr	10 Hr	000
CO32	Pump/delivery fan hour counter set (see paragraph *"1.30 Load maintenance request function"*).	0	999	10 Hr	10 Hr	000
CO33	Evaporator n 2 pump hour counter set (see paragraph *"1.30 Load maintenance request function"*).	0	999	10 Hr	10 Hr	000
CO34	Condenser pump hour counter set (see paragraph *"1.30 Load maintenance request function"*).	0	999	10 Hr	10 Hr	000
CO35	Condenser n° 2 pump hour counter (see paragraph *"1.30 Load maintenance request function"*).	0	999	10 Hr	10 Hr	000
Pump down (OPTIONAL)						
CO36	Pump down operating mode (see paragraph *"1.28 Switch-off function with pump down (NOT ENABLED FUNCTION)"*) 0= not enabled function 1= Unit off with pump-down and unit on without pump-down 2= Unit off with pump-down, unit on with pump-down 3= Unit off with pump-down only in chiller mode, unit on without pimp-down 4= Unit off with pump-down only in chiller mode, unit on with pimp-down	0	4			0
CO37	Pump-down pressure set (see paragraph *"1.28 Switch-off function with pump down (NOT ENABLED FUNCTION)"*).	0.0 0	50.0 725	Bar psi	Dec int	
CO38	Pump-down pressure differential (see paragraph *"1.28 Switch-off function with pump down (NOT ENABLED FUNCTION)"*).	0.1 1	12.0 174	Bar psi	Dec int	
CO39	Maximum pump-down time duration during the start up and the stop (see paragraph *"1.28 Switch-off function with pump down (NOT ENABLED FUNCTION)"*).	0	250	Sec		030
Evaporator Unloading (NOT ENABLED FUNCTION)						
CO40	Unloading compressors setpoint in chiller mode from high temperature of the evaporator water inlet (see *"1.29 Compressors unloading function"*).	-30.0 -22	70.0 158	°C °F	Dec int	
CO41	Unloading differential from high temperature of the evaporator water inlet (see *"1.29 Compressors unloading function"*).	0.1 0	25.0 45	°C °F	Dec int	
CO42	Delay time to engage the Unloading function with high temperature from evaporator water inlet (see *"1.29 Compressors unloading function"*).	0	250	Sec	10sec	1
CO43	Maximum unloading duration time with high temperature of evaporator water inlet.	0	250	Min		005
Condenser Unloading						
CO44	Unloading compressor set point: temperature / pressure in chiller mode (see *"1.29 Compressors unloading function"*).	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F Bar Psi	Dec int Dec int	
CO45	Unloading compressor differential: temperature / pressure in chiller mode (see *"1.29 Compressors unloading function"*).	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int	
CO46	Unloading compressor set point: temperature / pressure in heat pump mode (see *"1.29 Compressors unloading function"*).	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F Bar Psi	Dec int Dec int	
CO47	Unloading compressor differential: temperature / pressure in heat pump mode (see *"1.29 Compressors unloading function"*).	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int	

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
CO48	Maximum unloading duration time from temperature/pressure control.	0	250	Min		5
CO49	Number of steps for circuit with active unloading 1= n° 1 step 2= n° 2 step 3= n° 3 step 4= n° 4 step 5= n° 5 step	1	5			1
CO50	Minimum ON time of the capacity step after the starting of the unloading function.	0	250	Sec		000
Compressor liquid injection function						
CO51	Setpoint of the solenoid valve activation during liquid injection	0 0	150 302	°C °F	Dec / int int	
CO52	Differential of the solenoid valve deactivation during liquid injection	0.1 0	25.0 45	°C °F	Dec int	
Management of resources in neutral zone operation						
CO53	Maximum permanence in neutral zone without activation of resources - with at least one resource activated.	0	250	Min		30
CO54	Maximum permanence in neutral zone without rotation of resources	0	999	Hr	1 Hr	0
Pr1	Password	0	999			023
Pr2	Password	0	999			032
Pr3	Password	0	999			069

1.35.7 Auxiliary output parameters (NOT ENABLED FUNCTION)

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
Auxiliary relay circuit n° 1 (NOT ENABLED FUNCTION)						
US01	Auxiliary relay n° 1 operation (see paragraph *"1.22 Auxiliary relay function (NOT ENABLED FUNCTION)"*) 0= not enabled 1= Always available with direct action 2= Available only when the unit is ON with direct action 3= Always available with reverse action 4= Available only when the unit is ON with reverse action	0	4			0
US02	Analogue input configuration for auxiliary relay of circuit n°1 control: allows to choose the probe from PB1 a PB10.	1	10			01
US03	Auxiliary relay n° 1 set point (see paragraph *"1.22 Auxiliary relay function (NOT ENABLED FUNCTION)"*).	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F Bar Psi	Dec int Dec int	
US04	Auxiliary relay n° 1 differential (see paragraph *"1.22 Auxiliary relay function (NOT ENABLED FUNCTION)"*).	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int	
Circuit n° 2 auxiliary relay (NOT ENABLED FUNCTION)						
US05	Auxiliary relay n° 2 operation (see paragraph *"1.22 Auxiliary relay function (NOT ENABLED FUNCTION)"*). 0= not enabled 1= Always available with direct action 2= Available only when the unit is ON with direct action 3= Always available with reverse action 4= Available only when the unit is ON with reverse action	0	4			0
US06	Analogue inlet configuration for the management of the auxiliary circuit n° 2: allows to choose the probe from PB1 to PB10.	1	10			2
US07	Auxiliary relay n° 2 set point (see paragraph *"1.22 Auxiliary relay function (NOT ENABLED FUNCTION)"*).	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F Bar Psi	Dec int Dec int	
US08	Auxiliary relay n° 2 differential (see paragraph *"1.22 Auxiliary relay function (NOT ENABLED FUNCTION)"*).	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int	
Pr1	Password	0	999			023
Pr2	Password	0	999			032
Pr3	Password	0	999			069

1.35.8 Condenser fans parameters

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
FA01	Fan regulation: 0= absent 1= always on 2= ON/OFF from steps 3= ON/OFF continuous by steps 4= speed proportional regulation	0	4			
FA02	Fan operation mode 0= depend on the compressor 1= do not depend on the compressor	0	1			0
FA03	If the condenser fan control is the TRIAC output, when the regulation starts the trigger output will drive the condenser fan at the maximum voltage for the time **FA03**, then the fan will work at the speed set by the regulation.	0	250	Sec		010
FA04	Fan phase shifting	0	8	Micro Sec	250ms	4
FA05	Ventilation and condensation one or separate 0= sole 1= separated	0	1			0
FA06	Pre-ventilation time before turning on the compressor in chiller mode. It allows to turn on the fan at the maximum speed before the compressor in order to reduce the successive condensing temperature/pressure increasing.	0	250	Sec		000
Chiller mode operation						
FA 07	Minimum speed for condenser fan in Chiller mode. It allows to fix the min. value for fan proportional regulation in chiller mode. It has a percentage value (0..100%).	30	100	%		30
FA08	Maximum speed for condenser fan in Chiller mode. It allows to fix the max. value for fan proportional regulation in chiller mode. It has a percentage value (0..100%).	30	100	%		100
FA09	*Proportional control:* It allows to set the condensing temperature/pressure value in chiller mode, to which correspond the minimum fan speed. *Step control* **SET 1°STEP** It allows to set the condensing temperature/pressure value in chiller mode, to which correspond the ON functioning of the relay output configured as 1° step of the fan condensing speed.	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F Bar Psi	Dec int int Dec int int	
FA10	*Proportional control:* It allows to set the condensing temperature/pressure value in chiller mode, to which correspond the maximum fan speed. *Step control* **SET 2°STEP** It allows to set the condensing temperature/pressure value in chiller mode, to which correspond the ON functioning of the relay output configured as 2° step of the fan condensing speed	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F Bar Psi	Dec int int Dec int int	
FA11	*Proportional control:* Proportional band for condenser fan control in chiller mode. It allows to set the temperature/pressure differential between the minimum and the maximum fan speed regulation. *Step control* If parameter **FA01** = 2 or 3 it becomes the step of circuit n° 1 in chiller mode.	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int int Dec int int	
FA12	*Proportional control:* CUT-OFF differential in chiller. It allows to set a temperature/pressure differential to stop the fan. *Step regulation* If parameter **FA01** = 2 or 3 it becomes the step of circuit n° 2 in chiller mode.	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int int Dec int int	
FA13	Over ride CUT- OFF in chiller. It allows to set a temperature/pressure differential to keep the minimum fan speed	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int int Dec int int	

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
FA14	CUT-OFF time delay. Allows to set a time delay before activating the CUT-OFF function after the fan start-up.If after the compressor start-up the proportional regulator requires to turn off the fan (cut-off) and **FA14**, the fan is on at the minimum speed for the time set in this parameter. If **FA14**=0 the function is disabled.	0	250	Sec		0
FA15	Night speed in chiller. It allows to fix the max. value for fan proportional regulation in chiller mode. To set the maximum fan speed percentage value (0..100%), it is related to the fan power supply.	30	100	%		090
Heat pump operation						
FA16	Minimum speed for condenser fan in Heat Pump mode. It allows to set the minimum fan speed percentage value (00..100%), it is related to the fan power supply	30	100	%		30
FA17	Maximum speed for condenser fan in Heat Pump mode. To set the maximum fan speed percentage value (00..100%), it is related to the fan power supply.	30	100	%		100
FA18	*Proportional control:* It allows to set the condensing temperature/pressure value in heat pump mode, to which correspond the minimum fan speed. *Step control* **SET 1°STEP** It allows to set the condensing temperature/pressure value in heat pump mode, to which correspond the ON functioning of the relay output configured as 1° step of the fan condensing speed	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F Bar Psi	Dec int Dec int	
FA19	*Proportional control:* It allows to set the condensing temperature/pressure value in heat pump mode, to which correspond the maximum fan speed. *Step control* **SET 2°STEP** It allows to set the condensing temperature/pressure value in heat pump mode, to which correspond the ON functioning of the relay output configured as 2° step of the fan condensing speed	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F Bar Psi	Dec int Dec int	
FA20	*Proportional control:* Proportional band for condenser fan control in Heat pump mode. It allows to set the temperature/pressure differential between the minimum and the maximum fan speed. *Step control* If parameter **FA01** = 2 or 3 it becomes the step of circuit n° 1 in heat pump mode (see the graphic with the fan control).	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int	
FA21	*Proportional control:* Proportional band for condenser fan control in Heat pump mode. It allows to set the temperature/pressure differential in heat pump mode, to turn off the fans. *Step control* If parameter **FA01** = 2 or 3 it becomes the step of circuit n° 2 in heat pump mode (see the graphic with the fan control).	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int	
FA22	Over ride CUT- OFF in Heat pump. To set a temperature/pressure differential to keep the minimum fan speed	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int	
FA23	Night speed in Heat pump mode. To set the maximum fan speed percentage value (00..100%), it is related to the fan power supply.	30	100	%		090
Hot start						
FA24	Hot start set point.	-30.0 -22	70.0 158	°C °F	Dec int	
FA25	Hot start differential.	0.1 0	25.0 45	°C °F	Dec int	
3-4 fan step (chiller operation)						
FA26	*Step control* **SET 3°STEP** It allows to set the condensing temperature/pressure value in chiller mode, to which correspond the ON functioning of the relay output configured as 3° step of the fan condensing speed	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F Bar Psi	Dec int Dec int	

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
FA27	*Step control* *SET 4°STEP* It allows to set the condensing temperature/ pressure value in chiller mode, to which correspond the ON functioning of the relay output configured as 4° step of the fan condensing speed	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F Bar Psi	Dec int Dec int	
3-4 fan step (heat pump operation)						
FA28	*Step control* *SET 3°GRADINO* It allows to set the condensing temperature/ pressure value in heat pump mode, to which correspond the ON functioning of the relay output configured as 3° step of the fan condensing speed	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F Bar Psi	Dec int Dec int	
FA29	*Step control* *SET 4°step* It allows to set the condensing temperature/pressure value in chiller mode, to which correspond the ON functioning of the relay output configured as 4° step of the fan condensing speed	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F Bar Psi	Dec int Dec int	
Pr1	Password	0	999			023
Pr2	Password	0	999			032
Pr3	Password	0	999			069

1.35.9 Antifreeze resistance parameters- integration - boiler (NOT ENABLED FUNCTION)

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
Ar01	Anti-freeze resistance setpoint in Chiller mode. To set a temperature value, below this value the anti-freeze relay is activated.	-30.0 -22	70.0 158	°C °F	Dec int	
Ar02	Regulation of the differential for antifreeze resistance in Chiller mode	0.1 0	25.0 45	°C °F	Dec Int	
Ar03	Anti-freeze integration resistance setpoint in heat pump mode. To set a temperature value, below this value the anti-freeze relay is activated	-30.0 -22	70.0 158	°C °F	Dec int	
Ar04	Regulation of the differential for antifreeze resistance in heat pump mode.	-30.0 -22	70.0 158	°C °F	Dec int	
Ar05	Antifreeze heaters / integration resistance in defrost 0= ON only with thermoregulation control 1= ON with thermoregulation and during the defrosting cycle	0	1			0
Ar06	Thermoregulation probe, antifreeze resistance / integration in Chiller mode. 0= Not enabled 1= Evaporator inlet 2= Evaporator outlet 1 and 2 3= Evaporator outlet 1 and 2 and common outlet 4= External air temp. 5= Medium defrost temp. Circ.1 and Circ.2	0	5			0 4 with antifreeze protection
Ar07	Thermoregulation probe, antifreeze resistance / integration in heat pump mode: 0= Not enabled 1= Evaporator inlet 2= Evaporator outlet 1 and 2 3= Evaporator outlet 1 and 2 and common outlet 4= External air temp. 5= Medium defrost temp. Circ.1 and Circ.2	0	5			0
Ar08	Thermoregulation probe, antifreeze resistance / condenser. 0= not enabled. 1= Condenser common water inlet probe. 2= Condenser common water inlet and condenser inlet 1 / 2 probe. 3= Condenser water outlet 1 / 2 probe. 4= Condenser water outlet 1 / 2 and common outlet.	0	4			0
Ar09	Anti-freeze resistances operation control with unit in remote OFF or stand-by mode: 0= always off with remote OFF or stand-by 1= on with remote OFF or stand-by (on according to the temperature control request)	0	1			1
Ar10	It controls the operation of the condenser/evaporator antifreeze resistances if the probe is damaged: 0= Anti-freeze resistances OFF with damaged probe 1= Anti-freeze resistances ON with damaged probe	0	1			1

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
center	**Boiler operation (NOT ENABLED FUNCTION)**						
Ar11	Boiler function: 0= not enabled 1= enable with integration control 2= enable with heater control	0	2			0
Ar12	External air temperate setpoint to enable the boiler resistance.	-30.0 -22	70.0 158	°C °F	Dec int	
Ar13	External air temperature differential not to enable the boiler resistance.	0.1 0	25.0 45	°C °F	Dec int	
Ar14	Delay time to enable the boiler resistance.	0	250		Min	000
center	**Boiler function in chiller mode (NOT ENABLED FUNCTION)**						
Ar15	Boiler resistance set point in chiller mode.	-30.0 -22	70.0 158	°C °F	Dec int	
Ar16	Boiler resistance proportional band in chiller mode.	-30.0 -22	70.0 158	°C °F	Dec int	
center	**Boiler function in heat pump mode (NOT ENABLED FUNCTION)**						
Ar17	Boiler resistance set point in heat pump mode.	-30.0 -22	70.0 158	°C °F	Dec int	
Ar18	Boiler resistance proportional band in heat pump mode.	0.1 0	25.0 45	°C °F	Dec int	
Ar19	External air set point: the compressors are turned ofF.	-30.0 -22	70.0 158	°C °F	Dec int	
Ar20	External air differential to start the compressor in integration operation.	0.1 0	25.0 45	°C °F	Dec int	
center	**Tank heater**						
Ar21	Tank heater set-point in chiller mode	-30.0 -22	70.0 158	°C °F	Dec int	
Ar22	Tank heater regulation range in chiller mode	0.1 0	25.0 45	°C °F	Dec int	
Ar23	Tank heater set-point in heat pump mode Serves to enter a temperature value below which the tank heater is activated	-30.0 -22	70.0 158	°C °F	Dec int	
Ar24	Tank heater regulation range in heat pump mode	-30.0 -22	70.0 158	°C °F	Dec int	
Ar25	Tank heater operation in defrost mode 0= activated only by thermoregulator 1= activated by thermoregulator and during defrost cycle	0	1			0
Ar26	Tank heater thermoregulation probe in chiller operation 0= disabled 1= regulation on evaporator inlet 2= regulation on evaporator outlet 1 / 2 3= regulation on evaporator outlet 1 / 2 and common outlet 4= regulation on Ambient Air Temp. 5= regulation on average Defrost Temp. between Circ.1 and Circ.2 6= regulation on Tank Temperature probe	0	6			0
Ar27	Tank heater thermoregulation probe in heat pump mode 0= disabled 1= regulation on evaporator inlet 2= regulation on evaporator outlet 1 / 2 3= regulation on evaporator outlet 1 / 2 and common outlet 4= regulation on Ambient Air Temp. 5= regulation on average Defrost Temp. between Circ.1 and Circ.2 6= regulation on Tank Temperature probe	0	6			0
center	**Antifreeze alarm**						
Ar28	Antifreeze alarm thermoregulation probe in chiller mode 0= disabled 1= regulation on evaporator inlet 2= regulation on evaporator outlet 1 / 2 3= regulation on evaporator outlet 1 / 2 and common outlet 4= regulation on Ambient Air Temp. 5= regulation on average Defrost Temp. between Circ.1 and Circ.2 6= regulation on Tank Temperature probe	0	6			2

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
Ar29	Antifreeze alarm thermoregulation probe in heat pump mode 0= disabled 1= regulation on evaporator inlet 2= regulation on evaporator outlet 1 / 2 3= regulation on evaporator outlet 1 / 2 and common outlet 4= regulation on Ambient Air Temp. 5= regulation on average Defrost Temp. between Circ.1 and Circ.2 6= regulation on Tank Temperature probe	0	6			2
Ar30	Condenser antifreeze alarm thermoregulation probe 0= disabled 1= regulates common condenser water inlet probe 2= regulates common condenser and condenser 1 / 2 water inlet probe 3= regulates condenser 1 / 2 water outlet probe 4= regulates condenser 1 / 2 and common water outlet probe	0	4			0
Antifreeze pump						
Ar31	Causes pump/s to start for antifreeze when device is OFF or on Stand-by 0= always off in remote OFF or Stand-by mode 1= on in remote OFF or Stand-by (started in accordance with thermoregulator demand)	0	1			0
Ar32	Pump/s operation thermoregulation probe for antifreeze 0= disabled 1= regulation on evaporator inlet 2= regulation on evaporator outlet 1 / 2 3= regulation on evaporator outlet 1 / 2 and common outlet 4= regulation on Ambient Air Temp. 5= regulation on average Defrost Temp. between Circ.1 and Circ.2 6= regulation on Tank Temperature probe	0	6			0
Ar33	Pump activation set-point in antifreeze operation on thermoregulation probe	-30.0 -22	70.0 158	°C °F	Dec int	
Ar34	Pump deactivation differential in antifreeze operation on thermoregulation probe	0.1 0	25.0 45	°C °F	Dec int	
Ar35	Anti-freeze resistances operation control with unit in chiller or in heat pump mode: 0= always off (both in chiller and in heat pump mode) 1= on only in chiller mode (according to the temperature control request) 2= on only in heat pump mode (according to the temperature control request) 3= on both in chiller and in heat pump mode (according to the temperature control request)	0	3			0
Pr1	Password	0	999			023
Pr2	Password	0	999			032
Pr3	Password	0	999			069

1.35.10 Defrosting parameters (NOT ENABLED FUNCTION)

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
dF01	Defrosting mode: 0= defrosting not enabled 1= temperature/pressure 2= time 3= external contact	0	4			0
dF02	Pressure temperature of defrosting start up	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F bar psi	Dec int Dec Int	
dF03	Pressure temperature of defrosting stop	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F bar psi	Dec int Dec Int	
dF04	Minimum defrosting duration.	0	250	Sec		030
dF05	Maximum diversion duration	1	250	Min		005
dF06	Delay time between the defrosting of the two circuits	0	250	Min		000
dF07	Compressor OFF time before the defrosting	0	250	Sec		020
dF08	Compressor OFF time after the defrosting	0	250	Sec		030
dF09	Defrosting delay time in the same circuit.	1	99	Min		10

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
dF10	Temperature setpoint for combined defrosting of the 1st circuit after **DF10** parameter counting	-30.0 -22	70.0 158	°C °F	Dec int	
dF11	Temperature setpoint to end the defrosting cycle in circuit n° 1.	-30.0 -22	70.0 158	°C °F	Dec int	
dF12	Temperature setpoint for combined defrosting of the 2nd circuit after **DF10** parameter counting	-30.0 -22	70.0 158	°C °F	Dec int	
dF13	Temperature set point to end the defrosting combined cycle in circuit n° 2.	-30.0 -22	70.0 158	°C °F	Dec int	
dF14	On forcing, it actives all defrosting steps of circuit n°1: 0= not enabled 1= enabled	0	1			0
dF15	On forcing, it actives all defrosting steps of circuit n°2: 0= not enabled 1= enabled	0	1			0
dF16	Time delay between the start up of the two compressors in defrosting mode.	0	250	Sec		003
dF17	Ventilation ON during the defrosting/dripping: 0= not enabled 1= only defrosting mode enable 2= defrosting/dripping mode enable	0	2			002
dF18	Pressure / temperature set point to force the ventilation ON during the defrosting.	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F bar psi	Dec int Dec int	
Forced defrosting						
dF19	Minimum time delay before a forced defrosting	0	250	sec		010
dF20	Temperature setpoint for forced defrosting.	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F bar psi	Dec int Dec int	
dF21	Forced defrosting differential.	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int	
Defrosting mode						
dF22	Defrosting on in the units with two circuits: 0= independent 1= if both have reached the defrosting request 2= if one has reached the defrosting request	0	2			2
dF23	End of the defrosting cycle in the units with two circuits and one condensing ventilation: 0= independent 1= if both have reached the end defrosting setpoint 2= if one has reached the end defrosting setpoint	0	2			2
Δt defrost management						
dF24	Parameter "a" defrost dynamic set-point calculation (a+b*x)	0	20			
dF25	Parameter "b" defrost dynamic set-point calculation (a+b*x)	0	1			
dF26	Defrost control delay time	0	250	Min.		15
dF27	Defrost request acceptance time	0	250	Min.		2
dF28	Maximum defrost cycles/hour	0	16			5
dF29	Refrigerant type: 0= R22 1= R407C 2= R134a 3= R404a 4= R410a	0	4			1
Defrosting beginning/end from analogue input (NOT ENABLED FUNCTION)						
dF30	Probe that set the defrosting beginning/end: 0= beginning/end with condensing temperature / pressure probe 1= beginning with evaporation pressure probe and end with condensing temperature probe 2= beginning with condensing temperature / pressure probe and end with evaporation pressure probe 3= beginning /end by evaporation pressure	0	3			0
Pr1	Password	0	999			023
Pr2	Password	0	999			032
Pr3	Password	0	999			069

1.35.11 Heat recovery parameters (NOT ENABLED FUNCTION)

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
rC01	Recovery mode: 0= not enabled 1= 2 independent circuits 2= 2circuits in parallel	0	2			0
rC02	Forced deactivation time of the step.	0	250	Sec		005
rC03	Forced deactivation time of the step after the rotation of the recovery valve.	0	250	Sec		005
rC04	Recovery minimum time	0	250	Min		001
rC05	Minimum delay time between two recoveries	0	250	Min		001
rC06	Temperature setpoint to deactive the recovery	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F Bar Psi	Dec int Dec int	
rC07	Temperature differential to enable the recovery.	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int	
rC08	Deactivation maximum time with condensing temperature/pressure.	0	250	Min		02.0
rC09	Condenser fan operation in recovery 0 = enabled 1 = not enabled	0	1			1
Pr1	Password	0	999			023
Pr2	Password	0	999			032
Pr3	Password	0	999			069

1.35.12 Alarms parameters

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
Low pressure alarm						
AL01	Low pressure alarm delay from digital/analogue input.	0	250	Sec		030
AL02	Low pressure alarm delay from digital input after compressor stop if the low pressure switch is used for the pump down.	10	250	Sec		015
AL03	Low pressure alarm set point from analogue inlet	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F bar psi	Dec int Dec int	
AL04	Low pressure alarm differential from analogue inlet	0.1 0 0.1 1	25.0 45 14.0 203	°C °F bar psi	Dec int Dec Int	
AL05	Alrm events maximum number per hour of the low pressure alarm from digital/analogue input. Manual reset with **AL05**=0. Automatic reset with **AL05**=16. From automatic to manual reset with **AL05** from 1 to 15.	0	16			3
AL06	Low temperature/pressure alarm during the defrosting (NOT ENABLED): 0= not enabled 1= enabled	0	1			0
AL07	Low temperature/pressure delay time during the defrosting (NOT ENABLED).	0	250	Sec		000
AL08	Low temperature/pressure alarm with the remote control OFF or in stand-by (NOT ENABLED): 0= alarm not enabled 1= alarm enabled	0	1			0
High pressure alarm						
AL09	Condensing high temperature/pressure alarm from analogue input.	-30.0 -22 0.0 0	70.0 158 50.0 725	°C °F bar psi	Dec int Dec int	
AL10	Condensing high temperature/pressure differential from analogue input.	0.1 0 0.1 1	25.0 45 4.0 203	°C °F bar psi	Dec int Dec int	

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
Oil alarm						
AL11	Oil low pressure / level delay from digital input	0	250	Sec		120
AL12	Minimum time of oil low pressure / level alarm from digital input during normal working condition	0	250	Sec		005
AL13	Alarm events maximum number per hour of oil low pressure/level. Manual reset **AL13**=0. Automatic reset **AL13**=16. From automatic to manual reset with **AL13** from 1 to 15.	0	16			03
Flow meter alarm						
AL14	Configuration: 0= not enabled 1= only chiller mode 2= only heat pump mode 3= chiller and heat pump mode	0	3			0
AL15	"Flow meter / supply fan overload" alarm delay after water pump/ fun activation	0	250	Sec		010
AL16	Alarm events maximum number of the fun supply/flow meter. Manual reset **AL16**=0. Automatic reset **AL16**=16. From automatic to manual reset with **AL16** from 1 to 15.	0/1	16			01
AL17	Flow meter/supply fun inlet enable	0	250	Sec		005
AL18	Flow meter/supply fun inlet not enabled	0	250	Sec		005
Compressor overload alarm						
AL19	Compressors overload time delay alarm at the start up	0	250	Sec		000
AL20	Alarm events maximum number of the compressor overload. Manual reset **AL20**=0. Automatic reset **AL20**=16. From automatic to manual reset with **AL20** from 1 to 15.	0	16			00
Pump-down alarm						
AL21	Alarm events maximum number during the pump down stop. Over this number the alarm is logged and displayed with a code. The alarm relay + buzzer is enabled. Manual reset **AL21**=0. Automatic reset **AL21**=16. From automatic to manual reset with **AL21** from 1 to 15.	0	16			03
AL22	Alarm events maximum number during the pump down start up. Over this number the reset is manual and the alarm is logged. The alarm relay + buzzer is enabled. Manual reset **AL22**=0. Automatic reset **AL22**=16. From automatic to manual reset with **AL22** from 1 to 15 and according to the configuration of the **AL23** parameter.	0	16			03
AL23	Pump-down manual or automatic reset during start up if it is reached the alarm events maximum number **AL22**: 0= automatic reset even if the maximum number is reached 1= manual reset enable after hour alarm events	0	1			00
Antifreeze alarm in chiller mode						
AL24	Antifreeze lower limit in chiller mode (from -30°C to **AL24**).	-30.0 -22	AL24	°C °F	Dec int	
AL25	Antifreeze higher limit in chiller mode (from **AL23** to 70°C).	AL24	70.0 158	°C °F	Dec int	
AL26	Antifreeze alarm set point: to set the temperature under which the alarm is enabled. Environment low temperature (air/air units), air outlet low temperature (air/air units) from **AL23** to **AL24**.	AL24	AL25	°C °F	Dec int	
AL27	Antifreeze differential set point in chiller mode: environment low temperature, air low temperature. To set a temperature differential that enables the alarm reset.	0.1 0	25.0 45	°C °F	Dec int	
AL28	Antifreeze alarm delay: environment low temperature, air low temperature. To set the time during which the temperature must be lower than **AL26**, after this time the antifreeze alarm is enabled.	0	250	Sec		5
AL29	Antifreeze alarm maximum number of events: low temperature in chiller mode. Set the maximum number of alarm events, after which the reset becomes manual. Manual reset **AL29**=0. Automatic reset **AL29**=16. From automatic to manual reset **AL29** from 1 to 15.	0	16			1

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
AL30	Antifreeze alarm operation: 0= to turn off the compressors when the probe temperature is lower than **AL26**. The display shows the alarm label but the buzzer and the relay are not enabled. 1= to turn off the compressor when the temperature probe is lower than **AL26**. The alrm is signalled through label+ buzzer + alarm relay.	0	1			1
Heat pump antifreeze alarm						
AL31	Antifreeze lower limit in heat pump mode (from -30°C to **AL31**).	-30.0 -22	AL31	°C °F	Dec int	
AL32	Antifreeze higher limit in heat pump mode (from **AL30** to 70°C).	AL31	70.0 158	°C °F	Dec int	
AL33	Antifreeze alarm set point: to set the temperature under which the alarm is enabled. Environment low temperature (air/air units), air outlet low temperature (air/air units) from **AL30** a **AL31**.	AL31	AL32	°C °F	Dec int	
AL34	Antifreeze differential set point in heat pump mode: environment low temperature, air low temperature. To set a temperature differential that enables the alarm reset.	0.1 0	25.0 45	°C °F	Dec int	
AL35	Antifreeze alarm delay: environment low temperature, air low temperature. **ATTENTION** *If during the Stand-by or remote off working there is an anti-freeze alarm event, and the* **AL35** *<>0, choosing the heat pump mode, from keyboard or digital input the anti-freeze alarm is aborted and the compressor starts working for the* **AL35** *time to heat the air or the water.After the* **AL35** *if the antifreeze probe* **Pbr** *value is still lower than* **AL33** *setpoint, for maximum* **AL36***, the unit is stopped and the anti-freeze alarm is generated again.*	0	250	Sec		005
AL36	Antifreeze alarm delay: environment low temperature and air low temperature. To set the time during which the temperature must be lower than **AL33**, in order to enable the alarm.	0	250	Sec		005
AL37	Antifreeze alarm maximum number of events: air low temperature. Set the maximum number of alarm events, after which the reset becomes manual. Manual reset **AL37**=0. Automatic **AL37**=16. From automatic to manual: **AL37** from1 to15.	0	16.0			03
AL38	Antifreeze alarm operation: 0= to turn off the compressors when the probe temperature is lower than **AL33**. The display shows the alarm label but the buzzer and the relay are not enabled. 1= to turn off the compressor when the temperature probe is lower than **AL33**. The alrm is signalled through label+ buzzer + alarm relay.	0	1			01
Compressor high temperature alarm discharge						
AL39	Compressors high temperature discharge alarm	0 0	150 302	°C °F	Dec / int int	
AL40	Compressors high temperature discharge differential	0.1 0	25.0 45	°C °F	Dec int	
AL41	Maximum number of events of the compressors high temperature discharge alarm. Set the maximum number of alarm events, after which the reset becomes manual. Manual reset **AL41**=0. Automatic reset **AL41**=16. From automatic to manual reset; **AL41** from 1 to 15.	0	16			01
Unit block general alarm						
AL42	Maximum number of events of the general alarm after which the reset becomes manual. Manual reset **AL42**=0. Automatic **AL42**=16. From automatic to manual reset: **AL42** from 1 to 15.	0	16			02
AL43	Generic alarm delay time after digital input enabling.	0	250	Sec		001
AL44	Generic alarm delay time after digital input not enabled.	0	250	10 sec	10 sec	001

Parameter	Description	Min.	Max.	Udm	Resolution	Setting
Alarm relay						
AL45	Enable the alarm relay output with remote control in off or stand-by: 0= outlet enabled 1=outlet not enabled	0	1			0
Alarm historic reset password - Compressor overload alarm						
AL46	Password value to reset the alarm historic or the compressor overload alarm	0	999			004
AL47	Operation of the compressor overload alarm. 0= stop the single compressor 1= stop the circuit	0	1			1
AL48	Evaporator water outlet low temperature indication set-point	-40.0 - 40 0.0 0	110 230 50.0 725	°C °F Bar Psi	Dec int Dec int	
AL49	Evaporator water outlet high temperature indication set-point	-40.0 - 40 0.0 0	110 230 50.0 725	°C °F Bar Psi	Dec int Dec int	
Pr1	Password	0	999			023
Pr2	Password	0	999			032
Pr3	Password	0	999			069

1.36 Alarms

Name	Label meaning	Cause	Reset	Restart	Icon	Action
AP01÷AP10	Probe alarms AP01÷AP10	Probe configured and the converted value is outside the range	The probe is not configured or converted values are within the range	Auto.	⚠ Flashing	Alarm relay + buzzer enabled
AEFL	Evaporator side flow-switch alarm	**(the flow switch alarm is active in the air/water – water/water configured unit)** active ID for 15sec (**AL15**) from the start of the water pump, after the ID is active for 5sec (**AL17**).	Inactive ID for 5sec (**AL18**)	Auto. - becomes manual after 1sec (**AL16**) tripping per hour (reset procedure in functions menu)	**Flow!** Flashing	Alarm relay + buzzer enabled only if the flow switch alarm is active during a normal operation phase.
ACFL	Condenser side flow switch alarm	**(the flow switch alarm is active in the air/water – water/water configured unit)** active ID for 10sec (**AL15**) from the start of the water pump, and afterwards the ID is active for 5sec (**AL17**) alarm disabled if **AL14**=0 alarm enabled only in chiller mode if **AL14**=1 alarm enabled only in heat pump mode if **AL14**=2 alarm enabled in chiller and heat pump mode if **AL14**=3	ID inactive for 5sec (**AL18**)	Auto. – becomes manual after 1sec (**AL16**) events per hour (reset procedure in functions menu)	**Flow!** Flashing	Alarm relay + buzzer is active only if the flow switch alarm is active during a normal operation phase.

Name	Label meaning	Cause	Reset	Restart	Icon	Action

ATTENTION

Activation of the alarm relay + buzzer occurs only if the flow switch alarm is active during a normal operation phase. Otherwise there is just a flashing signal "Flow!". Example: the machine stops because the set-point and parameter CO16 / CO21= 2 have been reached.

FLOW-SWITCH ALARM NOTES
CO16 / CO21=0 Water pump absent
The alarm is managed only if one digital input is configured as flow switch, **the restart is always automatic.**
CO16 / CO21=1 Water pump with continuous function
The alarm is managed only if one digital input is configured as flow switch, **the restart is always automatic with the unit in stand–by or remote OFF (pump off),** and it becomes **manual** on restart after **AL16** events per hour.
(in chiller or heat pump mode only) If a flow switch alarm activates while the unit is functioning, the blocked loads are described in the table. The water pump follows its regulation and turns off when **AL16 event per hour are blocked.**
CO16 / CO21=2 water pump activates on the request of the compressor
The alarm is managed only if one digital input is configured as flow switch, **the restart is always automatic with the unit in stand–by or remote OFF (pump off),** and it becomes manual on restart after **AL16** events per hour.
If a flow switch alarm activates while the unit is functioning, the blocked loads are described in the table.
The water pump follows its regulation and turns off when **AL16** event per hour are blocked.
<u>**MANUAL RESTART OF THE FLOW SWITCH ALARMS**</u>
The functions menu must be accessed once the number of **AL16** events has been reached (reset procedure in function menu). The signals do NOT DISAPPEAR if the alarm is still active, the water pump, if managed, may start and the alarm is by-passed for **AL18** allowing the normal start of the unit if the alarms are within this time interval.
AL15 Pump activation flow switch alarm delay
This allows delaying the recognition of the flow switch alarm when the water pump starts and allows the normal flow rate to be reached.
AL16 Maximum number of flow switch events
This determines the maximum number of flow switch alarm events per hour that once exceeded, the alarm passes from automatic restarts to manual restart. The water pump is blocked when the flow switch alarm is in manual restart.

ATTENTION

The number of events per hour cannot be set lower than 1 with the air/water water/water CF01=1.2 unit configuration.

AL17 Active flow switch input duration
This allows setting a time during which the flow switch alarm must remain active. After this time, the alarm is signalled. The count begins after the **AL15** time and allows filtering possible flow rate drops or the presence of air bubbles in the water circuit.
AL18 Inactive flow switch input duration
This allows setting a time during which the flow switch alarm must remain inactive. After this time if the alarm is in the automatic restart mode it is reset and if it is in the manual restart mode it can be reset.

Name	Label meaning	Cause	Reset	Restart	Icon	Action
AtSF	Delivery fan thermal alarm ALARM THAT CAN NOT BE ENABLED	**CF01**=0 each time the fan starts ID active for the **AL15** time of the water pump start, after ID active for the **AL17** time	ID not active for **AL18**	Auto. - becomes manual after **AL16** tripping per hour (reset procedure in functions menu)	**Flow!** Flashing	Alarm relay + buzzer enabled
AtE1	Evaporator 1 water pump thermal protection	ID configured as evaporator 1 water pump thermal protection	With ID not enabled	Manual (reset procedure in functions menu)	⚠ Flashing	Alarm relay + buzzer enabled
AtE2	Support evaporator 2 water pump thermal protection	ID configured as support evaporator 2 water pump thermal protection				
AtC1	Condenser 1 water pump relay.	ID configured as condenser 1 water pump relay active.	With ID inactive.	Manual (reset procedure in functions menu).	⚠ Flashing	Alarm relay + buzzer active.
AtC2	Support condenser 2 water pump relay.	ID configured as condenser 2 water pump relay active.				
AEE	Eprom alarm	Failed Eprom data.	-------	Manual	⚠ Flashing	Alarm relay + buzzer enabled.
AFr	Net frequency alarm	Net frequency different from the one configured (50Hz) in **CF83** parameter	Control the power supply frequency disabled by **CF83**=2 parameter or the frequency is within the set range	Auto.	⚠ Flashing	Alarm relay + buzzer enabled

Name	Label meaning	Cause	Reset	Restart	Icon	Action
ALOC	Unit block general alarm	ID configured as a unit block general alarm active for 1 sec. (**AL43**)	ID configured as a unit block general alarm inactive for 10 sec. (**AL44**)	Auto. – becomes manual after 2 sec. (**AL42**) tripping per hour (reset procedure in functions menu). Logged only with manual reset.	⚠ Flashing	Alarm relay + buzzer enabled
ACF1	- Unit configured as heat pump and circuit inversion valve not configured. - Incorrect combination of the defrost parameter values (**dF22/dF23**).	Incorrect programming	Correct programming	Auto.	⚠ Flashing	Alarm relay + buzzer enabled
ACF2	- Unit configured for the ON/OFF or proportional control of the condensation without the configuration of the related probe (one probe per circuit if separate condensation, at least one probe if single condensation). - If one of the following rules is not respected in the event of proportional regulation: (**FA09**+**FA11**+**FA12**<**FA10**) (**FA12**<**FA13**) (**FA07**<**FA15**<**FA08**) - If one of the following rules is not respected when the proportional regulation with pump is enabled: (**FA18**+**FA21**+**FA20**<**FA19**) (**FA21**<**FA22**) (**FA16**<**FA23**<**FA17**) - If one of the following rules is not respected in the event of ON-OFF regulation: (**FA09**<**FA10**) - If one of the following rules is not respected when the ON-OFF regulation with pump is enabled: (**FA18**<**FA19**) - If a condensation/evaporation probe per circuit is not present when the pump and defrost are enabled. - When triac regulation is enabled (**CF68**, **CF69**=2) and the continuous power supply has been selected (**CF83**=0)	Incorrect programming	Correct programming	Auto.	⚠ Flashing	Alarm relay + buzzer enabled.
ACF3	Two digital/analogue inputs configured with the same function or without the necessary resources (eg. compressor 3 relay configured but not compressor 3)	Incorrect programming	Correct programming	Auto.	⚠ Flashing	Alarm relay + buzzer enabled
ACF4	**CF79**=1 and the non-configured input or **CF79**=2 NTC probe not configured as external air temperature	Incorrect programming	Correct programming	Auto.	⚠ Flashing	Alarm relay + buzzer enabled.
ACF5	If circuit 2 has been configured and the resources have been configured (relay: solenoid pump-down, heaters, inversion valve, condensing fan ON - OFF, recovery, auxiliary)	Incorrect programming	Correct programming	Auto.	⚠ Flashing	Alarm relay + buzzer enabled

Name	Label meaning	Cause	Reset	Restart	Icon	Action
ACF6	The total number of compressors in the 2 circuits (**CF04**+**CF05**) is: >6 >4 and the starting of the compressors is indirect (**CO10** different than 0) or the number of capacity control **CF06** is different than 0. >2 and the intermittent valve is enabled with ON (**CO08**) and OFF (**CO09**) times different than 0 - If the pump-down function is configured in at least one circuit. The pump-down circuit solenoid relay is not configured. Neither the pump-down pressure-switch nor the circuit evaporation probe are configured and the pump-down is enabled in start-up or not even the low-pressure pressure-switch is configured.	Incorrect programming	Correct programming	Auto.	⚠ Flashing	Alarm relay + buzzer enabled
ACF6	- The compressor has been configured with **CF04** and **CF05** parameters but the related relays have not been foreseen - Main. - Intermittent valve when enabled by the ON/OFF times (**CO08**/**CO09**) different than 0; - Neither the capacity control nor the by-pass gas when the by-pass time is different than 0; - Star centre coil 2 / when starting is part winding or star delta; - The capacity control for all foreseen capacity control; - A relay has been configured related to a compressor that has not been foreseen; - Intermittent valve when the ON or OFF times are at 0; - Star centre coil 2 / when starting is direct; - Capacity control not foreseen	Incorrect programming	Correct programming	Auto.	⚠ Flashing	Alarm relay + buzzer enabled
ACF7	Defrost pump configuration alarm - if Ar31=1 and Ar32=0 or - if Ar31=1 and there are no probes configured as NTC	Incorrect programming	Correct programming	Auto.	⚠ Flashing	Alarm relay + buzzer enabled
ACF8	- Thermoregulation probe configuration a thermoregulation probe (in chiller **ST09**, in pump when enabled **ST10**) is not correctly configured (it does not exist or is not NTC)	Incorrect programming	Correct programming	Auto.	⚠ Flashing	Alarm relay + buzzer enabled
ACF9	- Recovery enabled **rC01** parameter different than 0 but only some of the resources are configured in a circuit (condensation probes, recover ID, recovery relay are necessary) or no output has been defined	Incorrect programming	Correct programming	Auto.	⚠ Flashing	Alarm relay + buzzer enabled
ArtF	Clock alarm	Clock damaged	Clock replacement	Manual (reset procedure in functions menu)	⚠ Flashing	Alarm relay + buzzer enabled

Name	Label meaning	Cause	Reset	Restart	Icon	Action
ArtC	Clock alarm	Clock to be adjusted	Clock adjusted	Manual (reset procedure in functions menu)	⚠ Flashing	Alarm relay + buzzer enabled
AEUn	Evaporator unloading signal	Functioning if the measured evaporator water input temperature is > than the set **CO40** for the time set in the **CO42** parameter	If the measured water temperature is < than the set **CO39** differential **CO41** unloading is activated after the **CO43** parameter set time	Auto.		Alarm relay + buzzer NOT enabled
ALti	Evaporator air inlet low temperature AIR/AIR UNITS ONLY	If **CF01**=0 if the NTC probe is configured as evaporator input. Measures a temperature < than the set **AL26** for **AL28** seconds in chiller If **CF01**=0 if the NTC probe is configured as evaporator input. and measures a temperature < than the set **AL33** for **AL36** seconds in heat pump In stand-by or OFF remote the reference probe is the evaporator input probe and the shortest time between **AL28** and **AL36** is taken as the by-pass time before the alarm.	If the configured probe is > then the set **AL26**+ differential **AL27** in chiller or if the configured probe is > than the set **AL33**+ differential **AL34** in heat pump In stand-by or OFF remote if the configured probe is > than the set **AL26**+ differential **AL27** or > than the set **AL33**+differential **AL34**	Auto.	⚠ Flashing	Alarm relay + buzzer enabled
AEP1	Evaporator 1 water pump maintenance request	Compressor operating time > than the set counter	Reset operating time (in functions menu -Hour function)	Manual	⚠ Flashing	Alarm relay + buzzer enabled
AEP2	Support evaporator 2 water pump maintenance request					
ACP1	Condenser 1 water pump maintenance request	Compressor operating time > than the set counter	Reset operating time (in functions menu -Hour function)	Manual	⚠ Flashing	Alarm relay + buzzer enabled
ACP2	Condenser 2 water pump maintenance request					
AELt	Evaporator water outlet low temperature	With unit operation selected (probe configured in evaporator outlet) if temperature detected by temperature control probe < AL48	If temperature detected by temperature control probe > AL48	Always automatic	⚠ Flashing	Alarm relay + buzzer activated
AEHt	Evaporator water outlet high temperature	With unit operation selected if temperature detected by temperature control probe > AL49	If temperature detected by temperature control probe < AL49	Always automatic	⚠ Flashing	Alarm relay + buzzer activated
b1HP	Circuit 1 digital input high pressure	With the unit ON, and the input of the high-pressure circuit pressure switch active	Input inactive	Manual (reset procedure in functions menu)	⚠ Flashing	Alarm relay + buzzer enabled
b2HP	Circuit 2 digital input high pressure					

Name	Label meaning	Cause	Reset	Restart	Icon	Action
b1LP **b2LP**	Circuit 1 digital input low pressure Circuit 2 digital input low pressure	- With the low-pressure circuit pressure switch active - If **AL08**=1, even with the unit in stand-by or OFF remote, if the circuit low-pressure pressure switch input is active - In defrost is **AL06**=1 if the compressor low-pressure pressure switch input is active The alarm is not signalled: 1. In defrost for the **AL07** time in correspondence with the activation of the cycle inversion valve 2. On the start-up of the compressor for the **AL01** time	Input disabling	Auto.- becomes manual after 2 sec. (**AL05)** tripping per hour (reset procedure in functions menu)	⚠ Flashing	Alarm relay + buzzer enabled
b1AC **b2AC** **b1Ac** **b2Ac**	Circuit 1 chiller mode antifreeze alarm Circuit 2 chiller mode antifreeze alarm Circuit 1 chiller mode antifreeze alarm signal Circuit 2 chiller mode antifreeze alarm signal	Operating and in stand-by OFF remote If the antifreeze regulation probe **Pbr** measures a temp.< than the set 2°C (**AL26**) for at least 5 sec. (**AL28**) seconds With the digital input configured as antifreeze alarm and active.	Antifreeze regulation probe **Pbr** measures a temp. > than the set **A26**+ differential **AL27** With digital input disabled	Auto. – becomes manual after **AL29** tripping per hour (reset procedure in functions menu)	⚠ Flashing	If **AL30**=0 only the comp. are turned off the alarm label (**b1Ac b2Ac**) is signalled but the alarm relay and buzzer are not activated If **AL30**=1 the comp. are turned off, The alarm label (**b1AC b2AC**) are signalled and the alarm relay and buzzer are activated. In addition to the above mentioned actions, if the alarm comes from the ID, the antifreeze heaters are also activated

ATTENTION

Both labels are displayed with the evaporator input alarm or the evaporator common output active or with a single ID configured.

Name	Label meaning	Cause	Reset	Restart	Icon	Action
b1AH	Circuit 1 heat pump mode antifreeze alarm	Operating and in stand-by OFF remote	Antifreeze regulation probe **Pbr** measures a temp. > than the set **A33**+ differential **AL34** With ID inactive	Auto. – becomes manual after **AL37** tripping per hour (reset procedure in functions menu)	⚠ Flashing	If **AL38**=0 only the comp. are turned off the alarm label (**b1Ah-b2Ah**) is signalled but the alarm relay and buzzer are not activated
b2AH	Circuit 2 heat pump mode antifreeze alarm	If the antifreeze regulation probe **Pbr** measures a temp.< than the set 2°C (**AL33**) for at least (**AL36**) 5 seconds With the ID configured as antifreeze alarm and active.				
b1Ah	Circuit 1 heat pump mode antifreeze alarm signal					If **AL38**=1 the comp. are turned off, The alarm label (**b1AH-b2AH**) are signalled and the alarm relay and buzzer are activated.
b2Ah	Circuit 2 heat pump mode antifreeze alarm signal					In addition to the above mentioned actions, if the alarm comes from the ID, the antifreeze heaters are also activated

Both labels are displayed with the evaporator input alarm or the evaporator common output active or with a single ID configured.

ATTENTION

*Parameter **AL35** delays the antifreeze alarm (air/air unit low air temperature output) at the start of the unit in the heat pump mode.*
*If in the stand-by / OFF remote mode, the unit indicates an antifreeze alarm and the time set in parameter **AL35** is different than 0, by selecting the heat pump mode with the button or with ID, the antifreeze situation is reset and the compressor can be turned on for the time set in parameter **AL35** because the unit starts to heat the water or air. Once the delay time **AL35** has passed, if the antifreeze regulation probe **Pbr** still measures a temperature < than the set **AL33** for at least **AL36** seconds, the unit is blocked and an antifreeze alarm is signalled.*

Name	Label meaning	Cause	Reset	Restart	Icon	Action
b1hP	Circuit 1 analogue input high pressure	With unit in chiller or in heat pump operation if the condensation control probe measures a value > than the set **AL09**	If the condensation control probe measures a value < than the set **AL09** - the differential **AL10**	Manual (reset procedure in functions menu)	⚠ Flashing	Alarm relay + buzzer enabled
b2hP	Circuit 2 analogue input high pressure					
b1lP	Circuit 1 analogue input low pressure (this alarm can not be enabled)	The alarm is activated when the probe, which is configured as condensation control, measures a pressure < than the set **AL03** in the following conditions: -- chiller mode or heat pump - stand-by or OFF-remote if **AL08**=1 In defrost mode if **AL06**=1 The alarm is not signalled: - in defrost for the **AL07** time in correspondence with the inversion of the valve - on the start-up of the compr. for 120 sec. (**AL01**).	If the condens. Control probe measures a pressure of the set > **AL03**+differential **AL04**	Auto. - becomes manual after 2 sec. (**AL05**) tripping per hour (reset procedure in functions menu)	⚠ Flashing	Alarm relay + buzzer enabled
b2lP	Circuit 2 analogue input low pressure (this alarm can not be enabled)					

ATTENTION

If the low pressure transducers are configured the low pressure alarm adjustment is on them only.

Name	Label meaning	Cause	Reset	Restart	Icon	Action
b1tF	Circuit 1 condensation fan relay alarm THIS ALARM CAN NOT BE ENABLED	With configured ID active	With inactive ID	Manual (reset procedure in functions menu)	⚠ Flashing	Alarm relay + buzzer enabled
b2tF	Circuit 2 condensation fan relay alarm THIS ALARM CAN NOT BE ENABLED					
b1PH	Circuit 1 pump-down stop alarm THIS ALARM CAN NOT BE ENABLED	Pressure switch if **CO36**=1,2,3,4 and with ID inactive and the pump-down stops for the **CO39** time Transducer if **CO36**=1,2,3,4 the set **CO37** time is not reached and the pump-down stops for the **CO39** time	From thermoregulation start-up and ID not active From thermoregulation start-up with evaporating pressure > than the set **CO37** + **CO38** differential	Auto. - becomes manual after **AL21** events per hour (reset procedure in functions menu). Logged only with manual restart	⚠ Flashing	Alarm relay + buzzer activated only when the alarm becomes manual restart
b2PH	Circuit 2 pump-down stop alarm THIS ALARM CAN NOT BE ENABLED					
b1PL	Circuit 1 pump-down start alarm THIS ALARM CAN NOT BE ENABLED	Pump-down pressure switch if **CO36**=1,2,3,4 with thermoregulation start-up and ID inactive for the time **CO39** Low pressure transducer if **CO36**=1,2,3,4 with thermoregulation start-up, the set **CO37** is not reached within the time **CO39**	From thermoregulation start-up and ID not active From thermoregulation start-up with evaporating pressure > than the set **CO37**+ differential **CO38**	Auto. - becomes manual after **AL21** tripping per hour if **AL23**=1 (reset procedure in functions menu) If **AL23**=0 it remains in automatic Logged only with manual restart	⚠ Flashing	Alarm relay + buzzer enabled only when the alarm becomes manual reset
b2PL	Circuit 2 pump-down start alarm THIS ALARM CAN NOT BE ENABLED					
b1dF	Circuit 1 defrost alarm signal THIS ALARM CAN NOT BE ENABLED	In defrost only, if **DF01**=1.3 defrost end temperature/ pressure or external contact and the defrost ends for **DF05** time	If stand-by or ON-OFF remote Next defrost cycle ends for temp./ press.	Auto. if next defrost ends for temperature/ pressure, otherwise manual. (reset procedure in functions menu)	⚠ Flashing	Alarm relay + buzzer NOT enabled
b2dF	Circuit 2 defrost alarm signal THIS ALARM CAN NOT BE ENABLED					
b1CU	Circuit 1 unloading signal	Operating if the probe, which is configured as condensation press/temp. control, measures a value > than the set **CO44**	If the condensation press./temp. measures < than the set **CO44** - differential **CO44** After unloading is activated and after parameter **CO47**	Auto.	⚠ Flashing	Alarm relay + buzzer NOT enabled
b2CU	Circuit 2 unloading signal					
b1CU	Circuit 1 condenser coil unloading signal THIS ALARM CAN NOT BE ENABLED	Operating is the probe, which is configured as condensation temp./press. control or evaporation pressure, measures a value < than the set **CO46**	If the condensation temp/press or evaporation pressure measures > than **CO46**+**CO47** With unloading function set after the set **CO48** parameter time	Auto.	⚠ Flashing	Alarm relay + buzzer NOT enabled
b2CU	Circuit 2 condenser coil unloading signal THIS ALARM CAN NOT BE ENABLED					

Name	Label meaning	Cause	Reset	Restart	Icon	Action
b1rC	Circuit 1 recovery disabled alarm THIS ALARM CAN NOT BE ENABLED	Operating if the probe, which is configured as condensation press/temp control, measures > than the set **rC06**	If the condensation press/temp measures < than the set **rC06**-differential **rC07** With unloading function set after the set **rC08** parameter time	Auto.	⚠ Flashing	Alarm relay + buzzer NOT enabled
b2rC	Circuit 2 recovery disabled alarm THIS ALARM CAN NOT BE ENABLED					
C1HP ÷C6HP	Compressors 1÷6 high pressure alarm	With the unit ON and the compressor pressure switch input active	Input disabling	Manual (reset procedure in functions menu)	⚠ Flashing	Alarm relay + buzzer enabled
C1oP÷C6 oP	Compressors 1÷6 pressure switch	The alarm is not signalled: after turning on the compressor for 120 sec. (**AL11**) with the unit running for 5 sec. (**AL12**)	Input disabling	Auto - becomes manual after 3 sec. (**AL13**) tripping per hour (reset procedure in functions menu)	⚠ Flashing	Alarm relay + buzzer enabled

OIL ALARM FROM PRESSURE SWITCH OR OIL LEVEL SWITCH (screw)

Occasionally it is possible to find both the safety systems. The delay, the active input duration and the number of events per hour allow to set-up both the protections.

Parameter **AL11**

Oil alarm delay after compressor ON.

It allows to set a delay time before signalling the oil or the oil level switch alarms after the compressor ON.

Parameter **AL12**

Duration of the pressure switch / oil level switch in normal operating conditions.

Duration of the oil level switch activation during normal running condition.

It allows to set the time delay before signalling the alarm. **AL11** defines the delay counting, it helps to override the low pressure or the low oil level determined, for example, by a new capacity control step of the compressor itself.

Par. **AL13**

Maximum number of alarm events per hour.

It fixes the maximum number of alarm events before switching the restart from automatic to manual.

Name	Label meaning	Cause	Reset	Restart	Icon	Action
C1tr÷C6t r	Compressor 1÷6 relay alarm	The alarm is not detected for **AL19** after the starting of the compressor with ID active	If ID is not active	Manual If more than **AL20** tripping per hour Of the compressor to reset the alarm, go to functions menu (see **COtr** function in functions menu)	⚠ Flashing	Alarm relay + buzzer enabled

Compressor involved: If parameter **AL47**=0 or 1 Off

Compressor not involved: If parameter **AL47**=0 perform adjustment

If parameter **AL47**=1 Off

<div style="background:green;color:white;padding:4px">**ATTENTION**</div>

The **AL47** *parameter determines the compressor relay alarm function.*

If the parameter **AL47**=0 (single compressor blocked) with digital input configured as active compressor relay, only the compressor connected to the input is blocked and the related alarm is displayed.

If the parameter **AL47**=1 (circuit blocked) with digital input configured as active compressor relay, all compressors within the circuit are blocked and the related alarm is displayed (the single signal is maintained).

Name	Label meaning	Cause	Reset	Restart	Icon	Action
C1dt÷C6 dt	Compressor 1÷6 high delivery temperature alarm	The temp. measured by the probe that is configured as high delivery temperature is > than the set 70°C (**AL39**) **ATTENTION** *With operating temperature up to 99.9°C the alarms are defined in tenths of degrees and in single degrees for operating temperatures greater than 100°C.*	The temp. measured by the probe that is configured as high delivery temperature is < than the set 70°C (**AL39**)-differential 10°C (**AL40**)	Auto. Manual If more than 1 sec. (**AL41**) tripping per hour occurs, enter the functions menu to reset the alarm	⚠ Flashing	Alarm relay + buzzer enabled
C1Mn÷ C6Mn	Compressor 1÷6 maintenance request	Compressor operating hours > than the set hour counter	Operation time Reset (hour function in the functions menu)	Manual	⚠ Flashing	Alarm relay + buzzer enabled

1.37 Probe key

In this chapter are indicated the probes **BTWOT**, **BEWOT1**, **BEWOT2, BHP1, BHP2** and **BAT1**, for their positioning consult the refrigerant drawing.

Their description is indicated in the following table

Name in the manual	Borne name	Description
BTWOT	**PB2**	TANK WATER OUTLET TEMPERATURE PROBE
BHP1	**PB3**	HIGH PRESSURE TRANSDUCER OF CIRCUIT 1
BHP2	**PB4**	HIGH PRESSURE TRANSDUCER OF CIRCUIT 2
BEWOT1	**PB7**	EVAPORATOR WATER OUTLET TEMPERATURE PROBE CIRCUIT 1
BEWOT2	**PB8**	EVAPORATOR WATER OUTLET TEMPERATURE PROBE CIRCUIT 2
BAT1	**PB9**	AMBIENT TEMPERATURE PROBE (only with antifreeze protection function)