iCHiLL

USER MANUAL

IC100CX EVO

rel. firmware 1.0

(rev. document 1.0)

INDEX

1. GENERAL WARNING

1.1 ⚠ PLEASE READ BEFORE USING THIS MANUAL

- This manual is part of the product and should be kept near the instrument for easy and quick reference.
- The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
- Check the application limits before proceeding.
- Dixell Srl reserves the right to change the composition of its products, even without notice, ensuring the same and unchanged functionality.

1.2 ⚠ SAFETY PRECAUTIONS

- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning: disconnect all electrical connections before any kind of maintenance.
- The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor or to “Dixell S.r.l.” (See address) with a detailed description of the fault.
- Consider the maximum current which can be applied to each relay (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining; do not use the same electrical conduit to install high voltage cabling and low voltage cabling.
- Some contactors can produce very high electrical stresses on the relay contacts mounted in the device. Dixell suggests to carefully check the technical documentation of the contactors and follow the instructions contained in this doumentation (commercial documentation is not a reference for theese information). To protect the relay contacts of the device, verify the need to use electrical disturbance suppressors or excess voltage protections.
- The ground connection of the secondary coil of the transformer that powers the device can result in a bad performance; where possible, this connection should be avoided.
- Fit the probe where it is not accessible by the end user.
- In case of applications in industrial environments, the use of mains filters (our mod. FT1) in parallel with inductive loads could be useful.

- The  symbol alerts the user of non-insulated “dangerous voltage” within the product area that is sufficiently high to constitute a risk of electric shock to persons.

- The  symbol alerts the user of important operating and maintenance (assistance) instructions found in the documentation attached to the device.

1.3 PRODUCT DISPOSAL (WEEE)

With reference to Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 and to the relative national legislation, please note that:

- There lies the obligation not to dispose of electrical and electronic waste as municipal waste but to separate the waste.
- Public or private collection points must be used to dispose of the goods in accordance with local laws. Furthermore, at the end of the product's life, it is also possible to return this to the retailer when a new purchase is made.
- This equipment may contain hazardous substances. Improper use or incorrect disposal can have adverse effects on human health and the environment.
- The symbol shown on the product or the package indicates that the product has been placed on the market after 13 August 2005 and must be disposed of as separated waste.

Should the product be disposed of incorrectly, sanctions may be applied as stipulated in applicable local regulations regarding waste disposal.

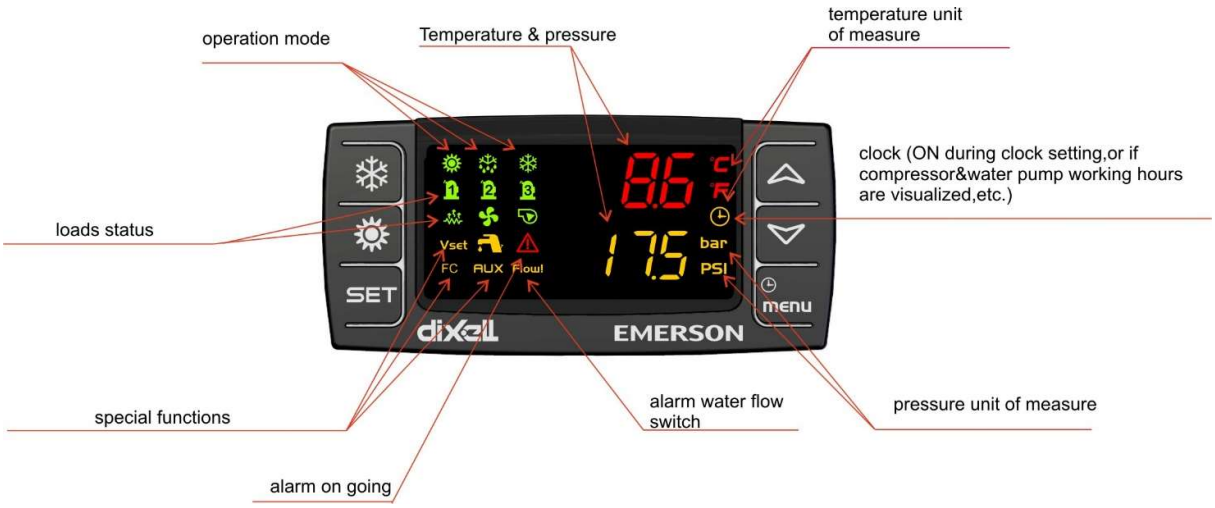
2. ICHILL 106CX/IC108CX FEATURES

FEATURES	IC106CX	IC108CX
RELAYS		
6	●	
8		●
DIGITAL INPUTS		
11	Configurable	Configurable
PROBES		
4 (NTC or PTC or digital input) 2 (NTC or PTC or 4÷20mA or 0 ÷ 5Volt or digital input)	Configurable	Configurable
PROPORTIONAL OUTPUTS		
2 configurables (0÷10V)	Configurable	Configurable
2 configurables (0÷10V or PWM)	Configurable	Configurable
SERIAL OUTPUTS		
TTL (Mod-Bus Rtu protocol)	●	●
Remote terminal VI613 (up to 2 remote terminal with probe on board), or V2I810 or VT810	●	●
LAN (to connect IEV electronic expansion valve driver)	●	●
POWER SUPPLY		
12 Vac/dc (+15%;-10%)	●	●
24 Vac/dc (± 10%)	Opt	Opt
MAIN DISPLAY (UPPER DISPLAY)		
± 4 digits with decimal point	●	●
SECONDARY DISPLAY (LOWER DISPLAY)		
± 4 digits with decimal point	●	●
OTHER		
Clock on board	Opt	Opt
Buzzer	●	●

- Opt = optional
- ● = default

3. USER INTERFACE

Meaning of the LEDs



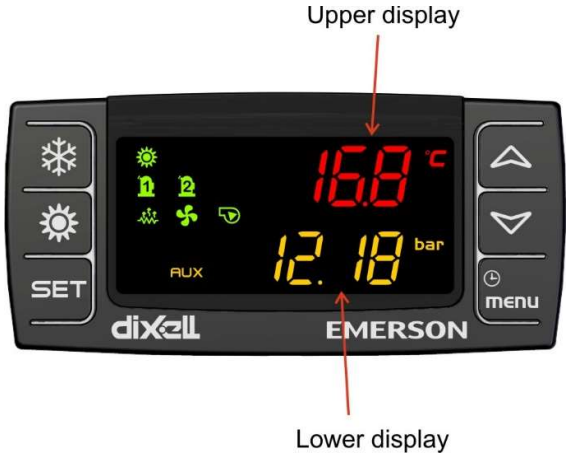
3.1 DISPLAY AND ICONS

ICON	MEANING / FUNCTIONNING
°C °F BAR PSI	ON when a temperature or pressure is visualized
	Real time clock: ON when the bottom display show the RTC ON during the programming with time based parameter value In function menu indicates the defrost delay counting
	General alarm: blinking in case of alarm
	Domestic hot water: ON when domestic hot water production is active
menu	ON when menù button is pressed
	Anti freeze heaters/ integration heating / boiler: ON if the heaters are switched ON
Flow!	Water flow alarm / supply fan overload (air / air unit): blinking in case of water flow alarm or supply fan overload alarm
	Water pump: ON if at least one water pump is actives or if supply fan is active
	Condenser fan: ON if at least one condenser fan is active

1 2 3	ON when the compressor is active Blinking = when a compressor activation is delayed (minimum OFF time, delay after water pump activation, etc.)
AUX	ON when an auxiliary output is active
❄ ☀	ON if the Ichill is swithed ON in cooling or heating
FC	ON when the free cooling is active
❄	ON in defrost Blinking during defrost activation delay

3.2 UPPER & LOWER DISPLAY CUSTOMIZATION

It is possible to select wich probe has to be visualized on the upper & lower display.



3.3 MAIN DISPLAY (UPPER DISPLAY)

Parameter dP01

PARAMETER VALUE	DESCRIPTION	CORRESPONDING LABEL
0	no visualization	**No label**
1	set point (parameter value)	
2	real set point (parameter value modified by energy saving or dynamic set point)	
3	evaporator water inlet temperature	**Ein**
4	evaporator water outlet temperature	**Eout**
5	condenser water inlet temperature	**Cin**
6	condenser water outlet	**Cout**
7	outlet temperature	**Et**

8	free cooling temperature	**FCIN**
9	remote terminal 1 temperature or Visograph 2.0 internal temperature (Pbr1)	**trE1**
10	remote terminal 2 temperature or Visograph 2.0 remote temperature (Pbr2)	**trE2**
11	combined defrost tempereature	**dEF1** circuit 1 **dEF2** circuit 2
12	domestic hot water temperature 1	**SAn1**
13	domestic hot water temperature 2	**SAn2**
14	solar panel temperature	**SoLE**
15	recovery temperature	rEC
16	condenser temperature	**Cdt1** circuit 1 **Cdt2** circuit 2
17	PTC probe of cooling regulation	

3.4 SECONDARY DISPLAY (LOWER DISPLAY)

Parameter dP02

PARAMETER VALUE	DESCRIPTION	CORRESPONDING LABEL
0	no visualization	**No label**
1	set point (parameter value)	
2	real set point (parameter value modified by energy saving or dynamic set point)	
3	evaporator water inlet temperature	**Ein**
4	evaporator water outlet temperature	**Eout**
5	condenser water inlet temperature	**Cin**
6	condenser water outlet	**Cout**
7	outlet temperature	**Et**
8	free cooling temperature	**FCIN**
9	remote terminal 1 temperature or Visograph 2.0 internal temperature (Pbr1)	**trE1**
10	remote terminal 2 temperature or Visograph 2.0 remote temperature (Pbr2)	**trE2**
11	combined defrost tempereature	**dEF1** circuit 1 **dEF2** circuit 2
12	domestic hot water temperature 1	**SAn1**
13	domestic hot water temperature 2	**SAn2**
14	solar panel temperature	**SoLE**
15	recovery temperature	rEC
16	condenser temperature	**Cdt1** circuit 1 **Cdt2** circuit 2

17	PTC probe of cooling regulation	
18	condenser pressure	**CdP1** circuit 1 **CdP2** circuit 2
19	evaporator pressure	**LP1** circuit 1 **LP2** circuit 2
20	compressor oil pressure	
21	real time clock	

3.5 VICX613: REMOTE TERMINAL 1 VISUALIZATION

If dP03=0 the display has the same visualization of the Ichill.
If dP03=1 upper display visualizes the temperature measured by the probe mounted in the remote terminal 1 (remote terminal must have internal temperature sensor)

3.6 VICX613: REMOTE TERMINAL 2 VISUALIZATION

If dP04=0 the display has the same visualization of the Ichill.
If dP04=1 upper display visualizes the temperature measured by the probe mounted in the remote terminal 2 (remote terminal must have internal temperature sensor)

3.7 DISPLAY VISUALIZATION IN REMOTE OFF

Digital input configured as remote ON/OFF: the active input sets the unit in OFF (even when the unit is a condensing unit).
The upper display shows **"OF.F** ", the led of the decimal point is blinking.

3.8 DISPLAY VISUALIZATION IN STD-BY

It is possible to customise the visualization of the display when the unit is in STD-BY:
Parameter dP09:
0= the display shows "STD-BY"
1= the display shows what defined by parameters dP1 and dP2
2= the display shows "OFF"

dP09=0

dP09=1
The display shows what defined by parameters dP1 and dP2

dP09=2

3.9 DISPLAY VISUALIZATION OF THE CONDENSIG UNIT

If the Ichill is used to control a condensing unit (CF05=1):

- and a digital input has to be configured as “cooling request”; in case of cooling request the display shows “OnC”
- and a digital input has to be configured as “heating request”; in case of heating request the display shows “OnH”

If the Ichill is used to control a condensing unit (CF05=1):

- and a digital input has to be configured as “regulation request”; in case of cooling request by key the display shows “OnC”; in STD-BY the display swows “On”, when the digital input is not active the display shows “OFF”
- and a digital input has to be configured as “regulation request”; in case of heating request by key the display shows “OnH”; in STD-BY the display swows “On”, when the digital input is not active the display shows “OFF”

4. HOW TO READ PROBES VALUE

4.1 PROBES VISUALIZATION

Starting from main visualization, through UP and DOWN keys it is possible to read the value of each configured probe.

EIn =	Evaporator inlet temperature
EOut =	Evaporator common outlet temperature
CIN =	Condenser common inlet temperature (water/water unit)

COut = Condenser common outlet temperature
Et = Outside temperature
FCIN = Free cooling temperature
trE1 = Remote keyboard 1 temperature (VI622) or Visograph 2.0 temperature of the internal sensor
trE2 = Remote keyboard 2 temperature (VI622) or Visograph 2.0 temperature of the remote sensor
dEF1 = Combined defrost temperature
San1 = Domestic hot water regulation temperature
San2 = Domestic hot water second probe temperature
SoLE = Solar panel temperature
REC = Heat recovery temperature
Cdt1= Condenser temperature
btUS = Tank probe temperature
OIL1/OIL2 = Compressor 1 oil temperature / Compressor 2 oil temperature
rh = humidity

4.2 DISPLAY LAYOUT

Pushing or key it is possible to read the valure of the probes connected to the instrument.
Every probe is identified by a label (see display visualization table).

4.3 HOW TO DISPLAY PROBES VALUE

Pushing or key it is possible to read the valure of the probes connected to the instrument.
Every probe is identified by a label (see display visualization table).

Example:
Fig.1: upper display shows outlet evaporator temperature, the lower display shows Out1.

Fig.1

5. OTHER DISPLAY VISUALIZATION

5.1 READ SET POINT VALUE

If the controller is in stand-by push and release the **SET** key:

- the display shows **SetC** (set point chiller)
- push SET key again, the display shows **SetH** (set point heat pump, when the hat pump is enabled)
- push SET key again, the display shows **SEtb** (set point by-pass valve); in this special configuration the chiller set point is not visualized
- push SET key again, the display shows **SEtS** (set point domestic hot water, when this function is enabled)

If the unit is working for cooling or heating, only the set point related to the current operation mode is visualized.

5.2 MODIFY THE SET POINT

Push **SET** key for at least **3** seconds:

- Cooling set point is flashing; push **UP** or **DOWN** key to modify the setpoint
- Push **SET** to confirm or wait the timeout
- Heating set point is flashing; push **UP** or **DOWN** key to modify the setpoint
- Push **SET** to confirm or wait the timeout
- Domestic hot water set point is flashing; push **UP** or **DOWN** key to modify the setpoint
- Push **SET** to confirm or wait the timeout

5.3 READ REAL SETPOINT

When a function that modify the set point is active (Energy saving, dynamic set point) by pushing SET key some times it is possible to read the real working set point **SEtr**.

5.4 HOW TO VISUALIZE DISABLED COMPRESSORS

If a compressor is disabled the lower display visualizes a label:
compressor 1 disabled: label c1ds
compressor 2 disabled: label c2ds
compressor 3 disabled: label c3ds

5.5 KEY FUNCTION

KEY	ACTION	FUNCTION
SET	Push and release	Chiller set point **SetC** Heat pump set point **SetH**
	Push once again	Real setpoint **Setr** (when Energy saving and/or dynamic set point are enabled)
	Push for 3 seconds	Set point modification
	Parameter setting: push once	To enter to parameter modification or confirm a value
	Push when an alarm is showed in menù ALrM	To reset the alarm

	Push once	Probes value
	Pushing once during the programming	To change the group of parameters, to change the parameter, to change the value of the parameter
	Push for 1 second during the programming when the display visualize Pr1 or Pr2 or Pr3	Push 1 second to move to Pr2 programming level Push 1 second again to move to Pr3 programming level
	Push once	Probes value
	Pushing once during the programming	To change the group of parameters, to change the parameter, to change the value of the parameter
	Push once	Turn ON or turn OFF the controller (in chiller or heat pump depending from CF59 parameter)
	Push once	Turn ON or turn OFF the controller (in chiller or heat pump depending from CF59 parameter)
	Push once	To enter the function Menu
	Push for 3 seconds	To set the clock (only for controller with clock on board)
	Pushing once during the programming	To exit from a group of parameter

KEY COMBINANTION

KEY	ACTION	FUNCTION
	Push both for 3 seconds	Enter the programming parameters
	Only in Pr3 level: push SET and DOWN key	Select the parameter level visibility Pr1 / Pr2 / Pr3
	Push both together	Exit the programming parameters
	Push 5 seconds in heat pump mode	Manual defrost
	Only in Pr3 programming level: push SET and then the MENU key	In Pr3 defines if the parameter can be modified or not in the other levels.

6. REMOTE TERMINAL VI613

The display visualization and the button functions are the same of the Ichill, then to use them refer to previous chapters.

It is possible to connect maximum two remote terminals VI613 available with or without internal temperature sensor.
If the remote terminal has internal temperature sensor, the thermoregulation can be done using this temperature (air/air unit).
Remote terminals have to be connected to the mauin controller using twisted shielded cable (e.g. Belden 8772 with minimum area 1 mm^2 and maximum length 100 mt).
In case of lack of communication between main controller and remote terminal (reversed connection polarity, faulty on main controller or remote terminal) or when both remote terminal have the same address (see dip switch position), the display shows “noL” (no link).
The main display visualization can be selected through the selection of one of the options of dp4 and dp5 parameters.

7. REMOTE LCD PANEL VGI810 OR V2I810

Two models of remote LCD panel are available;

- VGI810 Visograph 1st series
- V2I810 Visograph IInd seres

The description of the user interface is available in the Visograph user manual.

8. REMOTE TOUCH PANEL VTIC10

The description of the user interface is available in the user manual of the Visotouch.

9. FIRST INSTALLING

9.1 ON BOARD CLOCK (OPTIONAL)

If giving power supply the bottom display shows "**rtC**" alternated with a temperature or pressure value, it is necessary to set the internal clock.
After a power failure, clock back-up battery lasts maximum 3 or 4 days. After this period it is necessary to set the again clock.

The internal clock is an option and it is not possible to update the instrument; it is necessary to order the instrument already complete of this features.

9.2 REAL TIME CLOCK SETUP

1. Push **MENU** key for some seconds until the bottom display shows **"Hour**" and the top display shows its value.
2. Push **SET** once: the value is blinking
3. Use the Up and Down keys to adjust it.
4. Push **SET** to confirm; automatically the display shows next parameter
5. Repeat the operations 2, 3 and 4 for all the data:
   - **Min:** minutes
   - **UdAy:** day of the week **(Sun** = Sunday, **Mon** =Monday, **tuE** =Tuesday, **UEd** = Wednesday, **tHu** = Thursday, **Fri** =Friday, **SAt** =Saturday)
   - **dAy:** day of the month
   - **MntH:** month
   - **yEAr:** year

10. PARAMETERS PROGRAMMING

10.1 DOWNLOAD: HOW TO PROGRAM AN INSTRUMENT WITH A PROGRAMMED "HOT KEY 64"

The device must not to be connected to the power supply.

1. Insert into the 5 poles connector the Hot Key 64 already programmed (by software Wizmate or other instrument)
2. Connect the device to the power supply
3. Automatically the parameters are downloaded

During the download the regulation is locked and the top display shows the "**doL**" blinking label.
At the end of the download the display shows following message:

- **"End"** if the programming procedure is OK; the regulation will start automatically
- **"Err"** if the programming procedure was not correctly completed.
  Repeat parameter programming procedure and verify if the parameters are downloaded correctly.

Upload: How to program a "Hot Key" using an already programmed device

The device must be connected to the power supply.

1. Insert into the 5 poles connector the Hot Key 64
2. Push Menu key
3. Serch **UPL** function pushing arrow keys
4. Push **SET** key to start the parameters upload

During the upload the display shows "**UPL**" blinking.
At the end of the download the display shows following message:

- **"End"** if the programming procedure is OK
- **"Err"** if the programming procedure was not correctly completed.

To exit the UPL function push the MENU key or wait the time-out (15 sec).

10.2 PARAMETERS PROGRAMMING USING THE KEYBOARD

There are three levels of visibility:

- Pr1 User level
- Pr2 Maintenance level
- Pr3 OEM level

The visibility level must be associate to each parameter:

- if a parameter is associated Pr1 visibility, this parameter is visible in Pr1, Pr2 and Pr3 level
- if a parameter is associated Pr2 visibility, this parameter is visible in Pr2 and Pr3 level
- if a parameter is associated Pr3 visibility, this parameter is visible only in Pr3 level

Password default values

Default values of the password are:

- Password level Pr1 = **1**
- Password level Pr2 = **2**
- Password level Pr3 = **3**

Each password can be changed in the range 0 ... 999.

CF parametrs (configuration parameters) cannot be changed if the instrument is switched on.
dF parameters (defrost parameters) cannot be changed if the defrost is ongoing.

Enter the programming level Pr1

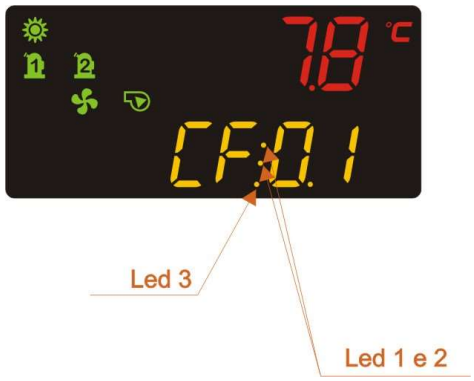
1. Push **SET** + **DOWN** keys together for 3 seconds
2. Upper display shows "**PASS**", lower display shows "**Pr1"**
3. Push **SET** key; upper display shows "**0"** blinking
4. Push **UP** or **DOWN** keys to type Pr1 password
5. Push **SET;** if the value is correct, upper display shows **"ALL"** (this category contains all the parameters)
6. Select the desired parameter group pressing **DOWN** or **UP** key
7. Push **SET** to enter; lower display shows the first available parameter, upper display shows its value
8. Push **SET** + **UP** to exit from parameters programming

Parameter status, leds and bottom display in Pr1

If the parameter is visible but not modifiable, led 1 and led 2 are blinking

Enter the programming level Pr2

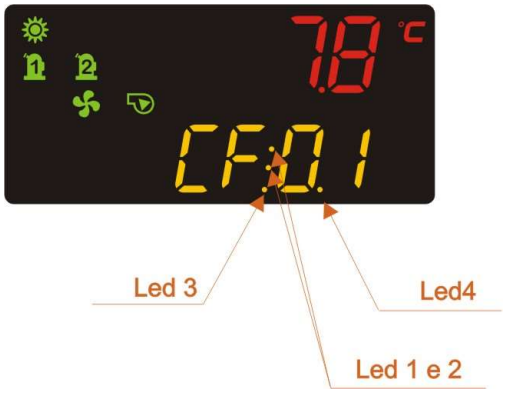
1. Push **SET** + **DOWN** keys together for 3 seconds; upper display shows "**PASS**", lower display shows "**Pr1"**
2. Push UP key for 2 seconds; upper display shows "**PASS**", lower display shows "**Pr2"**
3. Push **SET** key; upper display shows "**0"** blinking
4. Push **UP** or **DOWN** keys to type Pr2 password
5. Push **SET;** if the value is correct, upper display shows **"ALL"** (this category contains all the parameters)
6. Select the desired parameter group pressing **DOWN** or **UP** key
7. Push **SET** to enter; lower display shows the first available parameter, upper display shows its value
8. Push **SET** + **UP** to exit from parameters programming



- Led 3 ON: the parameter is visible and modifiable in Pr1 level and Pr2 level
- All leds OFF: the parameter is visible and modificable in Pr2 level but not visible in Pr1 level
- Led 3 blinking: the parameter is visible in Pr1 and Pr2 level but but not modifiable in Pr1 level
- Led 1 and led 2 blinking: the parameter is visible but not modifiable in Pr2 level

Enter the programming level Pr3

1. Push **SET** + **DOWN** keys together for 3 seconds; upper display shows "**PASS**", lower display shows "**Pr1"**
2. Push UP key for 2 seconds; upper display shows "**PASS**", lower display shows "**Pr2"**
3. Push UP key for 2 seconds; upper display shows "**PASS**", lower display shows "**Pr3"**
4. Push **SET** key; upper display shows "**0"** blinking
5. Push **UP** or **DOWN** keys to type Pr3 password
6. Push **SET;** if the value is correct, upper display shows **"ALL"** (this category contains all the parameters)
7. Select the desired parameter group pressing **DOWN** or **UP** key
8. Push **SET** to enter; lower display shows the first available parameter, upper display shows its value
9. Push **SET** + **UP** to exit from parameters programming



- Leds 3 / 4 on: the parameter is visible and modifiable in Pr1 level and Pr2 level
- All leds OFF: the parameter is not visible in Pr1 level and Pr2 level
- Leds 3 / 4 blinking: the parameter is visible in Pr1 and in Pr2 but not modifiable
- Led 4 On and led 3 blinking: the parameter is visible in Pr1 and Pr2 level but modifiable only in Pr2 level
- Led 4 ON: the parameter is visible and modifiable in Pr2 level

How to change a parameter value

1. Push the **SET** + **DOWN** keys together for 3 seconds; upper display shows "**PASS**", lower display shows "**Pr1"**
2. Enter to Pr1, or Pr2 or Pr3 level according to the level of visibility of the parameter to modify
3. Select the desired parameter group pressing **DOWN** or **UP** key
4. Push **SET** to enter the parameter value
5. Change the value pressing **UP** or **DOWN** keys
6. Push "**SET**" to confirm; after some seconds the display shows the next visible parameter
7. Push **SET + UP** together to exit from parameters programming

Change the Password value

To change the password value is necessary to know the current value.

Pr1 LEVEL PASSWORD

1) Enter to Pr1 level
2) Select a group of parameters (ALL, St, CF,…)
3) Last parameter of each group is "**Pr1**" password value
4) Push **SET** key
5) Change the value pressing **UP** or **DOWN** keys
6) Upper display blinks for some seconds and then shows the next parameter
7) Push **SET + UP** together to exit from parameters programming

Pr2 LEVEL PASSWORD

1. Enter Pr2 level
2. Select a group of parameters (ALL, St, CF,…)
3. Last parameter of each group is "**Pr2**" password value
4. Push **SET** key
5. Change the value pressing **UP** or **DOWN** keys
6. Upper display blinks for some seconds and then shows the next parameter
7. Push **SET + UP** together to exit from parameters programming

Pr3 LEVEL PASSWORD

1. Enter Pr3 level
2. Select a group of parameters (ALL, St, CF,…)
3. Last parameter of each group is "**Pr3**" password value
4. Push **SET** key
5. Change the value pressing **UP** or **DOWN** keys
6. Upper display blinks for some seconds and then shows the next parameter
7. Push **SET + UP** together to exit from parameters programming

Move a parameter from Pr2 level to Pr1 level

If a parameter is visible in Pr2 but not in Pr1:

- Enter to Pr2 level
- Select the desired parameter group pressing **DOWN** or **UP** keys
- Select the desired parameter pressing **DOWN** or **UP** keys; led 3 has to be OFF
- Push SET key and then DOWN key; led 3 is lighted and the parameter is now visible also in Pr1 level

Move a parameter from Pr3 to Pr2 to Pr1

If a parameter is visible in Pr3 but not in Pr1 and Pr2:

- Enter to Pr3 level
- Select the desired parameter group pressing **DOWN** or **UP** keys
- Select the desired parameter pressing **DOWN** or **UP** keys; led 3 has to be OFF
    - To make visible the parameter in both level, Pr1 and Pr2, push SET key and then DOWN key; led 3 and led 4 are lighted
    - To make visible the parameter only in level Pr2, push SET key and then DOWN key; led 3 is lighted

Programming: digital input and output polarity

Digital inputs, digital outputs (relay), proportional outputs configured as ON/OFF, analogue inputs configured as digital input configuration parameters are composed by a letter and a number:

- The letter represents the status of the input or output when the associated function is active:
    - o (open) = the function associated to the input or output is active when the contact is open
    - c (close) = the function associated to the input or output is active when the contact is closed
- The number defines the function associated to the input or output

Example: CF37 = digital input 7 configuration

- **"7"** means that the digital input is configured as "high pressure switch" (see paragraph of I/O configuration)
- **"o"** means that the digital input is active for **open** contact, then the high pressure alarm is detected when the digital input is open.

11. FUNCTION MENU

The function Menu (MENU key) contains the informations related to all possible enabling functions:

- **ALrM** Read and reset the alarms
- **ALOG** Read and reset the alarm log
- **UPL** Upload the parameter into the Hot Key
- **CrEn** Enable – disable one or the two circuits
- **COEn** Enable – disable one of the compressors
- **Hour** Read and reset the number of compressor running hour
- **COSn** Read and reset the number of compressor starts-up
- **COdt** Read the compressor discharge temperature
- **Cond** Read the condensing fan speed percentage of the proportional output

- **Pout** Read the percentage of the proportional output 0 ÷ 10 Vdc
- **PoEn** Enable – disable evaporator or condenser water pumps
- **dF** Time counting to next defrost cycle, under heat pump mode,
- **uS** Read the probe temperatures that enabled to control the auxiliary output
- **SoL** Read temperature, Set point and output status of solar panel
- **FC** Read temperature, Set point and output status of Free cooling
- **trEM** Read probe temperature of the remote panels
- **Et1** Read temperature, pressure, set point of the electronic expansion valve 1
- **Et2** Read temperature, pressure, set point of the electronic expansion valve 2
- **REC** Enable / disable recovery function

11.1 MENU "ALRM": ALARM LIST (READ AND RESET)

Push **MENU** key:
1) **AlrM** is visualized on the display
2) Push **SET** key;if there are no active alarm, nothing happens
3) If there is at least an alarm, the lower display shows the alarm code and the upper display shows:
   - **rSt** if the alarm can be reset
   - **NO** if the alarm can't be reset
4) To reset the alarm push **SET** key when the rSt label is displayed
5) Repeat above operation to reset all the alarms
6) To exit to **ALrM** menu push **MENU** key

Manual alarm reset if password is requested

Push **MENU** key
1. **AlrM** is visualized on the display
2. Push **SET** key; if there is at least an alarm, the lower display shows the alarm code and the upper display shows:
   - **rSt** if the alarm can be reset
   - **NO** if the alarm can't be reset
3. Push **SET** when the **rSt** label is displayed
4. Upper display shows "**0**" blinking, lower display shows **PAS**
5. Push **UP** or **DOWN** key to type the password value
6. If the password is OK the alarm is reset

PASSWORD TO ENTER IN THE ALARM MENU

It is possible to protect by password the **Alrm** alarm menu:
- If A097 and A098 = 0 no password is required to enter in the alarm menu
- If A097 = 1 is always prompted for a password to enter in the alarm menu
- If A097>0 and A098>0:
  - the password is not requested if the number of alarms reset manually is less than A098
  - the password is requested if the number of alarms reset manually reaches A098

Default password to reset alarms and enter to Alrm menu

The parameter A046 represents the password value to reset the alarms that require the password and the password value to enter to the Alrm menu (when the password request is enabled); default value is **4.**

11.2 ALOG: ALARM LOG LIST

ALOG menu allows to read last 100 alarms.
Push **MENU** key:
1. Search **ALOG** menu pushing **UP** or **DOWN** key
2. Push **SET** key
3. Lower display shows the alarm code, upper display shows n00 that represent the first alarm in the list (maximum 100 alarms can be stored)
4. Push **UP** or **DOWN** key to scroll the alarm list
5. To exit the **ALOG** function push **MENU** or wait the timeout

For each alarm it is possible to read following informations:

Push SET key:

- Upper display shows the operation mode of the controller when the alarm was detected (Cool, Heat, STD-BY, etc.)
- Lower display shows the time (only if the device is provided by internal clock)

Push UP or DOWN key:

- Upper display shows the year (only if the device is provided by internal clock)
- Lower display shows mont and day (only if the device is provided by internal clock)

Erase the Alarm log list

Push **MENU** key:

1. Push **UP** or **DOWN** keys to select **ALOG** menu
2. Push **SET key**
3. Push **UP** or **DOWN** key to search **ArSt** label on the bottom display
4. Push **SET**: the lower display shows **PAS** and the upper display "0" blinking
5. Push **UP** or **DOWN** keys to insert the password (that can be set by parameter AL46)
6. If the password is OK the label **ArST** blinks for 5 seconds, then the display returns to normal condition read-out
7. If the password is not correct the display shows **PAS** again.
8. To exit push the **MENU** key one time or wait the timeout

THE ALARM LIST CONTAINS 100 EVENTS IN A FIFO STRUCTURE. WHEN THE MEMORY IS FULL ANY NEW ALARM WILL ERASE THE OLDEST.

PASSWORD to erase the ALARM LOG

Default value is 4**.**

11.3 CrEn: DISABLE – ENABLE THE CIRCUIT

Push **MENU** key:

1. Push **UP** or **DOWN** key to select **CrEn**
2. Push **SET** key: the lower display shows **Cr1E**, the upper display shows **En**
3. Push **SET** key for 3 seconds
4. The upper display shows the **En** blinking label
5. Push **UP** or **DOWN** key to select **diS** (Disabled) or **En** (Enabled)
6. Push **SET** key to confirm the new selection
7. To exit the **CrEn** function push **MENU** key or wait the timeout

If the circuit is disabled in normal visualization the lower display shows **b1dS**.

11.4 COEn: HOW TO ENABLE OR DISABLE A SINGLE COMPRESSOR

Push **MENU** key:

1. Push **UP** or **DOWN** key to select **COEn**
2. Push **SET** key: lower display shows **CO1E**, upper display shows **En**
3. Select desired compressor pushing **UP** or **DOWN** key
4. Push **SET** for 3 seconds
5. Upper display shows the blinking **En** label
6. Push **UP** or **DOWN** key to select **diS** (compressor disabled) or **En** (compressor enabled)
7. Push **SET** to confirm
8. To exit the **COEn** function push **MENU** key or wait the timeout

If a compressor is disabled in normal visualization the lower display shows **C1dS** (compressor 1 disabled), or **C2dS** (compressor 2 disabled) or **C3dS** (compressor 3 disabled).

11.5 POEn: HOW TO ENABLE OR DISABLE A WATER PUMP

Push **MENU** key:

- Push **UP** or **DOWN** key to select "**POEn"**
- Push **SET;** lower display shows **"PE1E"**, upper display shows "**En"** (water pump enabled)

- Push **UP** or **DOWN** key to select the water pump to disable
- Push **SET** and keep pressed for 3 seconds; upper display shows "**En"** blinking.
- Push **UP** or **DOWN** key to select **"diS"**
- Push **SET** to confirm the operation

PE1E = evaporator water pump 1 status (En= enabled, dIS= disabled)
PE2E = evaporator water pump 2 status (En= enabled, dIS= disabled)
PC1E = condenser water pump 1 status (En= enabled, dIS= disabled)
PC2E = condenser water pump 2 status (En= enabled, dIS= disabled)
PSAE = domestic hot water pump status (En= enabled, dIS= disabled)
PSuE = solar panel water pump status (En= enabled, dIS= disabled)
PFCE = free cooling water pump status (En= enabled, dIS= disabled)

If a water pump is disabled in normal visualization the lower display shows **PE1d** (evaporator water pump 1 disabled), or **PE2d** (evaporator water pump 2 disabled) or **PC1d** (condenser water pump 1 disabled) or **PC2d** (condenser water pump 2 disabled) or **PSad** (domestic hot water pump disabled) or **PSud** (solar panel water pump disabled) or **PFcd** (free cooling water pump disabled).

11.6 COSN: NUMBER OF COMPRESSOR STARTS-UP

The number of starts-up is expressed in tens of starts-up (eg. 2 = 20 starts).
Push **MENU** key:
1. Push **UP** or **DOWN** key to select **COSn**
2. Push **SET**: **C1S** is showed on the upper display, the lower display shows the number of starts- up
3. Push **UP** or **DOWN** key to scroll the compressor list
4. To exit the **COSn** function push **MENU** key or wait the timeout

How to reset compressors starts-up number
Push **MENU** key:
1. Push **UP** or **DOWN** key to select **COSn**
2. Push **SET** key; the upper display shows **C1S**, the lower display shows the number of starts-up
3. Push **UP** or **DOWN** keys to select the desired compressor
4. Push **SET** key for 3 seconds to reset the starts-up; the upper display shows the number of start-up blinking, then it shows 0
5. To exit the **Hour** function push **MENU** key or wait the timeout.

11.7 COdt: HOW TO VISUALIZE THE COMPRESSOR DISCHARGE TEMPERATURE

Push **MENU** key:
1. Push **UP** or **DOWN** key to select **COdt**
2. Push **SET;** the lower display shows **CO1t** (compressor 1 discharge temperature), the upper display shows the temperature
3. Push **UP** or **DOWN** key to select **CO1t** or **CO2t** or **CO3t**
4. Push **MENU** to exit **COdt** menu

CO1t compressor 1 discharge temperature
…
CO3t compressor 3 discharge temperature

11.8 PbUs: HOW TO VISUALIZE 4..20MA DYNAMIC SET POINT PROBE

Enter the MENU function pushing **MENU** key:
1. Push **UP** or **DOWN** keys to select **PbUs**
2. Push **SET** key to visualize the probe value (expressed in 4..20mA)

11.9 Hour: READ-OUT OF THE RUNNING HOURS

The running hours are expressed in tens of hours (eg. 2 = 20 hours)
Push **MENU** key:
1. Push **UP** or **DOWN** key to select **Hour**
2. Push **SET** key: the lower display shows **CO1H**, the upper display shows running hours

3. Use the **UP** or **DOWN** key to scroll the list.

To exit the Hour function push **MENU** key or wait the timeout

CO1H Compressor 1 running hours .. **CO3H** Compressor 3 running hours.
EP1H Evaporator water pump or Supply fan running hours
EP2H Support evaporator water pump running hours
CP1H Condenser water pump running hours
CP2H Support condenser water pump running hours
SAPH Domestic hot water pump running hours
PAPH Solar panel water pump running hours
FCPH Free cooling water pump running hours

How to reset the loads working hours

Push **MENU** key:

1. Push **UP** or **DOWN** keys to select **HOUr**
2. Push **SET** key; the lower display shows **CO1H**, the upper display shows running hours
3. Push **UP** or **DOWN** keys to select the desired compressor
4. Push **SET** key for 3 seconds to reset the running hours; the upper display shows the working hour blinking, then it shows "0"
5. To exit the Hour function push **MENU** key or wait the timeout.

11.10 COND: READ-OUT OF THE CONDENSER FAN OUTPUT PERCENTAGE OR NUMBER OF STEPS

Condenser fan output percentage

Push **MENU** key:

1. Push **UP** or **DOWN** key to select **Cond**
2. Push **SET** key: the lower display shows **Cnd1**, the upper display shows the current output percentage
3. Use the **UP** or **DOWN** keys to select Cnd1 or Cnd2, the top display shows the value
4. To exit the Hour function push **MENU** key or wait the timeout.

Condenser fan active steps

Push **MENU** key:

1. Push **UP** or **DOWN** key to select **Cond**
2. Push **SET** key: the lower display shows Cnd1, the upper display shows the number of active steps
3. Push **UP** or **DOWN** key to visualize the number of steps of the second circuit (if enabled)
4. To exit the Hour function push **MENU** key or wait the timeout.

11.11 Pout: READ-OUT OF THE PROPORTIONAL OUTPUT VALUE (OUT1...OUT3)

Push **MENU** key:

1. Push **UP** or **DOWN** key to select **Pout**
2. Push **SET** key: the lower display shows Pou1, the upper display shows the output percentage
3. Use the **UP** or **DOWN** keys to select **Pou1**, **Pou2**, **Pou3**
4. To exit the **Hour** function push **MENU** key or wait the timeout.

If the proportional output are configured to drive an external relay, the display will show:

- 0=relay off
- 100=relay on

Pou1 Proportional OUT 1 value
Pou2 Proportional OUT 2 value
Pou3 Proportional OUT 3 value
Pou4 Proportional OUT 3 value

11.12 FC: READ-OUT OF THE FREE COOLING PROBE

Push **MENU** key:

1. Push **UP** or **DOWN** key to select **FC**
2. Push **SET** key: the lower display shows **FCP1**, the upper display shows the temperature
3. Use the **UP** or **DOWN** keys to read all the informations about free cooling
4. To exit the **Hour** function push **MENU** key or wait the timeout.

FCP1 Free cooling probe 1 temperature
FCP2 Free cooling probe 2 temperature
FCdF Free cooling differential
FCrL Free cooling water pump status
FCAn Free cooling analog output status

11.13 READ-OUT OF THE PROBES CONFIGURED TO CONTROL SOLAR PANEL

Push **MENU** key:

1. Push **UP** or **DOWN** keys to select **Sol**
2. Push **SET** key: the lower display shows **SLPb**, the upper display shows the temperature
3. Push **UP** or **DOWN** keys to read all the informations about solar panel
4. To exit the **Hour** function push **MENU** key or wait the timeout.

SLPb Solar panel probe 1 temperature
SSP2 Solar panel probe 2 temperature
SSdi Solar panel differential
SPMP Solar panel water pump status
SLrL Solar panel valve status

11.14 dF: READ-OUT OF THE DELAY TIME TO START THE NEXT DEFROST

Push **MENU** key:

1. Push **UP** or **DOWN** keys to select **dF**
2. Push **SET** key: dF1 label is showed on the top display, the bottom display shows the time delay to next defrost in minutes / seconds. The icon is on.
3. Use the **UP** or **DOWN** keys to select dF1 or dF2.

To exit the Hour function push **MENU** key or wait the timeout

dF1 delay time to next defrost of the circuit 1

11.15 uS: READ-OUT OF THE PROBES CONFIGURED TO CONTROL AN AUXILIARY OUTPUT RELAY

Push **MENU** key:

1. Push **UP** or **DOWN** keys to select **uS**
2. Push **SET** key: the label **uSt1** (temperature probe) or **uSP1** (Pressure probe) is showed on bottom display, the top display shows the the temperature or pressure value
3. Use the **UP** or **DOWN** keys to select **uSt1** auxiliary 1 probe or **uSt2** auxiliary 2 probe
4. To exit the Hour function push **MENU** key or wait the timeout.

uSt1 auxiliary 1 probe value
uSt2 auxiliary 2 probe value

11.16 trEM: HOW TO DISPLAY THE TEMPERATURE DETECTED BY REMOTE TERMINAL 1 OR REMOTE TERMINAL 2

Push **MENU** key:

1. Push **UP** or **DOWN** key to select **trEM**
2. Push **SET** key: **trE1** label is shown on the lower display, the upper display shows the probe value.
3. Use the **UP** or **DOWN** arrow to change beteween **trE1** or **trE2** read-out
4. To exit to the normal display read-out push MENU or wait the time – out time

trE1 value of the NTC probe of the remote #1
trE2 value of the NTC probe of the remote #2

11.17 rEC: HOW TO ENABLE/DISABLE THE HEAT RECOVERY AND VISUALIZE THE STATUS OF THE HEAT RECOVERY FUNCTION

Push **MENU** key:

- Push **UP** or **DOWN** key to select **rEC**

Through the **rEC** menu it is possible:

- Enable/disable the heat recovery:
  - Upper display visualizes heat recovery status (En /diS)
  - Push and hold **SET** for some seconds
  - **En** / **diS** flashing
  - Push **UP** or **DOWN** key to modify the heat recovery status (enable or disable)
  - Push **SET** to confirm

- Through **UP** or **DOWN** key it is possible to visualize the status of heat recovery valves
  - **rEC1** is showed in upper display, ON / OFF is showed in lower display

12. HOW TO SWITCH ON / SWITCH OFF THE UNIT AND HOW TO SELECT OPERATION MODE (COOLING / HEATING)

It is possible to switch on or switch off the device in different way:

- by keyboard
- by time table
- by digital input

The unit can be configured for only cooling, only heating or cooling and heating.

CF2 Unit selection type
1= only chiller
2= only heat pump
3= chiller and heat pump

12.1 DEVICE SWITCH ON / SWITCH OFF BY KEYBOARD

Push and release the ❄ key:

- if CF59 =0 the unit starts or stops in cooling mode
- if CF59 =1 the unit starts or stops in heating mode

Push and release the ☼ key:

- if CF59 =0 the unit starts or stops in heating mode
- if CF59 =1 the unit starts or stops in cooling mode

NOTE:
it is not possible to change directly from heating to cooling or viceversa; it is necessary to put the device in std-by and then switch on the device in the desired mode.

12.2 SWITCH ON / SWITCH OFF THE ICHILL BY DIGITAL INPUT

If a digital input is configured as remote ON/OFF:

- The digital input overrides the keyboard command
- The keyboard can run only if the digital input is not active
- When the digital input is not active the instrument restore its status (had before the digital input activation)

12.3 SWITCH ON / SWITCH OFF THE ICHILL BY PROGRAM SCHEDULE

Refer to the paragraph “Energy saving and ON/OFF program schedule“.

12.4 COOLING / HEATING OPERATION MODE

The device can be configured for only cooling, or only heating or cooling and heating.

CF 2	Operation mode configuration 1= only cooling 2= only heating 3= cooling and heating	1	3		

Through the parameter CF60 it is possible to determine in which way select cooling or heating mode.

12.4.1 CF60=0: cooling / heating selection by keyboard

If CF59 = 0:

- push ❄ key to switch on the device in cooling mode; push ❄ key to switch off the device
- push ✹ key to switch on the device in heating mode; push ✹ key to switch off the device

If CF59 = 1:

- push ❄ key to switch on the device in heating mode; push ❄ key to switch off the device
- push ✹ key to switch on the device in cooling mode; push ✹ key to switch off the device

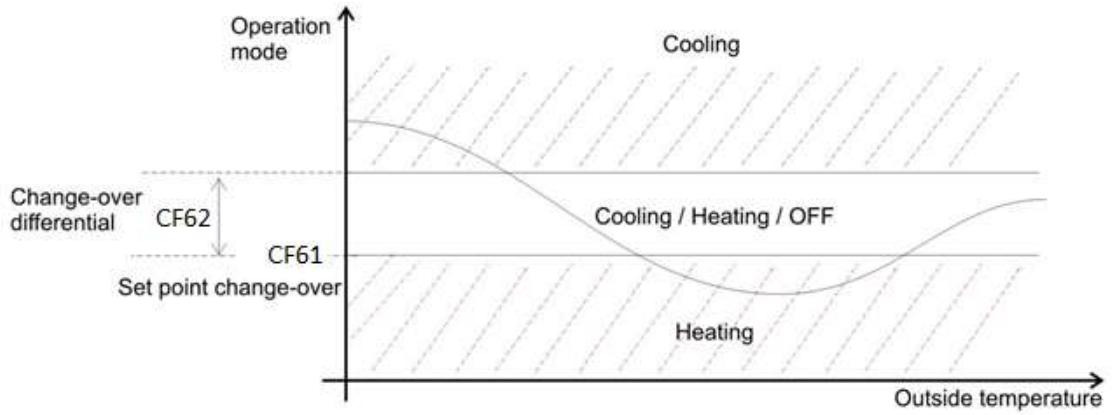
12.4.2 CF60=1: cooling / heating selection by digital input request

Cooling or heating mode selection is done by a digital input configured in proper way.
Cooling or heating selection by keyboard is disabled; it is only possible to switch on or switch off the device in the operating state selected by the digital input.

12.4.3 CF60=2: cooling / heating selection by outside temperature

Outside temperature can be used to select cooling or heating operation mode.
CF61 Change over Setpoint
If outside temperature falls below CF61 degrees, heating mode is automatically selected.
CF62 Change over Differential
If outside temperature increases over CF61+CF62 degrees, cooling mode is automatically selected.

If outside air temperature has a value within CF62 differential, it is possible to change the operation mode by the keypad.



13. COMPRESSOR REGULATION

CO79	Working mode of the compressor 0 = chiller and heat pump 1 = only chiller 2 = only heat pump	0	2		

It is possible to decide how many compressors are used in chiller, heat pump and domestic hot water production.

- parameter CO59: maximum number of compressors to use in cooling
- parameter CO60: maximum number of compressors to use in heating
- parameter CO61: maximum number of compressors to use in domestic hot water
- parameter CI24: maximum output percentage of the compressor inverter controlled in cooling
- parameter CI25: maximum output percentage of the compressor inverter controlled in heating
- parameter CI26: maximum output percentage of the compressor inverter controlled in domestic hot water
- parameter CI30: maximum output percentage of the compressor inverter controlled in defrost

13.1 COMPRESSOR SECURITY TIME

- CO01 Minimum ON time of the compressor after switching on
- CO02 Minimum OFF time of the compressor after switching off
- CO68 Minimum time between two switch on of the same compressor

13.2 REGULATION PROBE SELECTION IN COOLING MODE

The parameter St09 allows to configure the regulation probe for cooling.

St09 Regulation probe in chiller
0= evaporator inlet temperature
1= evaporator outlet temperature
2= remote terminal 1 internal probe (VICX610 keyboard) or Visograph 2.0 internal temperature probe
3= remote terminal 2 internal probe (VICX610 keyboard) or Visograph 2.0 remote temperature probe
4= PTC regulation probe

13.3 REGULATION PROBE SELECTION IN HEATING MODE

The parameter St10 allows to configure the regulation probe for heating.

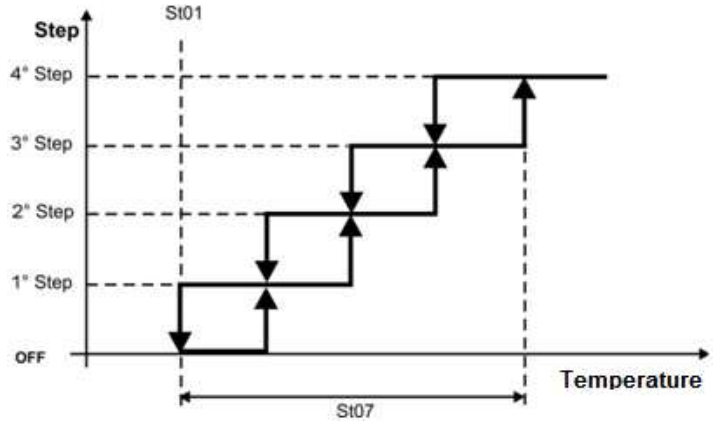
St10 Regulation probe in heat pump
0= evaporator inlet temperature
1= evaporator outlet temperature
2= remote terminal 1 internal probe (VICX610 keyboard) or Visograph 2.0 internal temperature probe
3= remote terminal 2 internal probe (VICX610 keyboard) or Visograph 2.0 remote temperature probe
4= condenser inlet temperature
5= condenser outlet temperature

14. PROPORTIONAL OR NEUTRAL ZONE REGULATION

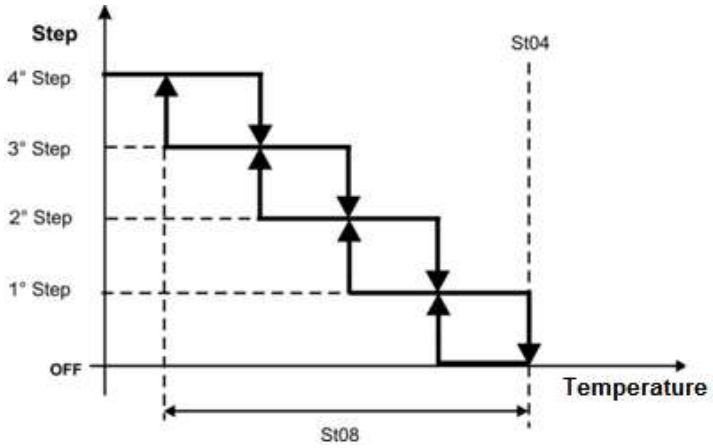
The parameter St11 allows to define the kind of regulation: proportional or neutral zone.

Cooling regulation

In the case of use of compressors with capacity steps, each partialization is seen as a step and the proportional band is divided by the number of total steps.
The activation of the compressors has to respect their safety time (minimum ON time, minimum OFF time, etc.).



Heating regulation
In the case of use of compressors with capacity steps, each partialization is seen as a step and the proportional band is divided by the number of total steps.
The activation of the compressors has to respect their safety time (minimum ON time, minimum OFF time, etc.).

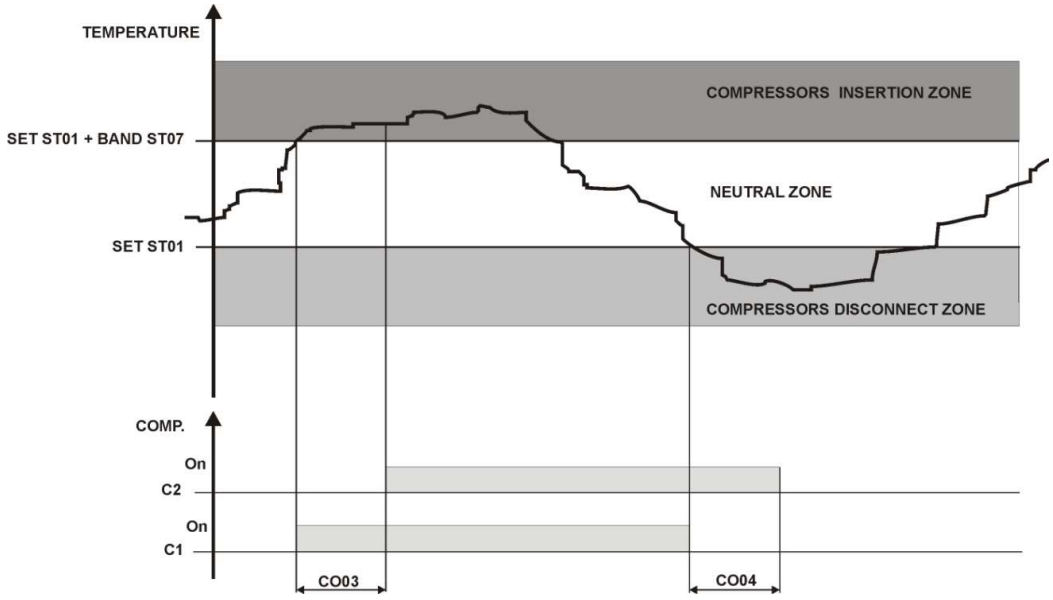


14.1 NEUTRAL ZONE REGULATION

Compressor regulation in chiller

- If the regulation temperature increases over the cooling set point + band, the device switch-on the compressors; each compressors is activated with a delay of CO3 seconds from the previous one
- If the regulation temperature is inside the band, the device frozen cooling request (no compressors are activated and no compressors are de-activated)
- If the regulation temperature decreases below cooling set point, the device switch-off the compressors; each compressors is de-activated with a delay of CO4 seconds from the previous one

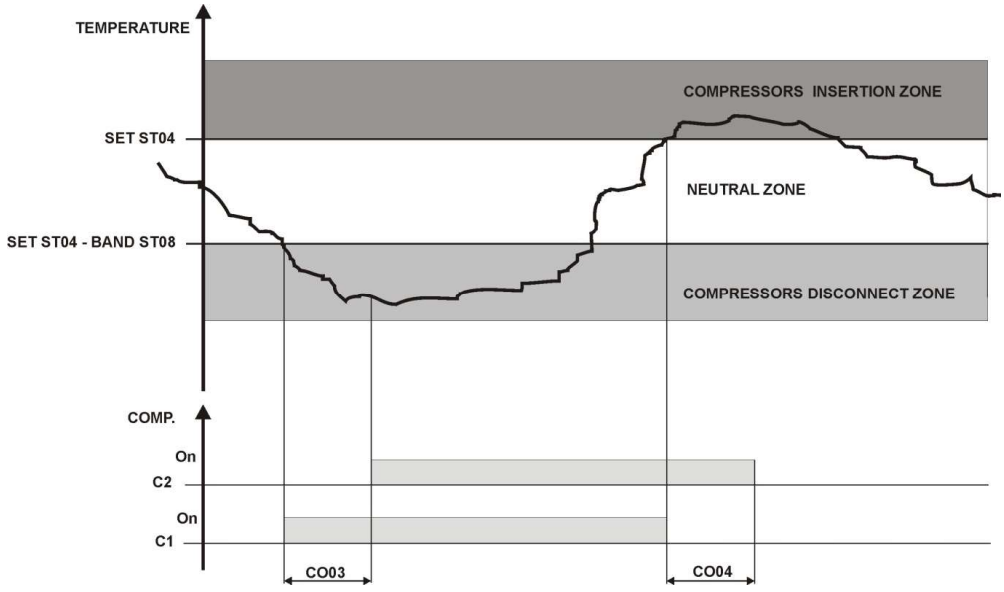
The activation of the compressors has to respect their safety time (minimum ON time, minimum OFF time, etc.).



Compressor regulation in heat pump

- If the regulation temperature decreases below the heating set point - band, the device switch-on the compressors; each compressors is activated with a delay of CO3 seconds from the previous one
- If the regulation temperature is inside the band, the device frozen cooling request (no compressors are activated and no compressors are de-activated)
- If the regulation temperature increases over heating set point, the device switch-off the compressors; each compressors is de-activated with a delay of CO4 seconds from the previous one

The activation of the compressors has to respect their safety time (minimum ON time, minimum OFF time, etc.).



Compressor in neutral zone

Par. CO48 Maximum time of work in neutral zone without resource insertion

When the temperature is inside the neutral zone, a timer is activated (parameter CO48); when this time is elapsed, the Ichill switch on all the compressor to avoid an stationary situation.
If the parameter value is 0 the function is non active.

Par. CO49 Maximum time of work in neutral zone without rotation resource
When the temperature is inside the neutral zone and only one compressor is ON, a timer is activated (parameter CO49); when this time is elapsed, the Ichill switch off the compressor and swith on an available compresso.
If the parameter value is 0 the function is non active.

15. COMPRESSORS MANAGEMENT

15.1 COMPRESSORS ROTATION

The **CO13** parameter determines the sequence of the activation or deactivation of the compressors.

CO13= 0 Fixed sequence
E.g.: 3 compressors configured
Switching on: 1st compressor → 2nd compressor → 3rd compressor → etc.
Switching off: 3rd compressor → 2nd compressor -→ 1st compressor

CO13= 1
Rotation by working hour
First compressor to be activated is the compressor with less working hours; next compressor to be activated follows the same rule.

CO13= 2
Rotation by starts-up
First compressor to be activated is the compressor with less start-up; next compressor to be activated follows the same rule.

If a compressor is not available, due to alarm or maintenance, the device switch on the next available compressor.

15.2 COMPRESSORS START- UP

The parameter CO10 defines the compressor start-up:
CO10=0 direct
CO10=1 part winding

15.2.1 Direct Start-Up

It is necessary to configure one relay to drive the contactor of the compressor.
EXAMPLE
Direct start up configuration for one compressor; a relay, configured as compressor, drive the contactor of the compressor.

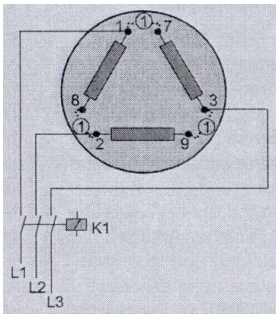


Fig. 1

15.2.2 Part Winding Start-Up

Each compressor needs two relay outputs:

- One for the part winding coil 1;
- One for the part winding coil 2.

Through the parameter CO10 (decimal of second, in a range 0..5 seconds), it is possible to delay the activation of the two coil.

Compressor Start- up With Part Winding

When the compressor has to be switched-on, as first step is switched on the art winding coil 1 and as second step, after CO10 time the part winding coil 2 is switched on.
To turn off the compressor the two relay outputs are both turned off at the same time.

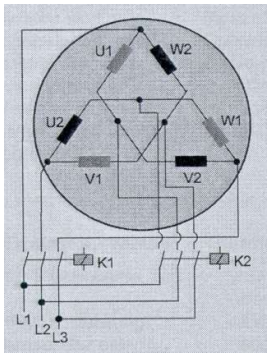


Fig 2

Part Winding start- up of Compressors or capacity compressors

If one or more capacity compressors are configured and the thermoregulation requires the full load start-up: the controller turns the solenoid valve on, after 1 second the first motor part of the 1st compressor (relay K1 of Fig. 2) and then the complete control with the contactor K2. Durning the CO12 time delay the step valve is forced on: minimum power. When the C012 is expired if the thermoregulation requires more power the valve will be switched off (maximum power).

15.3 CAPACITY STEP CONTROL OF SCREW COMPRESSOR

Note:
read carefully in the compressor documentation the sequence of activation of each valve of the screw compressor; the Ichill allows to manage different kind of compressors, but it is possible that the compressor needs a different way to manage the capacity steps.
The Ichill doesn't manage stepless screw compressors.

CO06 capacity step operation mode.
To select the right operation mode, please read the compressor technical documentation.

- **CO06 = 0 operating mode 1**

Eg: compressor with 3 capacity step.

	0% of request	25% of request	50% of request	75% of request	100% of request
Compressor relay	**OFF**	**ON**	**ON**	**ON**	**ON**
Capacity step 1	**ON***	**ON**	**OFF**	**OFF**	**OFF**
Capacity step 2	**OFF**	**OFF**	**ON**	**OFF**	**OFF**
Capacity step 3	**OFF**	**OFF**	**OFF**	**ON**	**OFF**

* If CO07=2 o CO07=3 (screw compressor) 25% valve is ON if the Ichill is ON and at set poiont reached; 25% valve is OFF if the Ichill is STD-BY or OFF

- **CO06 = 1 operating mode 2**

Eg: compressor with 3 capacity step.

	0% of request	25% of equest	50% of request	75% of equest	100% of request
Compressor relay	**OFF**	**ON**	**ON**	**ON**	**ON**

Capacity step 1	**ON***	**ON**	**ON**	**ON**	**OFF**
Capacity step 2	**OFF**	**OFF**	**ON**	**ON**	**OFF**
Capacity step 3	**OFF**	**OFF**	**OFF**	**ON**	**OFF**

* If CO07=2 o CO07=3 (screw compressor) 25% valve is ON if the Ichill is ON and at set poiont reached; 25% valve is OFF if the Ichill is STD-BY or OFF

- **CO06 = 2 operating mode 3**

Eg: compressor with 3 capacity step.

	0% of request	25% of equest	50% of request	75% of equest	100% of request
Compressor relay	**OFF**	**ON**	**ON**	**ON**	**ON**
Capacity step 1	**ON***	**ON**	**ON**	**ON**	**OFF**
Capacity step 2	**OFF**	**ON**	**ON**	**OFF**	**OFF**
Capacity step 3	**OFF**	**ON**	**OFF**	**OFF**	**OFF**

* If CO07=2 o CO07=3 (screw compressor) 25% valve is ON if the Ichill is ON and at set poiont reached; 25% valve is OFF if the Ichill is STD-BY or OFF

- **CO06 = 3 operating mode 4**

Eg: compressor with 3 capacity step.

	0% of request	25% of equest	50% of request	75% of equest	100% of request
Compressor relay	**OFF**	**ON**	**ON**	**ON**	**ON**
Capacity step 1	**ON***	**OFF**	**ON**	**ON**	**ON**
Capacity step 2	**OFF**	**OFF**	**OFF**	**ON**	**ON**
Capacity step 3	**OFF**	**OFF**	**OFF**	**OFF**	**ON**

* If CO07=2 o CO07=3 (screw compressor) 25% valve is ON if the Ichill is ON and at set poiont reached; 25% valve is OFF if the Ichill is STD-BY or OFF

Note
When the compressor is working with capacity control in sequential step in direct or reverse modes, if the power requested is 50% and 75% the unit turn on also the step 25% that must be enabled to make run the other two.

15.4 MINIMUM LOAD START- UP

The parameter **CO07** allows to manage the first capacity step (tipically 25% capacity step of screw compressor) operation mode; this capacity step can be used only at the start-up of the compressor or as real capacity step during the regulation.

CO07=0
First capacity step is used only to start the compressor at the minimum load; the valve is switched on for CO12 seconds, then it is switched off.

CO07=1
First capacity step is used as first capacity step of the regulation.

CO07=2 SCREW COMPRESSOR
First capacity step is used only to start the screw compressor at the minimum load; the valve is ON when the compressor is OFF and it remains ON for CO12 seconds after the switching ON of the compressor.

CO07=3 SCREW COMPRESSOR
First capacity step is used as lower step of the regulation; when the compresor is OFF the valve is ON.

15.5 BY PASS GAS VALVE FOR COMPRESSOR START-UP

It is possible to manage a by-pass valve to use for the start-up of the compressor.
A relay has to be configured as “By-pass gas valve compressor” and it is necessary to set CO12 parameter that represent the valve activation time at the compressor start-up.
The by-pass valve is activated 1 seconds before compressor switching-on and deactivated after CO12 from compressor activation.

15.6 INTERMITTENT SOLENOID VALVE FOR SCREW COMPRESSOR

Some screw compressors have a valve that has to be energized with a ON/OFF cycles when the compressor is ON; the valve stays ON for CO08 seconds and OFF for CO09 seconds.
Note:
due to the high number of activations and de-activations, the function must be used by configuring an analog output as “By-pass gas valve compressor” (in this case the analog output works in ON/OFF mode) and connect it to an external SSR relay (chech analog output characteristic to select the right SSR relay).

16. COMPRESSOR INVERTER CONTROLLED

The Ichill manages maximum two inverter compressors; the regulation is to proportional band (can’t be used the neutral zone).
The signal 0÷10V is given by one of 4 configurable outputs of the Ichill (OUT1÷OUT4).
Possible unit configuration:

- 1 compressor inverter controlled
- 1 compressor inverter controlled and maximum 2 ON/OFF compressor (managed by relay)

First step to be activated is always the compressor inverter controlled; it will be swiched on when the regulation request reaches the percentage set by CI10 parameter.

Inverter compressor with continuous modulation (CI01=0)

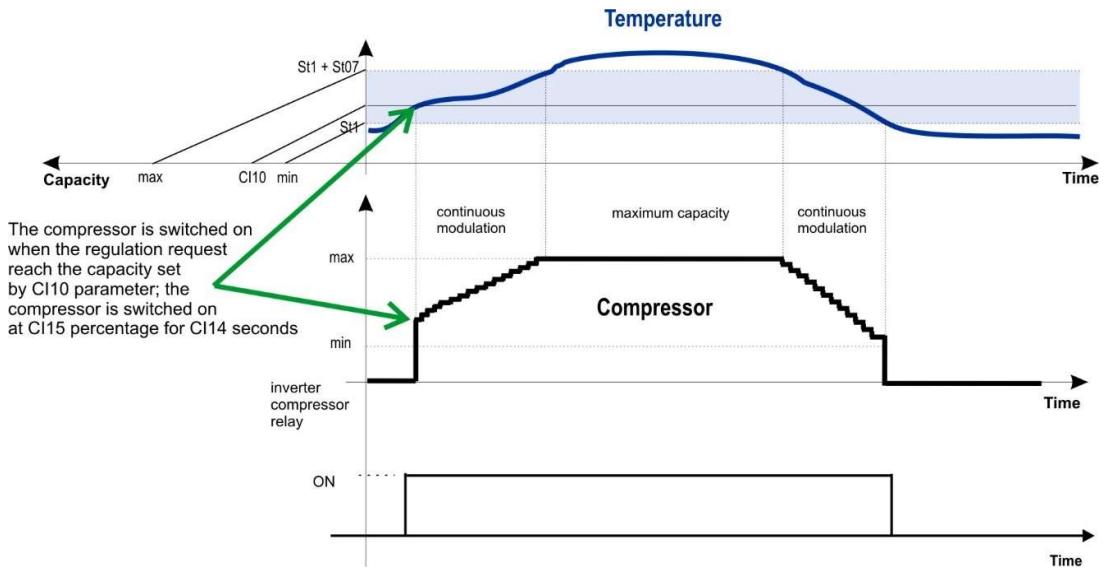
When the compressor is switched-on, it is forced at the speed set by parameter CI15:

- if CI16 parameter is set to 0, the compressor will maintain the CI15 speed for CI14 and then it modulates the speed according to the temperature regulator's demand
- if CI16 parameter is set with a value bigger than 0, the compressor will start at CI15 speed and then it will be forced to reach 100% increasing the speed of 1% every CI16 seconds; once reached 100%, it modulates the speed according to the temperature regulator's demand

After start-up phase the compressor increases or decreases the speed with variations of 1% every CI23 seconds.

It is possible to limit the maximum speed of the compressor inverter controlled in each operation mode:

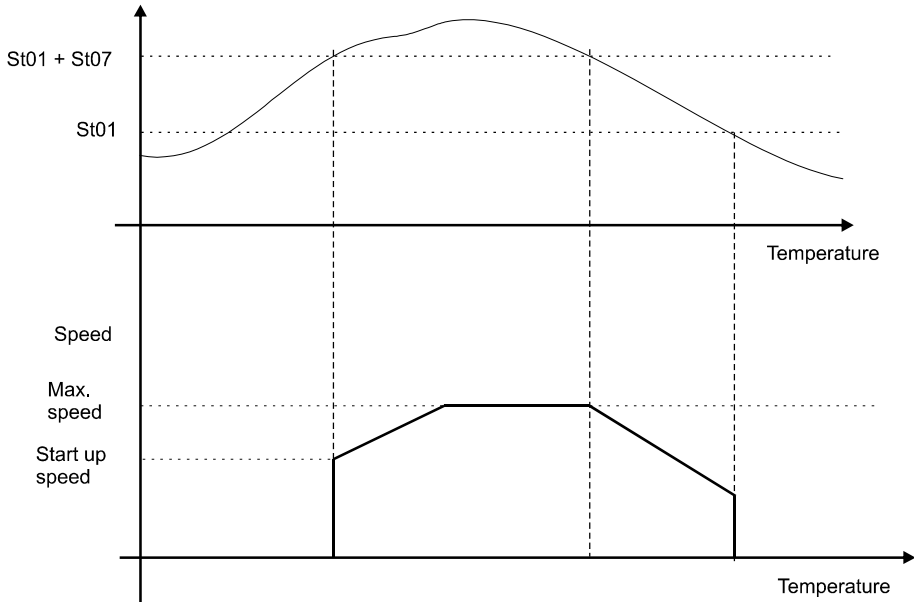
- parameter CI24: maximum output percentage of the compressor inverter controlled in cooling
- parameter CI25: maximum output percentage of the compressor inverter controlled in heating
- parameter CI26: maximum output percentage of the compressor inverter controlled in domestic hot water
- parameter CI30: maximum output percentage of the compressor inverter controlled in defrost



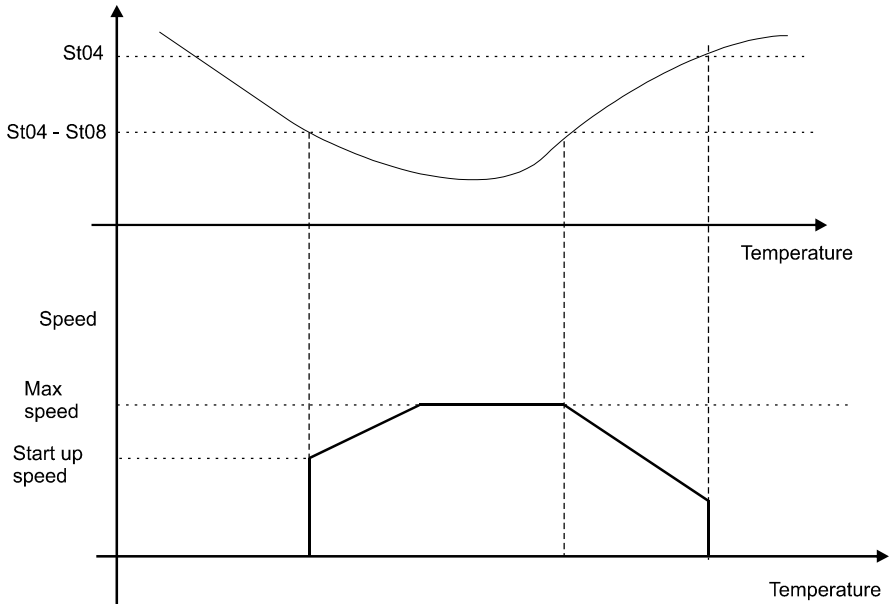
To increase or decrease the power the compressor works by step of 1% of the power; every step is delayed by CI16 at the start-up of the compressor and CI23 when the compressor works normally.
When the compressor inverter controlled is activated, it works at power configured by CI15 parameter for CI14 seconds; after that:

- if the parameter CI16=0 the compressor modulates the power according to the regulation request
- the parameter CI16>0 the compressor is forced to works at maximum power and then it modulates the power according to the regulation request

COMPRESSOR INVERTER CONTROLLED OPERATING MODE: CHILLER
At the start up the compressor is forced to work at CI15 speed for CI14 seconds.



COMPRESSOR INVERTER CONTROLLED OPERATING MODE: HEAT PUMP
At the start up the compressor is forced to work at CI15 speed for CI14 seconds.



Parameters involved:

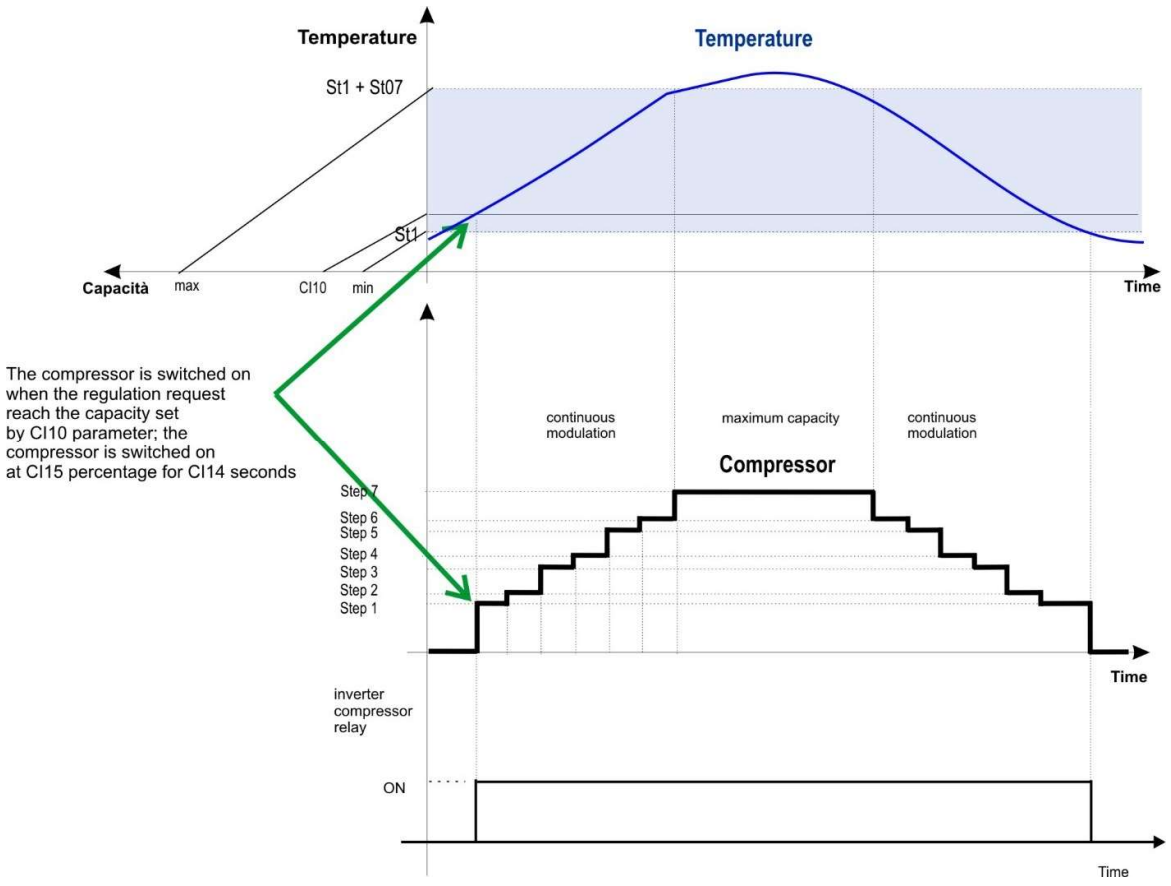
CI10	Inverter compressor percentage request to switch it on
CI11	Inverter compressor unloading decreasing step
CI12	Inverter compressor unloading decreasing delay
CI13	Inverter compressor: maximum capacity when power reduction is active
CI14	Inverter compressor : time at max capacity
CI15	Inverter compressor : capacity start-up
CI16	Inverter compressor: delay capacity variation at start-up
CI17	Inverter compressor: capacity limit to count CI18 time
CI18	Inverter compressor: maximum working time below CI17 capacity
CI19	Inverter compressor: time at the maximum capacity
CI20	Inverter compressor: maximum on time
CI21	Inverter compressor: compressor 1 minimum capacity
CI22	Inverter compressor: compressor 1 maximum capacity
CI23	Inverter compressor: capacity variation delay
CI24	Inverter compressor: cooling maximum capacity
CI25	Inverter compressor: heating maximum capacity
CI26	Inverter compressor: sanitary water maximum capacity
CI27	Inverter compressor: heating outside temperature to reduce compressor capacity
CI28	Inverter compressor: heating outside differential to reduce compressor capacity
CI29	Inverter compressor: maximun reduced capacity
CI30	Inverter compressor: defrost maximum capacity
CI31	Inverter compressor: unloading maximum capacity

Inverter compressor with incremental/decremental step (CI01>0)

The compressor modulates the power according to the thresholds set in the appropriate parameters; up to 8 power steps (defined in power %) are available.
At power-on the compressor is forced at the speed set by CI15 parameter; the % power set in this parameter must correspond to the percentage set in one of the steps set by the parameters CI02..CI09.
When the start-up phase is completed:

- if parameter CI16 = 0, the compressor will modulate as required by the temperature regulator
- if parameter CI16 > 0 the compressor will be forced to reach 100% and then will modulate as required by the temperature regulator

During the regulation each power variations is delayed of CI23 seconds.
In case of big power variation (as a limit example, suppose the demand increases from 40% to 90%), the compressor increases / decreases the power step by step.



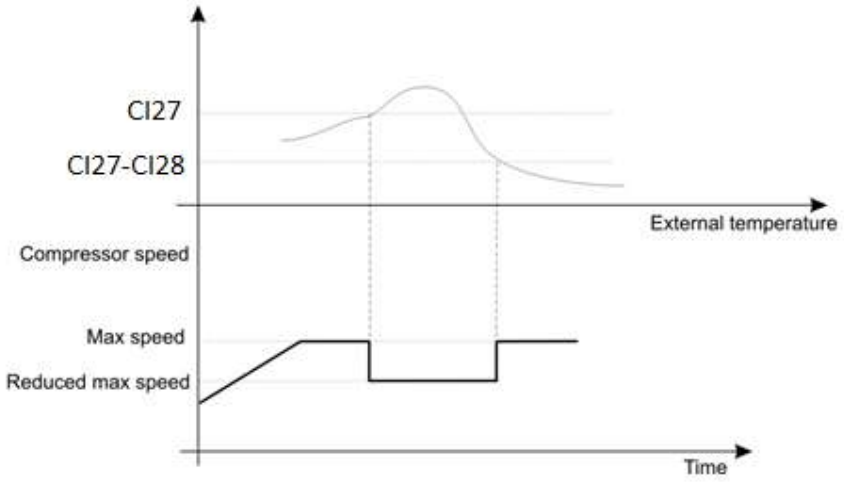
Parameters involved:

CI01	Inverter compressor step regulation
CI02..CI09	Inverter compressor step 1.. step 8 percentage
CI10	Inverter compressor percentage request to switch on
CI11	Inverter compressor unloading decreasing step
CI12	Inverter compressor unloading decreasing delay
CI13	Inverter compressor: maximum capacity when power reduction is active
CI14	Inverter compressor : time at max capacity
CI15	Inverter compressor : capacity start-up
CI16	Inverter compressor: delay capacity variation at start-up
CI17	Inverter compressor: capacity limit to count CI18 time
CI18	Inverter compressor: maximum working time below CI17 capacity
CI19	Inverter compressor: time at the maximum capacity

CI20 Inverter compressor: maximum on time
CI21 Inverter compressor: compressor 1 minimum capacity
CI22 Inverter compressor: compressor 1 maximum capacity
CI23 Inverter compressor: capacity variation delay
CI24 Inverter compressor: cooling maximum capacity
CI25 Inverter compressor: heating maximum capacity
CI26 Inverter compressor: sanitary water maximum capacity
CI27 Inverter compressor: heating outside temperature to reduce compressor capacity
CI28 Inverter compressor: heating outside differential to reduce compressor capacity
CI29 Inverter compressor: maximun reduced capacity
CI30 Inverter compressor: defrost maximum capacity
CI31 Inverter compressor: unloading maximum capacity

16.1 INVERTER COMPRESSOR IN HEAT PUMP AND EXTERNAL TEMPERATURE

It is possible to reduce the compressor speed (both compressor in parallel if configured) in heat pump when external temperature increases over a determined temperature.



17. COMPRESSORS WITH DIFFERENT CAPACITY POWER

The function is enabled if:

- at least 2 compressor are configured
- the capacity of the compressors is not 0 and different for each one

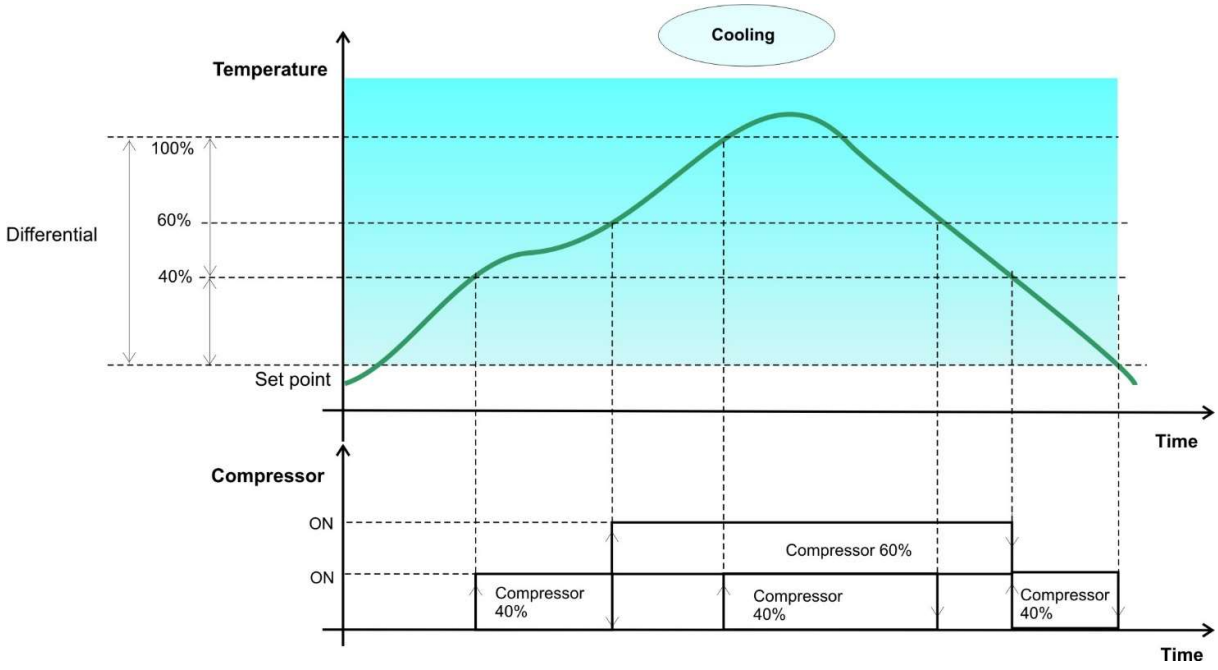
Parameters involved:

CO75	Compressor 1 capacity	0	100 %
CO76	Compressor 2 capacity	0	100 %
CO77	Compressor 3 capacity	0	100 %
CO78	Maximum number of start up of the compressor in 15 minutes 0= Disabled	0	15

Example: circuit with 2 compressors:

- step 1: first compressor to be activated is the compressor with lower capacity
- step 2: the compressor is switched off and is activated the compressor with higher capacity
- step 3: both compressors are activated

The regulation is a steps; if two compressors with different weight are configured, 3 steps are available.



18. MAXIMUM OPERATION TIME OF A COMPRESSOR

If more than a compressor is configured in a circuit but only one is ON, after CO55 operating time the compressor is switched off and another available compressor is switched on.
The compressor to switch on is choosen considering the number of running hours or the number of start-up.

CO55	Compressor: working time before rotation	0	250	min
CO73	Compressor: overlapping time during rotation	0	250	sec

19. LOADS MAINTENANCE WARNING

It is possible to determine by parameter the number of hours of operation beyond which a warning message for maintenance is displayed.
The warning message does not entail any action on the controller, all adjustments continue normally.

CO24 ... CO26: compressor 1…4 operation hours to generate the maintenance warning
CO27 .. CO30: evaporator and condenser water pumps operation hours to generate the maintenance warning
CO56, CO57 e CO71: domestic hot water, solar panel and free cooling water pumps operation hours to generate the maintenance warning

If the operation hours is set to 0, the warning signaling is disabled.

20. PUMP DOWN

20.1 CO31 = 1 PUMP DOWN ENABLED ONLY AT THE SWITCHING OFF

20.1.1 CO31=1: PUMP DOWN by low pressure switch or dedicated pump down pressure switch

Pump down is enabled if:

- CO31=1 Pump down enabled at switching ON in cooling and heating
- A digital input is configured as low pressure switch or pump down pressure switch
- A relay is configured as pump down solenoid valve

When the device has to switch OFF the last compressor of a circuit:

- Pump down solenoid valve is closed
- The compressor is switched OFF when low pressure/pump down switch is activated; if low pressure/pump down switch is not activated in CO34 time, the device forces the compressor OFF and signals a pump down alarm.
  If the alarm occurs more than A021 times per hour, the Ichill generate a manual reset alarm.
  If the low pressure switch is used for pump down, the low pressure alarm is disabled for A002 time after valve activation; to disable it when the pump down procedure is enabled and when the compressors are OFF, set A002=0.

If the device is switched OFF by digital input (configured as remote OFF) or by keyboard, pump down procedure is enabled; in this special case the led of the operation mode active at that time (cooling or heating) is blinking.

If both digital input are configured, low pressure switch and pump down switch, the pump down procedure follows pump down switch status.

At next compressor switching ON, the pump down valve is open and, after 1 second, first compressor is switched ON.

20.1.2 CO31=1: PUMP DOWN by low pressure transducer

CO31 = 1 Pump down enabled only during the switching OFF

Pump down is enabled if:

- CO31=1 Pump down enabled at switching ON in cooling and heating
- An analog input is configured as low pressure probe
- A relay is configured as pump down solenoid valve

When the device has to switch off the last compressor of a circuit:

- Pump down solenoid valve is closed
- The compressor is switched OFF when the pressure detected by low pressure transducer decreases below CO32; if the pressure doesn't decrease below this threshold, after CO34 time the compressor is forced OFF and signals a pump down alarm.
  If the alarm occurs more than A021 times per hour, the Ichill generate a manual reset alarm.
  Low pressure alarm is disabled for A002 time after valve activation; to disable the low pressure alarm when the pump down procedure is enabled, set A002=0 (the alarm is disabled when the compressor is OFF).

If the device is configured with a low pressure transducer and with a pump down pressure switch, to switch OFF the compressor both conditions have to be satisfied:

- the pressure detected by low pressure transducer falls below CO32
- pump down pressure switch is activated

If the device is switched OFF by digital input (configured as remote OFF) or by keyboard, pump down procedure is enabled; in this special case the led of the operation mode active at that time (cooling or heating) is blinking.

At next switching ON of the compressors, the pump down valve is open and, after 1 second, first compressor is switched ON.

20.2 CO31 = 2 PUMP DOWN ENABLED AT SWITCHING OFF AND SWITCHING ON

20.2.1 CO31 = 2: PUMP DOWN by low pressure transducer

Pump down is enabled if:

- CO31=2 Pump down enabled at switching ON and switching OFF
- An analog input is configured as low pressure transducer
- A relay is configured as pump down solenoid valve

When the device has to switch off the last compressor of a circuit:

- Pump down solenoid valve is closed
- The compressor is switched OFF when the pressure detected by low pressure transducer falls below CO32; if the pressure doesn't decrease below this threshold, after CO34 time the compressor is forced OFF and signals a pump down alarm.
  If the alarm occurs more than A021 times per hour, the Ichill generate a manual reset alarm.
  Low pressure alarm is disabled for A002 time after valve activation; to disable the low pressure alarm when the pump down procedure is enabled, set A002=0 (the alarm is disabled when the compressor is OFF).

If the device is configured with a low pressure transducer and with a pump down pressure switch, to switch OFF the compressor both conditions have to be satisfied:

- the pressure detected by low pressure transducer falls below CO32
- pump down pressure switch has to be activated

If the device is switched OFF by digital input (configured as remote OFF) or by keyboard, pump down procedure is enabled; in this special case the led of the operation mode active at that time (cooling or heating) is blinking.

At next switching ON of the compressors:

- Pump down solenoid valve is open
- The compressor is switched ON when the pressure detected by low pressure transducer is greater than CO32 + CO33. If the pressure doesn't increase over CO32 + CO33 in CO34 time, a pump down alarm is signalled and the compressors are forced OFF. If the alarm occurs more than A022 times per hour, the Ichill generate a manual reset alarm.

If the device is configured with a low pressure transducer and with a pump down pressure switch, to switch ON the compressor both conditions have to be satisfied:

- the pressure detected by low pressure transducer has to be grater than CO32 + CO33
- pump down pressure switch is de-activated

20.2.2 CO31 = 2: PUMP DOWN by pump down pressure switch

Pump down is enabled if:

- CO31=2 Pump down enabled at switching ON and switching OFF in cooling and heating
- A digital input is configured as pump down pressure switch
- A relay is configured as pump down solenoid valve

When the device has to switch off the last compressor of a circuit:

- Pump down solenoid valve is closed
- The compressor is switched OFF when the pump down pressure switch is active; if it is not activated, after CO34 time the compressor is forced OFF and signals a pump down alarm.
  If the alarm occurs more than A021 times per hour, the Ichill generate a manual reset alarm.
  Low pressure alarm is disabled for A002 time after valve activation; to disable the low pressure alarm when the pump down procedure is enabled, set A002=0 (the alarm is disabled when the compressor is OFF).

If the device is configured with a low pressure transducer and with a pump down pressure switch, to switch OFF the compressor both conditions have to be satisfied:

- the pressure detected by low pressure transducer falls below CO32
- pump down pressure switch has to be activated

If the device is switched OFF by digital input (configured as remote OFF) or by keyboard, pump down procedure is enabled; in this special case the led of the operation mode active at that time (cooling or heating) is blinking.

At next switching ON of the compressors:

- Pump down solenoid valve is open
- The compressor is switched ON when the pump down pressure switch is de-activated. If the pump down pressure switch is not de-activated, after CO34 a pump down alarm is signalled and the compressors are forced OFF. If the alarm occurs more than A022 times per hour, the Ichill generate a manual reset alarm.

If the device is configured with a low pressure transducer and with a pump down pressure switch, to switch ON the compressor both conditions have to be satisfied:

- the pressure detected by low pressure transducer has to be grater than CO32 + CO33
- pump down pressure switch is de-activated

20.3 CO31 = 3 PUMP DOWN ENABLED DURING THE SWITCHING OFF ONLY IN CHILLER MODE (LOW PRESSURE SWITCH OR PUMP DOWN SWITCH)

The description of the pump down procedure is equivalent to the configuration CO31=1, but only in chiller mode; in heat pump mode the solenoid valve is activated when the first compressor is witched on ON and de-activated when the last compressor is OFF.

20.4 CO31 = 4 PUMP DOWN ENABLED DURING THE SWITCHING OFF AND SWITCHING ON ONLY IN CHILLER MODE (LOW PRESSURE SWITCH OR PUMP DOWN SWITCH)

The description of the pump down procedure is equivalent to the configuration CO31=2 but only in chiller mode; in heat pump mode the solenoid valve is activated when the first compressor is ON and de-activated when the last compressor is OFF.

20.5 PUMP DOWN: BY TIME

To enable the pump down by time is necessary to set the parameter CO31>0 (enable it only at switching OFF, or at switching ON and switching OFF, etc.); the compressor is activated after CO58 time after solenoid valve switching on and de-activated after CO59 time from solenoid valve switching off.

CO 53	Maximum time for the activation of the pump-down during the switching off CO53 = 0 Disabled	0	250	Sec	
CO 54	Maximum time for the activation of the pump-down during the switching on CO54 = 0 Disabled	0	250	Sec	

20.6 LOW PRESSURE ALARM AND PUMP DOWN

AO02 parameter allows to manage the low pressure alarm when the pump down is enabled:

- AO02=0: low pressure alarm is inhibited during compressor switching OFF and when the compressors are OFF
- AO02>0: low pressure alarm is inhibited during compressor switching OFF for the time set by parameter AO02; when the AO02 time is elapsed, the alarm can be detected.

Il parametro AO02 definisce il funzionamento dell' allarme di bassa pressione con pump down abilitato.
AO02 = 0 l'allarme di bassa pressione è inibito durante la fermata del compressore con procedura di pump down e con compressore spento; l'allarme di bassa pressione non è segnalato

AO02 ≠ 0 l'allarme di bassa pressione è inibito per il tempo impostato nel parametro AO02 durante la fermata del compressore con procedura di pump down; terminata la procedura di spegnimento e scaduto il tempo AO02 se l'ingresso digitale del pressostato è attivo, sarà segnalato l'allarme

21. UNLOADING

Unloading fuction is used typically to prevent high pressure or low pressure alarm in some critical conditions; when the unloading is active the device reduces the number of running compressors.

21.1 UNLOADING BY EVAPORATOR WATER INLET TEMPERATURE

The function is useful for operating the machine in critical operating conditions, reducing the number of compressors or reducing the power of the inverter compressor, even with high evaporator inlet water temperatures (e.g.: when the unit starts in the summer with high thermal load and high outside temperature).
The unloading function is managed by the analog input configured as evaporator water inlet probe.
When the function is active, the device reduces the power leaving on only the number of compressors set by CO44 parameter or reducing the speed of the inverer till the percentage set by CI31 parameter.
The inverter reduces progressively the speed:

- CI11 percentage every CI12 seconds if the compressor is configured for continuous modulation
- a power step every CI12 seconds if the compressor is configured for step modulation

Unloading operation
If the evaporator inlet water temperature increases and reaches CO35 thresold, after CO37 delay time the unloading function is activated; the lower display shows AEun message alternating with normal display.
When the temperature drops below CO35 – CO36, unloading function is deactivated.
When active, the function is disabled after CO38 minutes also if temperature conditions are not satisfied.

21.2 UNLOADING BY CONDENSER HIGH PRESSURE, CONDENSER HIGH TEMPERATURE OR EVAPORATOR LOW PRESSURE

The function is useful for operating the machine in critical operating conditions, reducing the number of compressors or reducing the power of the inverter compressor.
Critical conditions are for example:

- switching ON the chiller in summer with high outside temperature, to avoid an high pressure alarm
- switching ON the heat pump in winter with low outside temperature, to avoid a possible low pressure alarm

When the unloading is active, the device reduces the power leaving ON only the number of compressors set by CO44 parameter or reducing the speed of the inverer till the percentage set by CI31 parameter.
The inverter reduces progressively the speed:

- it reduces CI11 percentage every CI12 seconds if the compressor is configured for continuous modulation
- it reduces a power step every CI12 seconds if the compressor is configured for step modulation

Unloading in Cooling operation mode
The reference probes of the unloading in cooling mode are the condenser probe.
If the condenser pressure / temperature increases over the threshold set by parameter CO39, the unloading function is activated and the device maintains active only the steps (compressors or capacity steps) set by CO44 parameter and/or reduces the speed of the compressor inverter controlled to CI31 percentage.
The lower display shows "b1Cu" alternating with the probe normally visualized.
The function is disabled when the condenser pressure / temperature drops below CO39 - CO40.
If the unloading is active and the condenser pressure / temperature remains between CO39 and CO39-CO40 for CO43 time, the function is automatically disabled.

Unloading in Heating operation mode
The reference probe of the unloading in heating mode is the evaporation probe; if evaporator probes are not configured, the reference probe is the condenser pressure probe (in unit with only one pressure probe, this probe is condenser and evaporation probe depending on operation mode, cooling or heating).

If the evaporator / condenser pressure decreases below the threshold set by parameter CO41, the unloading function is activated and the device maintains active only the steps (compressors or capacity steps) set by CO44 parameter and/or reduces the speed of the compressor inverter controlled to CI31 percentage.
When the evaporator / condenser pressure increases over CO41+CO42, the unloading function is disabled and all compressor are available to work.

If the device is configured with screw compressor (compressor with capacity steps) the unloading function, when active, is forced for minimum CO45 time (set CO45=0 to disable this function).
If the unloading is active and the evaporator / condenser pressure remains between CO41 and CO41+CO42 for CO43 time, the function is automatically disabled.

21.3 UNLOADING BY LOW EVAPORATOR TEMPERATURE

The lower value between the inlet evaporator probe, ~~common outlet evaporator probe~~ or outlet probe, enables the unloading function.
When the value of one of the probes above decreases below the set point CO50, after CO37 time the unloading function is activated; the number of active compressors/step is determined by the CO44 parameter or CO31 speed in case of inverter compressor.
When the unloadin is active, the display shows the label **b1EU – b2EU** alternated to a default visualization.
Unloading function is disabled when the temperature of all the probes configured rise over CO50 + CO51 or when the CO52 time is elapsed.

21.4 UNLOADING BY DIGITAL INPUT

The unloading can be activated by digital input (a digital input has to be configured with this function); when the digital input is active, the number of compressors on the circuit is reduced to the value set in the parameter CO44 and, in case of inverter compressor, the speed is brought to the value set by CI31 parameter.
If the unloading is active, the display shows b1CU.
The unloading condition will remain till the digital input is active.
In unloading status the function that hestabilish the maximum operation time of a single compressor remains active; if a compressor remains on for the time set in CO55 (others compressors are off), it will be switched off and another compressor (according to the logic given by CO14) is switched on.
If CO73>0 both compressors work together for CO73 time, then first compressor is switched off.
The time CO43 (maximum time in unloading) is not usable for the unloading function by digital input.

22. POWER REDUCTION BY DIGITAL INPUT

The function allows to limit the power absorbed by the machine by reducing the maximum number of compressors available for adjustment; the function is enabled by activating the digital input configured for that function.
The following parameters allow you to set the maximum number of compressors and limit the maximum frequency of the compressor to the inverter:

- CO80 maximum number of available compressors if the power reduction is active
- CI13 maximum % of the inverter compressor if the power reduction is active

In the case of simultaneous configuration of inverter and ON / OFF compressors, when the power reduction is active both inverter compressors and ON / OFF compressors are limited.

23. SOLENOID VALVE FOR LIQUID INJECTION

It is possible to configure 2 valves for the liquid injection of the screw compressor (compressor 1 and compressor 2).
When the **compressor is off** the solenoid valve **is always OFF**. When the compressor is on:

- if the temperature detected by the probe mounted in the compressor increases over CO46 setpoint, the valve is switched on
- if the temperature detected by the probe mounted in the compressor decreases under CO46-CO47 the valve is switched off.

24. SOLENOID VALVE WATER SIDE

For each circuit, a water solenoid valve can be configured; this valve will operate as follows:

- The valve is activated CO69 seconds before first compressor activation
- The valve is de-activated with CO70 delay delay after last compressor switching off

25. CONDENSING UNIT OPERATION

To enable the operation as condensing unit, it is necessary to set the parameter CF05 = 1.
In condensing unit the control probes are not used and the switching ON and switching OFF of the compressors is related to the state of the digital inputs of each compressor.

25.1 OPERATION WITH DIGITAL INPUT CONFIGURED AS REGULATION REQUEST

If a digital input is configured as regulation request:

- if the contact is NOT ACTIVE the unit is in stand-by and the upper display shows OFF
- if the contact is ACTIVE the unit is ON and the upper display shows:
  - On if the unit is in std-by by keyboard
  - OnC if the unit is ON in chiller
  - OnH if the unit is ON in heat pump.

The operation mode, cooling or heating, is defined pressing the correspondent key on the keyboard.
When the digital input configured as regulation request is active, a compressor is switched on; other compressor will be activated by other digital inputs.
If the digital input is active, the unit can be switched off by keyboard; to switch on the unit is necessary:

- Switch it on by keyboard
- Or de-activate then activate the digital input

25.2 OPERATION WITH DIGITAL INPUT CONFIGURED AS CHILLER REGULATION REQUEST

If a digital input is configured as cooling request:

- if the contact is NOT ACTIVE the unit is in stand-by and the upper display shows OFF
- if the contact is ACTIVE the unit is ON and the upper display shows OnC (ON chiller)

When the digital input configured as chiller regulation request is active, first compressor is switched on; other compressor will be activated by other digital inputs.
If the digital input is active, the unit can be switched off by keyboard; to switch on the unit is necessary:

- Switch it on by keyboard
- Or de-activate then activate the digital input

25.3 OPERATION WITH DIGITAL INPUT CONFIGURED AS HEAT PUMP REGULATION REQUEST

If a digital input is configured as heating request:

- if the contact is NOT ACTIVE the unit is in stand-by and the upper display shows OFF
- if the contact is ACTIVE the unit is ON and the upper display shows OnH (ON heat pump)

When the digital input configured as heat pump regulation request is active, a compressor is switched on; other compressor will be activated by other digital inputs.
If the digital input is active, the unit can be switched off by keyboard; to switch on the unit is necessary:

- Switch it on by keyboard
- Or de-activate then activate the digital input

Contemporary regulation request error
If two digital inputs are configured as chiller request and heat pump request and both are simultaneously active, the unit is placed in OFF and the upper display shows the label Ferr.

25.4 OPERATION WITH DIGITAL INPUT CONFIGURED AS COMPRESSOR REQUEST

It is possible to turn ON and turn OFF the compressors without following or partially following the logic given by the parameters CO13 and CO14, assigning to a digital input the function to switch ON and switch OFF a specific compressor or a compressor of a specific circuit.
This use is foreseen only for ON / OFF compressors (not with capacity step and not compressor inverter controlled).
In case of incorrect configuration of the digital inputs (condensing unit and compressors with capacity step, digital input configured for a non-existing compressor, etc) is generated ACF4 alarm configuration.

Setting for operation with a digital input configured as direct compressor request:
In this configuration the logic of the selection of which compressor has to be switched ON or swiched OFF (set by parameters CO13 and CO14) is not activated; the digital input switches ON and switch OFF directly the assigned compressor.
If the compressor assigned to a digital input is not available (for alarm, maintenance, etc.), the request will remain active and the compressor will be used for regulation when available; in case of unavailability of a compressor, the controller does not distribute the request to another compressor.
For this operation mode it is not possible to configure the compressor rotation by operation time (CO55 must be set to 0).

Configuration values of the digital inputs (depending on the number of compressors):

- A digital input = o51* or c51* (compressor 1)
- A digital input = o52* or c52* (compressor 2)
- A digital input = o53* or c53* (compressor 3)

* o and c letter assign the polarity of the digital input

25.5 ERROR OF CONDENSING UNIT

Possible alarms:

• In case of contemporary activation of the digital inputs congured as chiller regulation request and heat pump regulation request the unit is placed in the OFF and the upper display the label Ferr.
• In case of incorrect configuration of the digital inputs (function enabled and not set up the correct number of inputs, or if the number of digital input and the number of compressors doesn't correspond), it will be reported the alarm configuration ACF4.

26. EVAPORATOR WATER PUMP (AIR/WATER UNIT) / SUPPLY FAN (AIR/AIR UNIT)

The operation mode of the water pump / supply fan is settable as following:

- **CO15=0:** Disabled: the water pump/supply fan is not managed.
  Attention: The air / air unit configured with CO15=0 does not manage the output for integration heaters.

- **CO15 = 1:** Continuous control

When the device is switched ON in chiller or heat pump, the water pump is immediately activated and the first compressor is switched on after CO16 delay.
When the Ichill is in STD-BY or remote OFF the water pump is switched OFF with a delay set by CO17 parameter.

- **CO15 = 2:** on compressor demand
  The water pump or supply fan is ON only if at least a compressor is ON; in case of compressor activation, the water pump is switched on CO16 time before compressor activation.
  When the last compressor is switched off, the water pump or supply fan is switched off after CO17 delay from compressor switching OFF.
  When the unit is in stand-by or remote off and the Ar09 =1, if the regulation requires the antifreeze heaters also the water pump is turned on.

The pump is always off if:

- The digital input configured as “Remote OFF” is active
- In case of water pump overload
- Incase of evaporator flow switch alarm if at manual reset.

26.1 EVAPORATOR PUMP GROUP

It is possible to configure two evaporator water pumps; the water pump to be activated is the pump with less working hours.
When a water pump works continuosly for CO18 time, the other one is switched ON and after CO19 second the first one is switched off.
If a water pump overload occurs, the water pump is switched OFF and the other one is switched on.

26.2 ANTIFREEZE PREVENTION WITH WATER PUMP

To prevent the antifreeze alarm it is possible to enable the operation of the water pump when the device is STD-BY or OFF.
If the temperature detected by the probe selected by parameter Ar22 decreases below Ar23 degrees, the water pump is switched ON.

Ar21 = operation mode of the water pump when the device is in STD-BY or remote OFF
0= always OFF
1= on when the antifreeze heater is ON

Ar22= Reference probe for the management of the water pump to prevent antifreeze alarm
0= the function is disabled
1= evaporator inlet
2= evaporator 1 or evaporator 2 outlet
3= evaporator 1 or evaporator 2 outlet and common outlet evaporator
4= outside temperature

Ar23 = Set point to activate the evaporator water pump for antifreeze prevention
Ar24 = Differential to de-activate the evaporator water pump for antifreeze prevention

26.3 EVAPORATOR WATER PUMP PERIODIC ACTIVATION

If the evaporator water pump is switched OFF (for normal adjustment or because the machine is in Std-by or OFF), periodic switching ON of the water pump can be performed.
At the end of the ON period, the device reading regulation temperature evaluates if it is necessary to switch ON the compressors or not.
When the machine is switched ON, if no adjustment is required the cycle starts with ON period.

CO62	Evaporator water pump / supply fan OFF time if the set point is reached	0	250	10 min	
CO63	Evaporator water pump / supply fan OFF time if the machine is STD-BY or OFF	0	250	10 hour	

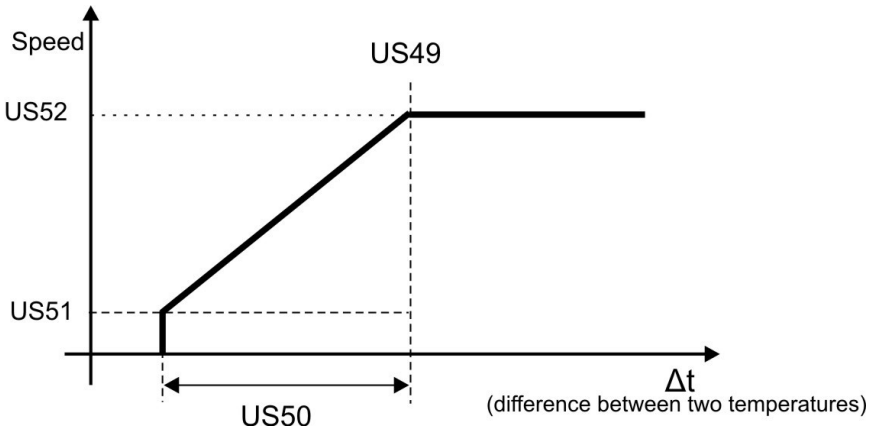
CO64	Evaporator water pump / supply fan ON time	0	250	Sec	10sec

26.4 MODULATING EVAPORATOR WATER PUMP

To enable the modulating evaporator water pump is necessary to configure an analog output as “Modulated evaporator water pump” (see analog and digital output configuration) .
The modulating evaporator water pump is enabled in cooling, heating and domestic hot water production; if the machine is in STD-BY or OFF the water pump is OFF.

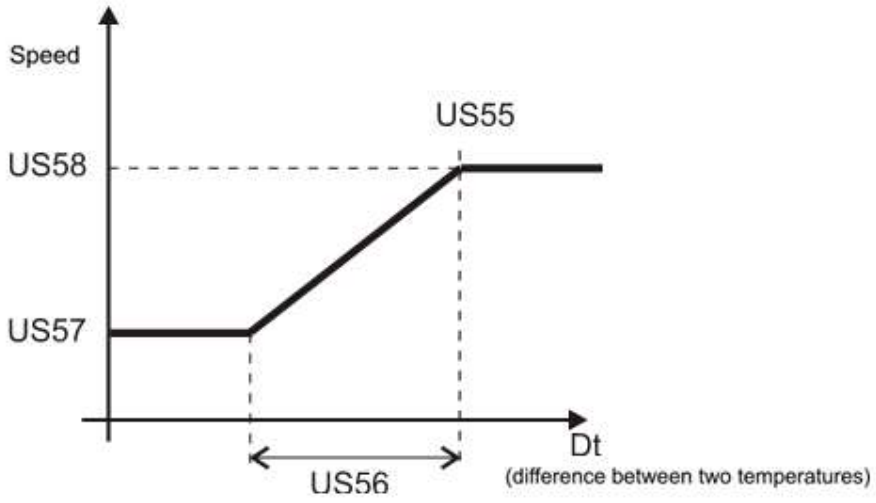
The water pump works according the difference value between two probes, which can be choosen both in summer an winter mode, among those configured in the instrument (Pb1, Pb2,…).
If the state of the water pump depends on the state of the compressor, when last compressor is switched off the water pump is forced at the percentage set by US60 speed for CO17 minutes, then it is switched off.
If the state of the water pump doesn’t depend on the state of the compressor, when last compressor is switched off the water pump is forced to run at US60 speed.

Chiller and chiller + domestic hot water (machine with valves OUT1 and OUT2 in the gas circuit)



Parameter	Description	min	max	udm	
US 47	Probe 1 selection for evaporator water pump modulation in chiller	0	10		
US 48	Probe 2 selection for evaporator water pump modulation in chiller	0	10		
US 49	Set point for maximum speed of modulationg evaporator water pump in chiller	-50.0 -58 -1.0 -14	70.0 158 50.0 725	°C °F Bar Psi	Dec int Dec int
US 50	Proportional band for maximum speed of modulationg evaporator water pump in chiller	0.1 0 0.1 0	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
US 51	Minimum speed of the evaporator water pump in chiller	0	100	%	
US 52	Maximum speed of the evaporator water pump in chiller	0	100	%	

Heat pump and domestic hot water



Parameter	Description	min	max	udm	
US 53	Probe 1 selection for evaporator water pump modulation in Heat Pump	0	10		
US 54	Probe 2 selection for evaporator water pump modulation in Heat Pump	0	10		
US 55	Set point for maximum speed of modulationg evaporator water pump in Heat Pump	-50.0 -58 -1.0 -14	70.0 158 50.0 725	°C °F Bar Psi	Dec int Dec int
US 56	Proportional band for maximum speed of modulationg evaporator water pump in Heat Pump	0.1 0 0.1 0	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
US 57	Minimum speed of the evaporator water pump in Heat Pump	0	100	%	
US 58	Maximum speed of the evaporator water pump in Heat Pump	0	100	%	

26.5 SUPPLY FAN PERIODIC VENTILATION

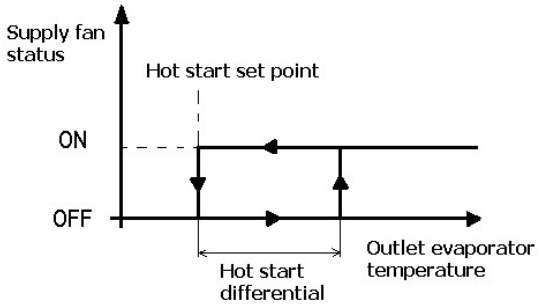
If the supply fan is switched off (for normal adjustment or because the machine is in Std-by or OFF), periodic ventilation can be performed to avoid the air stratification.
At the end of the ON period of the ventilation, the device reading regulation temperature evaluates if it is necessary to switch ON the compressors or not.
When the machine is switched ON, if no adjustment is required the cycle starts with ON period.

CO62	Evaporator water pump / supply fan OFF time if the set point is reached	0	250	10 min	
CO63	Evaporator water pump / supply fan OFF time if the machine is STD-BY or OFF	0	250	10 hour	
CO64	Evaporator water pump / supply fan ON time	0	250	Sec	10sec

26.6 HOT START

In the air air unit and in heating mode it is possible to stop the supply fan when the outlet evaporator temperature falls below FA24 degrees.

FA23 Hot start Setpoint
FA24 Hot start differential



27. CONDENSER WATER PUMP

The operation mode of the condenser water pump is settable as following:

- **CO20=0** Disabled: the water pump is not managed.

- **CO20 = 1** Continuous control
  When the device is switched ON in chiller or heat pump, the water pump is immediately activated and the first compressor is switched ON after CO16 delay.
  When the Ichill is in STD-BY or remote OFF the water pump is switched OFF with a delay set by CO21 parameter.

- **CO20 = 2** On compressor demand
  The water pump is ON only if at least a compressor is ON; in case of compressor activation, the water pump is switched ON CO17 time before compressor activation.
  When the last compressor is switched off, the water pump or supply fan is switched OFF after CO21 delay after compressor switching OFF.

The pump is always OFF if:

- The device is in STD-BY or remote OFF (except in case of water pump switching OFF delay or water pump ON for pre-antifreeze)
- Water pump overload alarm
- Condenser flow switch alarm if MANUAL reset.

27.1 CONDENSER PUMP GROUP

It is possible to configure two condenser water pumps; the water pump to be activated is the pump with less working hours.
When a water pump works continuosly for CO22 time, the other one is switched on and after CO23 second the first one is switched off.
If a water pump overload occurs, the water pump is switched off and the other one is switched on.

27.2 ANTIFREEZE PREVENTION WITH WATER PUMP

To prevent the antifreeze alarm it is possible to enable the operation of the water pump when the device is STD-BY or OFF.
If the temperature detected by the probe selected by parameter Ar32 decreases below Ar33 degrees, the water pump is switched ON.

Ar31 = Operation mode of the water pump when the device is in STD-BY or remote OFF
Ar31= 0 water pump OFF
Ar31=1 water pump ON if the temperature of the probe selected by parameter Ar32 is lower than Ar33 set point

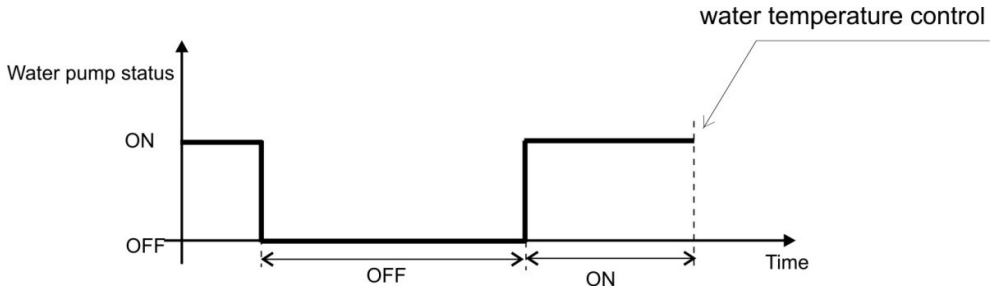
Ar32= Reference probe for the management of the water pump to prevent antifreeze alarm
0= the function is disabled
1= condenser inlet temperature

2= condenser outlet temperature
3= outside outlet temperature

Ar33 = Set point to activate the condenser water pump for antifreeze prevention
Ar34 = Differential to de-activate the condenser water pump for antifreeze prevention

27.3 CYCLIC OPERATION OF THE WATER PUMP

If the water pump is OFF (reached set point), is possible to enable it to run to detect the right water temperature (in case of water/water unit with reversing valve on water circuit) .
At the end of the ON time, the controller verify if is necessary to switch on the compressor/s or not; if is not necessary, the water pump is switched OFF for CO65 time and then switched on for another CO67 ON cycle.



Parameters	Description	min	max	unit of measure
CO 65	Condenser water pump OFF time if the set point is reached	0	250	10 min
CO 66	Condenser water pump OFF time if the machine is STD-BY or OFF	0	250	10 hour
CO 67	Condenser water pump ON time	0	250	10 Sec

28. CONDENSER FAN REGULATION

The signal to drive the modulating condenser fan is available in the Out 1...Out4 analog outputs:
FA01 and **FA02** parameters define the operative mode of the condenser fans.

FA01 Enable fan regulation
0 = Condenser fan disabled
1 = ON/OFF operation mode without regulation
2 = ON/OFF condenser fan: operation mode 1
3 = ON/OFF condenser fan: operation mode 2
4 = Condenser fan proportional fan speed

FA02 Condenser fan operation mode
0 = Fan on only if compressor on
1 = Independent from the compressor and off during the stand–by / or from remote OFF

Example of FA01 and FA02 combination:
FA01 = **1** and **FA02 = 0**
The condenser fan is ON when the compressor is ON

FA01 = **1** / **FA02 = 1**
The condenser fan is always ON and independent from the compressor status

FA01 = **4** / **FA02** = **0**
The condenser fan works in proportional regulation only when the compressor is on; when the compressor is OFF, also the fans are forced OFF.

FA01 = **4** / **FA02** = **1**
The condenser fan works in proportional regulation also if the compressor is OFF.

28.1 CONDENSER FAN WITH STEP MODULATION

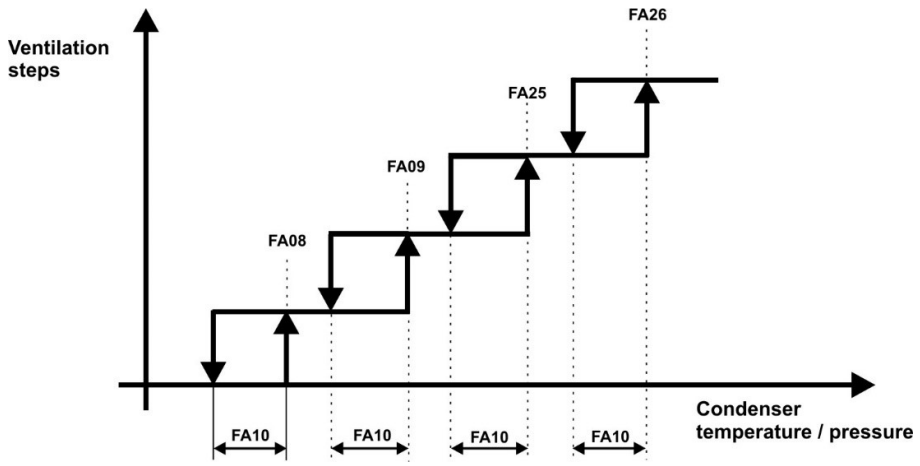
- **FA01=2 Opration mode 1**

	Step n° 1	Step n° 2	Step n° 3	Step n° 4
Relay step n° 1	ON	OFF	OFF	OFF
Relay step n° 2	OFF	ON	OFF	OFF
Relay step n° 3	OFF	OFF	ON	OFF
Relay step n° 4	OFF	OFF	OFF	ON

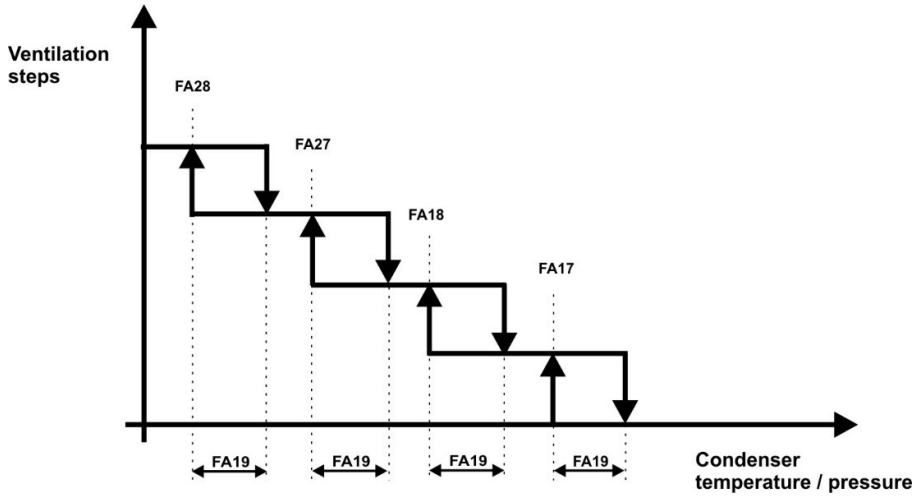
- **FA01=3 Operation mode 2:**

	Step n° 1	Step n° 2	Step n° 3	Step n° 4
Relay step n° 1	ON	ON	ON	ON
Relay step n° 2	OFF	ON	ON	ON
Relay step n° 3	OFF	OFF	ON	ON
Relay step n° 4	OFF	OFF	OFF	ON

Condenser fan in cooling mode



Condenser fan in Heating mode



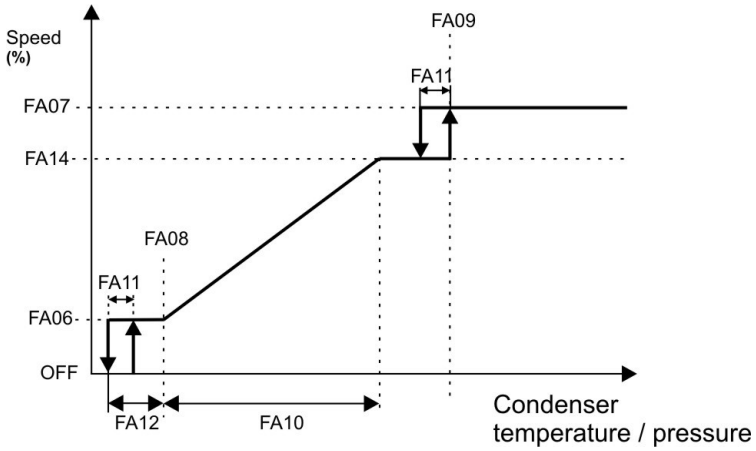
28.2 CONDENSER FAN WITH PROPORTIONAL CONTINUOUS MODULATION

By setting parameter FA01=4, the condenser fans is managed in proportional continuous modulation.
Analog output status and ON / OFF digital output status are connected to each other:

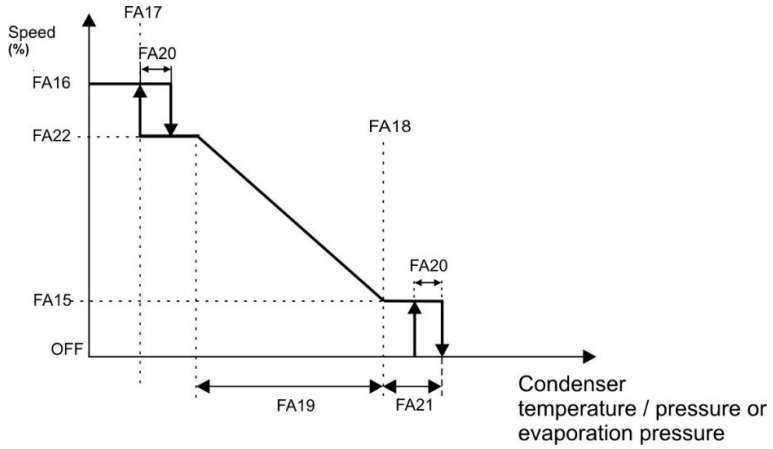
- If the analog output value is greater than 0, then digital output is active
- If the analog output value is 0, then digital output is OFF

If the fans are configured with a phase-cut signal, the phase shift between voltage and current must be configured; this setting (FA04 parameter) is needed to adapt the signal to the inductive component of the fan motor.

Condenser fan in cooling mode



Condenser fan in Heating mode



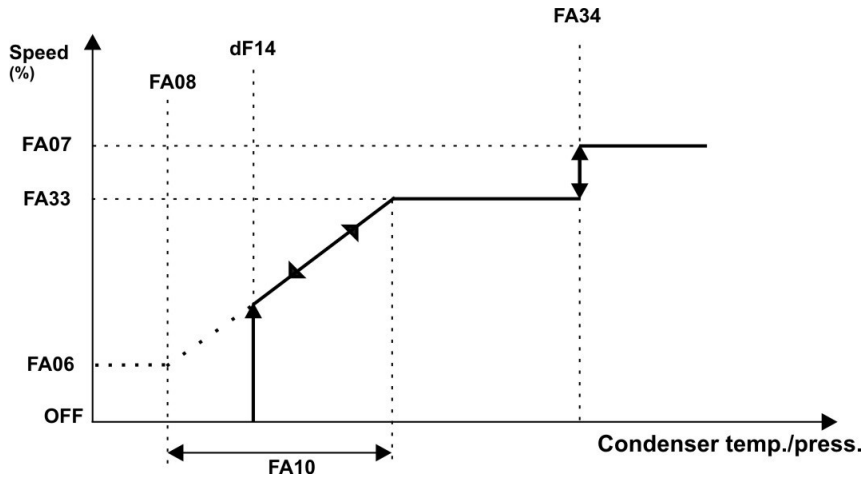
28.3 CONDENSER FAN IN DEFROST

dF13 parameter allows to enable the condenser fans during defrosting:

- dF13 = 0 Condenser fan disabled in defrost
- dF13 = 1 Condenser fansenabled only during defrosting
- dF13 = 2 Condenser fan enabled during defrost and forced on during dripping time

During the defrost the condenser fan regulate as shown below.
The basic adjustment is that of the operation in chiller, with the following differences:

• the threshold of temperature / pressure to enable fan activation is determined by parameter dF14
• once the fan is started, the modulation occurs between the pressure values FA08 and FA08 + FA10
• speed at the end of modulation is determined by the parameter FA33
• in case of increasing temperature / pressure to a value higher than FA34, fans are forced to maximum speed of FA07



28.4 FAN SPEED LIMITATION BY DIGITAL INPUT OR TIME BAND

The function allows to reduce the maximum speed of condensing fans; this function can be enable by time band or by digital input.
The maximum setable speed has a minimum FA07 / FA16 limit if the fans are modulating and value 1 if they are operated by steps.

FA36 = maximum % speed when the speed limitation is active
FA37 = maximum number of steps when the speed limitation is active
FA38 = time band start time of fan speed limitation
FA39 = time band stop time of fan speed limitation

29. ANTI FREEZE, INTEGRATION HEATING OR BOILER HEATERS

29.1 EVAPORATOR ANTIFREEZE HEATER IN COOLING MODE

The parameter **Ar06** selects the reference probe/s to control the evaporator anti-freeze heaters in cooling mode.

Ar06 = 0: the function is disabled
Ar06 = 1: the regulation probe is evaporator water inlet.
Ar06 = 2: the regulation probe are evaporator water outlet
Ar06 = 3: the regulation probe is outside temperature

The heater is activated when the temperature detected by one of the probes configured by parameter Ar06 falls below the threshold set by parameter Ar01; the heater is deactivated when the temperature rises above the Ar01 + Ar02 threshold.

29.2 EVAPORATOR ANTIFREEZE HEATER IN HEATING MODE

The parameter **Ar07** selects the probe/s to control the evaporator anti-freeze heaters in heating mode.

Ar07 = 0: the function is disabled
Ar07 = 1: the regulation probe is evaporator water inlet
Ar07 = 2: the regulation probe are evaporator water outlet
Ar07 = 3: the regulation probe is outside temperature

The heater is activated when the temperature detected by one of the probes configured by parameter Ar07 falls below the threshold set with parameter Ar03; the heater is deactivated when the temperature rises above the Ar03 + Ar04 threshold.

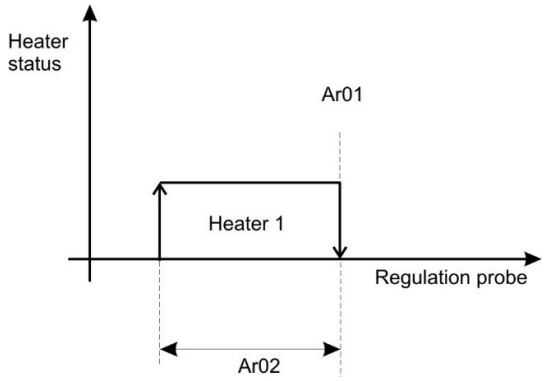
Ar05 parameter allows to choose the operation mode of the heaters during the defrost:

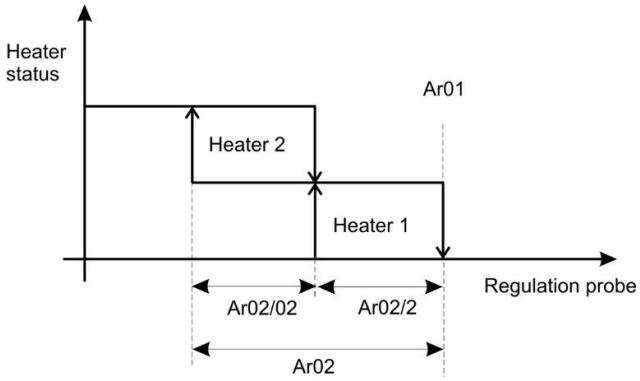
Ar05 = 0: heaters are activated according to the regulation request
Ar05 = 1: heaters are activated according to the regulation request and are always ON during the defrost. The heaters are switched on when the 4-way valve change from heat-pump to defrost and switched off only after the dripping time and the compressors restart.

29.3 SUPPORT HEATER IN AIR – AIR UNIT

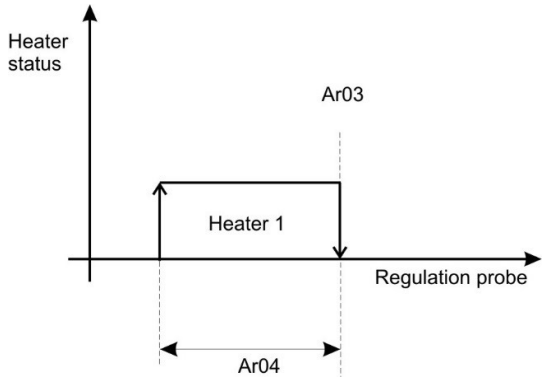
It is possible to configure an heater that can be enabled in air-air units.
The control probe is the cooling or heating regulation probe (defined by parameters St09 and St10), and the setpoints are defined by parameters Ar01 (Ar02 differential) and Ar03 (Ar04 differential).

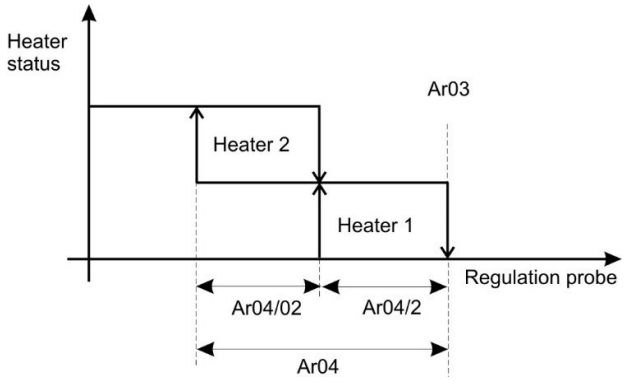
Heater regulation in cooling mode
Heater in one gas circuit





Heater regulation in heating mode
Heater in one gas circuit





Operation of the support heater during the defrost cycle
Ar05 parameter establishes the status of the heaters during the defrost cycle:

- Ar05=0: the heaters are activated only by their thermoregulation during the defrost cycle
- Ar05=1: the heaters are activated by their thermoregulation and are always on during the defrost cycle. Heaters turns on when the reversing valve converts the operation from heat to defrost and switch OFF when the dripping time ends.

29.4 CONDENSER ANTI-FREEZE HEATERS IN COOLING MODE

The parameter Ar08 allows to select which probe controls the haeters in cooling and heating mode.

Ar08 = 0: the function is disabled.
Ar08 = 1: the regulation probe is condenser water inlet
Ar08 = 2: the regulation probe are evaporator water outlet
Ar08 = 3: the regulation probe is outside temperature

Reference set point are:

- Cooling mode
  - Ar25 Set point condenser antifreeze heater in cooling mode
  - Ar26 Differential condenser antifreeze heater in cooling mode

- Heating mode
  - Ar27 Set point condenser antifreeze heater in heating mode
  - Ar28 Differential condenser antifreeze heater in heating mode

Heaters status in case of probe failure
It is possible to determine the behavior of condenser heaters in case of failure of the control probe:

- Ar30 = 0 the heaters are off
- Ar30 = 1 the heaters are forced on

Heaters with device in OFF or std-by
It is possible to determine the behavior of condenser heaters when the controller is in OFF and STD-BY:

- Ar29 = 0 the heaters are off
- Ar29 = 1 the heaters are enabled for operation according to their regulator

29.5 BOILER HEATERS

The function is enabled when:

- one probe is configured as outside temperature

- the boiler is enabled setting the parameter Ar11=1 (boiler in integration to the heat pump) or Ar11=2 (boiler in substitution to the heat pump).

Ar11=1 Boiler in integration mode
When outside temperature decreases under Ar12 thresold, starts the countdown of the time set by Ar14 parameter.
If during the Ar14 delay the external air temperature increases above the Ar12 + Ar13, Ar14 time is reloaded.
When the Ar14 delay is elapsed and the external air temperature is still below Ar12 setpoint, if the water temperature detected by the evaporator probe is lower than Ar15 in chiller mode or Ar17 in heat pump mode, the heaters are turned on.
When the temperature rises over Ar15 + Ar16 in chiller mode or Ar17+Ar18 in heat pump the heaters are turned off.
If the heaters are on and the outside temperature increases over Ar12 + Ar13, they are turned OFF and the Ar14 delay is reloaded.

It is possible to switch OFF the compressor if outside temperature falls below Ar19 setpoint; the compressor restart if outside temperature increases over Ar19+Ar20.

Heating control Ar11=2
When outside temperature decreases under Ar12 thresold, starts the countdown of the time set by Ar14 parameter.
If during the Ar14 delay the external air temperature increases above the Ar12 + Ar13, Ar14 time is reloaded.
When the Ar14 delay is elapsed and the external air temperature is still below Ar12 setpoint, if the water temperature detected by the evaporator probe is lower than Ar15 in chiller mode or Ar17 in heat pump mode the heaters are turned ON and the compressors are turned OFF.
When the water temperature detected by the evaporator probe increases over Ar15+Ar16 or Ar17 + Ar18, the heaters are turned OFF.
If the outside temperature increases over Ar12 +Ar13, the heaters are turned off, the compressor regulation restarts and the Ar14 delay is reloaded.

Boiler heaters during the defrost cycle
Ar05 parameter defines the status of the heaters during the defrost:

- Ar05=0 Heaters activated according to their regulation
- Ar05=1 Heaters switched ON when the 4-way valve changes the status from heat pump to defrost and switched OFF after the dripping time at the end of the defrost.

Note
The heaters of the boiler are always off in case of:
- flow switch alarm
- water pump overload alarm

30. DEFROST CYCLE

The defrost can be enabled in air / air unit or air / water unit and if heating mode is enabled.
It is possible to configure a relay to represents defrost status; the relay is switched ON when the defrosting process starts and it is switched OFF when the procedure ends (after dripping phase).

dF01 Defrost configuration:
dF01=0 Defrost disabled
dF01=1 Defrost start and stop: by condenser temperature / pressure and dedicated thresold
dF01=2 Defrost start=by probe selected by dF24; defrost stop= by time (set by dF05 parameter)
dF01=3 Defrost start=by probe selected by dF24; defrost stop= by external contact (digital input)
dF01=4 Defrost with condenser fan (heat pump partially disabled)
dF01=5 Defrost start=by digital input; defrost stop= by probe selected by parameter dF24

30.1 DEFROST CYCLE PHASES

PHASE 1: interval time between two defrosts dF09

Depending on the configuration assigned to the parameter dF40, the interval time between two defrosts may be related or not to compressor status:

• dF34=0 Interval time between two defrosts depends on compressor status

If at least one compressor is switched ON and the condenser temperature / pressure or evaporation pressure drops below dF02 threshold, the dF09 counter starts to decrease.

Notes regarding the count of the interval between two defrosts:

1. dF09 counter is reinitialized in the event of power failure, or after a defrost cycle, or following the operating mode modification (from heating to cooling), or if the device is placed in STD-BY or remote OFF
2. dF09 counting time is suspended if the compressors are off or if the condensation temperature / pressure or evaporation pressure rises above the start defrost thresold (dF02 parameter)

- **dF34= 1 Interval time between two defrosts indipendent of compressor status**

  Once the controller is powered and heating mode is activated or when a defrost cycle is completed, the device starts counting the minimum time between two defrosts (set by parameter dF09); this time is independent to the state of the compressors, independent to the presence of alarms, etc. The time counting is interrupted and reinitialized if the controller is placed in remote STD-BY or OFF.

  When the time counting is elapsed and:

  - at least one compressor of the circuit is ON
  - the condenser temperature / pressure or evaporation pressure drops below dF02 threshold and remains below this thresold for dF35 time

  the defrost of the involved circuit can start.

  When the defrost ends (after dripping phase), the delay time between two defrosts is recharged and restarts conting.

  The delay time is recharged whenever the controller is OFF (STD-BY or remote OFF), or if there is a changeament in operating mode (transition from heating to cooling by digital input or automatic change-over), or after a black-out.

  Forced defrosting and manual defrost have priority over observing the minimum time between two defrosts.

Phase 2: start defrost

When phase 1 ends, the defrost procedure starts.

Defrost procedure:

1. All the compressors are switched OFF (if parameter dF06 has a value greater than 0)
2. The device starts counting dF06 time
3. When half of dF06 time is elapsed, the state of the reversing valve is inverted
4. When dF06 time is elapsed, the defrost cycle starts and the compressors are restarted (if dF06=0 the compressors are already on); if more than a compressor have to be switched ON, each compressor switching ON is delayed of dF12 time.

To reduce the defrost time it is possible to force all the compressors ON setting the parameter dF11=1.

If the device is configured with an inverter compressor, in defrost it is forced to the % set by parameter CI32.

The defrost has a minimum duration of dF04 seconds.

It is possible to enable the condenser fan during the defrost and the dripping time:

dF17 Fan control during defrost / dripping time

dF13=0 Condenser fan disabled

dF13=1 Condenser fan enabled only in defrost

dF13=2 Condenser fan enabled in defrost and dripping time

To start the defrost if one digital input is configured as “End defrost” is active, the device waits until the contact is de-activated.
If one probe is configured as combined defrost:

- If the combined defrost probe is lower than dF10 thresold, the process proceeds to phase 3.
- If the combined defrost probe is higher than dF10 thresold, the process doesn’t proceed to phase 3

Phase 3: end defrost
Defrost ends if:

1. dF02=1:
    - the temperature / pressure detected by condensation or evaporation probe increases over dF03 thresold
    - if combined defrost probes are used, when the combined defrost temperature increases over dF10 threshold
2. dF01=2: by time set by dF05 parameter
3. dF01=3: if the digital input configured as end defrost is de-activated

End defrost procedure:

1. All compressors are switched OFF (if the parameter dF07>0)
2. The device starts counting dF07 time
3. When half of dF07 time is elapsed, the state of the reversing valve is reversed
4. When dF07 time is elapsed, the device restart normal heating operation

If dF07 = 0, the reversing valve status is inverted without stopping the compressors.

Forced defrost
The function allows to enable a forced defrost cycle if the condenser temperature / pressure or evaporation pressure remains below the dF16 thresold for dF15 time.
If during dF15 time counting the condenser temperature / pressure or evaporation pressure rises above dF16 + dF17, dF15 time is recharged.
Forced defrost override normal defrost procedure.

Manual defrost
To test defrost operation it is possible to force manually the defrost.
If the condenser temperature / pressure or evaporation pressure is lower than dF03 thresold, by pressing SET key and then pressing the UP key for 5 seconds it is possible to force the defrost.

30.2 END OF DEFROST FOR MAXIMUM TIME

If the defrost ends for maximum time and not for achievement of the conditions of end defrost, a specific alarm is signalled (b1dF appears on the display).
AO88 parameter sets the maximum number of alarms:

- if the number of alarms is lower than a thresold set by AO88 parameter, the alarm reset is automatic and does not affect the normal regulation
- if the number of alarms reaches the thresold set by AO88 parameter, the alarm reset is manual and the affected circuit is locked

30.3 DEFROST WITH CONDENSER FAN PROCEDURE

DEFROST WITH CONDENSER FANS
If dF01 = 4 defrost is activated through the condenser fans.
If the device detects the conditions to defrost, if outside air temperature (a probe has to be configured as outside temperature) is greater than the threshold set by dF20 parameter, the defrost is done starting the condenser fan and switching OFF the compressors.
The defrost ends:

- If a combined defrost probe is configured, for temperature or maximum defrost time
- If the condenser probe is a temperature probe, for temperature or maximum defrost time
- If the condenser probe is a pressure probe, for maximum defrost time

ATTENTION:
also if the defrost with condenser fan is activated, if outside temperature is lower than dF26, the defrost is done through hot gas (compressor ON).

If the condenser fan is ON during the dripping time (parameter dF13 = 2), the ventilation is forced ON only if the temperature detected by the probe configured as outside temperature is bigger of dF20 value.
Note:
the forced defrost is always done with hot gas.

30.4 SUPPLY FAN STATUS DURING THE DEFROST (AIR/AIR UNIT)

Supply fan can be switched OFF during the defrost to avoid blowing fresh air into the room.

NOTE:

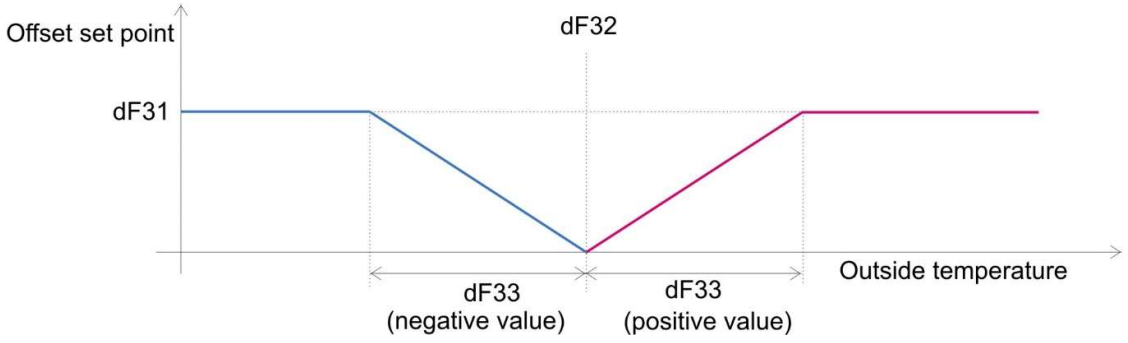
dF19	Supply fan status during the defrost 0= Disabled 1= Enabled	0	1		

30.5 DEFROST DYNAMIC SET POINT

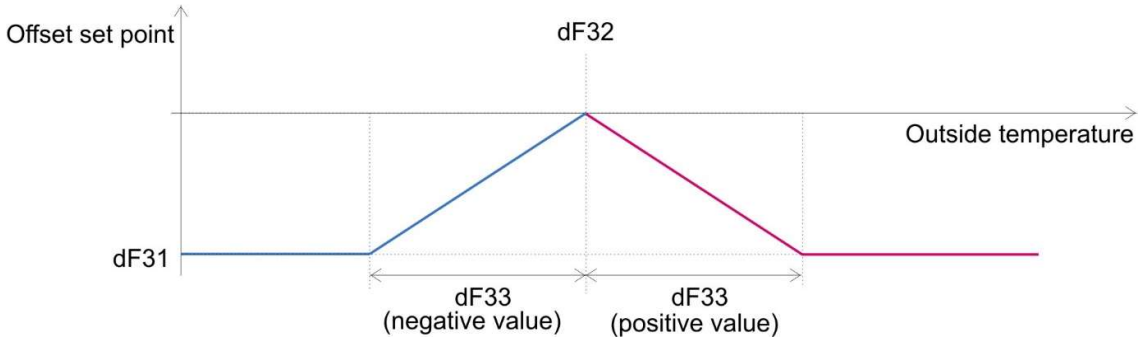
It is possible to modify the start defrost set point according to outside temperature.

Example 1: positive offset dF37>0

Aggiornare disegni anche su manual DIN



Example 2: negative offset dF37<0



30.6 COMBINED DEFROST

The function is enabled if one of the analog input is configured as NTC temperature for combined defrost. This probe detects the external air temperature of the condenser (evaporator in heat pump) and its temperature value determines the start and the stop of the defrost cycle.
Description:
The defrost count-down starts when the temperature/pressure of the probe, configured as condensing/evaporating probe, is lower than dF02 parameter.
After the dF09 counting the instruments checks the temperature probe value (configured as combined defrost) and if it is lower than dF09 (temperature setpoint to start the defrost the defrost cycle starts, otherwise the unit still runs in heat pump mode.
When the temperature decreases under the dF10 value the defrost immediately start.
The defrost ends when the NTC combined defrost probe increases over dF11.

31. DOMESTIC HOT WATER

The domestic hot water control is enabled when the machine is switched ON and disabled if the machine is OFF or in STAND-BY.
The device has to be configured to manage the heat pump (not allowed only chiller), and has to be configured for proportional regulation (St11=0) and not in neutral zone.
In case of unit with dedicated exchanger for domestic hot water (valve 1 and valve 2 positioned in gas circuit) and cooling and domestic hot water active at the same time, the number of compressors to activate is determined by the assigned priority (cooling or domestic hot water) set by FS02 parameter.
Two temperature probes need to be configured when the function is enabled:

- Probe 1: it is used to determine the temperature of the domestic hot water; this probe must be configured
- Probe 2: it can be used to stop the domestic hot water production for high temperature. As an alternative to Probe 2 it is possible ti choose another probe, setting FS48 parameter. This probe is optional.

Configurable proportional band and set-point are used to regulate the production of domestic hot water; when the domestic hot water function is enabled, symbol is lighted on the display.
The domestic hot water set-point can be viewed and modified on the display by pressing the SET button.

Domestic hot water setpoint is visible by pressing the SET key and it is identified by the SetS label:

- press SET button: cooling / heating setpoint will be displayed
- press SET button again: cooling / heating real set point will be displayed if energy saving or dynamic setpoint are enabled
- press SET button again: domestic hot water setpoint will be displayed

It is possible to set a minimum temperature under which the domestic hot water heaters are switched on (low temperature protection).

Domestic hot water setpoint can be modified:

- press and hold SET button for some seconds; cooling or heating set point is flashing and can be modified if necessary
- press SET button: domestic hot water set point is flashing and can be modified

There is the possibility to enable the second set point by time bands (parameters ES19..ES33) or by activating a digital input properly configured.
The operation mode is equivalent to the Energy Saving (see dedicated chapter); when the second set point is enabled:

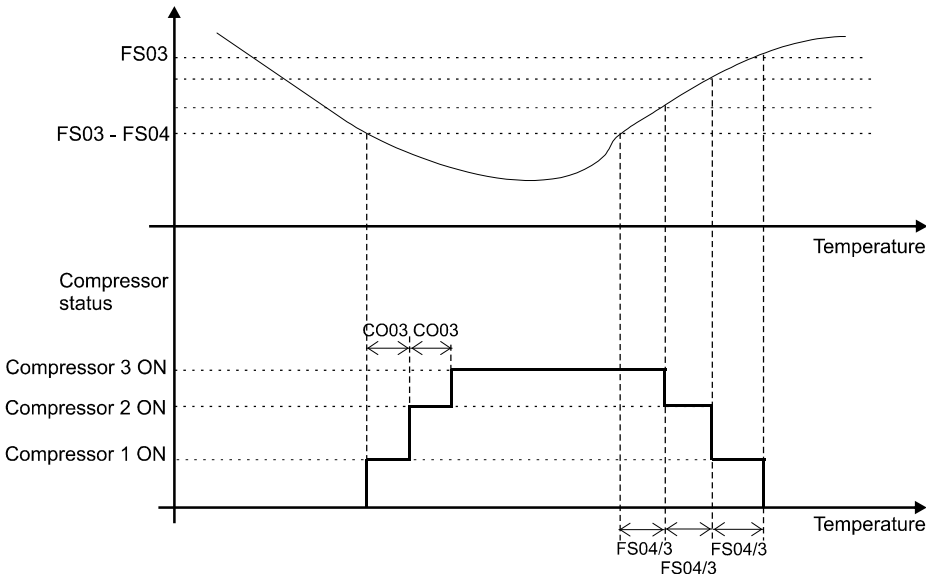
- to the domestic hot water set point is add the offset set by ES32 parameter
- the regulation differential is set by ES33 parameter

In order to enable time zones, the Ichill must be of a model with an internal clock.

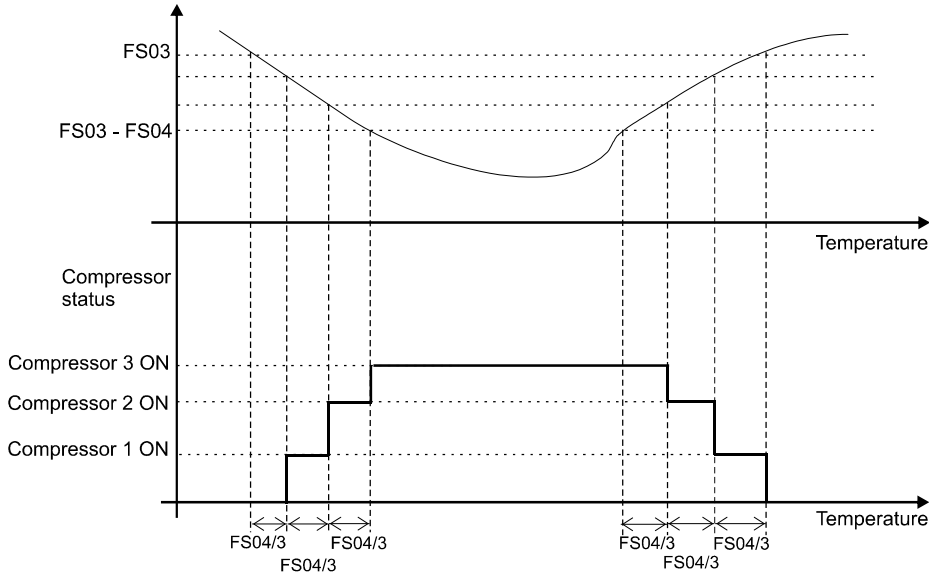
The domestic hot water demand follows the following rules:

- FS07=0 Domestic hot water operation starts when domestic water temperature is lower than FS03 - FS04; so, when the function is activated all the compressors will be switched ON
- FS07=1 Domestic hot water operation starts when domestic water temperature is lower than FS03 - (FS04 / number of compressors); so, when the function is activated only the first compressor will be switched ON

FS07=0 Example for machine with 3 compressors



FS07=1 Example for machine with 3 compressors



Domestic hot water heaters:
Domestic hot water is produced using mainly the compressors; the domestic hot water heaters are only used if one or more compressors are not available for regulation (due to an alarm of a compressor, activation of the unloading function,..) or if the domestic hot water set-point is not reached within a configured timeframe (described in greater detail below).
The FS09 parameter allows you to determine if the domestic hot water heaters can be used when a compressor is not available.
When the domestic hot water heaters are activated, the regulation band is divided according to the number of compressors and domestic hot water heaters available (see figure below).

Maximum time for reaching the domestic hot water set-point
A counter determines the maximum time for reaching the domestic hot water set-point as from the moment the production of domestic hot water is requested; once this time has elapsed (parameter FS10) there are 2 options:
- If FS08=0, enable all the compressors (if not already enabled)
- If FS08=1, enable all the compressors and all the heating elements

After all the available steps (compressors and heaters) have been enabled, they remain activated until the domestic hot water set-point has been reached. At which point the heating elements are switched off immediately, while the compressors are switched off in order, with a CO03 delay between each one.

In the event of domestic hot water probe 1 faulty (the domestic hot water regulation probe), the domestic hot water function is stopped and disabled; the controller will regulate normally in chiller or heat pump mode.
In the event of domestic hot water probe 2 faulty (not involved in the regulation), the alarm is signalled without affecting heat regulation in any way; domestic hot water will continue to be produced normally even if the display probe is not working properly.
If there is an error with the heat regulation probe (for the chiller or heat pump) during production of domestic hot water, the machine will continue to operate but the regulation of the chiller or heat pump is disabled and domestic hot water continues to be produced.

31.1 DOMESTIC HOT WATER PRODUCTION: VALVES IN WATER CIRCUIT ___ FS01=1 (AIR/WATER, WATER/WATER UNIT)

31.1.1 - Domestic hot water operation when the unit is in heating mode

When domestic hot water production is required (and it has priority), the sequence of operation is the following:
- the domestic hot water pump is switched on
- after a delay of FS12 seconds, domestic hot water valve 1 is swithed on

- after a delay of FS11 seconds the domestic hot water valve 2 is switched off

Domestic hot water is produced until the FS03 set-point is reached.
Once the domestic hot water set-point is reached, the sequence of operation is the following:

- domestic hot water valve 2 is switched on
- after a delay of FS11seconds the domestic hot water valve 1 is switched off
- after a delay of FS35 seconds the domestic hot water circulation pump is switched off

Condenser fans are normally managed.

The defrost takes priority over the production of domestic hot water.
If the controller determines the need for a defrosting cycle during the production of domestic hot water, the Ichill stops the domestic hot water operation to activate the defrost procedure:

- all compressors and heaters are stopped
- the domestic hot water valve 2 is switched ON
- after FS11 delay domestic hot water valve 1 is switched OFF
- after a delay of FS35 seconds the domestic hot water pump is switched OFF
- the defrost can now start as per the normal procedure

At the end of the defrosting cycle:

- If there is a need to produce domestic hot water, the compressors and any heating elements will be switched on. After the FS12 delay from the end of the dripping phase, domestic hot water valve 1 is switched on and, after the FS11 delay, domestic hot water valve 2 is switched off.
- If there is no need to produce domestic hot water, the controller continues with normal heat regulation.

31.1.2 - Domestic hot water operation when the unit is in cooling mode

When the production of domestic hot water is required (and it has priority), it is necessary to reverse the cycle as follows:

- the compressors are switched OFF
- after dF07/2 delay the 4-way valve status is reversed
- after dF07/2 the compressors are switched ON
- after a delay of FS12 seconds valve 1 is switched on
- after the FS11 delay the domestic hot water valve 2 is switched off

The production of domestic hot water stops once the set-point is reached and it will be possible to return to produce cold water (if needed):

- the compressors are switched off
- the valve 2 is switched on
- after the FS11 delay the domestic hot water valve 1 is switched off
- after a delay of FS35 seconds the domestic hot water circulation pump is switched off
- after a delay of dF08/2 the 4-way valve status is reversed
- after a delay of dF08/2 the compressors are switched on as per normal if required by the chiller regulator

31.2 DOMESTIC HOT WATER PRODUCTION: VALVES IN GAS CIRCUIT ___ FS01=2 (AIR/WATER, WATER/WATER UNIT)

31.2.1 Domestic hot water operation when the unit is producing hot water

When domestic hot water production is required (and it has priority), the sequence of operation is the following:

- the domestic hot water pump is switched on
- after a delay of FS12 seconds the valve 1 is activated
- after a delay of FS11 seconds the domestic hot water valve 2 is switched off

Domestic hot water is produced until the FS03 set-point is reached.

Once the domestic hot water set-point is reached:

- domestic hot water valve 2 is switched on
- after a delay of FS11 seconds the domestic hot water valve 1 is switched off

- after a delay of FS35 seconds the domestic hot water circulation pump is switched off

Condenser fans are managed normally.

The defrost takes priority over the production of domestic hot water.

If the controller determines the need for a defrosting cycle during the production of domestic hot water, the Ichill stops the domestic hot water operation to activate the defrost procedure:

- all compressors and heaters are stopped
- the valve 2 is activated
- after the FS11 delay the domestic hot water valve 1 is switched off
- after a delay of FS35 seconds the domestic hot water pump is switched off

The defrost can now start as per the normal procedure.

At the end of the defrosting cycle:

- If there is a need to produce domestic hot water, the compressors and any heating elements will be switched on. After the FS12 delay from the end of the dripping phase, domestic hot water valve 1 is enabled and, after the FS11 delay, domestic hot water valve 2 is switched off.
- If there is no need to produce domestic hot water, the controller continues with normal heat regulation.

31.2.2 - Domestic hot water operation when the unit is producing cold water

When the production of hot domestic hot water is required, the sequence of operation depends on the status of the compressors:

a) One or more compressors are ON

If the production of domestic hot water is required during operation in chiller mode:

- the domestic hot water circulation pump is switched ON
- after a FS12 delay the domestic hot water valve 1 is switched ON
- after the FS11 delay the domestic hot water valve 2 is switched OFF

The following two cases could occur during the production of domestic hot water:

- The domestic hot water set-point is reached when the chiller is working (the chiller set-point is not reached):
  - the domestic hot water valve 2 is switched on
  - after the FS11 delay the domestic hot water valve 1 is switched off
  - after a delay of FS35 seconds the domestic hot water circulation pump is switched off

  At the end of this phase, if necessary, the machine continues to regulate in chiller mode

- The regulation temperature reaches the chiller set-point (parameter ST01) and the domestic hot water production is working:
  - the domestic hot water circulation pump stays ON
  - the domestic hot water valve 2 is switched on
  - after the FS11 delay the domestic hot water valve 1 and the compressors are switched OFF
  - after the dF07/2 delay the 4-way valve status is reversed
  - after dF07/2 the compressors are switched on again to produce hot domestic hot water
  - after the FS13 delay from the 4-way valve switching, the domestic hot water valve 1 is switched ON
  - after the FS11 delay the domestic hot water valve 2 is switched OFF

Once the domestic hot water set-point is reached:

- the domestic hot water valve 2 is switched ON
- after the FS11 delay domestic hot water valve 1 is switched OFF
- after FS35 seconds the domestic hot water circulation pump and the compressors are switched OFF
- after the dF08/2 delay the status of the 4-way valve is reversed

If the domestic hot water production is working and the temperature detected by the chiller regulation probe is greater than St01+St07 (cold water required), the sequence of operation is the following:

- the domestic hot water pump will remain ON
- the domestic hot water valve 2 is switched ON
- after the FS11 delay the domestic hot water valve 1 is switched OFF
- the compressors are switched OFF
- after the dF08/2 delay the 4-way valve status is reversed
- after a delay of dF08/2 the compressors are switched on to produce chilled water and domestic hot water

When the domestic hot water set-point is reached:

- domestic hot water valve 2 is switched on
- after the FS11 delay the domestic hot water valve 1 is switched OFF
- after a delay of FS35 seconds the domestic hot water circulation pump is switched off

b) None of the compressors are switched ON for the production of chilled water

In this case, the cycle is reversed as follows:

- the 4-way valve status is reversed
- after dF07/2 the compressors are switched ON
- the domestic hot water pump switches on after the FS13 delay from start-up of the compressors
- after a delay of FS12 seconds the domestic hot water valve 1 is switched ON
- after the FS11 delay the domestic hot water valve 2 is switched OFF.

Once the domestic hot water set-point is reached, the sequence of operation is the following:

- the domestic hot water valve 2 is switched ON
- after the FS11 delay the domestic hot water valve 1 and the compressors are switched OFF
- after a delay of FS35 seconds the domestic hot water circulation pump is switched OFF
- after the dF07/2 delay the 4-way valve status is reversed and normal regulation is restored.

If chilled water is required during the production of domestic hot water, operation is the same as in the previous case.

31.3 WATER PUMPS MANAGEMENT

The domestic hot water pump is managed in domestic hot water regulation or during the anti-legionella cycle.

Evaporator water pump:

- if CO15=1 (evaporator water pump always on), also in domestic hot water regulation the water pump is ON. If the machine is forced to work only in domestic hot water (digital input “only domestic hot water” is active), the evaporator water pump is:
  - OFF if FS22=1
  - ON if FS22=0

- if CO15=2 (evaporator water pump on if at least a compressor is on), the parameter FS22 allows to choose if the water pup is on or off in case of domestic hot water production. If the machine has the domestic hot water valves placed in the gas circuit, in case of contemporary cooling and domestic hot water production, the evaporator water pump is on.

If only one water pump is needed for cooling, heating and domestic hot water, the evaporator water pump has to be configured.

Management of the domestic hot water pump

The domestic hot water pump can be turned on continuously (also when the device is on cooling or heating regulation) or activated only during the production of hot water and during the cycle of legionella as described in the following paragraphs.

In the case in which the domestic hot water pump is turned on during the production of domestic hot water, the timing of are the following:

• OUT 1 and OUT 2 outputs switching with the delay of FS12 seconds from pump switching on

• the water pump switching off occurs with the delay of FS35 seconds from OUT 1 and OUT 2 outputs switching.

The domestic hot water flow switch is managed by parameters AO65 …AO68.

Domestic hot water flow switch, solar panel flow switch and overload domestic hot water pump.

It is possible to enable the domestic hot water flow switch by setting appropriately parameters AO65..AO68.
It is possible to enable the solar panel flow switch by setting appropriately parameters AO69..AO72.

If domestic hot water flow switch or domestic hot water pump overload is active, domestic hot water regulation is disabled; heating and cooling regulation proceed normally.
If solar panel flow switch is active, solar panel regulation is disabled; heating and cooling regulation proceed normally.

31.4 ANTI-LEGIONELLA FUNCTION

The FS24 parameter allows you to enable the anti-legionella function.

- **FS24=0** enabled by intervals between two anti-legionella cycles; the process will have to be repeated after the FS30 time since the last anti-legionella production procedure was carried out. The counter continues to operate, regardless of whether the machine is ON or OFF or in standby; if the power is OFF, the value of the counter is recorded and then continued when the machine is next started up.

- **FS24=1** enabled by time-bands; Ichill with internal real time clock is required (you need to configure the day of activation FS32 and the start time FS31).

- **FS24=2** enabled by daily time band (start time FS31 is needed)

To disable the function is necessary to configure:

- FS24=0
- FS30=0

Or

- FS24=1
- FS32=0

Or

- FS24=2
- FS31=0:00

The function is enabled when the machine is ON. If the request for an anti-legionella cycle is made when the machine is switched off, the cycle will start immediately when the machine is next switched on and the priority is given to anti-legionella cycle.
If instead heat regulation is prioritized, the anti-legionella cycle will run when the chiller/heat pump set-point is reached.
The function must remain active for the minimum time configured with parameter FS33 (activated when the temperature of the domestic hot water reaches the anti-legionella set-point) and can last a maximum of FS34 minutes.
If FS02=0 the Anti-legionella cycle starts when cooling/heating set point is reached.

If the legionella cycle ends for maximum time and not to have achieved and maintained the set point for the time needed, ALEG alarm is generated (registered in the alarm log); the alarm has no effect on regulation and it is only a warning.
If the cycle ends because of alarms, defrost, OFF machine, etc., the alarm is generated and the legionella request is maintained (when the alarm is reset, the legionella cycle starts).

Compressors and domestic hot water heaters in Anti-legionella cycle

FS23=0 Compressors and heaters used at the same time in Anti-legionella cycle
When the anti-legionella cycle is active, all the compressors and heating elements configured for the domestic hot water are switched on; once the set-point (FS14) is reached, the compressors are switched off

(delayed of CO04 time) while the heating elements are switched off when the the set-point (FS25) + band (FS28) is reached.
The anti-legionella cycle is enabled for FS33 time; during this time the machine works to maintain the anti-legionella set point.
The Anti-legionella cycle lasts maximum FS34 minutes.
It is possible to switch off the compressors if the domestic hot water temperature reaches FS29 temperature.
At the end of this procedure, the controller returns to the production of domestic hot water or normal heating/cooling regulation.
If the FS02 parameter (operating priority) gives priority to heating/cooling regulation and the production of anti-legionella needs to be enabled, then the heat regulation set-point has to be reached beforehand.
The anti-legionella cycle has to end before heating/cooling regulation can start, even if the FS02 parameter gives the priority to heating/cooling regulation.

FS23=1 First compressors then heaters are used in Anti-legionella cycle
At first the compressors are switched on; when FS29 set point is reached, all the compressors are switched off and domestic hot water heaters are switched on to reach the Anti-legionella set point (FS25) + band (FS28).
Once reached, the instrument works to maintain the set point for FS33 time; if water temperature falls down below FS25 the heaters are switched on and if falls down below FS29 compressors are switched on.
The Anti-legionella cycle lasts maximum FS34 minutes.

FS23=2 Only heaters are used in Anti-legionella cycle
Only domestic hot water heaters are used in the Anti-legionella cycle (compressors off); when FS25 + FS28 temperature is reached the heaters are switched off.
Once reached the set point, the instrument works to maintain the set point for FS33 time; the Anti-legionella cycle lasts maximum FS34 minutes.

FS23=3 Only compressors are used in Anti-legionella cycle
Only compressors are used in the Anti-legionella cycle (heaters off); when FS25 + FS28 temperature is reached the compressors are switched off.
Once reached the set point, the instrument works to maintain the set point for FS33 time; the Anti-legionella cycle lasts maximum FS34 minutes.
Priority management (domestic hot water or heating/cooling)

If FS02 =0, priority is given to the production of chilled/hot water; domestic hot water is produced once the chiller/heat pump requests has been satisfied.
The production of anti-legionella is stopped in case of chiller/heat pump requests.

If FS02=1, priority is given to the production of domestic hot water (or anti-legionella). Chilled water or hot water can be produced once the need for domestic hot water has been satisfied (if required).

If FS02=2, if the digital input configured as “Domestic hot water priority” is active, the priority is given to the production of domestic hot water.

If defrosting is required, this takes priority over the production of domestic hot water or anti-legionella even if FS02=1.

31.5 DOMESTIC HOT WATER SECOND SET POINT

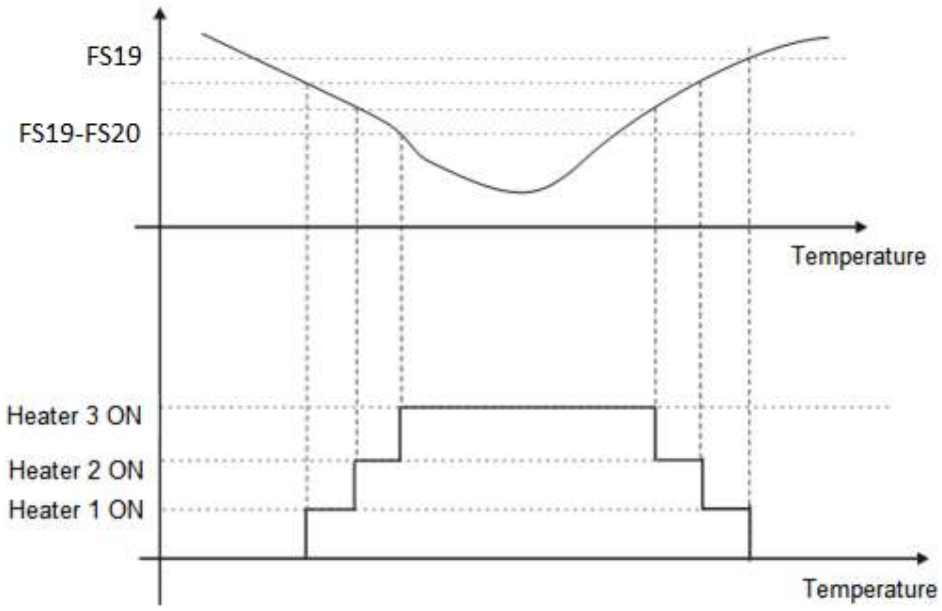
The domestic hot water second set point can enabled by time bands (ES19..ES33 parameters) or digital input properly configured.
In case of domestic hot water second set point enabled by time bands, the Ichill must have internal clock.

Par. ES25 – ES31	0= Function disabled 1= 1st period enabled 2= 2nd period enabled 3= 1st and 2nd periods enabled 4= 3rd period enabled 5= 1st and 3rd periods enabled 6= 2nd and 3rd periods enabled 7= 1st, 2nd and 3rd periods enabled

Inside the time band or when the digital input is active to the domestic hot water set point is applied an offset (parameter ES32) and the new differential for the regulation is ES33.

31.6 LOW DOMESTIC HOT WATER TEMPERATURE

It is possible to activate the hot water heaters for low temperature protection; the control probe can be selected by parameter FS21.
Adjustment will always be active if domestic hot water is enabled and if the machine is on.



32. SOLAR PANEL MANAGEMENT

Though appropriate configuration of AF24 and AF25 parameters is possible to use the solar panel in heating or for domestic hot water production.
The solar panel is managed through the valve and water pump control; their status depend from:

- solar panel temperature
- regulation probe (typically heating regulation probe or domestic hot water regulation probe); this probe is defined in AF26 and AF27 parameters

32.1 SOLAR PANEL IN DOMESTIC HOT WATER

- **Compressors and solar panel in integration to domestic hot water (AF24=1):**

If:

solar panel temperature – domestic hot water temperature > AF28 (Dt to enable solar panel in domestic hot water)

the solar panel are enabled to work; domestic hot water probe is defined by AF26 parameter (it is possible to set another probe, if needed).
Compressors are normally managed by domestic hot water temperature and domestic hot water set point.

- if domestic hot water temperature < AF20-AF21, the valve of the solar panel is open and the water pump is on

- if domestic hot water temperature > AF20, the valve of the solar panel is close and the water pump is off

- **Solar panel in heating mode (AF24=2)**

If:

solar panel temperature – domestic hot water temperature > AF28 (Dt to enable solar panel in domestic hot water)

the solar panel are enabled to work; domestic hot water probe is defined by AF26 parameter (it is possible to set another probe, if needed).
At first compressors are not used for domestic hot water.
It is possible to set a maximum time to use solar panel (AF30); when this time is elapsed and domestic hot water set point is not reached, the solar panel are disabled and compressors are switched on.
The domestic hot water pump runs when solar panel are enabled.
In regulation, if

solar panel temperature – domestic hot water temperature < AF28

the solar panel are disabled and the hot domestic hot water is done by compressors.

Dt control is done only at the time of the request of domestic hot water; at this moment, if Dt< AF28 the solar panel are not used and compressors are used for heating.

32.2 SOLAR PANEL IN HEATING MODE

- **Solar panel in integration mode (AF25=1)**

If:

solar panel temperature – heating temperature > AF29 (Dt to enable solar panel in heating)

the solar panel are enabled to work (valve is open and water pump on); heating probe is defined by AF27 parameter (it is possible to set another probe, if needed).
Compressors are normally managed by heating regulation.

- **Solar panel in Heating (AF25=2)**

If:

solar panel temperature – heating temperature > AF29 (Dt to enable solar panel in heating)

the solar panel are enabled to work; heating probe is defined by AF27 parameter (it is possible to set another probe, if needed).
At first compressors are not used for heating.
It is possible to set a maximum time to use solar panel (AF30); when this time is elapsed and domestic hot water set point is not reached, the solar panel are disabled and compressors are switched on.

In regulation, if

solar panel temperature – heating temperature < AF29

the solar panel are disabled and the heating is done by compressors.

Dt control is done only at the time of the request of heating; if Dt<AF29 the solar panel are not used and compressors are used for heating.

33. GEOTHERMAL FREE COOLING

Te following outputs can be configured:

- relay for valve / water pump management
- 0..10V analog output to control a modulating valve

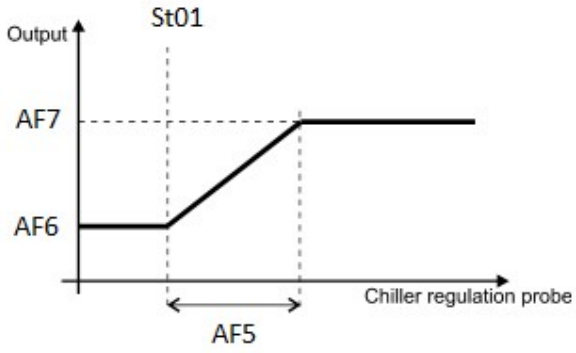
In heating mode the relay is always OFF and the analog output is forced to 0 volts.
Free cooling operation mode:

- **CF3=2**: Free cooling is the only cooling source
- **CF3=3**: Free cooling and compressors work together for cooling. The compressors work according their standard regulation.

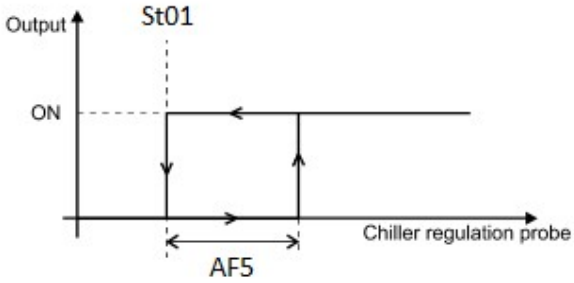
Free cooling management
Two probes are needed, selected from those configured in the instrument (1 Pb1, 2=Pb2, etc.); parameters to select the probes are AF8 and AF9.

- if T1 temperature – T2 temperature ≥ AF1, the Free cooling is enabled and the relay and analog output are manages as figures below
- if T1 temperature – T2 temperature < AF1 – AF2, the Free cooling is disabled

Analog output management:



Digital output management:



Parameter	Description	min	max	udm
AF1	Temperature differential to enable the freecooling function	0	25.0 45	°C °F
AF2	Temperature differential for the free cooling regulation	0.1 0	25.0 45	°C °F
AF3	Free cooling maximum time	0	250	min
AF4	Differential to enable the compressors in Free cooling	0 0	30.0 54	°C °F
AF5	Proportional band Free coling	0.1 0	25.0 45	°C °F
AF6	Minimum value Free cooling analog output	0	100	%
AF7	Maximum value Free cooling analog output	0	100	%
AF8	T1 probe selection for Free cooling 0=disabled, 1=Pb1, 2=Pb2, etc.	0	22	
AF9	T2 probe selection for Free cooling 0=disabled, 1=Pb1, 2=Pb2, etc.	0	22	

AF10	Probe selection to disable free cooling for low temperature	0	12	
AF11	Low temperature threshold to disable the free cooling	-50.0 -58	110 230	°C °F
AF12	Low temperature differential to disable the free cooling	0.1 0	25.0 45	°C °F
AF13	Delay to enable compressors in free cooling	0	250	min
AF14	Free cooling analog out differential	0.1 0	25.0 45	°C °F
AF15	Free cooling water pump OFF time if chiller only Free cooling	0	250	min
AF16	Free cooling water pump ON time if chiller only Free cooling	0	250	sec
AF17	Outside temperature thresold to force the condenser fan at maximum speed	0	1	
AF18	Outside temperature differential to disable the forced maximum speed of the condenser fan	0.1 0	25.0 45	°C °F
AF19	Delay time of condenser fan regulation in free cooling	0	250	min

- **Only free cooling for cooling (CF2=2)**

  Compressors are not used in cooling mode; the consent to the activation of the evaporator and condenser water pumps is given by the cooling regulation probe and with set point St01; also the control of the Free cooling valve is given by the cooling regulation probe.
  If the freecooling set point is not reached within the AF3 time (if set to 0 the function is disabled), there will be the forced output from the Free ccoling.
  In case of forced exit from Free cooling or if the Free cooling set point has been reached, the shutdown time of the Free cooling water pump AF15 is active; expired this time the water pump is on (with it also the system pump if it is not already on) for the AF16 time, after which the Dt between the evaporator water inlet temperature and the water inlet probe temperature will be checked, with consequent resumption of operation in Free cooling if there are the right conditions.
  If parameters AF15 and AF16 are set to 0, the function is disabled (to enable the function, both parameters must be set with a value greater than 0).
  If there are the conditions for Free cooling the water pumps will remain on (system pump and Free cooling) and the Free cooling will work to bring the water to a cooling set; if there are no Free cooling conditions, the countdown of the AF15 switch-off time and the subsequent AF16 forced switch-on time will start.

- **Free cooling with compressors (CF2 = 3)**
  If the system requires cooling, the Dt between the temperature T1 and the temperature T2 is checked; in the case in which there are the conditions of Free cooling:
  - if the regulation temperature is lower than St1 + AF4, Free Cooling is performed only with Free Cooling resources; the reference set point is St1 and the differential is AF5. The compressors remain off; in any case the maximum time for reaching the set point AF3 is active, after which the compressors are enabled (set point St1 and differential St07)
  - if the control temperature exceeds St1 + AF4 (active threshold both at the regulation call and at regulation in progress), the compressor is enabled to operate (set point St1 and differential St07). The enabling of the compressors may be delayed by the time AF13, starting from the threshold is exceeded.

  The condition AF5 <St07 ≤ AF4 must be respected, on condition that the configuration alarm AC12 is generated.

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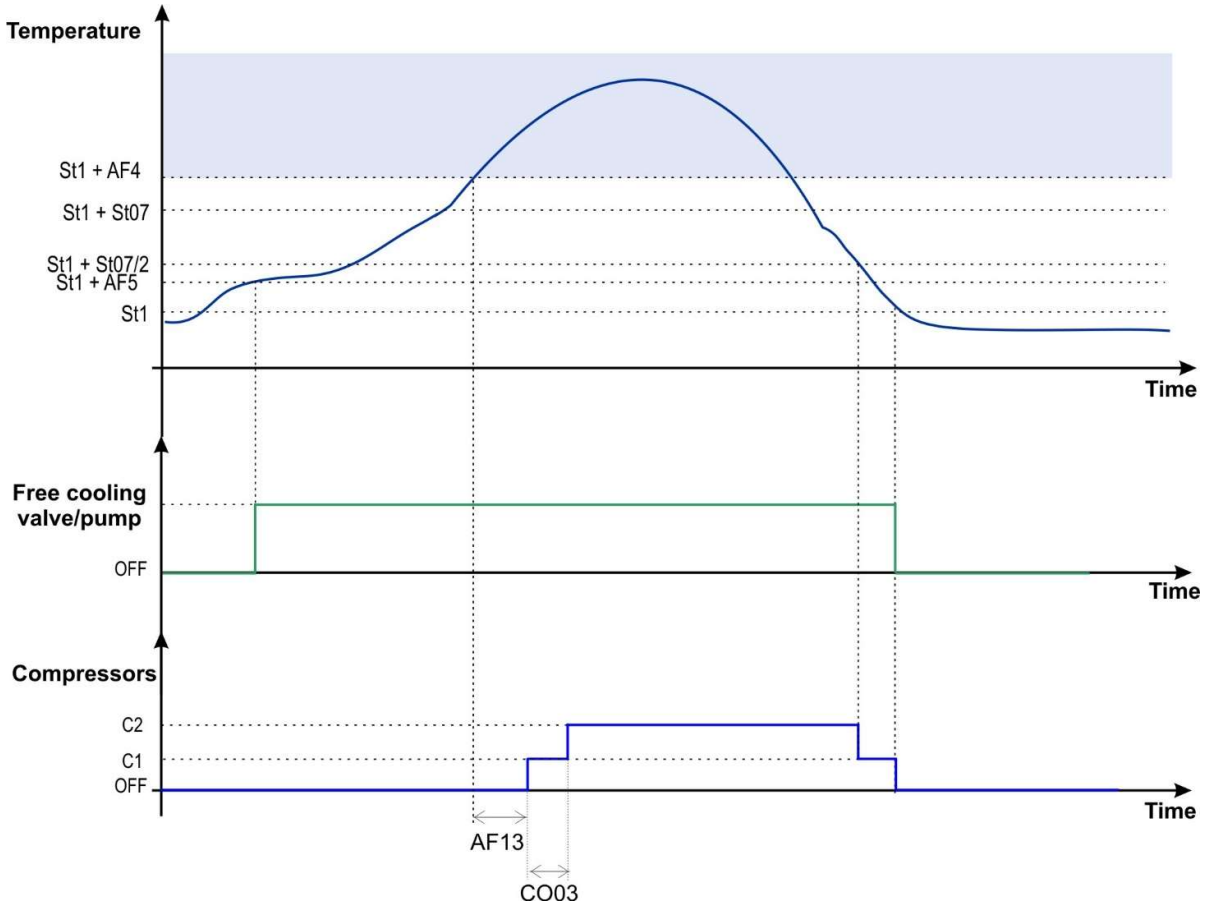


Low temperature protection

If the temperature detected by probe selected with AF10 parameter is lower than AF11 set point, the free cooling is disabled; the free cooling will be enabled when temperature is higher than AF11 + AF12.

33.1 FAN SPEED CONTROL IF COMPRESSORS AND FREE COOLING ARE USED FOR COOLING (CF3=3)

When the free cooling is not active the condenser fan speed is managed like standard regulation.
If free cooling is active:

- outside temperature > AF17 + AF18: condenser fan speed is forced at maximum speed
- outside temperature < AF17: when outside temperature decreases below AF17 temperature, after AF19 minutes the condenser fan speed is managed as standard regulation

34. UNIT WITH SPLITTED EXCHANGERS (AIR / WATER UNIT)

The parameter CF68=1 enables the management of the splitted exchangers.
Through the parameter dF29 is possible to select witch probe is used for the management (outside temperature or condenser temperature/pressure).
If outside temperature is selected, hybrid exchangers regulation of both circuits work in parallel.
If condenser temperature/pressure is selected:

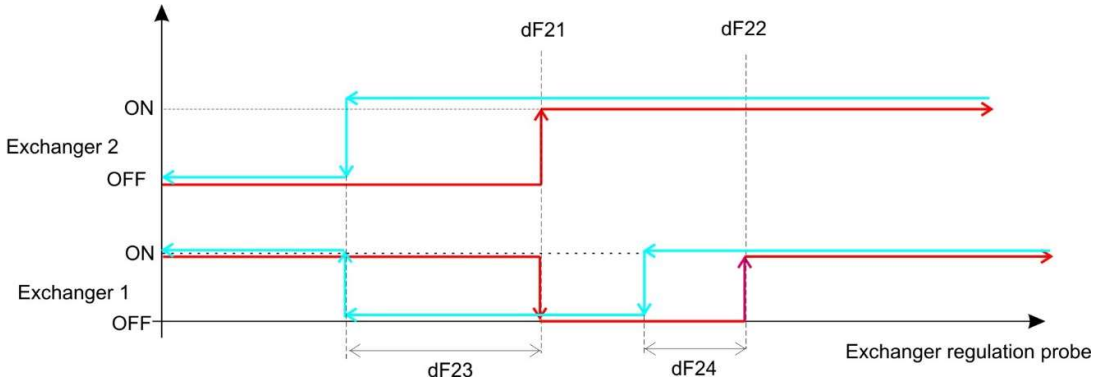
- common condenser: the regulation is done according the higher value of pressure/temperature of the circuits in summer and the lower value in winter
- separated condenser: every exchanger is managed accordind the temperature/pressure of the specific circuit

Parametres involved:

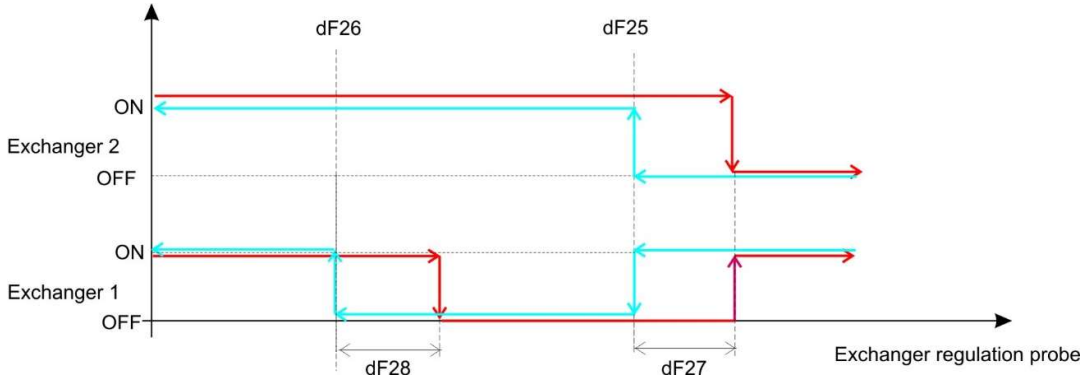
- Splitted exchangers set point 1 in cooling mode (parameter dF21)
- Splitted exchangers set point 1 in cooling mode (parameter dF23)
- Splitted exchangers set point 2 in cooling mode (parameter dF22)
- Splitted exchangers set point 2 in cooling mode (parameter dF24)

- Splitted exchangers set point 1 in heating mode (parameter dF25)
- Splitted exchangers set point 1 in heating mode (parameter dF27)
- Splitted exchangers set point 2 in heating mode (parameter dF26)
- Splitted exchangers set point 2 in heating mode (parameter dF28)

Summer operation mode:



Winter operation mode:



If the machine is switched on and the reference probe of splitted exchangers is inside the differential:

- Cooling: temperature/pressure inside the differential dF23 = exchanger 2 ON
- Cooling: temperature/pressure inside the differential dF24 = exchanger 1 and exchanger 2 ON
- Heating: temperature/pressure inside the differential dF27 = exchanger 2 ON
- Heating: temperature/pressure inside the differential dF28 = exchanger 1 and exchanger 2 ON

In chiller when first compressor starts both exchangers are ON for dF30 time; after this time the regulation follows diagrams above.
If dF30=0 the regulation follows diagrams above also at the start up.
In defrost this regulation is disabled.
In STD-BY or remote OFF the status of the exchangers is hybrid exchanger 1=ON, hybrid exchanger 2=OFF.
The set point is related to the status of the machine:

- if the machine is producing cooled water and domestic hot water, reference set point is chiller set point
- if the machine is producing only domestic hot water, reference set point is heat pump set point

35. HEAT RECOVERY FUNCTION

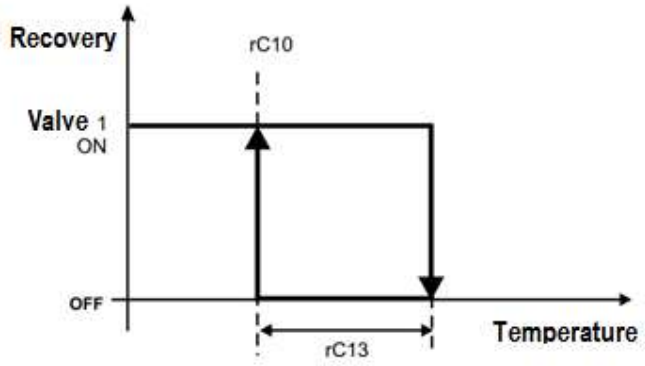
The heat recovery function is enabled if:

- the parameter **rC01** > 0
- the unit is working in chiller mode
- the condensing temperature or pressure is lower than set rC06 – rC07
- the heat recovery input/output resources are correctly configured

If the heat recovery is configured, in the menu the REC sub-menu is available to read the status of the valves and to disable / enable the function.

35.1 HEAT RECOVERY TEMPERATURE PROBE

If single valve is configured:



If the heat recovery digital input is active and if the heat recovery temperature is lower than the first valve activation threshold, the recovery valve will be activated on the circuit switched on.
If both circuits are working, first is activated the heat recovery valve of circuit 1 and then the heat recovery valve of circuit 2.

HEAT RECOVERY: CIRCUIT CONFIGURED WITH ONLY ONE COMPRESSOR

If:

- chiller unit is on
- the compressor is ON
- condenser temperature or pressure is lower than rC06

the heat recovery starts if the the digital input configured as recovery is active and, in case of use of the recovery probe, if the temperature is below the rC10 set point (both conditions must be fulfilled); in this condition the relay configured as recovery valve is activated.
When the heat recovery request is not active, the relay configured as recovery valve will be deactivated.
When the unit enters in recovery operation, the recovery state is maintained for a minimum time set in parameter rC04.
When the heat recovery is deactivated, next request will not be fulfilled until the end of time set in the rC05 (counted from the moment of exit the recovery operation).

HEAT RECOVERY: CIRCUIT CONFIGURED WITH MORE THAN ONE COMPRESSOR

Enter in heat recovery

If:

- chiller unit is on

- at least a compressor is ON
- condenser temperature / pressure are lower than rC06

the heat recovery starts if the digital input configured as recovery is active and, in case of use of the probe recovery, if the temperature is below the rC10 set point (both conditions must be fulfilled):

- if the heat recovery request comes when the number of compressors switched ON is lower than the maximum available, the recovery valve is activated with delay of RC02 seconds; during this delay the switching ON of more compressors, if required by the regulation, is inhibited.
  Once the valve is turned ON, any additional compressors required by regulation chiller compressors will be delayed of rC03 seconds after the valve

• if the heat recovery request comes when the maximum number of available compressor is switched ON, a compressor is switched off and a delay time rC02 starts counting; once elapsed, the heat recovery valve is activated, condenser fan is switched OFF (if rC09=1) and starts conting a delay rC03 after wich the compressor will be re-started (if CO02 time is elapsed).

Exit from heat recovery

- If:
  - Heat recovery digital input is de-activated or heat recovery temperature rise over RC10 + RC13, when the number of compressors switched ON is lower than the maximum available for that circuit, recovery valve is switched OFF after a delay of rC02 seconds; during rC02 delay the switching ON of more compressors of the circuit, if required by the regulation, is inhibited.
    Once the valve is turned OFF, any additional compressors required by regulation chiller compressors will be delayed of rC03 seconds after the valve.
  - Heat recovery digital input is de-activated or heat recovery temperature rise over RC10 + RC13 when the maximum number of available compressor for that circuit is switched ON, then:
    - a compressor will be switched OFF
    - starts counting rC02 delay, after that recovery valve is switched OFF
    - after rC03 delay the compressor will be re-started (if CO02 time is elapsed).

35.2 DISABLE HEAT RECOVERY DUE TO CONDENSER HIGH PRESSURE – TEMPERATURE

If the condenser pressure or temperature (depends on the presence of the pressure transducer or condenser temperature sensor) exceeds the value se t by parameter rC06, the heat recovery is deactivated.
If heat recovery is disabled the display shows the message b1rC = recovery disabled.
Heat recovery is re-activated if the pressure / temperature drops below the rC06-rC07 value.
Heat recovery is disabled for rC08 time, after which it will be refreshed.

35.3 HOW TO DISABLE MANUALLY THE HEAT RECOVERY

It is possible to disable manually the heat recovery:

- Press MENU button
- Press arrow keys to search rEC menu
- Press SET button
- The display shows recovery status: En = enabled, diS = disabled
- press and hold SET button for some seconds to disable or re-activate the heat recovery
- If necessary press and hold SET button to enable or disable the heast recovery
  - The En or diS status flashes
  - Change the status by pressing the arrow keys
  - Confirm your choice by pressing the SET button
- By pressing the arrow keys you can see the current state of the heat recovery

36. HUMIDITY CONTROL

CF4 parameter allows to enable the dehumidification and/or the humidification.

CF4 Enable de-humidification and/or the humidification
0. Humidity control disabled
1. Enable only dehumidification
2. Enable only humidification
3. Enable dehumidification and humidification

An analog input has to be configured as humidity probe or it is possible to use the internal probe of the Visograph 2.0 (in the Visograph 2.0 humidity and temperature probe are optional).
In case of use of both, probe connected to the IC200 EVO and Visograph with internal probes, for humidity control the Ichill uses the probe connected to the analog input.

36.1 DEHUMIDIFICATION

To use dehumidification function:

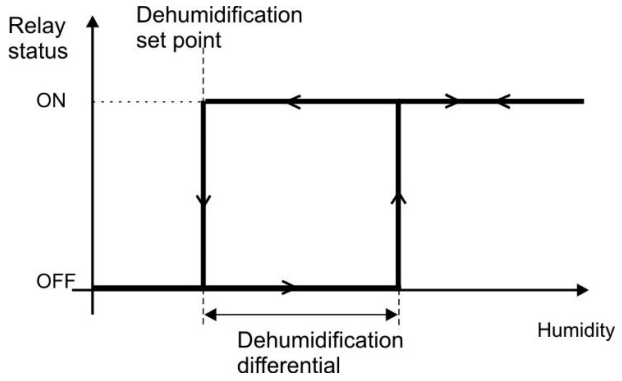
- the Ichill has to be configured to manage a chiller (only cooling)
- the Ichill has to be configured to manage an heat pump (cooling and heating)

Dehumidification is enabled only if the device is in cooling mode, both in regulation or set point reached.
If the controller is regulating for cooling with only free cooling (compressors switched off), the dehumidification function is inhibited.
When the controller detects the conditions for dehumidifying, he value set by a specific parameter is subtracted from the cooling set point; the ON / OFF and modulating output are managed as shown below.
When dehumidification is ongoing the set point could be modified by:
• Energy saving
• Dynamic set point
• Dehumidification

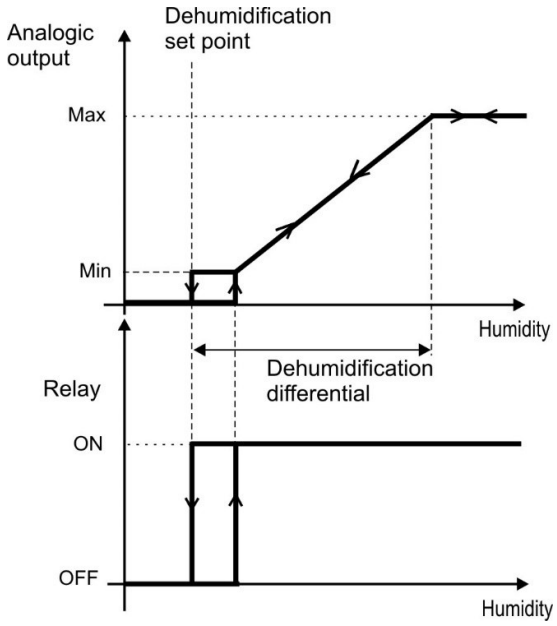
With dehumidification in progress, in air / air applications if the flow temperature falls below Ar1 / Ar3 threshold, the support heaters are activated to counteract the lowering of the temperature (standard function to be configured in the Ichill).

AF35	Dehumidification minimum set point	0	AF36	rH%	int
AF36	Dehumidification maximum set point	AF35	100	rH%	int
AF37	Dehumidification set point	AF35	AF36	rH%	int
AF38	Dehumidification differential	1	25	rH%	int
AF39	Offset cooling set point in dehumidification	0.1 0	25.0 45	°C °F	Dec int

Dehumidification relay



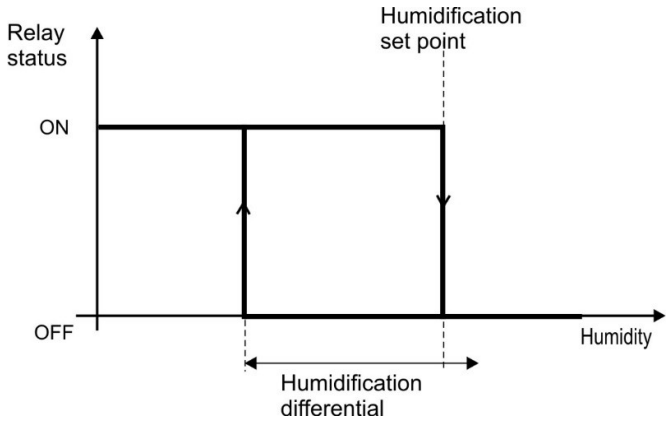
Dehumidification relay and analog output
If both dehumidification relay and analog output are configured, the relay is ON when the analog output has a value bigger than zero.
The analog output has an hysteresis to avoid the ON/OFF due to temperature instability.



36.2 HUMIDIFICATION

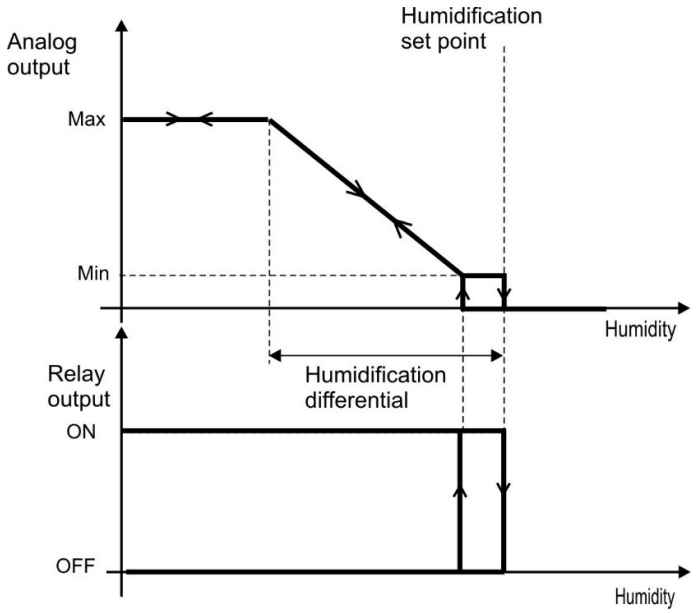
Humidification function is configurable for chiller and heat pump unit; the humidification is enabled only if the compressors are OFF and the free cooling is not ongoing.

Humidification relay

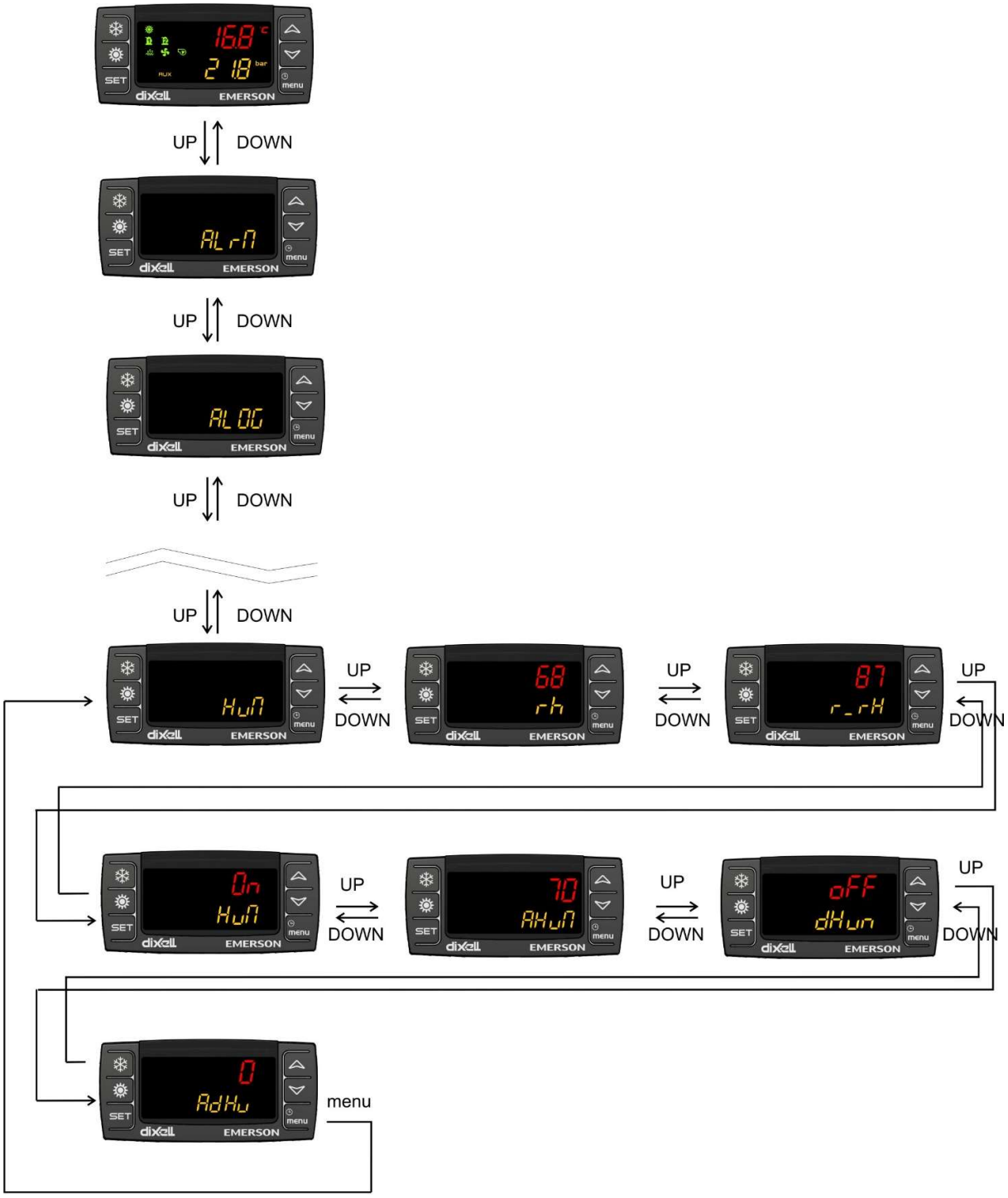


AF31	Humidification minimum set point	0	AF32	rH%	int
AF32	Humidification maximum set point	AF31	100	rH%	int
AF33	Humidification set point	0	100	rH%	int
AF34	Humidification differential	1	25	rH%	int

Humidification relay and analog output
If both humidification relay and analog output are configured, the relay is ON when the analog output has a value bigger than zero.
The analog output has an hysteresis to avoid the ON/OFF due to temperature instability.



36.3 HUMIDIFICATION AND DEHUMIDIFICATION DISPLAY VISUALIZATION



37. AUXILIARY RELAYS

Two auxiliary regulators for the management of two ON/OFF relay outputs, completely independent from the other regulations, can be configured if needed.
The outputs are configurable:

- a relay has to be configured as Auxiliary output 1 or Auxiliary output 2
- a reference probe has to be associated to each relay
- separated set point for cooling and heating regulation are available

- direct, inverse or automatic action can be assigned
- it is possible to enable the relay operaton only in cooling mode, only in heating mode or both

It is possible to set the maximum time of activation of each relay (parameter US21); after this time, the output is switched off.
The relay can be re-activate at the next request for auxiliary output regulation.
If US21 has value 0, this function is disabled.

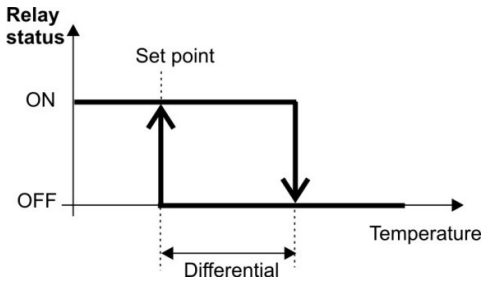
uS01 configuration auxiliary relay 1
uS11 configuration auxiliary relay 2

0 = Disabled
1 = Function always enabled (also in stand-by or remote off) in direct action
2 = Function enabled only if the device is ON (cooling or heating) in direct action
3 = Function always enabled (also in stand-by or remote off) in inverse action
4 = Function enabled only if the device is ON (cooling or heating) in inverse action
5 = Function enabled only if the device is ON (cooling or heating) in direct action in heating mode and inverse action in cooling mode

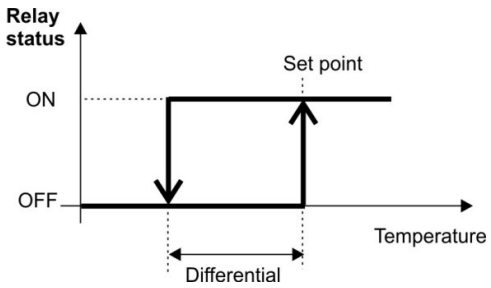
To configure the regulation of the auxiliary relay, please refer to uS parameters.

If uS01 and / or uS11 are set to 5 value, the device sets automatically direct or inverse action depending on the operating mode active on that moment (direct action in heating mode and inverse action in cooling mode).
In STD-BY, or OFF by digital input, or OFF by Modbus command, the output is deactivated.

Auxiliary relay with direct action



Auxiliary relay with inverse action



US 1	Auxiliary relay 1 operating mode 0 = Disabled 1 = Function always enabled (also in stand-by or remote off) in direct action 2 = Function enabled only if the device is ON (cooling or heating) in direct action 3 = Function always enabled (also in stand-by or remote off) in inverse action 4 = Function enabled only if the device is ON (cooling or heating) in inverse action 5 = Function enabled only if the device is ON (cooling or heating) in direct action in heating mode and inverse action in cooling mode	0	5		
US 2	Analog input configuration for auxiliary relay 1 control. Allows to select which probe value Pb1..Pb10 controls the relay	1	10		
US 3	Auxiliary relay 1 summer minimum set point	-50.0 -58 -1.0 -14	US5	°C °F Bar Psi	Dec int Dec int
US 4	Auxiliary relay 1 summer maximum set point	US5	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
US 5	Auxiliary relay 1 summer set point	US3	US4	°C °F Bar Psi	Dec int Dec int
US 6	Auxiliary relay 1 winter minimum set point	-50.0 -58 -1.0 -14	US8	°C °F Bar Psi	Dec int Dec int
US 7	Auxiliary relay 1 winter maximum set point	US8	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
US 8	Auxiliary relay 1 winter set point	US6	US7	°C °F Bar Psi	Dec int Dec int
US 9	Auxiliary relay 1 summer differential	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
US 10	Auxiliary relay 1 winter differential	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
US 11	Auxiliary relay 2 operating mode 0 = Disabled 1 = Function always enabled (also in stand-by or remote off) in direct action 2 = Function enabled only if the device is ON (cooling or heating) in direct action 3 = Function always enabled (also in stand-by or remote off) in inverse action 4 = Function enabled only if the device is ON (cooling or heating) in inverse action 5 = Function enabled only if the device is ON (cooling or heating) in direct action in heating mode and inverse action in cooling mode	0	5		

US 12	Analogue input configuration for auxiliary relay 2 control . Allows to select which probe value Pb1..Pb10 controls the relay	1	10		
US 13	Auxiliary relay 2 summer minimum set point	-50.0 -58 -1.0 -14	US15	°C °F Bar Psi	Dec int Dec int
US 14	Auxiliary relay 2 summer maximum set point	US15	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
US 15	Auxiliary relay 2 summer set point	US13	US14	°C °F Bar Psi	Dec int Dec int
US 16	Auxiliary relay 2 winter minimum set point	-50.0 -58 -1.0 -14	US18	°C °F Bar Psi	Dec int Dec int
US 17	Auxiliary relay 2 winter maximum set point	US18	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
US 18	Auxiliary relay 2 winter set point	US16	US17	°C °F Bar Psi	Dec int Dec int
US 19	Auxiliary relay 2 summer differential	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
US 20	Auxiliary relay 2 winter differential	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
US 21	Maximum operating time of auxiliary realys	0	250	min	
...					
US 61	AUX 1 relay operation mode 1= only in Chiller 2= only in Heat pump 3= in Chiller and Heat pump	1	3		
US 62	AUX 2 relay operation mode 1= only in Chiller 2= only in Heat pump 3= in Chiller and Heat pump	1	3		

38. AUXILIARY PROPORTIONAL OUTPUTS

Two analog outputs, completely independent from the other regulations, can be configured if needed.
The outputs are configurable:

- an analog output has to be configured as Auxiliary output 1 or Auxiliary output 2
- a reference probe has to be associated to each analog output
- separated set point for cooling and heating regulation are available
- direct, inverse or automatic action can be assigned
- it is possible to enable the relay operaton only in cooling, only in heating or both

uS22 configuration auxiliary output 1
uS34 configuration auxiliary output 2

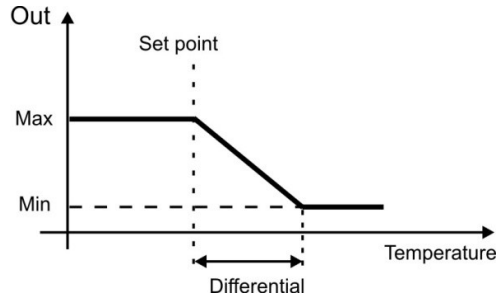
0 = Disabled
1 = Function always enabled (also in stand-by or remote off) in direct action

2 = Function enabled only if the device is ON (cooling or heating) in direct action
3 = Function always enabled (also in stand-by or remote off) in inverse action
4 = Function enabled only if the device is ON (cooling or heating) in inverse action
5 = Function enabled only if the device is ON (cooling or heating) in direct action in heating mode and inverse action in cooling mode

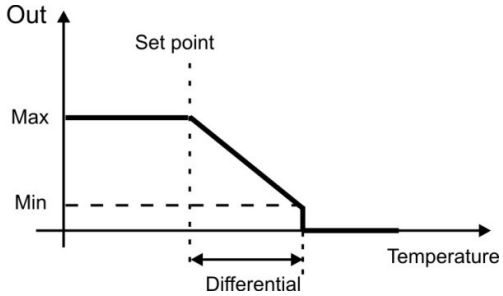
If uS01 and / or uS11 are set to the 5 value, the device sets automatically direct or inverse action depending on the operating mode active on that moment (direct action in heating mode and inverse action in cooling mode).
In STD-BY, or OFF by digital input, or OFF by Modbus command, the output is deactivated

Auxiliary Proportional output: Direct action

US46=0

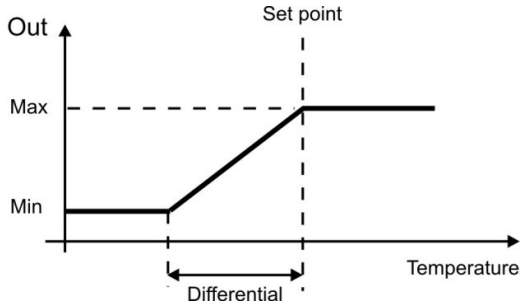


US46=1

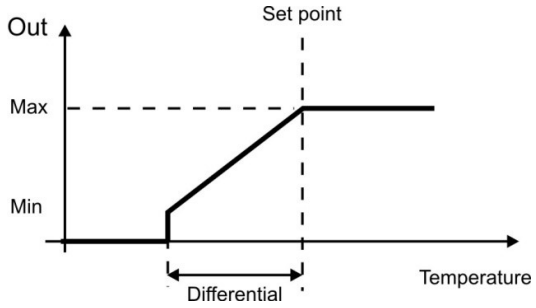


Auxiliary Proportional output: Inverse action

US46=0



US46=1



US 22	Auxiliary proportional output n° 1 operating mode 0 = Disabled 1 = Function always enabled (also in stand-by or remote off) in direct action 2 = Function enabled only if the device is ON (cooling or heating) in direct action 3 = Function always enabled (also in stand-by or remote off) in inverse action 4 = Function enabled only if the device is ON (cooling or heating) in inverse action 5 = Function enabled only if the device is ON (cooling or heating) in direct action in heating mode and inverse action in cooling mode	0	5		
US 23	Analogue input configuration for auxiliary control 1 Allows to select which probe value Pb1..Pb10 controls output	1	10		
US 24	Analog output 1 summer minimum set point	-50.0 -58 -1.0 -14	US26	°C °F Bar Psi	Dec int Dec int
US 25	Analog output 1 summer maximum set point	US26	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
US 26	Analog output 1 summer set point	US24	US25	°C °F Bar Psi	Dec int Dec int
US 27	Analog output 1 winter minimum set point	-50.0 -58 -1.0 -14	US29	°C °F Bar Psi	Dec int Dec int
US 28	Analog output 1 winter maximum set point	US29	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
US 29	Analog output 1 winter set point	US27	US28	°C °F Bar Psi	Dec int Dec int
US 30	Analog output 1 summer differential	0.1 0 0.1 0	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
US 31	Analog output 1 winter differential	0.1 0 0.1 0	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
US 32	Analog output 1 minimum value	0	US33	%	
US 33	Analog output 1 maximum value	US32	100	%	

US 34	Auxiliary proportional output n° 2 operating mode 0 = Disabled 1 = Function always enabled (also in stand-by or remote off) in direct action 2 = Function enabled only if the device is ON (cooling or heating) in direct action 3 = Function always enabled (also in stand-by or remote off) in inverse action 4 = Function enabled only if the device is ON (cooling or heating) in inverse action 5 = Function enabled only if the device is ON (cooling or heating) in direct action in heating mode and inverse action in cooling mode	0	5		
US 35	Analogue input configuration for auxiliary 2 control Allows to select which probe value Pb1..Pb10 controls output	1	10		
US 36	Analog output 2 summer minimum set point	-50.0 -58 -1.0 -14	US38	°C °F Bar Psi	Dec int Dec int
US 37	Analog output 2 summer maximum set point	US38	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
US 38	Analog output 2 summer set point	US36	US37	°C °F Bar Psi	Dec int Dec int
US 39	Analog output 2 winter minimum set point	-50.0 -58 -1.0 -14	US41	°C °F Bar Psi	Dec int Dec int
US 40	Analog output 2 winter maximum set point	US41	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
US 41	Analog output 2 winter set point	US39	US40	°C °F Bar Psi	Dec int Dec int
US 42	Analog output 2 summer differential	0.1 0 0.1 0	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
US 43	Analog output 2 winter differential	0.0 0 0.1 0	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
US 44	Analog output 2 minimum value	0	US45	%	
US 45	Analog output 2 maximum value	US44	100	%	
US 46	Operation mode under minimum value	0	1		
...					
US 63	AUX 1 analog output operation mode 1= only in Chiller 2= only in Heat pump 3= in Chiller and Heat pump	1	3		
US 64	AUX 2 analog output operation mode 1= only in Chiller 2= only in Heat pump 3= in Chiller and Heat pump	1	3		

39. PROBE SELECTION FOR REGULATION WITH SELECTABLE PROBE

For some regulators it is possible to select the reference probe; in this case select the probe as showed below:

0 Not used
1 Pb1 of Ichill
2 Pb2 of Ichill
3 Pb3 of Ichill
4 Pb4 of Ichill
5 Pb5 of Ichill
6 Pb6 of Ichill
7 probe mounted in remote keyboard 1 (VI613)
8 probe mounted in remote keyboard 2 (VI613)
9 Pb1 of electronic expansion valve 1 (IEV)
10 Pb2 of electronic expansion valve 1 (IEV)
11 Pb3 of electronic expansion valve 1 (IEV)
12 Pb4 of electronic expansion valve 1 (IEV)

40. ENERGY SAVING AND DEVICE SWITCHING ON BY PROGRAM SCHEDULE

40.1 ENERGY SAVING BY DIGITAL INPUT

The Energy saving function is enabled when a digital input configured as “Energy saving” is active.
When the Energy Saving function is active:

- to the set point is applied an offset set by ES14 and ES16 parameters (different for cooling and heating)
- the regulation differential is set by ES15 and ES17; standard differentials (set by St07 e St08 parameters) are not used if the Energy Saving is active
- if the Energy saving is active, the first pressure of SET button allows to read the set point set by parameter and second pressure allows to read the real set point (set by parameter modified by Energy saving finction)

40.2 ENERGY SAVING BY PROGRAM SCHEDULE

This function can be used only if the Ichill has the real time clock on board (it is optional) and allows to set three events per day.
If the Energy saving is active:

- to the set point is applied an offset set by ES14 and ES16 parameters (different for cooling and heating)
- the regulation differential is set by ES15 and ES17; standard differentials (set by St07 e St08 parameters) are not used if the Energy Saving is active
- if the Energy saving is active, the first pressure of SET button allows to read the set point set by parameter and second pressure allows to read the real set point (set by parameter modified by Energy saving finction)

Program schedule:
ES01..ES06 parameters allow to set start and stop time for each time band

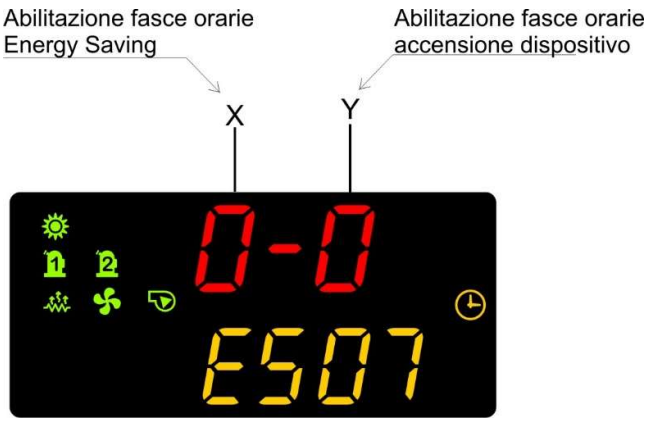
How to enable time bands:
the parameters ES07..ES13 allow to enable the time bands of each day of the week
Each parameter is composed by two numbers:

- left number, identified by “X”, allows to enable the time table for the Energy saving
- right number, identified by “Y”, allows to enable the time table for the switching ON of the device

The parameters ES07..ES13 can be set in the following way:
0= function disabled
1= 1st period enabled
2= 2nd period enabled

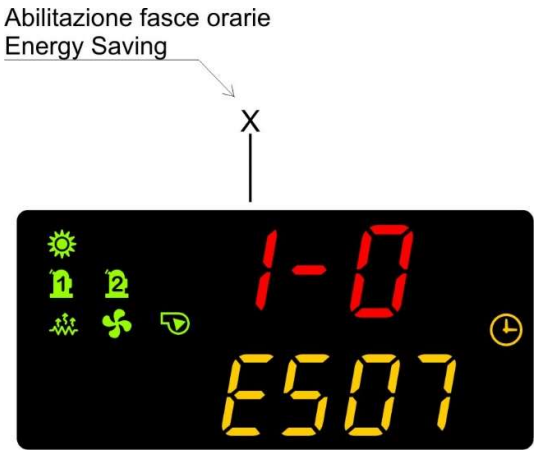
3= 1st and 2nd periods enabled
4= 3rd period enabled
5= 1st and 3rd periods enabled
6= 2nd and 3rd periods enabled
7= 1st, 2nd and 3rd periods enabled

DISPLAY VISUALIZATION OF THE ES07..ES13 PARAMETERS



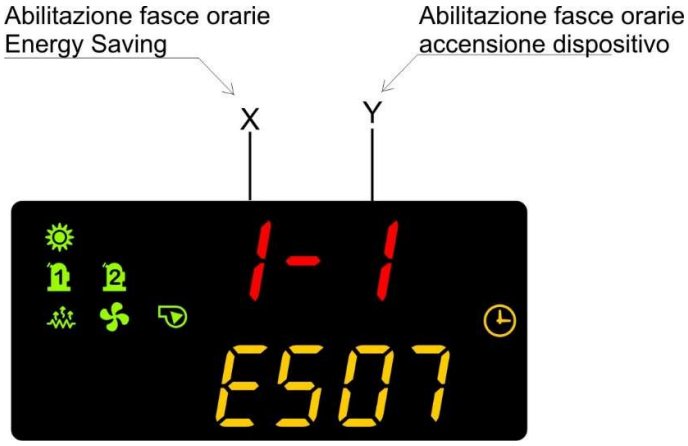
Example of time band configuration

- Enable time band 1 for Energy Saving



- Enable time band 1 to switch ON the device

- Enable time band 1 to switch ON the device and at the same time enable the Energy Saving



Energy Saving set point:
ES14..ES17 parameters allow to set the offset to add or substract to the set point and set the differential to use when the function is active.

ES14 offset to apply to the set point in cooling to obtain the second set point
ES15 cooling differential to use when the Energy saving is active
ES16 offset to apply to the set point in heating to obtain the second set point
ES17 heating differential to use when the Energy saving is active

How to switch on the controller when it is off by real time clock
When the unit is in OFF by RTC and the parameter ES18 > 0, if the user switch on the controller by keyboard the unit stay on for ES18 time; when this time is elapsed the unit return to OFF.

41. DYNAMIC SETPOINT

The controller allows to modify the temperature set point by adding or subtracting a proportional value depending on the value of a specific analogue input; this analog input can be:

- Outside temperature; if an analog input is configured to detect the outside temperature, this analog input is used also for the dynamic set point
- Dedicated 4..20mA probe; if an analog input is configured as “4..20mA probe for dynamic set point”, this analog input is used for the dynamic set point

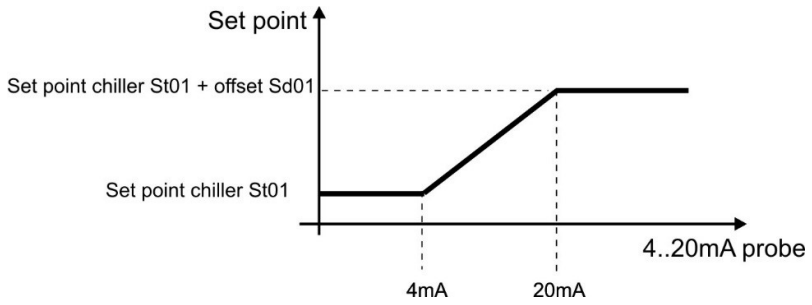
This function is enabled if:

- in chiller mode the parameter Sd01 must have a value bigger than 0
- in heat pump mode the parameter Sd02 must have a value bigger than 0
- an analog input has to be configured as 4÷20mA for dynamic setpoint or as outside temperature

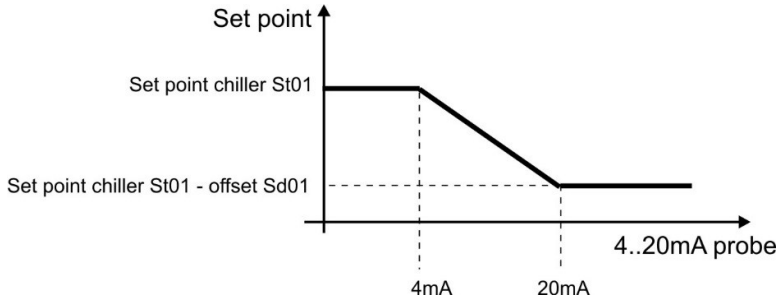
Note:
when a probe is configured as outside temperature, the Dynamic set point is automatically enabled; if it is not necessary to use this function, set Sd01=0 and Sd02=0.

Dynamic setpoint diagram

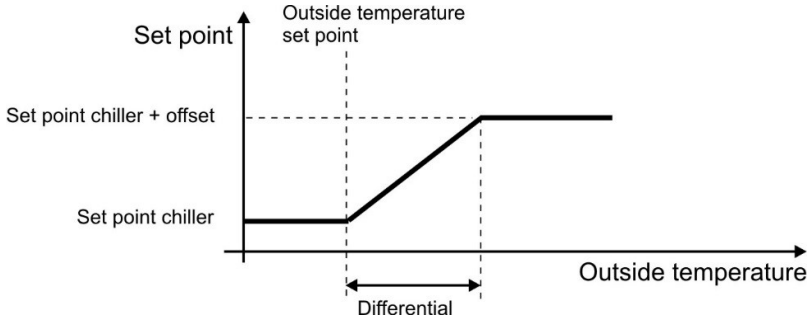
Analog input configured as 4..20mA for dynamic setpoint and positive offset:



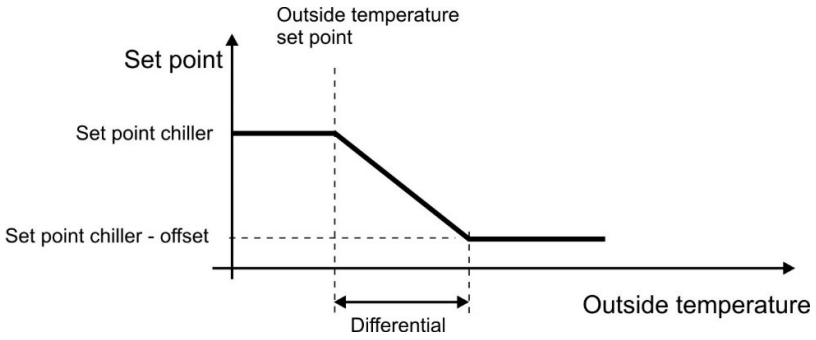
Analog input configured as 4..20mA for dynamic setpoint and negative offset:



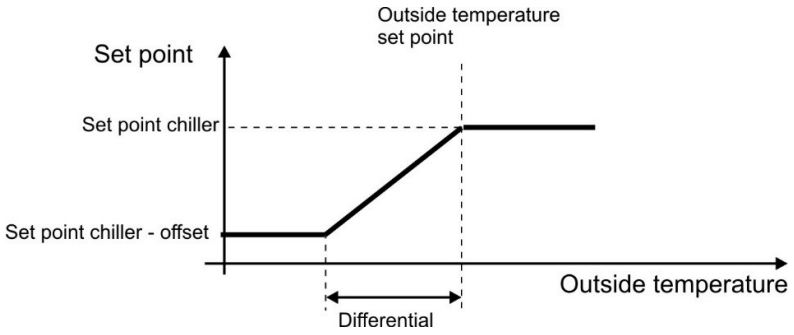
Analog input configured as outside temperature, positive differential and positive offset:



Analog input configured as outside temperature, positive differential and negative offset:



Analog input configured as outside temperature, negative differential and negative offset:



42. BY-PASS GAS VALVE

This function can be enabled only in chiller unit; instead of switch-OFF the compressor when the temperature reaches the set point, the compressor is always maintained ON and the by-pass gas valve by-pass the gas to significantly reduce the cooling capacity of the plant to guarantee an high precision of the regulation.
An analog outputs, configured as ON/OFF by-pass valve, has to be configured; the use of the analog output is due to the fact that having a continuous ON/OFF cycle a relay could have a very short operation life (external SSR relay has to be used).
The by-pass valve has a setpoint defined by bP02 parameter; the bypass valve set point and the compressor shutdown set point are connected by the differential bP20 (compressor shutdown set = bypass valve set - bP20).
The cooling regulation probe, defined by parameter St09, regulates both the compressor and the by-pass valve.
The by-pass valve set point can be modified by the Energy Saving function and the dynamic set point:

- press SET key to display the by-pass valve set point; the lower display shows Setb. The compressor shutdown set point (SetC) is not displayed.
- press and hold SET key to change the by-pass valve set point (and therefore the compressor shutdown set point, being related to the by-pass valve set point). The compressor shutdown set point will not be editable.

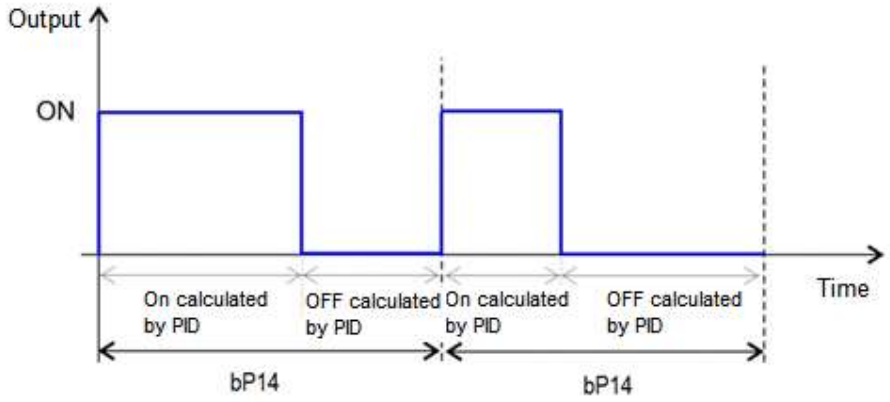
There is the possibility to turn OFF the compressor if the by-pass valve remains active for too long time.

If the by-pass gas valve is enabled, the following adjustments can not be enabled:

- Heating mode
- Condensing unit
- Domestic hot water
- IEV electronic expansion valve driver control

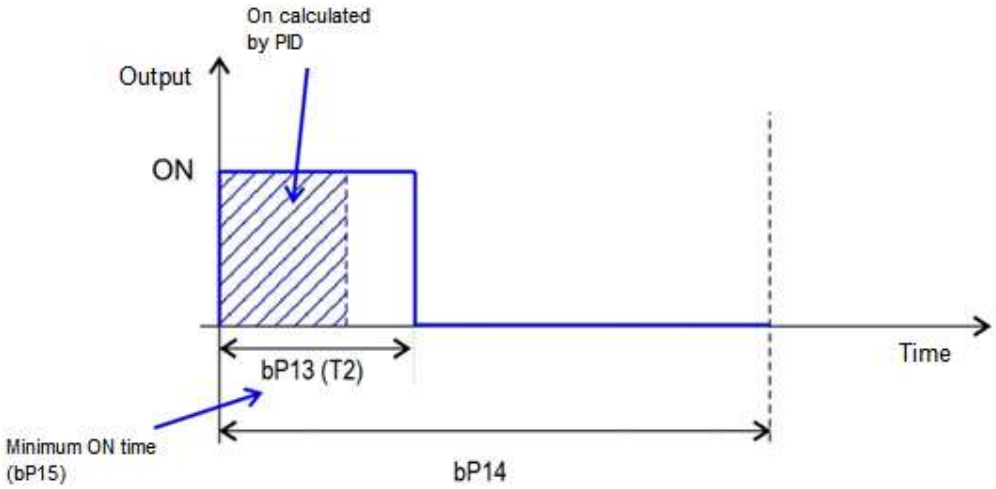
If one of the settings / functions listed above is enabled, the AC15 configuration alarm is generated

PID SETTING



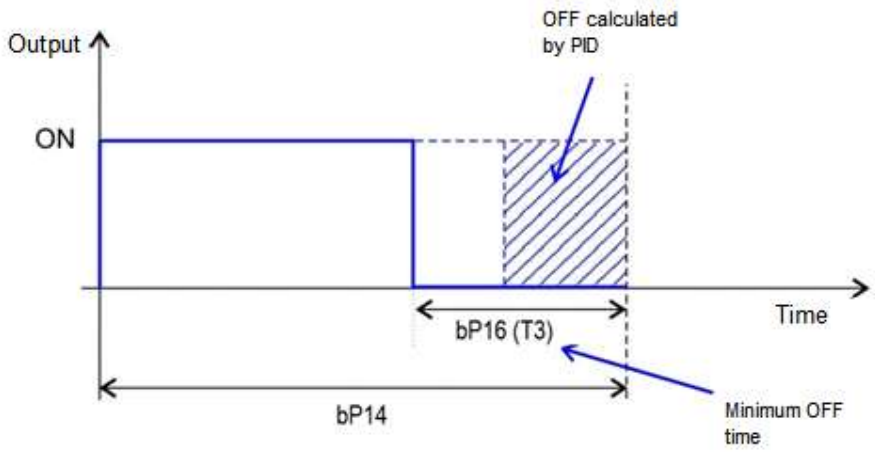
The minimum activation time and the minimum de-activation time are settable:
Minimum activation time

- bP14 PID period time
- bP15 minimum activation time



Minimum de-activation time

- bP14 PID period time
- bP16 minimum de-activation time



Other parameters:

bP17 Sample time of the derivative component (Sr)
Derivative component is calculated every bP17 seconds

bP18 Band adjustement (rS)
This parameter is used to adjust error calculation (error=bP2 + bP18 – probe value)

bP19 Integral band limitation (Ar)
Anti reset wind up, limit the integral contribution, forcing the error between –Ar and Ar.
If bP19=0, the integral band limitation is disabled.

By-pass balve maximum time

If the PID calculation reaches 100% (the by-pass valve reach the maximum time of the evaporator by-pass), the bP21 delay starts counting; if the PID calculation remains over 70%, when bP21 time is elapsed the compressor is switched off.
The compressor is switched on if regulation temperature increase over by-pass valve set point and CO02 and CO91 time are elapsed.
To disable this function is necessary to set bP21=0.

Evaporator inlet temperature and tank outlet temperature differential

It is possible to control the differential temperature between two probes; typically these two probes are evaporator inlet temperature and tank outlet temperature differential, that have to be configured by bP08 (T1 temperature) and bP09 (T2 temperature).
When the difference between these two temperatures is lower than bp05 for Bp06 TIME, to the by-pass valve set point is added Bp07 value.
This new set point remains active till the compressors are switched off.

Analg output configured as by-pass valve.

An analog outp has to be configured as by-pass valve; optiona are:

- bP10 = 0 by-pass valve not managed
- 0.1< bP 10 < 9.9 by-pass valve managed in ON/OFF mode; the output value is determined by the value of bP10 (Bp10= 5, is 5 Volts)
- bP 10 = 10 by-pass valve is managed in modulation way; the PID reguulation calculates the output value between 0V to 10V

Parameters involved

Parameter	Description	Min	Max	Unit of measure
bP 1	Enable by-pass valve	0	1	
bP 2	By-pass valve set point	-50.0 -58	110 230	°C °F
bP 3	By-pass valve minimum set point	-50.0 -58	bP 2	°C °F
bP 4	By-pass valve maximum set point	bP2	110 230	°C °F
bP 5	Differential temperaure: T1 – T2	0 0	25.0 45	°C °F
bP 6	Delay time to apply the offset to the By-pass valve set point	0	250	Min
bP 7	Offset applied to By-pass valve set point	-12.0 -21	12.0 21	°C °F
bP 8	Differential temperature probe 1 selection* 0= non configured 1= Pb1 of the Ichill 2= Pb2 of the Ichill .... * see paragraph 38	0	12	
bP 9	Differential temperature probe 2 selection * 0= non configured 1= Pb1 of the Ichill 2= Pb2 of the Ichill .... * see paragraph 38	0	12	
bP 10	By-pass valve output value • 0.1< bP10 < 9.9 ON/OFF output with value set by bP10 • bP10 = 10 modulated output between 0V to 10V depending on PID calculation	0	10.0	
bP 11	PID: Proportional component	0 0	25.0 45	°C °F
bP 12	PID: Integral component	0	250	sec
bP 13	PID: Derivative component	0	250	sec
bP 14	PID: period of by pass valve	2	20	sec
bP 15	By-pass valve minimum activation time T2 (if ON/OFF output)	1	10	sec
bP 16	By-pass valve minimum de-activation time T3 (if ON/OFF output)	1	10	sec
bP 17	Derivative component sampling time (Sr)	1	10	sec
bP 18	Band adjustment (rS)	-12.0 -21	12.0 21	°C °F
bP 19	Integral band limitation (Ar)	0 0	25.0 45	°C °F
bP 20	Switching off compressor differential (from by-pass valve set point)	0.1 1	25.0 45	°C °F
bP 21	By-pass valve maximum activation time	0	250	Min x 10

43. MASTER / SLAVE FUNCTION

The IC100 EVO can be used as a slave in a master / slave configuration; the master is represented by a device that has the specific function, the IPM500 Master.
The use of the device as a slave is enabled automatically when the Ichill is connected to the Master and the serial communication with the Master work correctly.
During operation, the slave:

• does not calculate the power to be supplied to the system; the power is calculated by the Master and sent to the Slave
• operates normally the procedure to enter to the defrost, but before starting the defrost it need the Master consent
• can be configured to manage compressors type ON / OFF (not inverter, not with capacity step)
• can not be configured to manage the domestic hot water
• can not be configured to handle condensing units

More detailed specifications of Master / Slave operation and configuration are in the IPM500 Master / Slave documentation.

44. OPERATION RELATED TO THE REAL TIME CLOCK

44.1 REAL TIME CLOCK DISABLED BY DIGITAL INPUT

When the digital input configured as “Operation working mode: by RTC or keyboard” is active, the real time clock is disabled and all the function involved with the real time clock are disabled.

44.2 “ONLY SUPPLY FAN” WORKING MODE”

This function can be enabled only if the Ichill is provided with internal clock.
If one of the digital input is configured as “Operation mode with supplay fan only” and it is activated, the Ichill enables only the supply fan (other loads are disabled); the supplay fan works according to the time table programming (parameters ES01..ES13).

ATTENTION:
When the supply fan is on and the Ichill is forced in STD-BY or remote OFF (by digital input), the supply fan will be switched off with a CO18 delay.

45. PASSWORD MANAGEMENT

Following the list of the password managed by the device:

- A046 Password to reset alarms and to enter to ALrM menu (default password=4)
- Pr1 Password: password to enter to Pr1 parameters level (default password=1)
- Pr2 Password: password to enter to Pr2 parameters level (default password=2)
- Pr3 Password: password to enter to Pr3 parameters level (default password=3)

46. POWER FAILURE

After a power failure when the power supply is correctly restored:

1. The device return to the status that it had before the power failure
2. If the power failure occurs during a defrost, the defrost procedure is cancelled
3. If before the power failure there was an alarm to be reset manually, when the power supply is correctly restored the alarm has to be reset manually (the alarm is not automatically reset after the power on).

47. MESSAGES - ALARM CODES

The alarm codes are defined by an alphanumeric code.
Alarm typology:

- **A** = alarm of the unit
- **b** = alarm of the circuit
- **C** = alarm of the compressor

47.1 AUTOMATIC / MANUAL ALARM DESCRIPTION

The menù ALrM allows to read/reset the alarms.
An alarm can be:

- **automatic reset**: the alarm reset automatically when the cause of the alarm is not present
- **manual reset**: manual reset is requested

Some alarms are managed by number of events per hour; it is possible to set a number of alarms per hour after witch the alarm become a manual reset.
Following an example of low pressure alarm:

- A005=0 the alarm is always manual reset
- 0<A005<16:
  - the alarm is automatic if the number of the event is < A005
  - the alarm is manual if the number of the event is = A005
- A005=16 the alarm is always automatic reset

Compressor overload alarm is managed in a special way:

- when the number of the alarms per hour is < A020, the alarm is a manual reset
- when the number of the event is = A020, the alarm is manual reset and a password is requested. In this case the alarm is stored and visible in COtr menu.

If the cause of alarm is already present, the display shows “no” and it is not possible to reset the alarm.
If the cause of alarm is not present, the display shows “Rst” and it is possible to reset the alarm.

AP1 ... AP6, APr1.. Apr2, APU1 .. APU4 PROBE FAILURE

Alarm display	**AP1** = PB1 probe alarm…**AP6** = PB6 regulator probe alarm **APr1** = remote keyboard 1 alarm probe …**APr2** = remote keyboard 2 alarm probe **APU1** expansion valve probe 1 alarm... **APU4** expansion valve probe 2 alarm
Cause of alarm	Probe configured but the read-out is not in the proper range
Reset	Value in the range of the specific probe
Restart	Automatic
Symbol	⚠ blinking
Signal	Alarm Relay and buzzer on
Loads status	The behaviour of the loads depend on witch probe is on error (regulation probe = compressors OFF; external temperature probe = only functions involved on this probe are disabled)

47.2 LAN CONFIGURATION ALARMS

AUAL Failed Communication With Electronic Expansion Valve

Alarm display	**AUAL**
Cause of alarm	Failed communication with electronic expansion valve
Reset	Automatic when the communication is working properly
Restart	Automatic
Symbol	⚠ blinking
Signal	Alarm relay buzzer ON
Loads status	All loads OFF

b1UA – b2UA Electronic Expansion Valve Alarm

Alarm display	**b1UA** (electronic expansion valve 1 alarm) **b2UA** (electronic expansion valve 2 alarm)
Cause of alarm	The alarm is detected when the IEV electronic expansion valve controller, connected through LAN, detects an alarm on valve 1 or valve 2 management
Reset	When te alarm on the IEV controller is reset
Restart	Automatic
Symbol	⚠ blinking
Signal	Alarm relay buzzer ON
Loads status	Loads belonging to the gas circuit of the faulty electronic expansion valve are forced OFF

Atr1 REMOTE TERMINAL 1/ Atr2 REMOTE TERMINAL 2 (VI613) COMMUNICATION ALARM

Alarm display	**Atr1** (communication alarm with remote terminal 1) **Atr2** (communication alarm with remote terminal 2)
Cause of alarm	Lack of serial communication with remote keyboard
Reset	When the serial communication works properly
Restart	Automatic
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads status	Compressors OFF it the remote terminal has internal probe and it is the regulation probe. Other loads are managed according to their specific configuration.

AtrE: LCD REMOTE TERMINAL (VISOGRAPH OR VISOTOUCH) COMMUNICATION ALARM

Alarm display	**AtrE**
Cause of alarm	Failure on serial communication with the LCD remote terminal
Reset	When the serial communication works properly
Restart	Automatic
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads status	Compressors OFF it the remote terminal has internal probe and it is the regulation probe. Other loads are managed according to their specific configuration.

noL Keyaboard Alarm

Alarm display	**noL**
Cause of alarm	No data communication between the remote terminal and the main controller.
Reset	When the communication is restored. Note: check wiring connections, address of the VI613 if two external keyboard are configured; respect the maximum length of wiring cables.
Loads	All loads work normally if the regulation probe is not the probe mounted in the external keyboard.

47.3 CIRCUIT ALARM

b1HP High Pressure switch circuit

Alarm display	**b1HP**
Cause of alarm	High pressure switch (digital input) is active
Reset	High pressure switch (digital input) not active

Restart	• Always manual if A054 = 0
	• Always automatic if A054 =16
	• Automatic to manual if 0<A054<16:
	  ○ Automatic if the number of alarms in the last hour is lower than A054
	  ○ Manual if the number of alarms in the last hour reaches A054

Symbol	⚠ blinking
Signal	Alarm Relay and buzzer on
Loads status	Compressors off. If FA02=0 the fan is forced at maximum speed for 60 seconds then switched off. If FA02=1 the fan is forced at maximum speed for 60 seconds then regulate according to normal fan regulation. Other loads are managed according to their specific configuration.

b1hP High condensing pressure / temperature

Alarm display	**b1hP**
Cause of alarm	Condensing temperature/pressure higher than A009 thresold
Reset	Condensing temperature/pressure lower than A009 – A010

Restart	• Always manual if A054 = 0 • Always automatic if A054 =16 • Automatic to manual if 0<A054<16: o Automatic if the number of alarms in the last hour is lower than A054 o Manual if the number of alarms in the last hour reaches A054
Symbol	⚠ blinking
Signal	Alarm Relay and buzzer on
Loads status	Compressors off. If FA02=0 the fan is forced at maximum speed for 60 seconds then switched off. If FA02=1 the fan is forced at maximum speed for 60 seconds then regulate according to normal fan regulation. Other loads are managed according to their specific configuration.

b1lp Low condensing temperature / pressure

Alarm display	**b1lP**
Cause of alarm	When condensing temperature / pressure (only the condenser probe is configured) is lower than A003 thresold. Setting A008=1 it is possible to disable the alarm detection when the compressors are OFF. Setting A006=1 it is possible to enable the low pressure alarm detection during the defrost. The alarm is not signalled: • in defrost, for the time A007, when the 4-way valve communtates • for the time set in A001 after turning on the compressor
Reset	When the temperature/pressure increases over A003 + A004
Restart	• Always manual if A005 = 0 • Always automatic if A005=16 • Automatic to manual if 0< A005<16: o Automatic if the number of alarms in the last hour is lower than A005 o Manual if the number of alarms in the last hour reaches A005
Symbol	⚠ blinking
Signal	Alarm Relay and buzzer on
Loads status	Compressors OFF. Other loads are managed according to their specific configuration.

b1LP low pressure switch

Alarm display	**b1LP**
Cause of alarm	When the low pressure switch (digital input) is active. If A008=1 it is possible to disable the alarm detection when the compressors are OFF If A006=1 it is possible to enable the low pressure alarm detection during the defrost The alarm is not signalled : • In defrost, for the time A007, when the 4-way valve communtates • For the time set in A001 after turning on the compressor
Reset	Low pressure switch (digital input) not active
Restart	• Always manual if A005 = 0 • Always automatic if A005=16 • Automatic to manual if 0< A005<16: o Automatic if the number of alarms in the last hour is lower than A005 o Manual if the number of alarms in the last hour reaches A005
Symbol	⚠ blinking

Signal	Alarm Relay and buzzer on
Loads status	Compressors OFF. Other loads are managed according to their specific configuration.

b1lp Low evaporating pressure (with pressure transducers only)

Alarm display	**b1lP**
Cause of alarm	Evaporating pressure (both probes are configured, condensing and evaporating) is lower than A003 thresold. The alarm is detected: • in stand-by or remote OFF when A008 = 1 • in defrost when A006=1 The alarm is not signalled: • in defrost, for A007 time, when 4-way valve is turned on • for A001 time after turning on the compressor
Reset	When the pressure increases over A003 + A004
Restart	• Always manual if A005 = 0 • Always automatic if A005=16 • Automatic to manual if 0< A005<16: o Automatic if the number of alarms in the last hour is lower than A005 o Manual if the number of alarms in the last hour reaches A005
Symbol	⚠ blinking
Signal	Alarm Relay and buzzer on
Loads status	Compressors OFF. Other loads are managed according to their specific configuration.

b1tF Condenser fan overload alarm

Alarm display	**b1tF**
Cause of alarm	Condenser fan overload digital input is active. The alarm is not signalled for A099 time starting from fan activation.
Reset	Condenser fan overload digital input not active
Restart	Manual
Symbol	⚠ blinking
Signal	Alarm relay + buzzer ON
Loads status	Compressors OFF. Other loads are managed according to their specific configuration.

b1AC - b1Ac Antifreeze alarm / Low outlet temperature (Air / Air unit) in Chiller mode

Alarm display	**b1AC** (anti-freeze alarm by digital input) **b1Ac** (anti-freeze alarm by antifreeze probe)
Cause of alarm	Unit ON or stand-by or OFF by digital input: o temperature detected by the antifreeze probe is lower than A026 for A028 seconds o anti-freeze digital input is active
Reset	o temperature detected by the antifreeze probe is higher than A026+ A027 o anti-freeze digital input not active

Restart	• Always manual if A029 = 0 • Always automatic if A029=16 • Automatic to manual if 0< A029<16: o Automatic if the number of alarms in the last hour is lower than A029 o Manual if the number of alarms in the last hour reaches A029
Symbol	⚠ blinking
Signal	If A030=0: o buzzer and the alarm relay are not activated If A030=1: o buzzer and the alarm relay are activated
Loads status	Compressors off. Other loads are managed according to their specific configuration.

b1AH Anti-freeze alarm / Low outlet air temperaure(Air/Air unit only) on heat pump mode

Alarm display	**b1AH** (anti-freeze alarm by digital input) **b1Ah** (anti-freeze alarm by antifreeze probe)
Cause of alarm	Unit ON or stand-by or OFF by digital input: o temperature detected by the antifreeze probe is lower than A033 for A036 seconds o anti-freeze digital input is active
Reset	o temperature detected by the antifreeze probe is higher than A033+ A034 o anti-freeze digital input not active
Restart	• Always manual if A037 = 0 • Always automatic if A037=16 • Automatic to manual if 0< A037<16: o Automatic if the number of alarms in the last hour is lower than A037 Manual if the number of alarms in the last hour reaches A037. If A074=1 to reset the alarm is necessary to type the password.
Symbol	⚠ blinking
Signal	If A038=0: o buzzer and the alarm relay are not activated If A038=1: o buzzer and the alarm relay are activated
Loads status	Compressors off. Other loads are managed according to their specific configuration.

b1CC Condenser Antifreeze alarm in Cooling mode

Alarm display	**b1CC** (anti-freeze alarm by digital input) **b1Cc** (anti-freeze alarm by antifreeze probe)
Cause of alarm	Alarm detected by probe: if the device is ON, or stand-by, or OFF by digital input when anti-freeze temperature (probe set by A103 parameter) is lower than A091. Alarm detected by digital input activation: when anti-freeze digital input is active.
Reset	Alarm detected by probe: when anti-freeze temperature is higher than A091 + A092 Alarm detected by digital input activation: when digital input is de-activated

Restart	If: • A106=16 always automatic reset • 0<A106<16: o Automatic reset if the number of alarms in an hour is less than A106 o Manual reset if the number of alarms in an hour reaches the number set in A106 • A106=0 always manual reset
Symbol	⚠ blinking
Signal	Alarm relay + buzzer ON
Loads status	Compressors off. Other loads are managed according to their specific configuration.

b1CH Condenser Antifreeze alarm in Heating mode

Alarm display	**b1CH** (anti-freeze alarm by digital input) **b1Ch** (anti-freeze alarm by antifreeze probe)
Cause of alarm	Alarm detected by probE: if the device is ON, or stand-by, or OFF by digital input when anti-freeze temperature (probe set by A103 parameter) is lower than A095. Alarm detected by digital input activation: when anti-freeze digital input is active.
Reset	Alarm detected by probe: when anti-freeze temperature is higher than A095 + A096 Alarm detected by digital input activation: when digital input is de-activated
Restart	• A108=16 always automatic reset • 0<A108<16: o Automatic reset if the number of alarms in an hour is less than A108 o Manual reset if the number of alarms in an hour reaches the number set in A108 • A108=0 always manual reset
Symbol	⚠ blinking
Signal	Alarm relay + buzzer ON
Loads status	Compressors off. Other loads are managed according to their specific configuration.

b1dF End defrost alarm

Alarm display	**b1dF**
Cause of alarm	The defrost ends for dF05 maximum time instead of temperature/pressure or end defrost digital input activation (dF01=1or dF01=3)
Reset	If A088=0 ▪ If the controller is switched off (stand - by or remote ON-OFF) ▪ When the next defrost ends correctly for temperature/pressure or end defrost digital input activation ▪ If A088>0 When the number of defrost not ended in propely way reaches A088, the alarm must be reset manually.
Restart	Automatic/manual depending on A088 parameter.
Symbol	⚠ blinking
Signal	Alarm relay + buzzer activated only when the alarm is manual reset.
Loads status	The alarm doesn't involve the loads

b1PH : Pump Down stop alarm from pump down pressure switch / low pressure switch

Alarm display	**b1PH**
Cause of alarm	Pressure switch: the pump down ends for maximum time and not by low pressure switch / pump down pressure switch Transducer: the pump down ends for maximum time and not reaching the pump down pressure
Reset	When the first compressor restart correctly (low pressure switch not active or evaporating pressure higher than CO32 + CO33)
Restart	• A021=16 always automatic reset • 0<A021<16: o Automatic reset if the number of alarms in an hour is less than A021 o Manual reset if the number of alarms in an hour reaches the number set in A021; the alarm is stored in the Alarm log o A021=0 always manual reset; the alarm is stored in the Alarm log
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON when it becomes to manual reset

b1PL Alarm during the Pump Down start-up from pump down pressure switch / Low pressure transducer

Alarm display	**b1PL**
Cause of alarm	Pressure switch: the low pressure switch is not de-activated during compressor switching on phase Transducer: low pressure is not bigger than CO32 during compressor switching on phase
Reset	When the first compressor restart correctly (low pressure switch non active or evaporating pressure higher than CO32 + CO33 (differential))
Restart	Automatic Manual after A021 alarms per hour if A023=1; in this case the alarm is stored in the Alarm log). If A023 = 0 the alarm is automatic reset and not stored in the alarm log.
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON when it becomes manual

47.1 COMPRESSOR ALARM

C1HP - C2HP - C3HP compressor high pressure alarms

Alarm display	**C1HP** (compressor 1 high pressure alarm) – … **C3HP** (compressor 3 high pressure alarm)
Cause of alarm	The unit is running and the digital input of the compressor high pressure switch is active.
Reset	Digital input not active
Restart	Manual reset
Symbol	⚠ blinking
Signal	Alarm Relay and and buzzer on
Compressor involved on alarm	OFF
Compressor not involved on alarm	Not influenced by the alarm

C1oP - C2oP - C3oP Pressure switch alarm / compressor oil

Alarm display	**C1oP** (Compressor 1 pressure switch … **C3oP** (Compressor 3 pressure switch)
Cause of alarm	The alarm is not signalled: • for A011 time after turning on the compressor • for A012 time after digital input activation
Reset	The alarm it is always resettable
Restart	• A013=16 always automatic reset • 0<A013<16: o Automatic reset if the number of alarms in an hour is less than A013 o Manual reset if the number of alarms in an hour reaches the number set in A013 o A013=0 always manual reset If A076=1 the alarm is only a warning and the compressor remains ON
Symbol	⚠ blinking
Signal	Alarm Relay and and buzzer on
Compressor involved on alarm	OFF
Compressor not involved on alarm	Not influenced by the alarm

C1Pd compressor oil differential pressure

Alarm display	**C1Pd (compressor 1)**
Cause of alarm	Pistons compressor: Compressor oil pressure – evaporating pressure < A078 Screw compressor: Condensing pressure – compressor oil pressure > A078
Reset	Pistons compressor: Compressor oil pressure – evaporating pressure > A078 + A079 Screw compressor: Condensing pressure – compressor oil pressure < A078 – A079
Restart	Automatic – Manual after A080 events per hour (Reset procedure in Menu function).
Symbol	⚠ blinking
Signal	Alarm Relay and buzzer on
Compressor / circuit involved	OFF If more than one compressor is configured in the circuressors are OFF

C1tr - C2tr - C3tr Compressor overload alarm

Alarm display	**C1tr** (Compressor 1 overload alarm) -…**C3tr** (Compressor 3 overload alarm)
Cause of alarm	Compressor overload digital input activation. The alarm is not detected within the A019 time delay after the on compressor
Reset	Compressor overload digital input not active

Restart	A077=0 • Always manual with password request if A020 = 0 • Always automatic if A020 =16 • If 0<A020<16: o manual if the number of alarms in the last hour is lower than A020 o manual with password request if the number of alarms in the last hour reaches A020 A077=1 • Always manual if A020 = 0 • Always automatic if A020 =16 • If 0<A020<16: o automatic if the number of alarms in the last hour is lower than A020 o manual if the number of alarms in the last hour reaches A020
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Compressor involved	OFF
Compressor not involved	OFF if A047=1

C1dt - C2dt - C3dt High compressor discharge temperature alarm

Alarm display	**C1dt** (High discharge temperature of the compressor 1) -…**C3dt** (High discharge temperature of the compressor 3)
Cause of alarm	Compressor discharge temperature higher than A039 setpoint
Reset	Compressor high discharge temperature lower than A039 – A040
Restart	• Always manual if A041=0 • Always automatic if A041=16 • If 0<A041<16: o automatic if the number of alarms in the last hour is lower than A041 o manual if the number of alarms in the last hour reaches A041
Symbol	⚠ blinking
Signal	Alarm Relay and buzzer on
Compressor involved	OFF
Compressor not involved	Not influenced by the alarm

47.2 UNIT ALARM

ALti: low air ambient temperature (Air / Air unit only)

Alarm display	**ALti**
Cause of alarm	Chiller mode: evaporator inlet temperature lower than A026 for A028 seconds. Heat pump: evaporator inlet temperature lower than lower than A033 forA036 seconds. Stand-by or remote OFF: evaporator inlet temperature lower than the lowest value compared between A028 and A036.
Reset	Chiller: evaporator inlet temperature higher than A026 + A027. Heat pump: evaporator inlet temperature higher than A033 + A034. Stand-by or remote OFF: the evaporator inlet temperature higher than A026+A027 or A033+A034.
Restart	Automatic
Symbol	⚠ blinking
Signal	Alarm Relay and buzzer on
Loads	Not influenced by the alarm

AEFL: evaporator water flow alarm (differential pressure switch)

Alarm display	**AEFL**
Cause of alarm	Evaporator water flow switch digital input active: • after A017 time the compressors are switched OFF • after A016 time the water pump is switched OFF The flow switch is not detecded for A015 starting from water pump activation
Reset	If the flow switch digital input is active for more than A017 but less than A016+ A017, the reset is automatic. If the flow switch digital input active for more than A016+ A017, the reset is manual.
Restart	After the manual reset the water pump restart working; if the flow switch is not active for more than A018 the compressors can restart.
Symbol	⚠ and **Flow!** are blinking
Signal	Alarm Relay and buzzer on
Loads status	Compressors off. Evaporator water pump OFF when the alarm is manual reset. Other loads are managed according to their specific configuration.

ACFL: condenser water flow alarm (differential Pressure switch)

Alarm display	**ACFL**
Cause of alarm	Condenser water flow switch digital input active: • after A057 time the compressors are switched OFF • after A056 time the water pump is switched OFF The flow switch is not detecded for A055 starting from water pump activation Alarm not enable if A014=0 Alarm enabled in chiller mode only if A014=1 Alarm enabled in heat pump mode only if A014=2 Alarm enabled in chiller and heat pump mode if A014=3
Reset	If the flow switch digital input is active for more than A057 but less than A056+ A057, the reset is automatic. If the flow switch digital input active for more than A056+ A057, the reset is manual.
Restart	After the manual reset the water pump restart working; if the flow switch is not active for more than A058 the compressors can restart.
Symbol	⚠ and **Flow!** are blinking
Signal	Alarm Relay and buzzer on.
Loads status	Compressors off. Condenser water pump OFF when the alarm is manual reset. Other loads are managed according to their specific configuration.

APFL: solar panel flow alarm

Alarm display	**APFL**
Cause of alarm	Solar panel flow switch digital input active: • after A071 time the compressors are switched OFF • after A071+A070 time the water pump is switched OFF The flow switch is not detecded for A069 starting from water pump activation
Reset	If the flow switch digital input is active for more than A071 but less than A070+ A071, the reset is automatic. If the flow switch digital input active for more than A070+ A071, the reset is manual
Symbol	⚠ blinking
Signal	Alarm Relay and and buzzer on.
Loads	Solar panel water pump OFF

AHFL: domestic hot water flow alarm

Alarm display	AHFL
Cause of alarm	Domestic hot water flow switch digital input active: • after A067 time the compressors are switched OFF • after A066+A067 time the water pump is switched OFF The flow switch is not detecded for A069 starting from water pump activation The flow switch alarm is not detecded for A065 seconds starting from water pump activation.
Reset	If the flow switch digital input is active for more than A067 but less than A066+ A067, the reset is automatic. If the flow switch digital input active for more than A066+ A067, the reset is manual
Symbol	⚠ blinking
Signal	Alarm Relay and and buzzer on.
Loads	Domestic hot water pump OFF

AtSF: supply fan overload alarm (air/air unit)

Alarm display	AtSF
Cause of alarm	Supply fan overload digital input activation; the alarm is delayed of A017 time. The flow switch alarm is not detecded for A015 seconds starting from supply fan activation.
Reset	Manual reset
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads	Compressors and supply fan off. Other loads are managed according to their specific configuration.

AtHS Domestic hot water heaters overload alarm

Alarm display	AtHS
Cause of alarm	Domestic hot water heaters overload digital input active
Reset	Domestic hot water heaters overload digital input not active
Restart	• Always manual with password request if A073 = 0 • Always automatic if A073 =16 • If 0<A073<16: o automatic if the number of alarms in the last hour is lower than A073 o manual if the number of alarms in the last hour reaches A073
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads	Domestic hot water heaters OFF

AEht: evaporator water inlet high temperature alarm

Alarm display	**AEht** evaporator inlet high water temperature
Cause of alarm	Evaporator water inlet temperature higher than A061 setpoint. The alarm is not signalled for A060 after compressor activation.
Reset	▪ If the water temperature is lower than A061 – A062 ▪ With unit in stand by or remote OFF if alarm reset is automatic
Restart	• Always manual with if A059 = 0 • Always automatic if A059 =16 • If 0<A059<16: o automatic if the number of alarms in the last hour is lower than A059 o manual if the number of alarms in the last hour reaches A059
Symbol	⚠ blinking

Signal	Alarm relay and buzzer ON
Compressor	OFF
Other Loads	Not influenced by the alarm

Alarm differential between set point and regulation probe

Alarm display	**AdCh** (alarm differential in cooling mode) **AdHt** (alarm differential in heating mode)
Cause of alarm	Cooling mode: if the difference between the regulation temperature and the cooling set point is bigger than St12. The alarm is delayed of St14 starting from the switching on of the first compressor. Heating mode: if the difference between the cooling set point and the regulation temperature is bigger than St13. The alarm is delayed of St14 starting from the switching on of the first compressor.
Reset	Cooling mode: the difference between the regulation temperature and the cooling set point is lower than St12-St15. Heating mode: if the difference between the cooling set point and the regulation temperature is lower than St13-St16.
Restart	Automatic
Symbol	⚠ blinking
Signal	Alarm relay and buzzer NOT ACTIVE
Loads	Not influenced by the alarm

AtE1 - AtE2 Evaporator water pump overload alarm

Alarm display	**AtE1** (evaporator water pump 1 overload alarm) **AtE2** (evaporator water pump 2 overload alarm)
Cause of alarm	Evaporator water pump 1 overload digital input is active Evaporator water pump 2 overload digital input is active
Reset	Evaporator water pump overload digital input not active
Restart	Manual
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads	Evaporator water pump and compressors OFF. Other loads are managed according to their specific configuration.

AtC1 - AtC2 Condenser water pump overload alarm

Alarm display	**AtC1** (condenser water pump 1 overload alarm) **AtC2** (condenser water pump 2 overload alarm)
Cause of alarm	Condenser water pump 1 overload digital input is active Condenser water pump 2 overload digital input is active
Reset	Condenser water pump overload digital input not active
Restart	Manual
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads	If only one condenser water pump is configured, the water pump and the compressors are OFF. If two condenser water pumps are configured, the water pump on alarm is switched off and the other is ON (according to its configuration); other loads are managed according to their specific configuration.

AtAS Domestic hot water pump overload alarm

Alarm display	**AtAS**
Cause of alarm	Domestic hot water water pump overload digital input is active
Reset	Domestic hot water water pump overload digital input not active

Restart	• Always manual with if A075 = 0
	• Always automatic if A075 =16
	• If 0<A075<16:
	  o automatic if the number of alarms in the last hour is lower than A075
	  o manual if the number of alarms in the last hour reaches A075

Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads	Domestic hot water pump OFF

ALC1: Generic alarm with stop regulation

Alarm display	**ALC1**
Cause of alarm	Generic alarm 1. The alarm is delayed of A043 after digital input activation.
Reset	Generic alarm 1 digital input not active. The digital input must be de-activated for A044 time to allow the alarm reset.

Restart	• Always manual with if A042 = 0
	• Always automatic if A042 =16
	• If 0<A042<16:
	  o automatic if the number of alarms in the last hour is lower than A042
	  o manual if the number of alarms in the last hour reaches A042
	The alarm is stored in tha alarm log only if it is to manuale reset.

Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads	Compressors off. Other loads are managed according to their specific configuration.

ALC2: Generic Signal alarm

Alarm display	**ALC2**
Cause of alarm	The alarm is delayed of A052 after digital input activation.
Reset	Generic alarm 1 digital input not active. The digital input must be de-activated for A053 time to allow the alarm reset.

Restart	Automatic if:
	• A050=0 (A051 is not non è significant in this configuration)
	• A050=1 and:
	  o the number of alarms in the last hour is less than A051
	  o A051=16
	Manual if:
	• A050=1
	• A051=0
	• the number of alarms in the last hour reaches A051

Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads	Managed acccording to their specific configuration if A050=0. OFF if A050=1.

Ferr: Motorcondensing error

Alarm display	**FErr**
Cause of alarm	If the device is configured as motorcondensing (CF0=1) and there is a contemporary call of cooling and heating regulation.
Reset	Automatic when there is not contemporary call of cooling and heating regulation.
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Compressors	Compressors off.
Loads	Other loads are managed according to their specific configuration.

47.3 GENERIC ALARMS

ALSF: Phase sequence alarm

Alarm display	**ALSF**
Cause of alarm	Phase sequence digital input activation
Reset	Phase sequence digital input not active
Restart	Automatic
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads	OFF

ArtC Clock alarm

Alarm display	**ArtC**
Cause of alarm	If the controller is not powered for more than 3 days, it is necessary to set the internal clock.
Reset	After clock adjustement
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads	No action on the loads operation mode.

ArtF Clock failure

Alarm display	**ArtF**
Cause of alarm	Clock failure
Reset	It is not possible to reset the alarm; the controller has to be repaired or replaced.
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads	No action on the loads operation mode.
Energy saving and ON / OFF unit by time table	All the functions that need the clock are disabled.

AEE Eeprom alarm

Alarm display	**AEE**
Cause of alarm	Internal memory fault.
Reset	It is not possible to reset the alarm; the controller has to be repaired or replaced.
Symbol	⚠ blinking

Signal	Alarm relay and buzzer ON
Loads	OFF

47.4 UNLOADING WARNING

b1Cu: Unloading by condensing temperature / pressure or evaporating pressure in Heat pump

Alarm display	**b1CU**
Cause of alarm	If only a pressure transducer is configured: condensing temperature or pressure is lower than CO41. If two pressure transducers are configured (high and low pressure): evaporating pressure is lower than CO41.
Reset	If only a pressure transducer is configured: condensing temperature or pressure is higher than CO41 + CO42. If two pressure transducers are configured (high and low pressure): evaporating pressure is higher than CO41 + CO42. The unloading ends also if this condition lasts more than CO43 maximum time.
Restart	Automatic
Symbol	⚠ blinking
Signal	Alarm relay and buzzer are not activated to signal the unloading.
Compressors	When the unloading condition is active, the controller limits the maximum number of compressors to use for the regulation; in each circuit can be used maximum CO44 compressors.
Other loads	No action on the loads operation mode.

b1Cu Unloading by high condensing temperature or pressure in chiller mode

Alarm display	**b1CU**
Cause of alarm	Condenser temperature or pressure higher than CO39
Reset	Condenser temperature/pressure lower than CO39 –CO40 The unloading ends also if this condition lasts more than CO43 maximum time.
Restart	Automatic
Symbol	⚠ blinking
Signal	Alarm relay and buzzer are not activated to signal the unloading.
Compressors	When the unloading condition is active, the controller limits the maximum number of compressors to use for the regulation; in each circuit can be used maximum CO44 compressors.
Other loads	No action on the loads operation mode.

b1Cu Unloading by high condensing temperature or pressure in chiller mode

Alarm display	**b1CU**
Cause of alarm	Unloading digital input activation
Reset	Unloading digital input de-activation
Restart	Automatic
Symbol	⚠ blinking

Signal	Alarm relay and buzzer are not activated to signal the unloading.
Compressors	When the unloading condition is active, the controller limits the maximum number of compressors to use for the regulation; in each circuit can be used maximum CO44 compressors.
Other loads	No action on the loads operation mode.

AEun: Unloading from evaporator water inlet high temperature

Alarm display	**AEUn**
Cause of alarm	Evaporator water inlet temperature higher than CO35 setpoint; the unloading is delayed of CO37 time.
Reset	Evaporator water inlet temperature lower than CO35 –CO36. The unloading ends also if this condition lasts more than CO38 maximum time.
Restart	Automatic
Symbol	⚠ blinking
Signal	Alarm relay and buzzer are not activated to signal the unloading.
Compressors	When the unloading condition is active, the controller limits the maximum number of compressors to use for the regulation; in each circuit can be used maximum CO44 compressors.
Other loads	No action on the loads operation mode.

AEun: Unloading from evaporator water outlet low temperature

Alarm display	**b1EU**
Cause of alarm	Evaporator water outlet temperature lower than CO50.
Reset	Evaporator water outlet temperature higher than CO50 + CO51.
Restart	Automatic
Symbol	⚠ blinking
Signal	Alarm relay and buzzer are not activated to signal the unloading.
Compressors	When the unloading condition is active, the controller limits the maximum number of compressors to use for the regulation; in each circuit can be used maximum CO44 compressors.
Other loads	No action on the loads operation mode.

47.5 GENERAL WARNING

b1rC Heat recovery disabling by high condensing temperature/pressure in chiller

Alarm display	**b1rC**
Cause of warning	Condenser temperature/pressure higher than the rC06.
Reset	Condenser temperature/pressure lower than rC06 –rC07. The heat recovery disabling lasts maximum rC08.
Signal	Alarm relay and buzzer not activated

AEP1 - AEP2 Evaporator water pump / Supply fan maintenance warning

Alarm display	**AEP1** (Main water pump/supply fan) **AEP2** (Support water pump)
Cause of warning	Running hours reach CO27 or CO28 thresold.
Reset	Running hour reset in Menu function.
Symbol	⚠ blinking
Signals	Alarm relay and buzzer
Loads	No actions on water pumps operation.

ACP1 - ACP1 Condenser pump mintenance	
Alarm display	**ACP1** (Condenser 1 pump maintenance) **ACP1** (Condenser 2 pump maintenance)
Cause of alarm	Running hours reach CO29 or CO30 thresold.
Reset	Running hour reset in Menu function.
Symbol	⚠ blinking
Signal	Alarm relay and buzzer activated
Loads	No actions on water pumps operation.

ASAn Domestic hot water pump mintenance	
Alarm display	**ASAn**
Cause of alarm	Running hours reach CO56 thresold.
Reset	Running hour reset in Menu function.
Symbol	⚠ blinking
Signal	Alarm relay and buzzer activated
Loads	No actions on water pump operation.

ASUn Solar panel water pump mintenance	
Alarm display	**ASUn**
Cause of alarm	Running hours reach CO57 thresold.
Reset	Running hour reset in Menu function.
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads	No actions on water pump operation.

C1Mn - C2Mn - C3Mn Compressor maintenance	
Alarm display	**C1Mn** (Compressor 1 maintenance) –…**C3Mn** (Compressor 3 maintenance)
Cause of alarm	Running hours reach CO24…CO26 thresold.
Reset	Running hour reset in Menu function.
Symbol	⚠ blinking
Signal	Alarm relay and buzzer ON
Loads	No actions on compressor operation.

C1ds – C2ds – C3ds COMPRESSOR OUT OF SERVICE

Alarm display	**C1ds** (Compressor 1 out of service)**…C3ds** (Compressor 3 out of service)
Cause of alarm	A compressor is disabled (see procedure described on 9.4 paragraph)
Reset	The compressor is enabled (see procedure described on 9.4 paragraph)
Compressor	The compressor disabled is forced OFF and not available for the regulation.

PE1d…PE2d EVAPORATOR WATER PUMP OUT OF SERVICE

Alarm display	**PE1d** (water pump 1 out of service)**…PE2d** (water pump 2 out of service)
Cause of alarm	A water pump is disabled (see procedure described on 9.5 paragraph)
Reset	The water pump is enabled (see procedure described on 9.5 paragraph)

Water pump	The water pump disabled is forced OFF and not available for the regulation. If the second evaporator water pump is not configured or not available, all the loads are forced OFF.

PC1d…PC2d CONDENSER WATER PUMP OUT OF SERVICE

Alarm display	**PC1d** (water pump 1 out of service)**…PC2d** (water pump 2 out of service)
Cause of alarm	A water pump is disabled (see procedure described on 9.5 paragraph)
Reset	The water pump is enabled (see procedure described on 9.5 paragraph)
Water pump	The water pump disabled is forced OFF and not available for the regulation. If the second evaporator water pump is not configured or not available, all the loads are forced OFF.

b1ds CIRCUIT OUT OF SERVICE

Alarm display	**b1ds**
Cause of alarm	The gas circuit is disabled (see procedure described on 9.3 paragraph)
Reset	The gas circuit is enabled (see procedure described on 9.3 paragraph)
Circuit	All the loads are forced OFF.

PSAd DOMESTIC HOT WATER PUMP OUT OF SERVICE

Alarm display	**PSAd**
Cause of alarm	The water pump is disabled (see procedure described on 9.5 paragraph)
Reset	The water pump is enabled (see procedure described on 9.5 paragraph)
Water pump	The water pump is forced OFF.

PSud SOLAR PANEL WATER PUMP OUT OF SERVICE

Alarm display	**PSud**
Cause of alarm	The water pump is disabled (see procedure described on 9.5 paragraph)
Reset	The water pump is enabled (see procedure described on 9.5 paragraph)
Water pump	The water pump is forced OFF.

PFCd FREE COOLING WATER PUMP OUT OF SERVICE

Alarm display	**PFCd**
Cause of alarm	The water pump is disabled (see procedure described on 9.5 paragraph)
Reset	The water pump is enabled (see procedure described on 9.5 paragraph)
Water pump	The water pump is forced OFF.

ALEG ANTI-LEGIONELLA CYCLE NOT COMPLETED CORRECTLY

Alarm display	**ALEG**
Cause of alarm	The anti-legionella cycle has not been completed correctly.

Reset	Manual reset or automatic reset when the next cycle has been completed correctly.
Loads	No actions on loads operation.

Alarm relay and buzzer

Alarm relay / buzzer outputs

Cause of alarm	Alarms still active Alarms not reset
Reset relay alarm	Whitout alarms In stand- by or remote ON-O FF if A042 = 1
Buzzer silencing	By pushing one of the key of the front panel

The alarm relay is enabled only by configurating the corresponding output resource.

47.6 ACF1 …AC16: CONFIGURATION ALARM

A configuration alarm forces the device to stand-by status; it is necessary to set the right configuration to switch on the device.

ACF1 Alarm generated if:
- Heating mode is enabled but the 4-way valve is not configured
- Defrost only with condenser fan enabled but external temperature probe not configured

ACF2 Alarm generated if:
- Condenser fan configured as step or proportional control, but condenser probes not configured
- Condenser fan configured for proportional control and following rules not respected:
  FA08 + FA10 + FA11 < FA09
  FA11 < FA12
  FA06 < FA14 < FA07

  FA17 + FA20 + FA19 < FA18
  FA20 < FA21
  FA15 < FA22 < FA16
- Condenser fan configured for ON/OFF control and at least one of the following rules not respected:
  FA08 < FA09 < FA25 < FA26 (cooling)
  FA17 > FA18 > FA27 > FA28 (heating)
- If the defrost is enabled and at least one of the following rules not respected:
  dF14 < FA34
  dF14 < FA09
  FA33 > FA06
  FA33 < FA07
- If condenser fan is configured with modulation and PWM outoput, and the power supply selection is dc voltage (CF63 = 2)
- Defrost enabled but the condenser/evaporating probe is not configured (depending on dF18 parameter configuration)
- If condenser fan is enabled as step control at least one of the following rules not respected:
  FA09 < FA10 < FA26 < FA27 in cooling mode
  FA29 < FA28 < FA19 < FA18 in heating mode

ACF3 Alarm generated if:
- Two relays, or two digital inputs, or two probes are configured with the same function
- Compressors or the circuit are enabled but without the necessary resources (es. compressor 3 overload alarm but compressor 3 relay is not configured)

ACF4 Alarm generated if:
- CF60=1 and none digital input configured as Chiller / Heat Pump request
- CF60=2 and none probe configured as external temperature probe
- Unit configured as Heat pump and rack compressor unit enabled (Cr01>0)
- CF05 = 1 (condensing unit enabled) and wrong configuration of the digital input of the condensing unit

ACF6 Alarm generated if:
- Three compressors are configured and it is enabled the capacity control of the compressor (CF07>0)
- Pump-down function is enabled but at least:
  - pump-down solenoid valve is not configured
  - pump-down switch, or evaporating probe, or low pressure switch are not configured
- A compressor is enabled by CF06 parameter but:
  - √ The relay of the compressor is not configured
  - √ CO08>0 and CO09 >0 (ON and OFF time of the intermittent valve) but the intermittent valve relay is not configured
  - √ CO12>0 (activation time of the by-pass compressor valve at the start up) but the compressor by-pass valve is not configured
  - √ CO11>0 (part-winding delay) but the part winding coil relay is not configured
  - √ The compressor is configured witch capacity valves but at least a relay of a capacity valve is not configured
- A relay is configured as:

- √ Compressor but the compressor is not enebled by CF06 parameter
- √ Compressor intermittent valve configured but CO08=0 and/or CO09=0
- √ Compressor by-pass gas valve configured but CO12=0
- √ Part winding coil configured but CO10=0 (part winding start up disabled)

- Wrong configuration of the capacity step valve

ACF7

Evaporator pump configuration:

- Enabled (CO15 >0) but the relay of the water pump is not configured
- Disabled (CO15=0) but the relay of the water pump is configured

Condenser pump configuration:

- Enabled (CO20 >0) but the relay of the water pump is not configured
- Disabled (CO20=0) but the relay of the water pump is configured

Water pump enabled for antifrezee prevention:

- Evaporator water pump enabled for antifreeze prevention (Ar21=1) but the needed probe is not configured (Ar22=0)
- Evaporator water pump enabled for antifreeze prevention (Ar21=1) but the probe selected by Ar22 parameter is not configured in the device
- Condenser water pump enabled for antifreeze prevention (Ar31=1) but the needed probe is not configured (Ar32=0)
- Condenser water pump enabled for antifreeze prevention (Ar31=1) but the probe selected by Ar32 parameter is not configured in the device

ACF8

Cooling / heating regulation probe configuration

- The regulation probe selected by ST09 or ST10 parameters is not configured in the device
- The compressor rack regulation probe selected by Cr01 is not configured in the device

ACF9

Recovery function enabled but whitout resources needed (heat recovery probe or digital input, heat recovery valve, condenser probe)

AC10

Compressor inverter controlled

- 2 anologue outputs configured to manage the same compressor
- An analog output is configured to control a compressor via inverter but none relays is configured as compressor
- Compressor inverter controlled and compressor capacity step are both configured
- If the unit is configured as condensing unit and a compressor is configured as compressor inverter controlled

AC11

Compressor with different power capacity enabled and:

- One analog output is configured as output for compressor inverter controlled
- At least one of the compressor has capacity power set to zero
- The compressor is configured with capacity step

AC12

Free cooling function enabled and:

- None relay is configured as free cooling valve
- the free cooling probes set by FS41 and FS42 are not configured
- AF01 < AF02
- FS01=2 (domestic hot water with dedicated exchanger) and CF03=2 (cooling only with free cooling)
- If it is not respected the following condition:
  AF05 < St07 ≤ AF04

AC13

Domestic hot water function enabled and:

- None relay is configured as domestic hot water valve 1
- None probe is configured as probe 1 of domestic hot water
- FS01=1 and domestic hot water valves configured to be switched off in STD-BY or OFF
- Domestic hot water priority defined by digital input and none digital input configured for this function
- FS49=1 and the regulation is in neutral zone (St11=1)

AC14
Alarm not managed

AC15
Hybrid exchangers enabled and:

dF21-dF23> dF22-dF24	or
dF21>dF22	or
dF26+dF28> dF25+dF27	or
dF27>dF25	

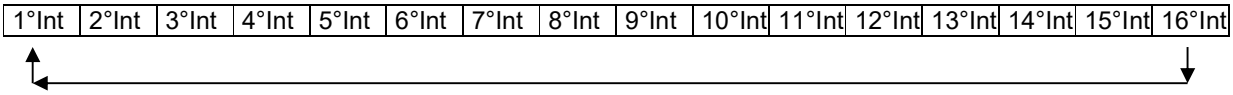
AC16
By-pass gas valve regulation enabled and:
- Heating control enabled
- Motor-condensing function enabled
- Domestic hot water management enabled
- IEV electronic expansion valve enabled

48. MANUAL ALARM PROCEDURE

CONCEPT OF NUMBER OF EVENTS PER HOUR

For some alarms is possible to set a number of alarms per hour:
- if the alarm occours a number of time lower than the value set, the alarm is automatic reset
- if the alarm occours a number of time equal the value set, the alarm is manual reset

Each hour is divided in 16th intervals (each interval is 3600 / 16 = 225 seconds).



After the unit start-up, each interval is marked as “not active”.
During the interval counting, for 255seconds, if at least an alarm event appears, the interval itself is marked “Active”.
Starting from the first interval the instrument calculates the 16 intervals and, at the end, it restats overwriting from the first.
In this way the last hour is always monitored and counted the active intervals.
When the number of active intervals reaches the threshold set with the corresponding parameter the alarm becomes manual.
By setting the threshold=0 the alarm is manual from its first activation, while if the threshold=16 the alarm is always automatic .

49. ALARMS LIST

49.1 MACHINE ALARMS

Alarm Code	Alarm description	Comp.	Heaters	Support heaters (air/air unit)	Evaporator Pump / Supply fan	Condenser Pump	Domestic hot water Water pump	Solar panel Water pump	Condenser fan	Auxiliary relay
ACF1 ... AC16	Configuration alarm	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
ACFL	Condenser flow alarm	OFF **(4)**	**(8)**	**(8)**	**(8)**	OFF **(3)**	**(8)**	**(8)**	**(8)**	**(8)**
AEE	Eeprom alarm	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
AEFL	Evaporator flow alarm	OFF **(4)**	OFF (boiler)	**(8)**	OFF **(3)**	**(8)**	**(8)**	**(8)**	**(8)**	**(8)**
AEht	High inlet evaporator water temperature	OFF	OFF (boiler)	**(8)**	**(8)**	**(8)**	**(8)**	**(8)**	**(8)**	**(8)**
AHFL	Domestic hot water flow switch alarm	OFF **(6)**	**(8)**	**(8)**	**(8)**	OFF	OFF	**(8)**	**(8)**	**(8)**
ALC1	General alarm	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
ALC2	General alarm type 2	OFF **(9)**	OFF **(9)**	OFF **(9)**	OFF **(9)**	OFF **(9)**	OFF **(9)**	OFF **(9)**	OFF **(9)**	OFF **(9)**
ALSF	Phase sequence alarm	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
ALti	Low air temperature of the evaporator inlet (air / air unit) Alarm									
AP1 ... AP6	Probe alarm	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**
APE1 ... APE8	I/O Expansion probe alarm	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**
APFL	Solar panel flow switch alarm	OFF **(6)**	**(8)**	**(8)**	**(8)**	**(8)**	**(8)**	OFF	**(8)**	**(8)**
APr1 APr2	Remote keyboard probe alarm	OFF **(3)**	OFF **(3)**	OFF **(3)**	OFF **(3)**	OFF **(3)**	OFF **(3)**	OFF **(3)**	OFF **(3)**	OFF **(3)**
APU1 ... APU4	IEV Electronic Expansion Valve probe alarm	**(7)**	**(7)**	**(7)**	**(7)**	**(7)**	**(7)**	**(7)**	**(7)**	
ASLA	Serial communication failure with I/O expansion	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	

AtAS	Domestic hot water pump overload	OFF **(6)**			**(8)**	**(8)**	**(8)**	**(8)**	**(8)**	**(8)**
AtC1	Condenser 1 water pump overload alarm	OFF **(4)**	**(8)**	**(8)**	**(8)**	OFF	**(8)**	**(8)**	OFF	**(8)**
AtC2	Condenser 2 water pump overload alarm	OFF **(4)**	**(8)**	**(8)**	**(8)**	OFF	**(8)**	**(8)**	OFF	**(8)**
AtE1	Evaporator 1 water pump overload alarm	OFF **(4)**	OFF (boiler) **(5)**	**(8)**	OFF	**(8)**	**(8)**	**(8)**	OFF	**(8)**
AtE2	Evaporator 2 water pump overload alarm	OFF **(4)**	OFF (boiler) **(5)**	**(8)**	OFF	**(8)**	**(8)**	**(8)**	OFF	**(8)**
AtHS	Domestic hot water heaters overload					**(8)**				
AtSF	Fan supply overload alarm	OFF		OFF	OFF				**(8)**	**(8)**
AUAL	Serial communication failure with IEV expansion valve driver	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
AtrE	Remote terminal Visograph 2.0 communication alarm	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**
Atr1 Atr2	Remote terminal VI613 communication alarm	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**	**(1)**

(1) = the status of the load depends on wich probe is faulty; e.g. if the regulation probe is faulty main loads are OFF, if external temperature probe is faulty there is not direct actions on the loads but the dynamic set point function is disabled
(2) = with probe configured as auxiliary relay control
(3) = loads are OFF only if the probe of the remote keyboard is set as regulation probe
(4) = The compressors are Off if the water pump is the only configured water pump; if 2 water pumps are configured, the compressors are OFF if both water pumps are in alarm or not available
(5) = Boiler heaters off if the water pump is the only configured water pump; if 2 water pumps are configured, the compressors are OFF if both water pumps are in alarm or not available
(6) Compressors switched off if only production of domestic hot water is ongoing
(7) In case of electronic expansion valve alarm all loads are OFF
(8) This loads are not influenced directly by the alarm; their status depends on the configuration of the device
(9) If A050=0 it is only a warning and the loads are not involved, if A050=1 it is a real alarm and the loads are switched OFF

49.2 CIRCUIT ALARM

Alarm Code	Alarm description	Compressors	Condensing fan
b1AC	Anti-freeze alarm in chiller mode	OFF	OFF
b1Ac	Anti-freeze warning in chiller		
b1AH	Anti-freeze alarm in heat pump	OFF	OFF
b1Ah	Anti-freeze warning in heat pump		
b1dF	End defrost alarm		
b1HP	High pressure switch	OFF	OFF after 60 seconds
b1hP	High condenser pressure by pressure transducer	OFF	OFF after 60 seconds
b1hP	High condensing temperature	OFF	OFF after 60 seconds
b1LP	Low pressure switch	OFF	OFF
b1LP	Low pressure detected by evaporating pressure transducer or by high pressure transducer (if only one pressure transducer is configured)	OFF	OFF
b1lP	Low condenser temperature	OFF	OFF
b1PH	Pump down alarm during the switching off the compressor	OFF	OFF
b1PL	Pump down during the switching on the compressor	OFF	OFF
b1tF	Fan overload	OFF	OFF
b1UA	Expansion valve 1 or valve 2 alarm	OFF	OFF

49.3 COMPRESSOR ALARM

Alarm Code	Alarm description	Compressor (*n*)	Compressors not involved
C(*n*)dS	Compressor (n) disabled (by dedicated procedure in menu function)	OFF	
C(*n*)dt	Compressor (n) high discharge temperature	OFF	
C(*n*)HP	Compressor(*n*) high pressure switch	OFF	
C(*n*)oP	Compressor(*n*) oil pressure switch / Oil level switch	OFF	
C1Pd	Compressor oil differential	OFF	
C(*n*)tr	Compressor(*n*) overload and A047=0	OFF	
C(*n*)tr	Compressor(*n*) overload and A047=1	OFF	OFF

(***n***) identifies the compressor 1 or 2 or 3

49.4 WARNING

Warning code	Description
AEP1	Evaporator 1 water pump maintenance
AEP2	Evaporator 2 water pump maintenance
ACP1	Condenser 1 water pump maintenance
ACP2	Condenser 2 water pump maintenance
AEun	Unloading by high evaporator inlet temperature
ASAn	Domestic hot water pump maintenance
ASUn	Solar panel water pump maintenance
ArtC	Clock to be set (the device if not powered for some days loses the time and the date)
ArtF	Clock failure
C(*n*)Mn	Compressor (*n*) maintenance
b1Cu	Unloading by high or low evaporator or condenser temperature or pressure
b1Cu	Unloading by low evaporator temperature or pressure
b1rC	Recovery function disabled
b1Eu	Unloading by low evaporator outlet temperature
noL	Link problem between the Ichill and the remote keyboard

50. ANALOG AND DIGITAL OUTPUT CONFIGURATION

50.1 INPUT / OUTPUT CONFIGURATION

Analog input Pb1 - Pb2 – Pb5 – Pb6

0. Probe not configured
1. Compressor 1 discharge temperature (PTC probe)
2. Compressor 2 discharge temperature (PTC probe)
3. Compressor 3 discharge temperature (PTC probe)
4. Solar panel temperature (PTC probe)
5. Cooling regulation temperature (PTC probe)
6. Evaporator inlet temperature (NTC probe)
7. Evaporator outlet temperature (NTC probe)
8. Condenser water inlet temperature (NTC probe, only for water/water unit)
9. Condenser water outlet temperature (NTC probe, only for water/water unit)
10. Free cooling temperature probe (NTC probe)
11. Outside temperature for dynamic setpoint / for boiler / for change over (NTC probe)
12. Combined defrost temperature (NTC probe)
13. Auxiliary probe 1 temperature (NTC probe)
14. Auxiliary probe 2 temperature (NTC probe)
15. Domestic hot water 1 temperature (regulation probe, NTC probe)
16. Domestic hot water 2 temperature (NTC probe)
17. Solar panel temperature (NTC probe)
18. Heat recovery temperature (NTC probe)
19. Condenser temperature (air/air or air/water unit, NTC probe)

After the number 19 the configuration can be selected from **o 1** to **c56** that allows to set an analogue input as digital input (to set the number, see the meaning of the digital input).

Analog input Pb3 - Pb4

0 Probe not configured
1 Compressor 1 discharge temperature (PTC probe)
2 Compressor 2 discharge temperature (PTC probe)
3 Compressor 3 discharge temperature (PTC probe)
4 Solar panel temperature (PTC probe)
5 Cooling regulation temperature (PTC probe)
6 Evaporator inlet temperature (NTC probe)
7 Evaporator outlet temperature (NTC probe)
8 Condenser water inlet temperature (NTC probe, only for water/water unit)
9 Condenser water outlet temperature (NTC probe, only for water/water unit)
10 Free cooling temperature probe (NTC probe)
11 Outside temperature for dynamic setpoint / for boiler / for change over (NTC probe)
12 Combined defrost temperature (NTC probe)
13 Auxiliary probe 1 temperature (NTC probe)
14 Auxiliary probe 2 temperature (NTC probe)
15 Domestic hot water 1 temperature (regulation probe, NTC probe)
16 Domestic hot water 2 temperature (NTC probe)
17 Solar panel temperature (NTC probe)
18 Heat recovery temperature (NTC probe)
19 Condenser temperature or pressure (temperature NTC or pressure 4÷20 mA or pressure 0÷ 5Volt)
20 Evaporator pressure (4÷20 mA or 0÷ 5Volt)
21 Auxiliary 1 probe (4÷20 mA / 0÷ 5Volt)
22 Auxiliary 2 probe (4÷20 mA / 0÷ 5Volt)
23 Dynamic setpoint probe (4÷20 mA)
24 Compressor 1 oil pressure probe (4÷20 mA or 0÷ 5Volt)
25 Humidity probe (4÷20 mA)
26 Humidity probe (0÷ 5Volt)

After the number 26 the configuration can be selected from **o 1** to **c56** that allows to set an analogue input as digital input (to set the number, see the meaning of the digital input).

Digital Input Id1 – Id11

0. Digital input not configured
1. Remote ON / OFF
2. Remote chiller / heat pump
3. Evaporator flow switch/ Supply fan overload
4. Condenser flow switch
5. Antifreeze alarm
6. High pressure switch
7. Low pressure switch
8. Compressor 1 high pressure
9. Compressor 2 high pressure
10. Compressor 3 high pressure
11. Compressor 1 overload
12. Compressor 2 overload
13. Compressor 3 overload
14. Condenser fan overload
15. Evaporator water pump 1 overload
16. Evaporator water pump 2 overload
17. Condenser water pump 1 overload
18. Condenser water pump 2 overload
19. Recovery request
20. Start/End defrost
21. Energy Saving
22. Pressure switch / compressor 1 oil level
23. Pressure switch / compressor 2 oil level
24. Pressure switch / compressor 3 oil level
25. Pump down pressure switch
26. Generic alarm n° 1
27. Generic alarm n° 2
28. Operation working mode: by RTC or keyboard
29. Enable only supply fan (air/air unit)
30. Thermoregulation request (condensing unit)
31. Cooling request (condensing unit)
32. Heating request (condensing unit)
33. Step 2 request (condensing unit)
34. Step 3 request (condensing unit)
35. Step 4 request (condensing unit)
36. Step 5 request (condensing unit)
37. Step 6 request (condensing unit)
38. Step 7 request (condensing unit)
39. Step 8 request (condensing unit)
40. Domestic hot water flow switch
41. Solar panel flow switch
42. Enable only domestic hot water (heating and cooling disabled)
43. Domestic hot water heaters overload
44. Domestic hot water pump overload
45. Enable domestic hot water second set point
46. Phase sequence alarm
47. Enable domestic hot water priority
48. Free cooling water pump flow switch
49. Expansion valve
50. Condenser antifreeze alarm
51. Compressor 1 request (condensing unit)
52. Compressor 2 request (condensing unit)
53. Compressor 3 request (condensing unit)
54. Enable unloading
55. Enable condenser fan maximum speed limitation
56. Enable power reduction

Digital Output (relay) RL1- RL8 (the number of relay depends on the device model)

0. Relay not configured
1. Alarm
2. Evaporator water pump 1 / Supply fan
3. Evaporator water pump 2
4. Evaporator anti-freeze heater
5. Supply heater (air/air) / boiler heater 1
6. Supply heater (air/air) / boiler heater 2
7. Condenser anti-freeze heater
8. Consenser water pump 1
9. Consenser water pump 2
10. 4-way valve (chiller / heat pump inversion cycle)
11. Condenser fan step 1
12. Condenser fan step 2
13. Condenser fan step 3
14. Condenser fan step 4
15. Pump down solenoid valve
16. Heat recovery valve
17. Free cooling valve
18. Auxiliary output 1
19. Auxiliary output 2
20. Solenoid intermittent valve compressor 1 (screw compressor)
21. Solenoid intermittent valve compressor 2 (screw compressor)
22. Solenoid valve for compressor 1 liquid injection
23. Solenoid valve for compressor 2 liquid injection
24. Domestic hot water valve 1
25. Domestic hot water valve 2
26. Domestic hot water heater 1
27. Domestic hot water heater 2
28. Domestic hot water heater 3
29. Solar panel water pump
30. Solar panel solenoid valve
31. Domestic hot water pump
32. Splitted exchanger 1
33. Splitted exchanger 2
34. Cooling/Heating status
35. Defrost status
36. Regulation status
37. Domestic hot water status
38. STD-BY/Remote OFF status
39. Solenoid water valve
40. Temperature differential alarm
41. By-pass gas valve
42. Dehumidification
43. Humidification
44. Compressor 1: direct start-up
    If part winding enabled: coil 1 compressor 1
45. If part winding enabled: coil 2 compressor 1
46. Capacity step valve 1 compressor 1
47. Capacity step valve 2 compressor 1
48. Capacity step valve 3 compressor 1
49. By-pass gas valve compressor 1
50. Compressor 2: direct start-up
    If part winding enabled: coil 1 compressor 2
51. If part winding enabled: coil 2 compressor 2
52. Capacity step valve 1 compressor 2
53. Capacity step valve 2 compressor 2
54. Capacity step valve 3 compressor 2
55. By-pass gas valve compressor 2
56. Compressor 3: direct start-up

If part winding enabled: coil 1 compressor 3
57. If part winding enabled: coil 2 compressor 3

Proportional output OUT 1 and OUT 2 (0 ÷ 10 Vdc)

0 Analog output not configured
1 Modulated evaporator water pump
2 Modulated Free cooling valve
3 By-pass gas valve
4 Auxiliary output 1
5 Auxiliary output 2
6 Inverter compressor 1
7 Dehumidification
8 Humidification
9 Condenser fan

After selection number 9 it is possible to configure the analog output as digital output with the same meaning of the relays configuration; every analog output can be configured from "**o 1"** to "**c43"** (see relay configuration table, the compressors can't be configured in the analog outputs).

Proportional output OUT 3 and OUT 4 (0 ÷ 10 Vdc/PWM)

0 Analog output not configured
1 Modulated evaporator water pump (0..10 Vdc)
2 Modulated Free cooling valve (0..10 Vdc)
3 By-pass gas valve (0..10 Vdc)
4 Auxiliary output 1 (0..10 Vdc)
5 Auxiliary output 2 (0..10 Vdc)
6 Inverter compressor 1 (0..10 Vdc)
7 Dehumidification (0..10 Vdc)
8 Humidification (0..10 Vdc)
9 Condenser fan (0..10 Vdc)
10 Condenser fan (PWM)

After selection number 11 it is possible to configure the analog output as digital output with the same meaning of the relays configuration; every analog output can be configured from "**o 1"** to "**c43"** (see relay configuration table, the compressors can't be configured in the analog outputs).

OTHER OUTPUTS

- LAN to connect IEV electronic expansion valve driver
- Serial output TTL to connect:
  - HotKey for parameters programming
  - ProgTool for parameters programming
  - XJ485CX (TTL→RS485 interface) for parameters programming with Wizmate software or for connection to the XWEB supervisor system, or for connection to a RS485 Modbus network.
- Remote keyboard (LED or LCD).

51. TABLE OF PARAMETERS

Set point parameters					
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**
ST 1	Chiller Setpoint	ST02	ST03	°C/°F	dec/int
ST 2	Chiller minimum Setpoint	-50.0 -58	ST01	°C °F	Dec int
ST 3	Chiller maximum Setpoint	ST01	110 230	°C °F	Dec int
ST 4	Heat pump setpoint	ST05	ST06	°C/°F	dec/int
ST 5	Heat pump minimum Setpoint	-50.0 -58	ST04	°C °F	Dec int
ST 6	Heat pump maximum Setpoint	ST04	110 230	°C °F	Dec int
ST 7	Temperature regulation band or differential in chiller mode	0.1 0	25.0 45	°C °F	Dec int
ST 8	Temperature regulation band in heat pump mode	0.1 0	25.0 45	°C °F	Dec int
ST 9	Probe selection for chiller regulation 0= Evaporator inlet temperature (NTC) 1= Evaporator outlet temperature (NTC) 2= Remote panel 1 internal temperature (led remote panel) or Visograph 2.0 internal temperature 3= Remote panel 2 internal temperature (led remote panel) or Visograph 2.0 remote temperature 4= Cooling regulation temperature (PTC)	0	4		
ST 10	Probe selection for heat pump regulation 0= Evaporator inlet temperature (NTC) 1= Evaporator outlet temperature (NTC) 2= Remote panel 1 internal temperature (led remote panel) or Visograph 2.0 internal temperature 3= Remote panel 2 internal temperature (led remote panel) or Visograph 2.0 remote temperature 4= Condenser inlet temperature (NTC) 5= Condenser outlet temperature (NTC)	0	5		
ST 11	Type of thermoregulation 0= Proportional 1= Neutral zone	0	1		
Temperature differential alarm					
ST 12	Temperature differential value to generate the alarm in cooling mode	0.0 0	25.0 45	°C °F	Dec int
ST 13	Temperature differential value to generate the alarm in heating mode	0.0 0	25.0 45	°C °F	Dec int
ST 14	Temperature differential alarm delay	0	250	Sec	
ST 15	Temperature differential differential to reset the alarm in cooling mode	0.0 0	25.0 45	°C °F	Dec int
ST 16	Temperature differential differential to reset the alarm in heating mode	0.0 0	25.0 45	°C °F	Dec int
Display visualization					
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**
dP 1	Default read-out of the top display	0	16		
dP 2	Default read-out of the bottom display	0	20		
dP 3	Top display default read-out of the remote terminal 1 0= same visualization defined by dP01 and dP03 1= temperature detected by the internal probe of the remote panel 1	0	1		
dP 4	Top display default read-out of the remote terminal 2 0= same visualization defined by dP01 and dP03 1= temperature detected by the internal probe of the remote panel 2	0	1		
dP 5	Visograph: probe visualized on the first row	0	30		
dP 6	Visograph: probe visualized on the second row	0	30		
dP 7	Visograph: probe visualized on the third row	0	30		
dP 8	Visograph: probe visualized on the fourth row	0	30		
dP 9	Visualization when the controller is in STD-BY 0= "STD-BY" 1= same visualization of dP1 and dP2 2= “OFF”	0	2		
Configuration parameters					
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**

CF 1	Type of unit 0= Air / air 1= Air / water 2= Water / water	0	2		
CF 2	Operation mode configuration 1= only cooling 2= only heating 3= cooling and heating	1	3		
CF 3	Chiller operation 1=only with compressor 2=only with free cooling 3=with compressors and free cooling	1	3		
CF 4	Enable humidification and or dehumidification 0=humidity control disabled 1=only dehumidification enabled 2=only humidification enabled 3=humidification and dehumidification enabled	0	3		
CF 5	Enable condensing unit 0= no 1= yes	0	1		
CF 6	Number of compressors 1= 1 2= 2 3= 3	1	3		
CF 7	Number of compressor capacity step 0= none 1= 1 2= 2 3= 3	0	3		
CF 8	Condensing / evaporating pressure or temperature selection 0 = Condenser probe: NTC temperature Evaporating probe: pressure transducer 4÷20mA 1 = Condenser probe: pressure transducer 4÷20mA Evaporating probe: pressure transducer 4÷20mA 2 = Condenser probe: NTC temperature Evaporating probe: pressure transducer 0÷5V 3 = Condenser probe: pressure transducer 0÷5V Evaporating probe: pressure transducer 0÷5V	0	3		
CF 9	Pb1 Configuration If Pb1 probe is configured as digital input	0 o 1	19 c56		
CF 10	Pb2 Configuration If Pb2 probe is configured as digital input	0 o 1	19 c56		
CF 11	Pb3 Configuration If Pb3 probe is configured as digital input	0 o 1	26 c56		
CF 12	Pb4 Configuration If Pb4 probe is configured as digital input	0 o 1	26 c56		
CF 13	Pb5 Configuration If Pb5 probe is configured as digital input	0 o 1	19 c56		
CF 14	Pb6 Configuration If Pb6 probe is configured as digital input	0 o 1	19 c56		
CF 15	Not used				
CF 16	Not used				
CF 17	Pb1 calibration	-12.0 -21	12.0 21	°C °F	Dec int
CF 18	PB2 calibration	-12.0 -21	12.0 21	°C °F	Dec int
CF 19	PB3 calibration	-12.0 -21 -5.0 -72 -4.0 -20	12.0 21 5.0 72 4.0 20	°C °F bar psi mA rH%	Dec int dec int int int
CF 20	PB4 calibration	-12.0 -21 -5.0 -72 -4.0 -20	12.0 21 5.0 72 4.0 20	°C °F bar psi mA rH%	Dec int dec int int int
CF 21	PB5 calibration	-12.0 -21	12.0 21	°C °F	Dec int
CF 22	PB6 calibration	-12.0 -21	12.0 21	°C °F	Dec int

CF 23	Not used				
CF 24	Not used				
CF 25	PB3 transducer: pressure value at 4mA or 0.5 Vdc	-1.0 -14 0	50.0 725 100	Bar psi rH%	Dec int int
CF 26	PB3 transducer: pressure value at 20mA or 5 Vdc	-1.0 -14 0	50.0 725 100	Bar psi rH%	Dec int int
CF 27	PB4 transducer: pressure value at 4mA or 0.5 Vdc	-1.0 -14 0	50.0 725 100	Bar psi rH%	Dec int int
CF 28	PB4 transducer: pressure value at 20mA or 5 Vdc	-1.0 -14 0	50.0 725 100	Bar psi rH%	Dec int int
CF 29	Not used				
CF 30	Not used				
CF 31	ID1 configuration	0	c56		
CF 32	ID2 configuration	0	c56		
CF 33	ID3 configuration	0	c56		
CF 34	ID4 configuration	0	c56		
CF 35	ID5 configuration	0	c56		
CF 36	ID6 configuration	0	c56		
CF 37	ID7 configuration	0	c56		
CF 38	ID8 configuration	0	c56		
CF 39	ID9 configuration	0	c56		
CF 40	ID10 configuration	0	c56		
CF 41	ID11 configuration	0	c56		
CF 42	RL1 configuration	0	c57		
CF 43	RL2 configuration	0	c57		
CF 44	RL3 configuration	0	c57		
CF 45	RL4 configuration	0	c57		
CF 46	RL5 configuration	0	c57		
CF 47	RL6 configuration	0	c57		
CF 48	RL7 configuration	0	c57		
CF 49	RL8 configuration	0	c57		
CF 50	Not used				
CF 51	OUT 1 configuration 0= not configured 1= Modulated evaporator water pump (0÷10V) 2= Modulated Free cooling valve (0÷10V) 3= By-pass gas valve (0÷10V) 4= Auxiliary output 1 (0÷10V) 5= Auxiliary output 2 (0÷10V) 6= Inverter compressor 1 (0÷10V) 7= Dehumidification (0÷10V) 8= Humidification (0÷10V) 9= Condenser fan (0÷10V) o1..c43 ON / OFF with the same meaning of relè configuration	0 o 1	9 c43		
CF 52	Proportional output OUT 2 0= not configured 1= Modulated evaporator water pump (0÷10V) 2= Modulated Free cooling valve (0÷10V) 3= By-pass gas valve (0÷10V) 4= Auxiliary output 1 (0÷10V) 5= Auxiliary output 2 (0÷10V) 6= Inverter compressor 1 (0÷10V) 7= Dehumidification (0÷10V) 8= Humidification (0÷10V) 9= Condenser fan (0÷10V) o1..c43 ON / OFF with the same meaning of relè configuration	0 o 1	9 c43		
CF 53	Proportional output OUT 3 0= not configured 1= Modulated evaporator water pump (0÷10V) 2= Modulated Free cooling valve (0÷10V) 3= By-pass gas valve (0÷10V) 4= Auxiliary output 1 (0÷10V) 5= Auxiliary output 2 (0÷10V) 6= Inverter compressor 1 (0÷10V) 7= Dehumidification (0÷10V) 8= Humidification (0÷10V) 9= Condenser fan (0÷10V) 10= Condenser fan (PWM) o1..c43 ON / OFF output with the same meaning of relè	0 o 1	10 c43		

CF 54	Proportional output OUT 4 0= not configured 1= Modulated evaporator water pump (0÷10V) 2= Modulated Free cooling valve (0÷10V) 3= By-pass gas valve (0÷10V) 4= Auxiliary output 1 (0÷10V) 5= Auxiliary output 2 (0÷10V) 6= Inverter compressor 1 (0÷10V) 7= Dehumidification (0÷10V) 8= Humidification (0÷10V) 9= Condenser fan (0÷10V) 10= Condenser fan (PWM) o1..c43 ON / OFF output with the same meaning of relè	0 o 1	10 c43		
CF 55	Remote panel 1 configuration (VI613 LED panel) 0= Disabled 1= Enabled: model with ambient temperature sensor 2= Enabled: model without ambient temperature sensor	0	2		
CF 56	Remote Panel 2 configuration (VI613 LED panel) 0= Disabled 1= Enabled: model with ambient temperature sensor 2= Enabled: model without ambient temperature sensor	0	2		
CF 57	Remote panel 1 internal probe calibration	-12.0 -21	12.0 21	°C °F	Dec int
CF 58	Remote panel 2 internal probe calibration	-12.0 -21	12.0 21	°C °F	Dec int
CF 59	Symbol association to function mode 0= ❄ chiller / ✹ heat pump 1= ✹ chiller / ❄ heat pump	0	1		
CF 60	Heating / coling selection mode 0= Heating / cooling selection by keyboard 1= Heating / cooling selection by digital input 2= Heating / cooling selection by outside temperature (automatic chang-over)	0	2		
CF 61	Automatic change over setpoint for heating / cooling selection	-50.0 -58	110.0 230	°C °F	Dec int
CF 62	Automatic change over differential	0.1 0	25.0 45	°C °F	Dec int
CF 63	Unit of measure selection 0= °C / °BAR 1= °F / °psi	0	1		
CF 64	Power supply frequency 0= 50 Hz 1= 60 Hz 2= Vcc power supply Note: if CF64 = 2 the condenser fan can't be configured for proportional regulation	0	2		
CF 65	Modbus address	1	247		
CF 66	Firmware Release (only reading, factory use)	Only reading			
CF 67	Eeprom parameter map (only reading, factory use)	Only reading			
CF 68	Enable splitted battery 0= disabled 1= enabled	0	1		
CF 69	Enable buzzer 0= disabled 1= enabled	0	1		
CF 70	Enable IEV electronic expansion valve LAN communication 0= disabled 1= enabled	0	1		
CF 71	LAN address for IEV electronic expansion valve communication	1	15		
CF 72	Evaporating probe position (only when IEV electronic expansion valve is enabled) 0= evaporating probe configured in the Ichill 1= evaporating probe configured in the IEV electronic expansion valve Note: is not possible to configure the evaporating probe in both controllers, Ichill and IEV	0	1		
CF 73	Compressor delay activation after electronic expansion valve start command	0	250	sec	

CF 74	Enable Visograph or Visotouch remote panel 0= disabled 1= enable Visograph or Visotouch without probe on board 2= enable Visograph with only on board temperature probe* 3= enable Visograph with only remote temperature probe* 4= enable Visograph with on board and remote temperature probe* *this configuration can be used only if the remote panel is Vsograph 2.0 with on board and remote probes	0	4		

Dynamic set point parameters					
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**
Sd 1	Dynamic set point offset in cooling mode	-50.0 -90	50.0 90	°C °F	Dec int
Sd 2	Dynamic set point offset in heating mode	-50.0 -90	50.0 90	°C °F	Dec int
Sd 3	Outside temperature setpoint to start the modification to the cooling set point	-50.0 -58	110.0 230	°C °F	Dec int
Sd 4	Outside temperature setpoint to start the modification to the heating set point	-50.0 -58	110.0 230	°C °F	Dec int
Sd 5	Outside temperature differential in cooling mode	-30.0 -54	30.0 54	°C °F	Dec int
Sd 6	Outside temperature differential in heating mode	-30.0 -54	30.0 54	°C °F	Dec int
Sd 7	Analog AUX 1 output: dynamic set point offset in cooling mode	-50.0 -90	50.0 90	°C °F	Dec int
Sd 8	Analog AUX 1 output: dynamic set point offset in heating mode	-50.0 -90	50.0 90	°C °F	Dec int
Sd 9	Analog AUX 1 output: outside temperature setpoint to start the modification of the cooling set point	-50.0 -58	110.0 230	°C °F	Dec int
Sd 10	Analog AUX 1 output: outside temperature setpoint to start the modification of the heating set point	-50.0 -58	110.0 230	°C °F	Dec int
Sd 11	Analog AUX 1 output: outside temperature differential in cooling mode	-30.0 -54	30.0 54	°C °F	Dec int
Sd 12	Analog AUX 1 output: outside temperature differential in heating mode	-30.0 -54	30.0 54	°C °F	Dec int
Sd 13	Analog AUX 2 output: dynamic set point offset in cooling mode	-50.0 -90	50.0 90	°C °F	Dec int
Sd 14	Analog AUX 2 output: dynamic set point offset in heating mode	-50.0 -90	50.0 90	°C °F	Dec int
Sd 15	Analog AUX 2 output: outside temperature setpoint to start the modification of the cooling set point	-50.0 -58	110.0 230	°C °F	Dec int
Sd 16	Analog AUX 2 output: outside temperature setpoint to start the modification of the heating set point	-50.0 -58	110.0 230	°C °F	Dec int
Sd 17	Analog AUX 2 output: outside temperature differential in cooling mode	-30.0 -54	30.0 54	°C °F	Dec int
Sd 18	Analog AUX 2 output: outside temperature differential in heating mode	-30.0 -54	30.0 54	°C °F	Dec int
Sd 19	Relay AUX 1 output: dynamic set point offset in cooling mode	-50.0 -90	50.0 90	°C °F	Dec int
Sd 20	Relay AUX 1 output: dynamic set point offset in heating mode	-50.0 -90	50.0 90	°C °F	Dec int
Sd 21	Relay AUX 1 output: outside temperature set point to start the modification of the cooling set point	-50.0 -58	110.0 230	°C °F	Dec int
Sd 22	Relay AUX 1 output: outside temperature set point to start the modification of the heating set point	-50.0 -58	110.0 230	°C °F	Dec int
Sd 23	Relay AUX 1 output: outside temperature differential in cooling mode	-30.0 -54	30.0 54	°C °F	Dec int
Sd 24	Relay AUX 1 output: outside temperature differential in heating mode	-30.0 -54	30.0 54	°C °F	Dec int
Sd 25	Relay AUX 2 output: dynamic set point offset in cooling mode	-50.0 -90	50.0 90	°C °F	Dec int
Sd 26	Relay AUX 2 output: dynamic set point offset in heating mode	-50.0 -90	50.0 90	°C °F	Dec int
Sd 27	Relay AUX 2 output: outside temperature set point to start the modification of the cooling set point	-50.0 -58	110.0 230	°C °F	Dec int
Sd 28	Relay AUX 2 output: outside temperature set point to start the modification of the heating set point	-50.0 -58	110.0 230	°C °F	Dec int
Sd 29	Relay AUX 2 output: outside temperature differential in cooling mode	-30.0 -54	30.0 54	°C °F	Dec int
Sd 30	Relay AUX 2 output: outside temperature differential in heating mode	-30.0 -54	30.0 54	°C °F	Dec int

Energy saving parameters					
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**
ES 1	Time band 1 start time (0÷24)	0	24.00	Hr	10 Min

ES 2	Time band 1 end time (0÷24)	0	24.00	Hr	10 Min
ES 3	Time band 2 start time (0÷24)	0	24.00	Hr	10 Min
ES 4	Time band 2 end time (0÷24)	0	24.00	Hr	10 Min
ES 5	Time band 3 start time (0÷24)	0	24.00	Hr	10 Min
ES 6	Time band 3 end time (0÷24)	0	24.00	Hr	10 Min
ES 7	Monday: energy saving or automatic on-off time band selection	0 - 0	7 - 7		
ES 8	Tuesday: energy saving or automatic on-off time band selection	0 - 0	7 - 7		
ES 9	Wednesday: energy saving or automatic on-off time band selection	0 - 0	7 - 7		
ES 10	Thursday: energy saving or automatic on-off time band selection	0 - 0	7 - 7		
ES 11	Friday: energy saving or automatic on-off time band selection	0 - 0	7 - 7		
ES 12	Saturday: energy saving or automatic on-off time band selection	0 - 0	7 - 7		
ES 13	Sunday: energy saving or automatic on-off time band selection	0 - 0	7 - 7		
ES 14	Energy Saving setpoint offset in cooling mode	-30.0 -54	30.0 54	°C °F	Dec int
ES 15	Energy Saving differential in cooling mode	0.1 0	25.0 45	°C °F	Dec int
ES 16	Energy Saving setpoint offset in heating mode	-30.0 -54	30.0 54	°C °F	Dec int
ES 17	Energy Saving differential in heating mode	0.1 0	25.0 45	°C °F	Dec int
ES 18	Maximum ON time when the unit is forced on by keyboard starting from OFF state by Energy saving	1	250	10 min	min
ES 19	Second set point domestic hot water time band 1 start time (0÷24)	0	24.00	Hr	10 Min
ES 20	Second set point domestic hot water time band 1 end time (0÷24)	0	24.00	Hr	10 Min
ES 21	Second set point domestic hot water time band 2 start time (0÷24)	0	24.00	Hr	10 Min
ES 22	Second set point domestic hot water time band 2 end time (0÷24)	0	24.00	Hr	10 Min
ES 23	Second set point domestic hot water time band 3 start time (0÷24)	0	24.00	Hr	10 Min
ES 24	Second set point domestic hot water time band 3 end time (0÷24)	0	24.00	Hr	10 Min
ES 25	Monday: second set point domestic hot water time band selection	0	7		
ES 26	Tuesday: second set point domestic hot water time band selection	0	7		
ES 27	Wednesday: second set point domestic hot water time band selection	0	7		
ES 28	Thursday: second set point domestic hot water time band selection	0	7		
ES 29	Friday: second set point domestic hot water time band selection	0	7		
ES 30	Saturday: second set point domestic hot water time band selection	0	7		
ES 31	Sunday: second set point domestic hot water time band selection	0	7		
ES 32	Second set point domestic hot water offset	-30.0 -54	30.0 54	°C °F	Dec int
ES 33	Second set point domestic hot water differential	0.1 0	25.0 45	°C °F	Dec int
	Compressor parameters				
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**
CO 1	Minimum compressor ON time after the start-up	0	250	10 sec	10 sec
CO 2	Minimum compressor OFF time after the switching off	0	250	10 sec	10 sec
CO 3	Delay between the switching on of the compressors or compressor capacity steps	1	250	Sec	
CO 4	Delay between the switching off of the compressors or compressor capacity steps	0	250	Sec	
CO 5	Start regulation delay after giving power supply	0	250	10 Sec	10 sec
CO 6	Compressor capacity step operation mode 0= operating mode 1 1= operating mode 2 2= operating mode 3 3= operating mode 4	0	3		
CO 7	Compressor minimum capacity step operation mode 0 = unloader valve actives only at the compressor start-up (unloader valve for easy compressor start-up) 1= minimum capacity step always active (valve used as minimum capacity step also in regulation) 2 = screw compressor unloader valve actives only at the compressor start-up (unloader valve for easy compressor start-up) 3= screw compressor minimum capacity step always active (valve used as minimum capacity step also in regulation)	0	3		
CO 8	Screw compressor intermittent valve ON time	0	250	Sec	
CO 9	Screw compressor intermittent valve OFF time	0	250	Sec	
CO 10	Compressor start-up operation mode 0= Direct start-up 1= Part - winding start-up	0	1		
CO 11	Part - winding coils delay time Delay between the activation of the two part winding coils	0	100	Sec/10	0.1 sec
CO 12	By-pass gas valve start-up time	0	250	sec	

CO 13	Compressor sequence activation 0 = Fixed sequence 1 = Compressors activation based on working hours 2 = Compressors activation based on the number of start-up	0	2		
CO 14	Circuit sequence activation 0= Circuit saturation 1= Circuit balancing	0	1		
CO 15	Operative mode of the evaporator water pump or supply fan 0= Disabled 1= Continuous operation The water pump is switched on when the device is switched on in cooling or heating mode 2= ON when at least a compressor is ON The water pump is ON only if at least a compressor is ON	0	2		
CO 16	Delay between evaporator water pump/supply fan activation and compressor activation	1	250	sec	10sec
CO 17	Delay between compressor switching-off and evaporator water pump switching-off	0	250	Min	
CO 18	Running hours for evaporator water pump rotation	0	999	10Hr	10Hr
CO 19	Simultaneously working time during evaporator water pump rotation	0	250	Sec	
CO 20	Operative mode for condenser water pump 0= Disabled 1= Continuous operation The water pump is switched on when the device is switched on in cooling or heating mode 2= ON when at least a compressor is ON The water pump is ON only if at least a compressor is ON	0	2		
CO 21	Delay between compressor switching-off and condenser water pump switching-off	0	250	Min	
CO 22	Running hours for condenser water pump rotation	0	999	10Hr	10Hr
CO 23	Simultaneously working time during condenser water pump rotation	0	250	Sec	
CO 24	Compressor 1 operation time to generate maintenance warning	0	999	10 Hr	10 Hr
CO 25	Compressor 2 operation time to generate maintenance warning	0	999	10 Hr	10 Hr
CO 26	Compressor 3 operation time to generate maintenance warning	0	999	10 Hr	10 Hr
CO 27	Evaporator water pump / Supply fan operation time to generate maintenance warning	0	999	10 Hr	10 Hr
CO 28	Second evaporator water pump operation time to generate maintenance warning	0	999	10 Hr	10 Hr
CO 29	Condenser water pump operation time to generate maintenance warning	0	999	10 Hr	10 Hr
CO 30	Second condenser water pump operation time to generate maintenance warning	0	999	10 Hr	10 Hr
CO 31	Pump down operating mode 0= Disabled 1= enable pump down procedure during the compressor switching off, disabled during the switching on 2= enable pump down procedure during both phases, compressor switching off and switching on 3= enable pump down procedure during the compressor switching off only in cooling mode, disabled during the switching on 4= enable pump down procedure during both phases, compressor switching off and switching on only in cooling mode	0	4		
CO 32	Pump–down pressure setpoint	-1.0 -14	50.0 725	Bar psi	Dec int
CO 33	Pump-down pressure differential	0.1 1	12.0 174	Bar psi	Dec int
CO 34	Maximum pump–down time	0	250	Sec	
CO 35	Unloading: evaporator water inlet temperature set point (unloading by high temperature)	-50.0 -58	110.0 230	°C °F	Dec int
CO 36	Unloading: evaporator water inlet temperature differential (unloading by high temperature)	0.1 0	25.0 45	°C °F	Dec int
CO 37	Unloading: evaporator water inlet temperature delay (unloading by high temperature)	1	250	10 Sec	10 sec
CO 38	Unloading: maximum time in unloading by high evaporator water inlet temperature	0	250	Min	
CO 39	Unloading: condenser temperature / pressure set point (unloading by high temperature or pressure)	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
CO 40	Unloading: condenser temperature / pressure differential (unloading by high temperature or pressure)	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
CO 41	Unloading: condenser/evaporator temperature or pressure set point (unloading by low temperature or pressure)	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int

CO 42	Unloading: condenser/evaporator temperature or pressure differential (unloading by low temperature or pressure)	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
CO 43	Unloading: maximum time in unloading by condenser/evaporator temperature or pressure	1	250	Min	
CO 44	Steps/compressors to maintain ON when the unloading is active 1= one step / one compressor 2= two steps / two compressors 3= three steps / three compressors	1	3		
CO 45	Minimum time in unloading if the compressors have capacity steps	0	250	Sec	
CO 46	Compressor liquid injection solenoid valve set point	0 32	150 302	°C °F	Dec / int int
CO 47	Compressor liquid injection solenoid valve differential	0.1 0	25.0 45	°C °F	Dec int
CO 48	Maximum working time if the regulation temperature remains inside the neutral zone to force a compressor activation	0	250	Min	10 Min
CO 49	Maximum working time if the regulation temperature remains inside the neutral zone to force a compressor rotation	0	999	Hr	1Hr
CO 50	Unloading: evaporator water outlet temperature set point (unloading by low temperature)	-50.0 -58	110.0 230	°C °F	Dec int
CO 51	Unloading: evaporator water outlet temperature differential (unloading by low temperature)	0.1 0	25.0 45	°C °F	Dec int
CO 52	Unloading: maximum time in unloading by evaporator outlet temperature (unloading by low temperature)	0	250	Min	
CO 53	Pump-down time in switching on phase CO53 = 0 Disabled	0	250	Sec	
CO 54	Pump-down time in switching off phase CO53 = 0 Disabled	0	250	Sec	
CO 55	Maximum compressor operating time to have a rotation (only one compressor has to be on to switch it off and switch on another compressor)	0	250	Min	
CO 56	Domestic hot water pump operation time to generate maintenance warning	0	999	10 Hr	10 Hr
CO 57	Solar panel water pump operation time to generate maintenance warning	0	999	10 Hr	10 Hr
CO 58	Enable the 4 way valve inversion when the last compressor is switched off. The 4 way valve is reverded for CO58 time and then come back to previous position.	0	250	sec	
CO 59	Maximum number of compressors to use in Cooling mode	1	15		
CO 60	Maximum number of compressors to use in Heating mode	1	15		
CO 61	Maximum number of compressors to use in Domestic hot water mode	1	15		
CO 62	Evaporator water pump OFF time if the set point is reached	0	250	10 min	
CO 63	Evaporator water pump OFF time if the machine is STD-BY or OFF	0	250	10 Ore	
CO 64	Evaporator water pump ON time	0	250	Sec	10sec
CO 65	Condenser water pump OFF time if the set point is reached	0	250	10 min	
CO 66	Condenser water pump OFF time if the machine is STD-BY or OFF	0	250	10 Ore	
CO 67	Condenser water pump ON time	0	250	Sec	10sec
CO 68	Minimum time between two switching on of the same compressor	0	250	sec	
CO 69	Compressor activation delay after water solenoid valve activation	0	250	sec	
CO 70	Water solenoid valve de-activation delay after compressor de-activation	0	250	sec	
CO 71	Free cooling water pump operation time to generate maintenance warning	0	999	10 Hr	10 Hr
CO 72	Disable condenser water pump in case of contemporary chilled water and domestic hot water operation 0= water pump enabled 1= water pump disabled	0	1		
CO 73	Compressor contemporary operation time during rotation phase	0	250	sec	
CO 74	Enable the activation of the supply fan / evaporator water pump when condensing unit doesn't require compressors activation	0	1		
CO 75	Compressor 1 capacity (set different to 0 only to enable the regulation with compressors with different capacity)	0	100%		
CO 76	Compressor 2 capacity (set different to 0 only to enable the regulation with compressors with different capacity)	0	100%		
CO 77	Compressor 3 capacity (set different to 0 only to enable the regulation with compressors with different capacity)	0	100%		
CO 78	Maximum compressor start up number every 15 minutes (set different to 0 only if the regulation with compressors with different capacity is enabled) 0= Disabled	0	15		
CO 79	Enable compressor operation in cooling and or heating 0 = chiller and heat pump 1 = only chiller 2 = only heat pump	0	2		
CO 80	Maximum number of compressor enabled when the power limitation is active	0	15		
Inverter compressor parameters					
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**

CI 1	Inverter compressor: enable steps regulation 0= steps regulation disabled (if inverter compressor is enabeld, it modulates the capacity in proportional way) 1= steps regulation enabled; only one step has to be configured 2= steps regulation enabled; two steps have to be configured … 8= steps regulation enabled; eight steps have to be configured	0	8		
CI 2	Inverter compressor: step 1 power percentage	0	100	%	
CI 3	Inverter compressor: step 2 power percentage	0	100	%	
CI 4	Inverter compressor: step 3 power percentage	0	100	%	
CI 5	Inverter compressor: step 4 power percentage	0	100	%	
CI 6	Inverter compressor: step 5 power percentage	0	100	%	
CI 7	Inverter compressor: step 6 power percentage	0	100	%	
CI 8	Inverter compressor: step 7 power percentage	0	100	%	
CI 9	Inverter compressor: step 8 power percentage	0	100	%	
CI 10	Inverter compressor: power percentage thresold to switch on the compressor	0	100	%	
CI 11	Inverter compressor in continuous modulation: power percentage in unloading status	0	100	%	
CI 12	Inverter compressor in continuous modulation: delay of each capacity step reduction in unloading status	0	250	sec	
CI 13	Inverter compressor: maximum percentage when the power limitation function is active	0	100	%	
CI 14	Inverter compressor: time to maintain the percentage CI15 at compressor start-up	0	250	sec	
CI 15	Inverter compressor: power percentage at compressor start-up	0	100	%	
CI 16	Inverter compressor: delay of each power percentace increment at compressor start-up	0	250	sec	
CI 17	Inverter compressor: power percentage thresold to force the compressor to maximum power	0	100	%	
CI 18	Inverter compressor: maximum time at power percentage lower than CI17 to force the maximum power	0	250	min	10 min
CI 19	Inverter compressor: forced time at maximum power	0	250	sec	
CI 20	Inverter compressor: maximum continuos operating time	0	999	min	
CI 21	Inverter compressor: minimum percentage	1	CI22	%	
CI 22	Inverter compressor: maximum percentage	CI21	100	%	
CI 23	Inverter compressor: minimum time of each power variation during compressor operation	1	250	sec	
CI 24	Inverter compressor: maximum percentage in cooling mode	1	100	%	
CI 25	Inverter compressor: maximum percentage in heating mode	1	100	%	
CI 26	Inverter compressor: maximum percentage in domestic hot water mode	1	100	%	
CI 27	Compressore inverter: outside temperature thresold to reduce the power in heating mode	-50.0 -58	110.0 230	°C °F	Dec int
CI 28	Compressore inverter: outside temperature differential to disable the power reduction function	0.1 0	25.0 45	°C °F	Dec int
CI 29	Compressore inverter: maximum power percentage when the power reduction function is active	0	100	%	
CI 30	Compressore inverter: maximum power percentage in defrost	1	100	%	
CI 31	Compressore inverter: maximum power percentage in unloading	1	100	%	
Auxiliary function parameters					
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**
US 1	Auxiliary relay 1 operation mode 0= Disabled 1= Always enabled with direct action 2= Enabled only when the unit is on with direct action 3= Always enabled with reverse action 4= Enabled only when the unit is on with reverse action 5= Enabled only when the unit is on with direct action in heating mode and reverse action in cooling mode	0	5		
US 2	Auxiliary relay 1 analog input selection See chapter 38 to select the probe	1	12		
US 3	Auxiliary relay 1 minimum set point in cooling mode	-50.0 -58 -1.0 -14 0	US5	°C °F Bar Psi rH%	Dec int Dec int int
US 4	Auxiliary relay 1 maximum set point in cooling mode	US5	110.0 230 50.0 725 100	°C °F Bar Psi rH%	Dec int Dec int int

US 5	Auxiliary relay 1 set point in cooling mode	US3	US4	°C °F Bar Psi rH%	Dec int Dec int int
US 6	Auxiliary relay 1 minimum set point in heating mode	-50.0 -58 -1.0 -14 0	US8	°C °F Bar Psi rH%	Dec int Dec int int
US 7	Auxiliary relay 1 maximum set point in heating mode	US8	110.0 230 50.0 725 100	°C °F Bar Psi rH%	Dec int Dec int int
US 8	Auxiliary relay 1 set point in heating mode	US6	US7	°C °F Bar Psi rH%	Dec int Dec int int
US 9	Auxiliary relay 1 differential in cooling mode	0.1 0 0.1 1 0	25.0 45 14.0 203 100	°C °F Bar Psi rH%	Dec int Dec int int
US 10	Auxiliary relay 1 differential in heating mode	0.1 0 0.1 1 0	25.0 45 14.0 203 100	°C °F Bar Psi rH%	Dec int Dec int int
US 11	Auxiliary relay 1 operation mode 0= Disabled 1= Always enabled with direct action 2= Enabled only when the unit is on with direct action 3= Always enabled with reverse action 4= Enabled only when the unit is on with reverse action 5= Enabled only when the unit is on with direct action in heating mode and reverse action in cooling mode	0	5		
US 12	Auxiliary relay 2 analog input selection See chapter 38 to select the probe	1	12		
US 13	Auxiliary relay 2 minimum set point in cooling mode	-50.0 -58 -1.0 -14 0	US15	°C °F Bar Psi rH%	Dec int Dec int int
US 14	Auxiliary relay 2 maximum set point in cooling mode	US15	110.0 230 50.0 725 100	°C °F Bar Psi rH%	Dec int Dec int int
US 15	Auxiliary relay 2 set point in cooling mode	US13	US14	°C °F Bar Psi rH%	Dec int Dec int int
US 16	Auxiliary relay 2 minimum set point in heating mode	-50.0 -58 -1.0 -14 0	US18	°C °F Bar Psi rH%	Dec int Dec int int
US 17	Auxiliary relay 2 maximum set point in heating mode	US18	110.0 230 50.0 725 100	°C °F Bar Psi rH%	Dec int Dec int int
US 18	Auxiliary relay 2 set point in heating mode	US16	US17	°C °F Bar Psi rH%	Dec int Dec int int
US 19	Auxiliary relay 2 differential in cooling mode	0.1 0 0.1 1	25.0 45 14.0 203 100	°C °F Bar Psi rH%	Dec int Dec int int

US 20	Auxiliary relay 2 differential in heating mode	0.1 0 0.1 1	25.0 45 14.0 203 100	°C °F Bar Psi rH%	Dec int Dec int int
US 21	Auxiliary realys maximum operating time	0	250	min	
US 22	Auxiliary proportional output 1 operation mode 0= Disabled 1= Always enabled with direct action 2= Enabled only when the unit is on with direct action 3= Always enabled with reverse action 4= Enabled only when the unit is on with reverse action 5= Enabled only when the unit is on with direct action in heating mode and reverse action in cooling mode	0	5		
US 23	Auxiliary analog output 1 input selection See chapter 38 to select the probe	1	12		
US 24	Analog output 1 minimum set point in cooling mode	-50.0 -58 -1.0 -14 0	US26	°C °F Bar Psi rH%	Dec int Dec int int
US 25	Analog output 1 maximum set point in cooling mode	US26	110.0 230 50.0 725 100	°C °F Bar Psi rH%	Dec int Dec int int
US 26	Analog output 1 set point in cooling mode	US24	US25	°C °F Bar Psi rH%	Dec int Dec int int
US 27	Analog output 1 minimum set point in heating mode	-50.0 -58 -1.0 -14 0	US29	°C °F Bar Psi rH%	Dec int Dec int int
US 28	Analog output 1 maximum set point in heating mode	US29	110.0 230 50.0 725 100	°C °F Bar Psi rH%	Dec int Dec int int
US 29	Analog output 1 set point in heating mode	US27	US28	°C °F Bar Psi rH%	Dec int Dec int int
US 30	Analog output 1 differential in cooling mode	0.1 0 0.1 1 0	25.0 45 14.0 203 100	°C °F Bar Psi rH%	Dec int Dec int int
US 31	Analog output 1 differential in heating mode	0.1 0 0.1 1 0	25.0 45 14.0 203 100	°C °F Bar Psi rH%	Dec int Dec int int
US 32	Analog output 1 minimum value	0	US33	%	
US 33	Analog output 1 maximum value	US32	100	%	
US 34	Auxiliary proportional output 2 operation mode 0= Disabled 1= Always enabled with direct action 2= Enabled only when the unit is on with direct action 3= Always enabled with reverse action 4= Enabled only when the unit is on with reverse action 5= Enabled only when the unit is on with direct action in heating mode and reverse action in cooling mode	0	5		
US 35	Auxiliary analog output 1 input selection See chapter 38 to select the probe	1	12		
US 36	Analog output 2 minimum set point in cooling mode	-50.0 -58 -1.0 -14 0	US38	°C °F Bar Psi rH%	Dec int Dec int int

US 37	Analog output 2 maximum set point in cooling mode	US38	110.0 230 50.0 725 100	°C °F Bar Psi rH%	Dec int Dec int int
US 38	Analog output 2 set point in cooling mode	US36	US37	°C °F Bar Psi rH%	Dec int Dec int int
US 39	Analog output 2 minimum set point in heating mode	-50.0 -58 -1.0 -14 0	US41	°C °F Bar Psi rH%	Dec int Dec int int
US 40	Analog output 2 maximum set point in heating mode	US41	110.0 230 50.0 725 100	°C °F Bar Psi rH%	Dec int Dec int int
US 41	Analog output 2 set point in heating mode	US39	US40	°C °F Bar Psi rH%	Dec int Dec int int
US 42	Analog output 2 differential in cooling mode	0.1 0 0.1 1 0	25.0 45 14.0 203 100	°C °F Bar Psi rH%	Dec int Dec int int
US 43	Analog output 2 differential in heating mode	0.1 0 0.1 1 0	25.0 45 14.0 203 100	°C °F Bar Psi rH%	Dec int Dec int int
US 44	Analog output 2 minimum value	0	US45	%	
US 45	Analog output 2 maximum value	US44	100	%	
US 46	Analog output status when the output is lower than minimum value 0= minimum value is maintained 1= the output is forced to 0	0	1		
US 47	Modulating evaporator water pump: probe 1 selection for modulation in cooling mode See chapter 38 to select the probe	0	12		
US 48	Modulating evaporator water pump: probe 2 selection for modulation in cooling mode See chapter 38 to select the probe	0	12		
US 49	Modulating evaporator water pump: set point for maximum speed in cooling mode	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
US 50	Modulating evaporator water pump: proportional band for speed modulation in cooling mode	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
US 51	Modulating evaporator water pump: minimum speed in cooling mode	0	100	%	
US 52	Modulating evaporator water pump: maximum speed in cooling mode	0	100	%	
US 53	Modulating evaporator water pump: probe 1 selection for modulation in heating mode See chapter 38 to select the probe	0	12		
US 54	Modulating evaporator water pump: probe 2 selection for modulation in heating mode See chapter 38 to select the probe	0	12		
US 55	Modulating evaporator water pump: set point for maximum speed in heating mode	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
US 56	Modulating evaporator water pump: proportional band for speed modulation in heating mode	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
US 57	Modulating evaporator water pump: minimum speed in heating mode	0	100	%	
US 58	Modulating evaporator water pump: maximum speed in heating mode	0	100	%	
US 59	Modulating evaporator water pump: speed in Free Cooling	0	100	%	
US 60	Modulating evaporator water pump: speed when compressor is OFF	0	100	%	

US 61	AUX 1 relay operation mode 1= enabled only in cooling mode 2= enabled only in heating mode 3= enabled in cooling and heating mode	1	3		
US 62	AUX 2 relay operation mode 1= enabled only in cooling mode 2= enabled only in heating mode 3= enabled in cooling and heating mode	1	3		
US 63	AUX 1 analog output operation mode 1= enabled only in cooling mode 2= enabled only in heating mode 3= enabled in cooling and heating mode	1	3		
US 64	AUX 2 analog output operation mode 1= enabled only in cooling mode 2= enabled only in heating mode 3= enabled in cooling and heating mode	1	3		
Condenser fan parameters					
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**
FA 1	Condenser fan configuration output 0 = Disabled 1 = ON/OFF: always on 2 = ON/OFF: operation mode 1 3 = ON/OFF: operation mode 2 4 = proportional speed control	0	4		
FA 2	Condenser fan operating mode 0= condenser fan regulation is enabled only if the compressor is ON 1= condenser fan regulation is always enabled, also if the compressor is OFF	0	1		
FA 3	Fan speed start-up time at maximum speed	0	250	Sec	
FA 4	Phase shifting of the fan motor (signal calibration due to inductive component of the fan motor)	0	8	Micro Sec	250µs
FA 5	Pre-ventilation time before turning on the compressor in cooling mode	0	250	Sec	
FA 6	Condenser fan minimum speed in cooling mode	0	100	%	
FA 7	Condenser fan maximum speed in cooling mode	0	100	%	
FA 8	- Proportional speed control Temperature / pressure threshold for minimum speed in cooling mode - ON/OFF regulation FA01=2 or FA01=3 Temperature / pressure to switch on the first step of the condenser fan in cooling mode	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
FA 9	- Proportional speed control Temperature / pressure to force the condenser fan at maximum speed in cooling mode - ON/OFF regulation FA01=2 or FA01=3 Condenser fan step 2 set point in cooling mode	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
FA 10	- Proportional speed control Proportional band for condenser fan modulation in chiller in cooling mode - ON/OFF regulation FA01=2 or FA01=3 Condenser fan differential of circuit 1 in cooling mode	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
FA 11	Proportional speed control: CUT-OFF differential in cooling mode	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
FA 12	Proportional speed control: over ride CUT- OFF in cooling mode	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
FA 13	Proportional speed control: CUT-OFF time delay	0	250	Sec	
FA 14	Condenser fan modulating maximum speed in cooling mode	0	100	%	
FA 15	Condenser fan minimum speed in heating mode	0	100	%	
FA 16	Condenser fan maximum speed in heating mode	0	100	%	
FA 17	- Proportional speed control FA01 = 4 Temperature / pressure threshold for minimum speed in heating mode - ON/OFF regulation FA01=2 or FA01=3 Temperature / pressure to switch on the first step of the condenser fan in heating mode	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
FA 18	- Proportional speed control FA01 = 4 Temperature / pressure to force the condenser fan at maximum speed in heating mode - ON/OFF regulation FA01=2 or FA01=3 Condenser fan step 2 set point in heating mode	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
FA 19	- Proportional speed control FA01 = 4 Proportional band for condenser fan control in heating mode - ON/OFF regulation FA01=2 or FA01=3 Condenser fan differential in heating mode	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int

FA 20	- Proportional speed control FA01 = 4 CUT-OFF differential in heating mode	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
FA 21	Proportional speed control: over ride CUT- OFF in heating mode	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
FA 22	Condenser fan modulating maximum speed in heating mode	0	100	%	
FA 23	Hot start setpoint (air/air unit)	-50.0 -58	110.0 230	°C °F	Dec int
FA 24	Hot start differential (air/air unit)	0.1 0	25.0 45	°C °F	Dec int
FA 25	FA01=2 or FA01=3 condenser fan ON/OFF regulation Set point step 3 in cooling mode	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
FA 26	FA01=2 or FA01=3 condenser fan ON/OFF regulation Set point step 4 in cooling mode	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
FA 27	FA01=2 or FA01=3 condenser fan ON/OFF regulation Set point step 3 in heating mode	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
FA 28	FA01=2 or FA01=3 condenser fan ON/OFF regulation Set point step 4 in heating mode	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
FA 29	Pre-ventilation time before turning on the compressor in heating mode	0	250	Sec	Sec
FA 30	Post ventilation time in heating mode	0	250	Sec	10Sec
FA 31	Outside temperature to enable post ventilation in heating mode	-50.0 -58	110.0 230	°C °F	Dec int
FA 32	Condenser fan speed during post ventilation in heating mode	0	100	%	
FA 33	Condenser fan maximum modulation speed in defrost	0	100	%	
FA 34	Temperature / pressure to force condenser fan maximum speed in defrost	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
FA 35	Condenser fan: force condenser fan at maximum speed during the free cooling and if the compressors are OFF 0= function disabled 1= function enabled	0	1		
FA 36	Modulating condenser fan: maximum speed when the night function is enabled	0	100	%	
FA 37	Steps condenser fan: maximum number of steps enabled when the night function is active	0	4		
FA 38	Condenser fan: night function start time	0	24.00	Hr	10 Min
FA 39	Condenser fan: night function end time	0	24.00	Hr	10 Min
	Antifreeze parameters				
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**
Ar 1	Anti-freeze heaters / integration heaters (air/air unit) setpoint in cooling mode	-50.0 -58	110.0 230	°C °F	Dec int
Ar 2	Antifreeze heaters heaters / integration heaters (air/air unit) proportional band in cooling mode	0.1 0	25.0 45	°C °F	Dec Int
Ar 3	Anti-freeze heaters / integration heaters setpoint (air/air unit) in heating mode	-50.0 -58	110.0 230	°C °F	Dec int
Ar 4	Antifreeze heaters heaters / integration heaters (air/air unit) proportional band in heating mode	0.1 0	25.0 45	°C °F	Dec int
Ar 5	Antifreeze heaters / integration heaters status in defrost 0= managed by heaters thermoregulation 1= managed by heaters thermoregulation and during the defrosting cycle	0	1		
Ar 6	Antifreeze probe selection to manage evaporator heaters / support heaters in cooling mode 0= Disabled 1= Evaporator inlet temperature 2= Evaporator outlet temperature 3= Outside temperature	0	3		

Ar 7	Antifreeze probe selection to manage evaporator heaters / support heaters in heating mode 0= Disabled 1= Evaporator inlet temperature 2= Evaporator outlet temperature 3= Outside temperature	0	3		
Ar 8	Antifreeze probe selection to manage condenser heaters (water/water unit) 0= disabled 1= Condenser water inlet temperature 2= Condenser water outlet temperature 3= Outside temperature	0	3		
Ar 9	Enable evaporator anti-freeze heaters in remote OFF or stand-by mode 0= Control disabled 1= Controlled by anti-freeze thermoregulation	0	1		
Ar 10	Anti-freeze heaters status in case of condenser/evaporator faulty probe: 0= Anti-freeze heaters disabled 1= Anti-freeze heaters forced on	0	1		
Ar 11	Boiler function 0= Disabled 1= Enabled in integration to the heat pump 2= Enabled in substitution to the heat pump	0	2		
Ar 12	Outside air temperaure setpoint to enable boiler heaters	-50.0 -58	110.0 230	°C °F	Dec int
Ar 13	Outside temperature differential to disable boiler heaters	0.1 0	25.0 45	°C °F	Dec int
Ar 14	Delay before turning on boiler heaters The delay starts counting when outside temperature falls below Ar12 thresold	0	250		Min
Ar 15	Boiler heaters setpoint in cooling mode	-50.0 -58	110.0 230	°C °F	Dec int
Ar 16	Boiler heaters proportional band in cooling mode	0.1 0	25.0 45	°C °F	Dec int
Ar 17	Boiler heaters setpoint in heating mode	-50.0 -58	110.0 230	°C °F	Dec int
Ar 18	Boiler heaters proportional band in heating mode	0.1 0	25.0 45	°C °F	Dec int
Ar 19	Outside air temperature setpoint to stop the compressor if the boiler is in integration mode	-50.0 -58	110.0 230	°C °F	Dec int
Ar 20	Outside air temperature differential to enable the compressor if the boiler is in integration mode	0.1 0	25.0 45	°C °F	Dec int
Ar21	Enable evaporator water pump in OFF or stand-by mode to prevent antifreeze alarm 0= Disabled 1= Enabled	0	1		
Ar22	Probe selection to manage the evaporator water pump in OFF or STD-BY 0= Disabled 1= Evaporator inlet 2= Evaporator outlet 3= Outside temperature	0	3		
Ar23	Evaporator water pump set point in OFF or stand-by mode for antifreeze protection	-50.0 -58	110.0 230	°C °F	Dec int
Ar24	Evaporator water pump differential in OFF or stand-by mode for antifreeze protection	0.1 0	25.0 45	°C °F	Dec int
Ar25	Condenser antifreeze heaters set point in cooling mode	-50.0 -58	110.0 230	°C °F	Dec int
Ar26	Condenser antifreeze heaters differential in cooling mode	0.1 0	25.0 45	°C °F	Dec int
Ar27	Condenser antifreeze heaters set point in heating mode	-50.0 -58	110.0 230	°C °F	Dec int
Ar28	Condenser antifreeze heaters differential in heating mode	0.1 0	25.0 45	°C °F	Dec int
Ar29	Enable condenser antifreeze heaters in OFF or STAND-BY 0= not enabeld 1= enabled (ON or OFF depending on regulation request)	0	1		
Ar30	Condenser antifreeze heaters status in case of probe faulty 0 = OFF 1= ON	0	1		
Ar31	Enable condenser anti-freeze heaters in remote OFF or stand-by mode 0= Control disabled 1= Controlled by anti-freeze thermoregulation	0	1		
Ar32	Condenser water pump probe selection for antifreeze operation 0= no probe is selected (water pump control disabled) 1= condenser inlet temperature 2= condenser outlet temperature 3= outside temperature probe	0	3		

Ar33	Condenser water pump set point in OFF or stand-by mode for antifreeze protection	-50.0 -58	110.0 230	°C °F	Dec int
Ar34	Condenser water pump differential in OFF or stand-by mode for antifreeze protection	0.1 0	25.0 45	°C °F	Dec int
	Defrost parameters				
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**
dF 1	Defrost configuration: 0= Disabled 1= Enabled: condenser temperature / pressure control 2= Enabled: • start defrost: probe selected by dF24 • stop defrost: by time (dF05) 3= Enabled: • start defrost: probe selected by dF24 • stop defrost: digital input properly configured 4= Enabled: defrost only with condenser fan 5= Enabled: • start defrost: digital input properly configured • stop defrost: probe selected by dF24	0	5		
dF 2	Start defrost temperature or pressure	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F bar psi	Dec int Dec Int
dF 3	Stop defrost temperature or pressure	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F bar psi	Dec int Dec Int
dF 4	Minimum defrost duration	0	250	Sec	
dF 5	Maximum defrost duration	0	250	Min	
dF 6	Compressor OFF time during the switching heating → defrost	0	250	Sec	
dF 7	Compressor OFF time during the switching defrost → heating	0	250	Sec	
dF 8	Delay time between two defrost	1	99	Min	
dF 9	Combined defrost: set point temperature of the combined defrost probe to start the defrost	-50.0 -58	110.0 230	°C °F	Dec int
dF 10	Combined defrost: set point temperature of the combined defrost probe to end the defrost	-50.0 -58	110.0 230	°C °F	Dec int
dF 11	Enable all compressors forcing ON in defrost 0= Disabled 1= Enabled (all compressors forced ON in defrost)	0	1		
dF 12	Delay between the switching on of the compressors in defrost	0	250	Sec	
dF 13	Enable fan control during defrost 0= Disabled 1= Enabled only in defrost 2= Enabled in defrost and dripping time	0	2		
dF 14	Pressure / temperature set point to enable the condenser fan regulation during the defrost	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F bar psi	Dec int Dec Int
dF 15	Forced defrost: time delay to start the defrost	0	250	sec	
dF 16	Pressure / temperature setpoint to enable the forced defrost	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F bar psi	Dec int Dec int
dF 17	Pressure / temperature differential to end the forced defrost	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
dF 18	Defrost probe selection 0= start and stop by condenser temperature / pressure 1= start by evaporator pressure and stop by condenser temperature / pressure 2= start by condenser temperature / pressure and stop by evaporator pressure 3= start and stop by evaporator pressure	0	3		
dF 19	Disable supply fan during the defrost cycle (air/air unit) 0= Supply fan enabled in defrost 1= Supply fan disabled in defrost	0	1		
dF 20	Outside temperature set point to enable defrost by condenser fan	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F bar psi	Dec int Dec int

dF 21	Splitted exchanger 1 set point in chiller	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F bar psi	Dec int Dec int
dF 22	Splitted exchanger 2 set point in chiller	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F bar psi	Dec int Dec int
dF 23	Splitted exchanger 1 differential in chiller	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
dF 24	Splitted exchanger 2 differential in chiller	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
dF 25	Splitted exchanger 1 set point in heat pump	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F bar psi	Dec int Dec int
dF 26	Splitted exchanger 2 set point in heat pump	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F bar psi	Dec int Dec int
dF 27	Splitted exchanger 1 differential in heat pump	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
dF 28	Splitted battery 2 differential in heat pump	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
dF 29	Probe selection to manage the splitted exchanger 0= outside temperature 1= condenser temperature/pressure	0	1		
dF 30	Forced time of maximum capacity of splitted exchanger in cooling mode when the compressor is switched on	0	250	sec	
dF 31	Defrost dynamic set point: maximum offset	-30.0 -54 -14.0 -203	30.0 54 14.0 203	°C °F Bar Psi	Dec int Dec int
dF 32	Defrost dynamic set point: outside temperature set point	-50.0 -58	110.0 230	°C °F	Dec int
dF 33	Defrost dynamic set point: outside temperature differential	-30.0 -54	30.0 54	°C °F	Dec int
dF 34	Interval time counting mode selection between two defrost 0= the interval time depends on the status of the compressor 1= the interval time is independent on the status of the compressor	0	1		
dF 35	Time to start the defrost if the defrost temperature/pressure remains below dF02 threshold (only if dF34=1)	0	250	sec	

Heat recovery parameters

Parameter	Description	min	max	M. u.	Resolution
rC 1	Heat recovery operation mode 0 = disabled 1 = enabled	0	2		
rC 2	Delay time of heat recovery valve activation	0	250	Sec	
rC 3	Compressor restart delay time after heat recovery valve activation	0	250	Sec	
rC 4	Heat recovery minimum working time	0	250	Min	
rC 5	Minimum delay time between two heat recovery activations	0	250	Min	
rC 6	Condenser temperature/pressure for recovery disabling	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
rC 7	Condenser temperature/pressure differential for heat recovery enabling	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
rC 8	Maximum time of heat recovery disabling	0	250	Min	
rC 9	Condenser fan status in heat recovery mode	0	1		
rC 10	Heat recovery set point	rC11	rC12	°C °F Bar Psi	Dec int Dec int

rC 11	Minimum value of the Heat recovery set point	-50.0 -58 -1.0 -14	rC10	°C °F Bar Psi	Dec int Dec int
rC 12	Maximum value of the Heat recovery set point	rC10	110.0 230 50.0 725	°C °F Bar Psi	Dec int Dec int
rC 13	Heat recovery differential	0.1 0 0.1 1	25.0 45 14.0 203	°C °F Bar Psi	Dec int Dec int
Domestic hot water parameters					
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**
FS 1	Domestic hot water regulation mode 0= disabled 1= enabled: regulation with valves in water circuit 2= enabled: regulation with valves in gas circuit	0	2		
FS 2	Domestic hot water thermoregulation priority 0= heating / cooling 1= domestic hot water 2= domestic hot water by digital input	0	2		
FS 3	Domestic hot water set point	FS05	FS06	°C/°F	dec/int
FS 4	Domestic hot water proportional band	0.1 0	25.0 45	°C °F	Dec int
FS 5	Minimum value of the domestic hot water set point	-50.0 -58	FS06	°C °F	Dec int
FS 6	Maximum value of the domestic hot water set point	FS05	110.0 230	°C °F	Dec int
FS 7	How to start domestic hot water operation 0= when the domestic hot water temperature requires the activation of all the compressors 1= when the domestic hot water temperature requires the activation of the first compressor	0	1		
FS 8	How to reach the domestic hot water set point 0= force all compressors on 1= force all compressors and heaters on	0	1		
FS 9	Enable heaters for domestic hot water regulation 0= disabled 1= enabled	0	1		
FS 10	Delay to activate the heaters during the domestic hot water regulation	0	250	Min	
FS 11	Domestic hot water Valve 1 and valve 2 switching time	0	999	sec	int
FS 12	Domestic hot water valve 1 activation delay after water pump activation	0	999	sec	int
FS 13	Reversing cycle delay in domestic hot water regulation	0	999	sec	int
FS 14	Enable compressor security time during domestic hot water regulation	0	1		
FS 15	Domestic hot water: security set point	-50.0 -58	110.0 230	°C °F	
FS 16	Domestic hot water: security differential	0.1 0	25.0 45	°C °F	
FS 17	Domestic hot water: minimum interruption time	0	250	min	
FS 18	Probe selection to force the exit from Domestic hot water See chapter 38 to select the probe	0	12		
FS 19	Domestic hot water heaters low temperature set point	-50.0 -58	110.0 230	°C °F	
FS 20	Domestic hot water heaters low temperature differential	0.1 0	25.0 45	°C °F	
FS 21	Probe selection for low domestic hot water temperature See chapter 38 to select the probe	0	12		
FS 22	Evaporator water pump enabled is Domestic hot water 0= enabled 1= disabled	0	1		
FS 23	Antilegionella cycle operation mode 0= compressors and heaters 1= compressors at the beginning and then heaters 2= only heaters 3= only compressors	0	3		
FS 24	Antilegionella operating mode 0 = interval time 1= weekly 2= daily	0	2		
FS 25	Antilegionella set point	FS26	FS27	°C/°F	dec/int
FS 26	Minimum value of the Antilegionella set point	-50.0 -58	FS25	°C °F	Dec int

FS 27	Maximum value of the Antilegionella set point	FS25	110.0 230	°C °F	Dec int
FS 28	Temperature band for heaters deactivation during antilegionella cycle	0.1 0	25.0 45	°C °F	Dec int
FS 29	Temperature set point to force OFF the compressors during antilegionella cycle	-50.0 -58	110.0 230	°C °F	
FS 30	Delay between two antilegionella cycles (if FS12=0)	0	250	Hr	
FS 31	Hour selection for the Antilegionella activation	0	24.00	Hr	10 min
FS 32	Day selection for the Antilegionella activation	0	7		
FS 33	Minimum operating working time of the Antilegionella cycle	1	250	min	
FS 34	Maximum operating working time of the Antilegionella cycle	0	250	min	
FS 35	Delay time to activate the domestic hot water valve starting from pump activation	0	250	sec	
FS 36	Delay time to deactivate the domestic hot water pump starting from valve deactivation	0	250	sec	

Free cooling e pannelli solari

Parametro	Descrizione	Min	Max	Unità di misura	Risoluzione
AF 1	Temperature differential to enable the freecooling function	0.1 0	25.0 45	°C °F	Dec int
AF 2	Temperature differential for the free cooling regulation	0.1 0	25.0 45	°C °F	Dec int
AF 3	Free cooling maximum time	0	250	min	
AF 4	Temperature differential to activate the compressors in Free cooling	0 0	30.0 54	°C °F	Dec int
AF 5	Free coling proportional band	0.1 0	25.0 45	°C °F	Dec int
AF 6	Minimum value Free cooling analog output	0	AF7	%	
AF 7	Maximum value Free cooling analog output	AF6	100	%	
AF 8	T1 probe selection for Free cooling temperature differential calculation See chapter 38 to select the probe	0	12		
AF 9	T2 probe selection for Free cooling temperature differential calculation See chapter 38 to select the probe	0	12		
AF 10	Probe selection to disable the Free cooling for low temperature See chapter 38 to select the probe	0	12		
AF 11	Set point to disable the Free cooling for low temperature	-50.0 -58	110.0 230	°C °F	
AF 12	Differential to disable the Free cooling for low temperature	0.1 0	25.0 45	°C °F	
AF 13	Delay time to enable compressor in free cooling if the regulation temperature rises over St01+St07	0	250	min	
AF 14	Dfferential to enable free cooling analog output	0.1 0	25.0 45	°C °F	
AF 15	Free cooling water pump OFF time if chiller only Free cooling	0	250	min	
AF 16	Free cooling water pump ON time if chiller only Free cooling	0	250	sec	
AF 17	Outside temperature set point to force the maximum speed of condenser fan	-50.0 -58	110.0 230	°C °F	
AF 18	Outside temperature differential to force the maximum speed of condenser fan	0.1 0	25.0 45	°C °F	
AF 19	Delay time of condenser fan regulation during Free cooling	0	250	min	
AF 20	Solar panel set point	AF22	AF23	°C/°F	dec/int
AF 21	Solar panel differential	0.1 0	25.0 45	°C °F	Dec int
AF 22	Minimum value of the solar panel set point	-50.0 -58	AF20	°C °F	Dec int
AF 23	Maximum value of the solar panel set point	AF20	110.0 230	°C °F	Dec int
AF 24	Solar panel operation mode for domestic hot water 0= disabled 1= integration to heat pump 2= substitution to heat pump	0	2		
AF 25	Solar panel opration mode for heating 0= disabled 1= integration to heat pump 2= substitution to heat pump	0	2		
AF 26	Solar panel used in integration to domestic hot water: probe selection for the temperature differential calculation See chapter 38 to select the probe	0	12		

AF 27	Solar panel used in integration to heating: probe selection for the temperature differential calculation See chapter 38 to select the probe	0	12		
AF 28	Temperature differential to enable solar panel in domestic hot water	0.1 0	25.0 45	°C °F	Dec int
AF 29	Temperature differential to enable solar panel in heating	0.1 0	25.0 45	°C °F	Dec int
AF 30	Maximum operation time of solar panel if set point not reached	0	250	min	
AF 31	Minimum value of the humidification set point	0	AF32	rH%	int
AF 32	Maximum value of the humidification set point	AF31	100	rH%	int
AF 33	Humidification set point	AF31	AF32	rH%	int
AF 34	Humidification differential	1	100	rH%	int
AF 35	Minimum value of the dehumidification set point	0	AF36	rH%	int
AF 36	Maximum value of the dehumidification set point	AF35	100	rH%	int
AF 37	Dehumidification set point	AF35	AF36	rH%	int
AF 38	Dehumidification differential	1	100	rH%	int
AF 39	Offset to apply to cooling set point in dehumidification	0.1 0	25.0 45	°C °F	Dec int
AF 40	Minimum value of the humidification analog output	0	AF41	%	
AF 41	Maximum value of the humidification analog output	AF40	100	%	
AF 42	Minimum value of the dehumidification analog output	0	AF43	%	
AF 43	Maximum value of the dehumidification analog output	AF42	100	%	

Alarm parameters

Parameter	Description	min	max	M. u.	Resolution
A0 1	Low pressure alarm delay after compressor activation	0	250	Sec	
A0 2	Low pressure alarm by-pass time during the switching-off in pump down mode. AL02 = 0 low pressure alarm disabled when the compressors are OFF AL02 > 0 low pressure alarm enabled after A002 time from compressor switching off	0	250	10 Sec	
A0 3	Low pressure alarm setpoint	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F bar psi	Dec int Dec int
A0 4	Low pressure alarm differential	0.1 0 0.1 1	25.0 45 14.0 203	°C °F bar psi	Dec int Dec Int
A0 5	Maximum number of low pressure alarms to generate manual reset alarm A005 = 0 always manual reset A005= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A005 - Manual reset if the number of alarms in an hour reaches A005 A005 =16 always automatic reset	0	16		
A0 6	Enable low temperature/pressure alarm detection during defrost 0= Disabled 1= Enabled	0	1		
A0 7	Low temperature / pressure alarm delay during defrost	0	250	Sec	
A0 8	Enable low temperature / pressure alarm when the unit in OFF or stand – by 0 = Disabled 1 = Enabled	0	1		
A0 9	Condenser high temperature / pressure alarm	-50.0 -58 -1.0 -14	110.0 230 50.0 725	°C °F bar psi	Dec int Dec int
A0 10	Condenser high temperature /pressure alarm differential	0.1 0 0.1 1	25.0 45 14.0 203	°C °F bar psi	Dec int Dec int
A0 11	Compressor low oil pressure / low oil level alarm delay starting from compressor activation	0	250	Sec	
A0 12	Compressor low oil pressure / oil level alarm delay during normal operation	0	250	Sec	

A0 13	Maximum number of compressor low oil pressure / oil level alarms per hour to generate manual reset alarm A013 = 0 always manual reset A013= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A013 - Manual reset if the number of alarms in an hour reaches A013 A013 =16 always automatic reset	0	16		
A0 14	Condenser flow switch configuration 0= Disabled 1= Enabled only in cooling mode 2= Enabled only in heating mode 3= Enabled in cooling and heating mode	0	3		
A0 15	Evaporator flow switch / supply fan overload alarm delay after water pump/ supply fan activation	0	250	Sec	
A0 16	Evaporator flow switch / supply fan overload alarm delay to switch OFF the evaporator water pump	0	250	Sec	
A0 17	Evaporator flow switch / supply fan overload delay to switch OFF the compressor	0	250	Sec	
A0 18	Evaporator flow switch / supply fan overload de-activation time to reset the alarm	0	250	Sec	
A0 19	Compressor overload alarm delay after compressor start-up	0	250	Sec	
A0 20	Maximum number of compressor overload alarm per hour to generate manual reset alarm A020 = 0 always manual reset A020= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A020 - Manual reset if the number of alarms in an hour reaches A020 A020 =16 always automatic reset	0	16		
A0 21	Maximum number of pump down alarm per hour, at the switching off, to generate manual reset alarm A021 = 0 always manual reset A021= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A021 - Manual reset if the number of alarms in an hour reaches A021 A021 =16 always automatic reset	0	16		
A0 22	Maximum number of pump down alarm per hour, at the start-up, to generate manual reset alarm A022 = 0 always manual reset A022= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A022 - Manual reset if the number of alarms in an hour reaches A022 A022 =16 always automatic reset	0	16		
A0 23	Select if the pump down alarm must change from automatic to manual reset: 0= Always automatic reset 1= Manual reset after A022 alarms per hour	0	1		
A0 24	Minimum antifreeze alarm setpoint in cooling mode	-50.0 -58	A026	°C °F	Dec int
A0 25	Maximum antifreeze alarm setpoint in cooling mode	A026	110.0 230	°C °F	Dec int
A0 26	Anti-freeze alarm, low ambient temperature (air/air), low outlet air temperature (air/air unit) set point	A024	A025	°C/°F	Dec/int
A0 27	Anti-freeze alarm, low ambient temperature (air/air), low outlet air temperature (air/air unit) differential	0.1 0	25.0 45	°C °F	Dec int
A0 28	Anti-freeze alarm, low ambient temperature (air/air), low outlet air temperature (air/air unit) alarm delay	0	250	Sec	
A0 29	Maximum number of anti-freeze, low ambient air temperature or low outlet air temperature alarm per hour to generate manual alarm reset: A029 = 0 always manual reset A029= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A029 - Manual reset if the number of alarms in an hour reaches A029 A029 =16 always automatic reset	0	16		

A0 30	Anti-freeze alarm operation mode in cooling mode 0= turn off the compressors; the display shows the alarm label but buzzer and alarm relay are not activated 1= turn off the compressors; the display shows the alarm label and buzzer and alarm relay are activated	0	1		
A0 31	Minimum antifreeze alarm setpoint in heating mode	-50.0 -58	A033	°C °F	Dec int
A0 32	Maximum antifreeze alarm setpoint in heating mode	A033	110.0 230	°C °F	Dec int
A0 33	Anti-freeze alarm setpoint in heat pump	A031	A032	°C/°F	Dec/int
A0 34	Anti-freeze alarm differential in heat pump	0.1 0	25.0 45	°C °F	Dec int
A0 35	Anti-freeze alarm delay in heating mode at the regulation start up	0	250	Sec	
A0 36	Anti-freeze, low air ambient temperature or low outlet air temperature alarm delay in heating during normal operation	0	250	Sec	
A0 37	Maximum number of anti-freeze, low air ambient temperature or low outlet air temperature alarms per hour in heating mode to generate the manual reset alarm. A037 = 0 always manual reset A037= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A037 - Manual reset if the number of alarms in an hour reaches A037 A037 =16 always automatic reset	0	16		
A0 38	Anti-freeze alarm operation mode in heating mode 0= turn off the compressors; the display shows the alarm label but buzzer and alarm relay are not activated. 1= turn off the compressors; the display shows the alarm label and buzzer and alarm relay are activated.	0	1		
A0 39	Compressor high discharge temperature setpoint	0 32	150 302	°C °F	Dec / int int
A0 40	Compressor high discharge temperature differential	0.1 0	25.0 45	°C °F	Dec int
A0 41	Number of compressor high discharge temperature alarms per hour to generate the manual reset alarm. A041 = 0 always manual reset A041= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A041 - Manual reset if the number of alarms in an hour reaches A041 A041 =16 always automatic reset	0	16		
A0 42	Number of generic alarm per hour to generate the manual reset alarm A042 = 0 always manual reset A042= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A042 - Manual reset if the number of alarms in an hour reaches A042 A042 =16 always automatic reset	0	16		
A0 43	Generic alarm delay (after digital input activation) to generate the alarm	0	250	Sec	
A0 44	Generic alarm delay (after digital input de-activation) to reset the alarm	0	250	10 sec	10 sec
A0 45	Enable alarm relay operation mode when the unit in off or stand – by: 0= Alarm output disabled 1= Alarm output enabled	0	1		
A0 46	Password value to reset the alarm log, compressor overload alarm and antifreeze alarm	0	999		
A0 47	Compressor overload alarm operation mode 0= switch off only the compressor in alarm 1= switch off all the compressors	0	1		
A0 48	Enable compressor overload alarm when the compressor is off 0 = Disabled 1= Alarm enabled	0	1		
A0 49	Enable compressor oil level alarm when the compressor is off 0 = Disabled 1= Alarm enabled	0	1		
A0 50	Generic alarm 2 operation mode 0= only warning message; always automatic reset 1= the alarm switch off all the regulations; the alarm reset depends on the value of parameter A051	0	1		

A0 51	Maximum number of generic alarm 2 before generating the manual reset alarm A051 = 0 always manual reset A051= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A051 - Manual reset if the number of alarms in an hour reaches A051 A051 =16 always automatic reset	0	16		
A0 52	Generic alarm 2 delay after digital input activation to generate the alarm	0	250	Sec	sec
A0 53	Generic alarm 2 delay after digital input de-activation to reset the alarm	0	250	sec	sec
A0 54	High pressure / temperature alarms per hour to generate the manual reset alarm. A054 = 0 always manual reset A054= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A054 - Manual reset if the number of alarms in an hour reaches A054 A054 =16 always automatic reset	0	16		
A0 55	Condenser flow switch alarm delay after water pump activation	0	250	Sec	
A0 56	Condenser flow switch alarm delay to switch OFF the condenser water pump	0	250	Sec	
A0 57	Condenser flow switch delay to switch OFF the compressor	0	250	Sec	
A0 58	Condenser flow switch de-activation time to reset the alarm	0	250	Sec	
A0 59	Maximum number of high water temperature alarm per hour to generate the manual reset alarm. A059 = 0 always manual reset A059= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A059 - Manual reset if the number of alarms in an hour reaches A059 A059 =16 always automatic reset	0	16		
A0 60	High water temperature alarm delay after compressor switching on	0	250	sec	10 sec
A0 61	High water temperature alarm set point	-50.0 -58	110 230	°C °F	Dec int
A0 62	High water temperature alarm differential	0.1 0	25.0 45	°C °F	Dec int
A0 63	High water temperature alarm probe selection See chapter 38 to select the probe	0	12		
A0 64	Low pressure alarm delay during normal operations	0	250	sec	
A0 65	Domestic hot water flow switch alarm delay after water pump activation	0	250	Sec	
A0 66	Domestic hot water flow switch alarm delay to switch OFF the water pump	0	250	Sec	
A0 67	Domestic hot water flow switch delay to switch OFF the compressor	0	250	Sec	
A0 68	Domestic hot water flow switch de-activation time to reset the alarm	0	250	Sec	
A0 69	Solar panel flow switch alarm delay after water pump activation	0	250	Sec	
A0 70	Solar panel flow switch alarm delay to switch OFF the water pump	0	250	Sec	
A0 71	Solar panel flow switch delay to switch OFF the compressor	0	250	Sec	
A0 72	Solar panel flow switch de-activation time to reset the alarm	0	250	Sec	
A0 73	Domestic hot water heaters overload alarm per hour to generate the manual reset alarm A073 = 0 always manual reset A073= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A073 - Manual reset if the number of alarms in an hour reaches A073 A073=16 always automatic reset	0	16		
A0 74	Enable password request to reset manual antifreeze alarm 0= password requested 1= password not requested	0	1		
A0 75	Domestic hot water pump overload alarms per hour to generate the manual reset alarm. A075 = 0 always manual reset A075= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A075 - Manual reset if the number of alarms in an hour reaches A075 A075=16 always automatic reset	0	16		
A0 76	Enable the compressor oil level alarm as for only signaling 0= automatic or manual reset oil alarm (dependes on A013) and compressor switched off 1= only warning (compressor stays ON)	0	1		

A0 77	Compressor overload alarm operation mode 0= depends on A020 parameter configuration 1= always automatic reset (overwrite A020 parameter)	0	1		
A0 78	Temperature differential to generate compressor/circuit differential oil alarm	0.1 1	14.0 203	bar psi	Dec int
A0 79	Temperature differential to reset compressor/circuit differential oil alarm	0.1 1	14.0 203	bar psi	Dec int
A0 80	Maximum number of compressor/circuit differential oil alarm per hour to generate the manual reset alarm. A080 = 0 always manual reset A080= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A080 - Manual reset if the number of alarms in an hour reaches A080 • A080=16 always automatic reset	0	16		
A0 81	Compressor/circuit differential oil alarm operation mode 0= disabled 1= enabled for pistons compressors 2= enabled for screw compressors	0	2		
A0 82	Free cooling switch alarm delay after water pump activation	0	250	Sec	
A0 83	Free cooling flow switch alarm delay to switch OFF the water pump	0	250	Sec	
A0 84	Free cooling flow switch delay to switch OFF the compressor	0	250	Sec	
A0 85	Free cooling flow switch de-activation time to reset the alarm	0	250	Sec	
A0 86	Flow switch alarm operation mode 0= Always manual reset 1= automatic reset after 1 minute 2= automatic reset after 2 minutes ... 250= automatic reset after 250 minutes	0	250	min	
A0 87	Evaporator/domestic hot water flow switch alarm by-pass time during valve (Out1 and Out2) commutation	0	250	Sec	
A0 88	Number of defrost alarm per hour to generate the manual reset alarm	0	250		
A0 89	Minimum value of the condenser antifreeze alarm set point in cooling mode	-50.0 -58	A091	°C °F	Dec int
A0 90	Maximum value of the condenser antifreeze alarm set point in cooling mode	A091	110 230	°C °F	Dec int
A0 91	Condenser antifreeze alarm set point in cooling mode	A089	A090	°C °F	Dec int
A0 92	Condenser antifreeze alarm differential in cooling mode	0.1 0	25.0 45	°C °F	Dec int
A0 93	Minimum value of the condenser antifreeze alarm set point in heating mode	-50.0 -58	A095	°C °F	Dec int
A0 94	Maximum value of the condenser antifreeze alarm set point in heating mode	A095	110 230	°C °F	Dec int
A0 95	Condenser antifreeze alarm set point in heating mode	A093	A094	°C °F	Dec int
A0 96	Condenser antifreeze alarm differential in heating mode	0.1 0	25.0 45	°C °F	Dec int
A0 97	Enable the access to the alarm menu with password 0= password not requested 1= password requested	0	1		
A0 98	Number of resetted manual alarms to enter in alarm menu with password	0	250		
A0 99	Overload condenser fan alarm by-pass time starting from fan activation	0	250	sec	
	Alarm parameters				
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**
A1 01	Evaporator anti freeze alarm probe selection in cooling mode 0= Disabled 1= Evaporator inlet temperature 2= Evaporator outlet temperature 3= Outside temperature	0	3		
A1 02	Evaporator anti freeze alarm probe selection in heating mode 0= Disabled 1= Evaporator inlet temperature 2= Evaporator outlet temperature 3= Outside temperature	0	3		
A1 03	Condenser anti freeze alarm probe selection 0= disabled 1= Condenser water inlet temperature 2= Condenser water outlet temperature 3= External temperature	0	3		
A1 04	Condenser antifreeze alarm delay starting from unit switching on	0	250	Sec	
A1 05	Condenser antifreeze alarm delay in cooling mode	0	250	Sec	

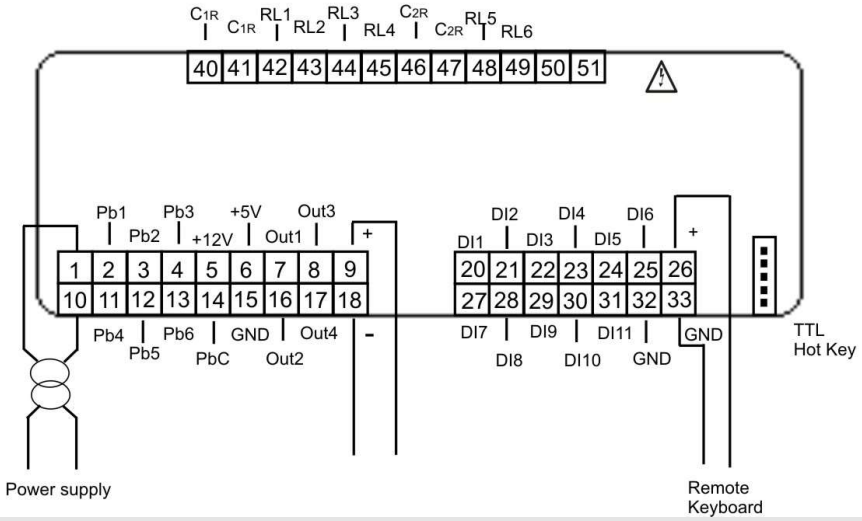
A1 06	Condenser antifreeze alarm events per hour to generate manual reset alarm in cooling mode A106 = 0 always manual reset A106= 1..15 = - Automatic reset if the number of alarm in an hour is lower than A106 - Manual reset if the number of alarms in an hour reaches A106 A106=16 always automatic reset	0	16		
A1 07	Condenser antifreeze alarm delay in heating mode	0	250	Sec	
A1 08	Condenser antifreeze alarm events per hour to generate manual reset alarm in heating mode	0	16		
	By-pass valve parameters				
Parameter	**Description**	**min**	**max**	**M. u.**	**Resolution**
bP 1	Enable by-pass gas valve	0	1		
bP 2	By-pass gas valve set point	-50.0 -58	110 230	°C°F	
bP 3	By-pass gas valve minimum set point	-50.0 -58	bP 2	°C°F	
bP 4	By-pass gas valve maximum set point	bP2	110 230	°C°F	
bP 5	Differential temperaure (T1 – T2)	0 0	25.0 45	°C °F	
bP 6	Delay time to apply the offset to the by-pass gas valve set point	0	250	Min	
bP 7	Offset applied to by-pass gas valve set point	-12.0 -21	12.0 21	°C °F	
bP 8	Temperature differential probe 1 selection (T1) See chapter 38 to select the probe	0	12		
bP 9	Temperature differential probe 2 selection (T2) See chapter 38 to select the probe	0	12		
bP 10	By-pass valve output value • 0.1< bP10 < 9.9 ON/OFF operation (value set by bP10) • bP10 = 10 modulated output between 0V to 10V depending on PID calculation	0	10.0		
bP 11	PID: Proportional component	0 0	25.0 45	°C °F	
bP 12	PID: Integral component	0	250	sec	
bP 13	PID: Derivative component	0	250	sec	
bP 14	PID: period of by pass valve	2	20	sec	
bP 15	By-pass valve minimum activation time T2 (if ON/OFF output)	1	10	sec	
bP 16	By-pass valve minimum de-activation time T3 (if ON/OFF output)	1	10	sec	
bP 17	Derivative component sampling time (Sr)	1	10	sec	
bP 18	Band adjustment (rS)	-12.0 -21	12.0 21	°C °F	
bP 19	Integral band limitation (Ar)	0 0	25.0 45	°C °F	
bP 20	Switching off compressor differential (from by-pass valve set point)	0.1 1	25.0 45	°C °F	
bP 21	By-pass valve maximum activation time	0	250	Min x 10	

52. WIRING CONNECTIONS

52.1 HARDWARE RESOURCES OF IC106CX

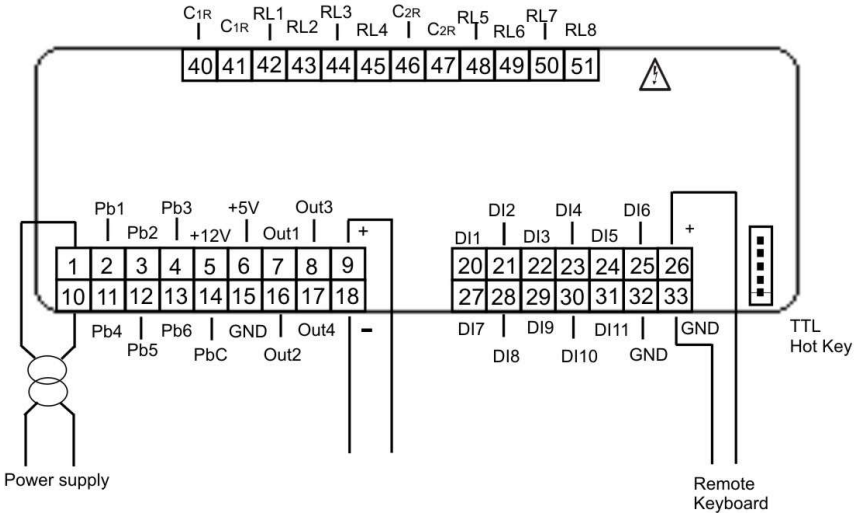
- 6 digital outputs (relays):
  max current on the relay contacts relè 5(2)A 250V
  max current on the common line 10A 250V
- 11 digital inputs free of voltage
- analogue inputs:
  - 4 temperature probes (NTC / PTC)
  - 2 temperature probes (NTC / PTC) / pressure transducer 4÷20 mA / pressure transducer ratio-metric 0÷ 5.0 Volt
- 4 modulating outputs:
  - 2 (0 ÷ 10 Volt)
  - 2 (0 ÷ 10.0 Volt or PWM*) (*for modulating condenser fan)
- 1 output to connect the remote panel (max 2 VI613 remote keyboards or 1 Visograph or 1 Visotouch)
- 1 LAN to connect an IEV electronic expansion valve driver
- 1 TTL output to connect:
  - Hot key 64 for parameters programming
  - XJ485CX (interface to convert TTL signal to RS485 signal) for monitoring systems (XWEB or third party system)

C_{1R} = common line for RL1, RL2, RL3, RL4 C_{2R} = common line for RL5, RL6



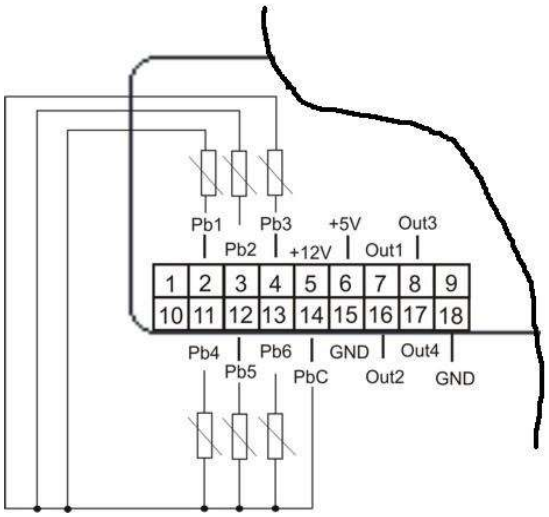
52.2 HARDWARE RESOURCES OF 108CX

- 8 digital outputs (relays):
  max current on the relay contacts relè 5(2)A 250V
  max current on the common line 10A 250V
- 11 digital inputs: (free of voltage)
- analogue inputs:
  - 4 temperature probes (NTC / PTC)
  - 2 temperature probes (NTC / PTC) / pressure transducer 4÷20 mA / pressure transducer ratio-metric 0÷ 5.0 Volt
- 4 modulating outputs:
  - 2 (0 ÷ 10 Volt)
  - 2 (0 ÷ 10.0 Volt or PWM*) (*for modulating condenser fan)
- 1 output to connect a remote panel (max 2 VI613 remote keyboards or 1 Visograph or 1 Visotouch)
- 1 LAN to connect an IEV electronic expansion valve driver
- 1 TTL output to connect:
  - Hot key 64 for parameters programming
  - XJ485CX (interface to convert TTL signal to RS485 signal) for monitoring systems (XWEB or third party system)



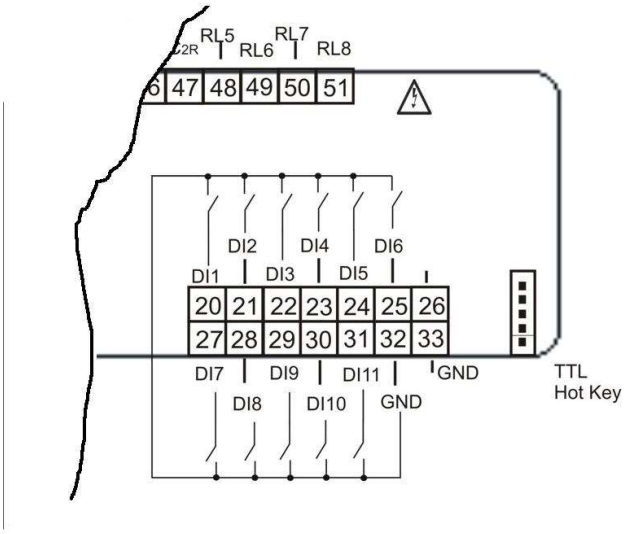
52.3 ANALOG INPUTS NTC – PTC PROBES

PbC = common terminal
Pb1…Pb6 = probe inputs



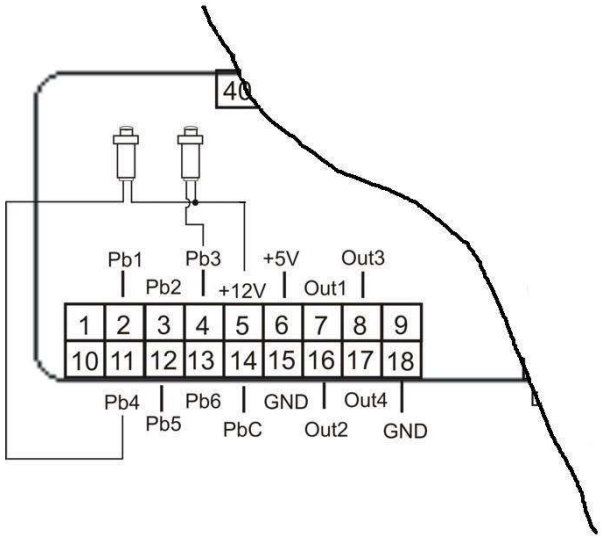
52.4 DIGITAL INPUTS

GND = common terminal
ID1…ID11 = digital inputs free of voltage



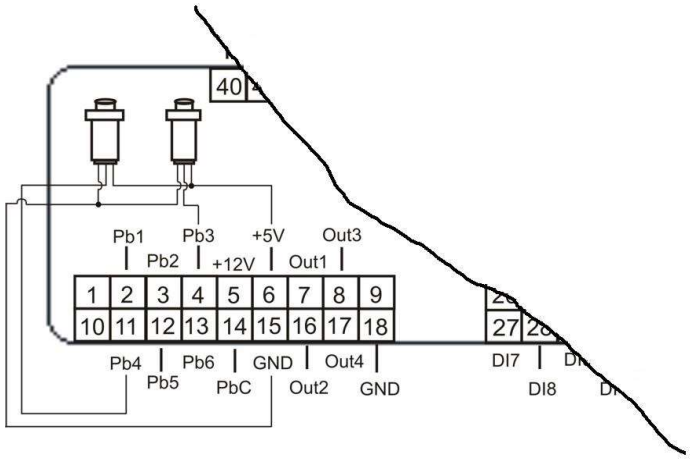
52.5 ANALOG INPUT FOR PRESSURE TRANSDUCER (4 ÷ 20MA SIGNAL)

12V = power supply for pressure transducers
Pb3 and **Pb4** = pressure transducer inputs



52.6 ANALOG INPUT FOR PRESSURE RATIOMETRIC TRANSDUCER (0 ÷ 5V SIGNAL)

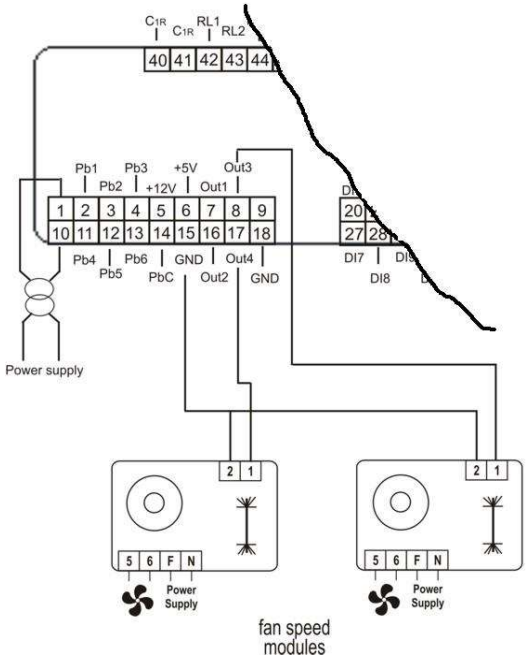
+5V = power supply for pressure transducers
GND = ground for pressure transducers
Pb3 and Pb4 = pressure transducer inputs



53. PWM OUTPUT FOR CONDENSER FAN SPEED CONTROL

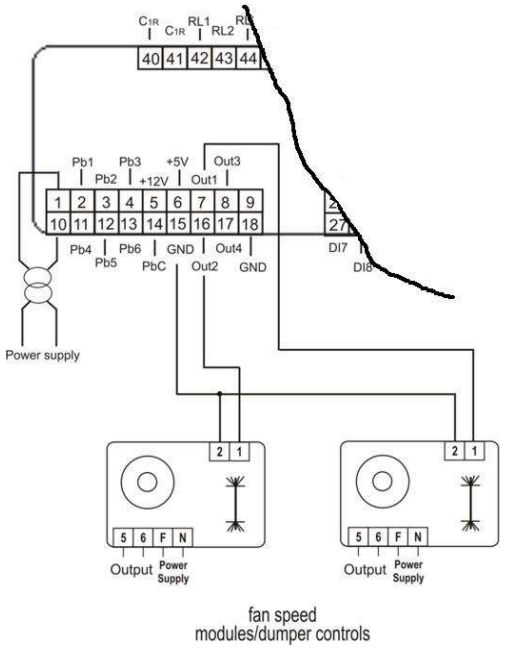
OUT3 and OUT4 = signals for the modulation of the condenser fan
GND = ground for pressure transducers

The compatible fan speed controller modules are:
XV05PK mono-phase 500 Watt (2A)
XV10PK mono-phase 1000 Watt (4A)
XV22PK mono-phase 2200 Watt (9A)



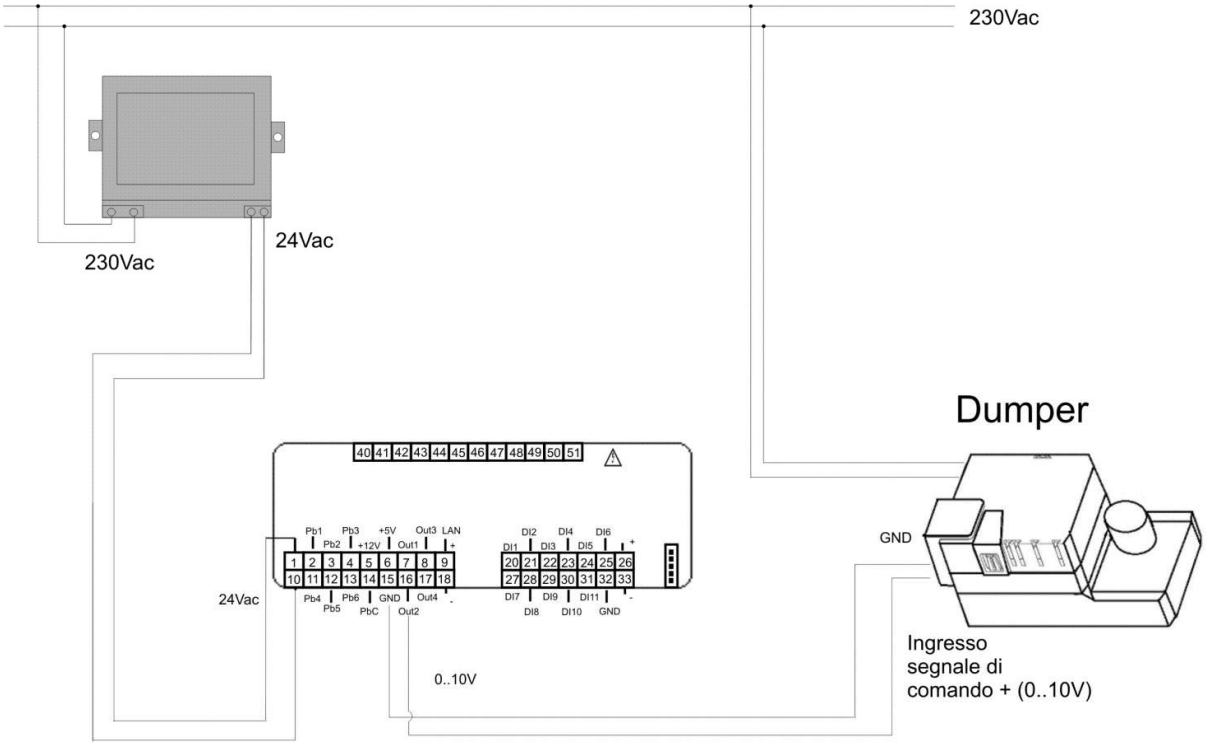
53.1 PROPORTIONAL OUTPUT 0..10V

OUT1…OUT4 = signals for the modulation of the condenser fan
GND = ground for pressure transducers

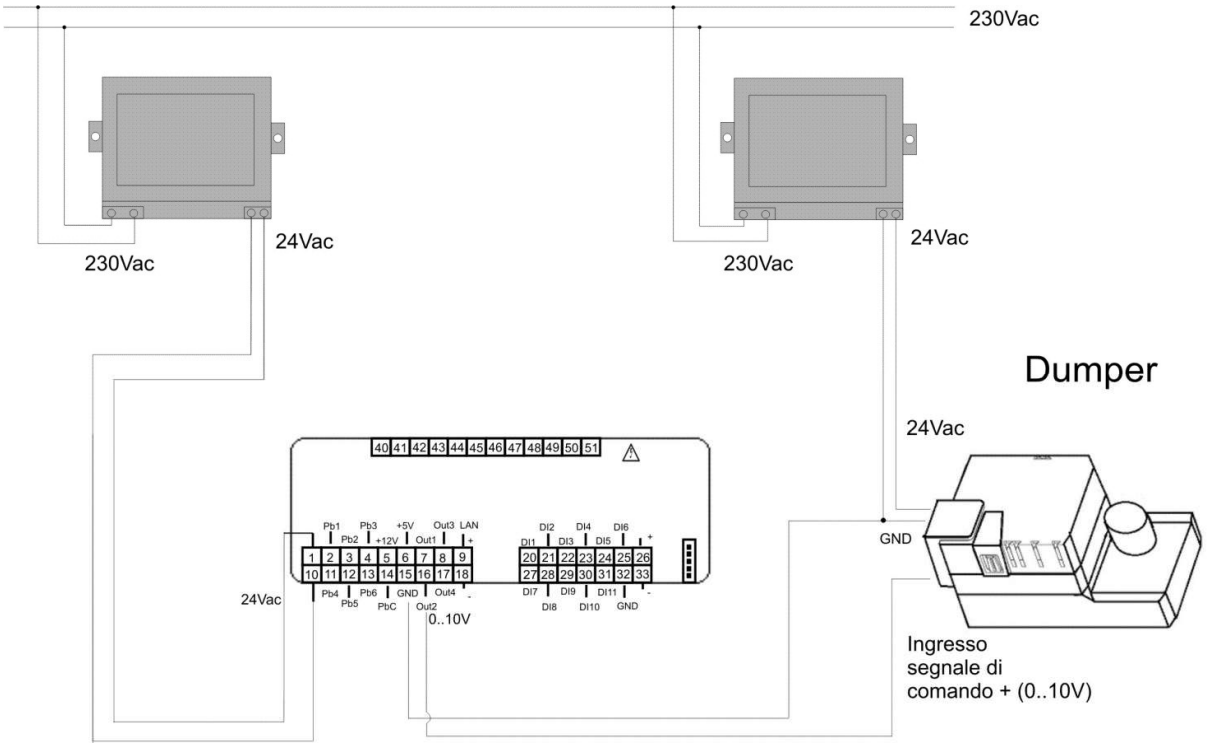


53.2 PROPORTIONAL OUTPUT 0..10V TO CONTROL DUMPER MOTORS

OUT1…OUT4 = signals for the modulation of the dumper motor
GND = ground
The connection showed below can be used only if the dumper has the input signal electrically insulated from supply voltage.



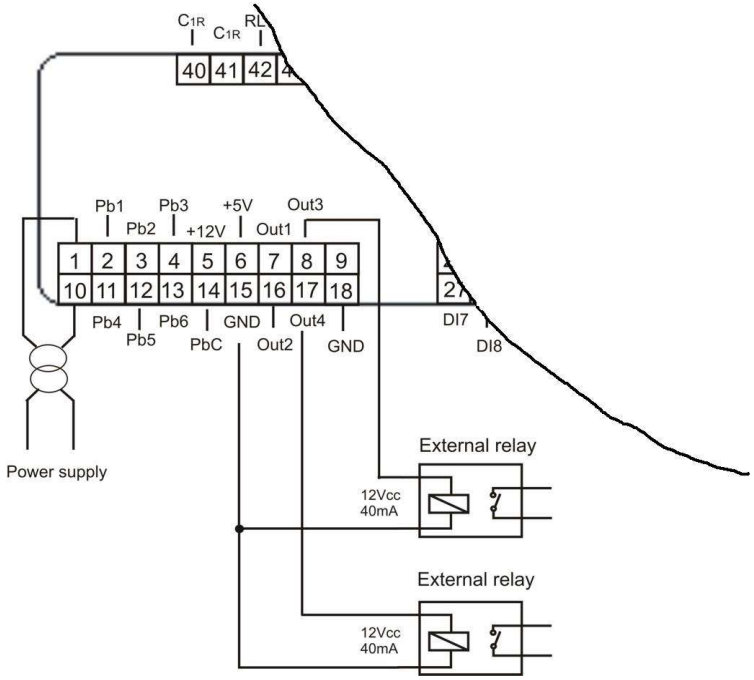
If the dumper motor has a common line between a pole of the power supply and the "–" pole of the 0..10V signal, it is necessary to use two transformers for the power supply of the controller Ichill and the power supply of the dumper motor.



53.3 PROPORTIONAL OUTPUTS CONFIGURED FOR AUX RELAY CONTROL

OUT1…OUT4 = signals for relays
GND = ground

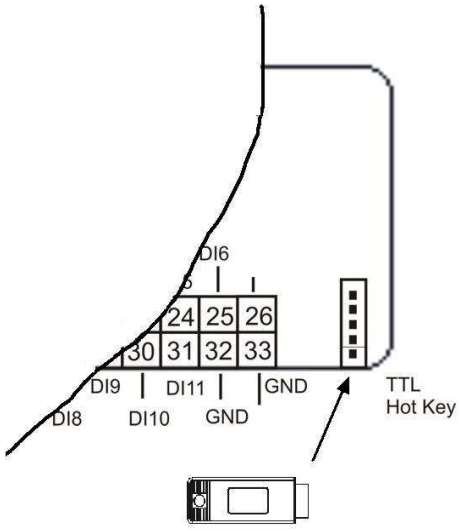
Max. current to drive the relay coil: 40mA.
Power supply of the relay: 12Vcc.
The analog output can be configured to manage an external relay; for special applications with an high number of cycles, it is strongly recommended the use of SSR relays.



53.4 HOT KEY 64 CONNECTION

HotKey 64 is used to:

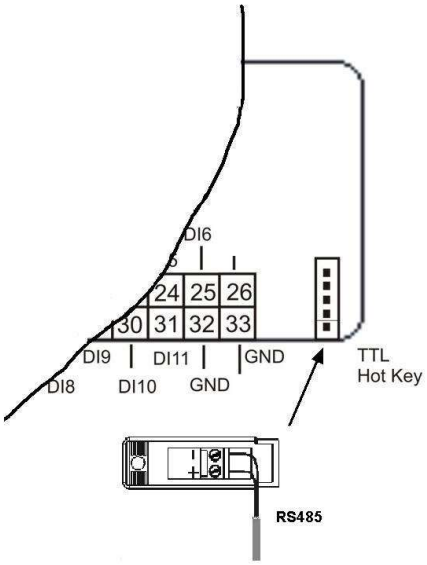
- tranfer a parameter list in the instrument
- copy the parameter list of the instrument to the HotKey



53.5 XJ485CX CONNECTION

The XJ485CX interface is a signal converter (from TTL to RS485).

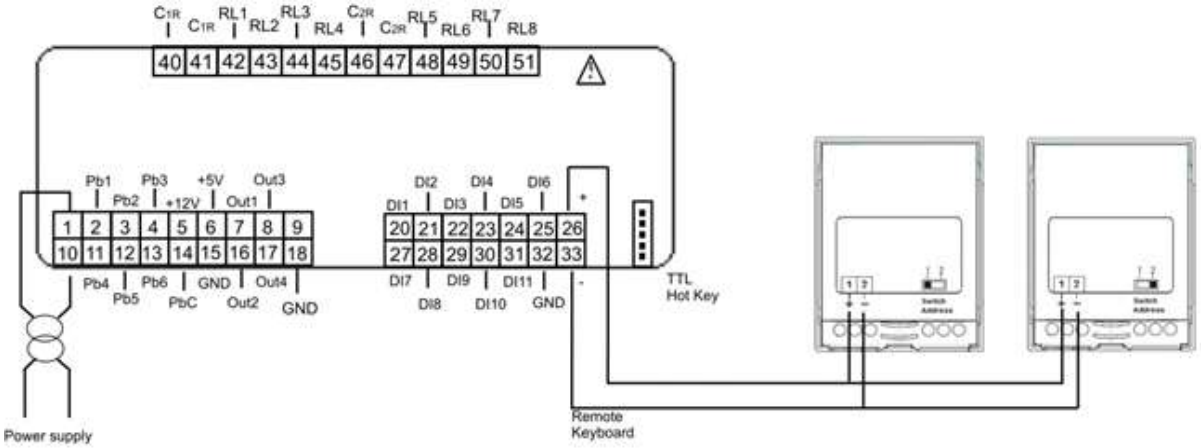
The RS485 uses two terminals (+) and (-) that must be connected respecting the polarity.
Use the CAB/RS02 to connect the XJ485 interface to the TTL connector.



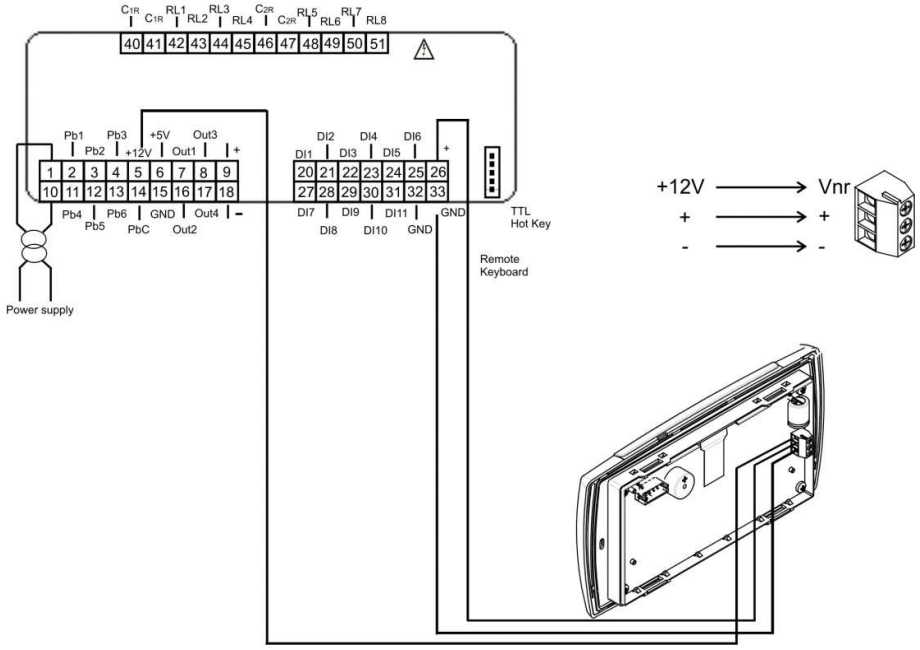
53.6 REMOTE PANEL CONNECTION (VI613 EVO OR V2I810 OR VTIC10)

It is possible to connect to the instrument up to two remote panels VI613 available with or without temperature sensor on board, or a V2I810 LCD panel, or a touch panel VTIC10; the use of keyboards VI613 exclude the possibility of using the keyboard Visograph or Visotouch and vice versa.
Parameters CF55 and CF56 allow to enable the keyboards VI613; the parameter CF74 allows to enable the V2I810 keyboard or VTIC10.
If the remote terminal VI613 is provided with probe on board, the temperature adjustment can be performed with the probe of the terminal.
The connection of the remote terminals must be performed using a shielded / twisted cable (such as Belden 8772, wires 1 mm^2 minimum); the maximum length of VI613 terminal cable is 100 mt. (maximum length of the connection, both if using one or two keyboards), the maximum length of V2I810 or VTIC10 terminal cable is 60mt.
In case of lack of communication between the device and the keyboard (wrong connection, wrong parameters configuration), the display shows the message "noL" (no link).
When using two keyboards VI613 you must configure the dip switch on the rear of the same, giving the first keypad address 1 and 2 to the second keypad.

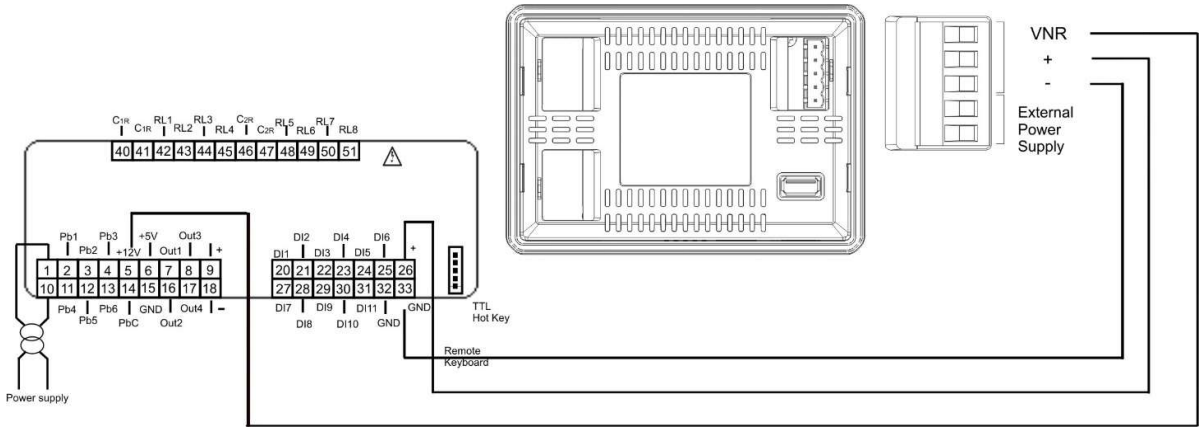
VI613 LED PANEL



VGI810 or V2I810 LCD PANEL



VTIC10 TOUCH PANEL



54. IEV ELECTRONIC EXPANSION VALVE CONNECTION

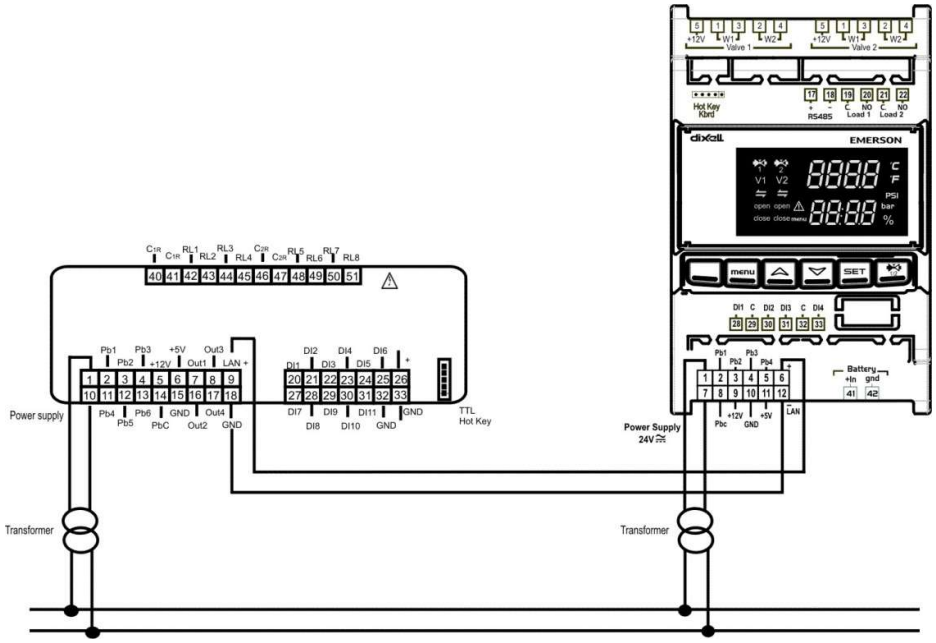
The Ichill 100CX EVO can be connected to the IEV electronic expansion valve driver.
The driver IEV regulates superheating autonomously; the connection to the controller Ichill is needed to synchronize the operation of the chiller or heat pump with the valve operation.
The configuration parameters, the setting of superheat control must be performed in the driver IEV.
The probe of the evaporation temperature has to be connected to the driver while the evaporation pressure probe can be connected to the controller or the driver Ichill IEV.

The connection to the Ichill is done via LAN.
To configure the driver IEV is necessary:

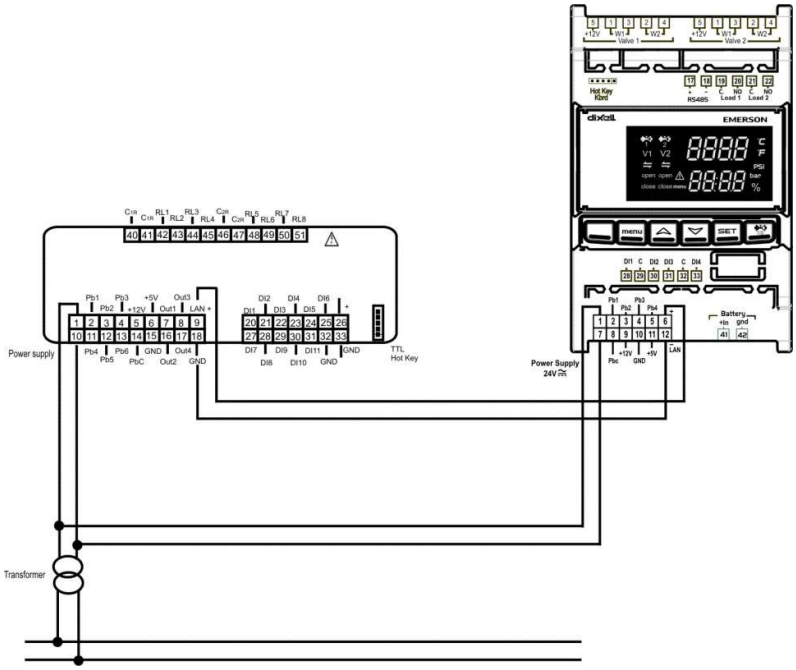
- enable in the Ichill the driver connection, via parameters CF70
- configure in the Ichill the communication address with the valve driver, via parameter CF71
- configure in the driver valve the address for communication with the Ichill with parameter Ec47 (must match the address set in parameter CF71 of the Ichill)
- set in the Ichill if the evaporation pressure probe is connected to the Ichill or to the IEV driver (parameter CF72)
- set in the IEV driver if the evaporation pressure probe is connected to the Ichill or to the IEV driver (parameter Ec2)
- connect the Ichill and IEV according to the diagram below

In case of lack of LAN communication, the adjustment dell'Ichill is immediately blocked.
The maximum length of the LAN connection is 30 mt.

Connection with separate transformer.



Connection with the same transformer (the power supply of the Ichill and expansion I / O must be 24 Vac/dc).



55. POWER SUPPLY FAILURE

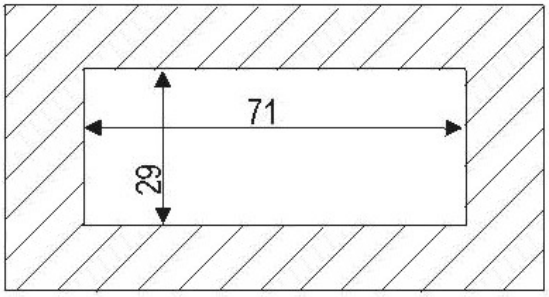
After a power supply failure, at the following power on:

1. the device return to the same status it had before the power OFF
2. if a defrost was ongiong, defrost procedure is stopped
3. if a manual reset alarm was ongoing, the alarm is not reset automatically

56. INSTALLING AND MOUNTING

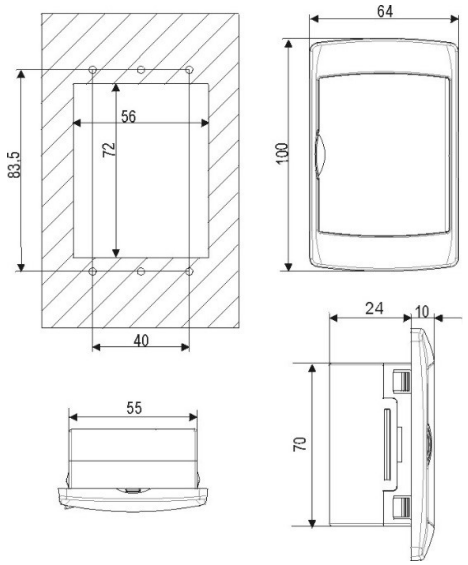
56.1 ICHILL PANEL CUT- OUT

The instrument must be mounted on vertical panel, with panel cut-out 71x29mm, and fixed using the special bracket supplied.
Avoid locations subject to heavy vibration, corrosive gases or excessive dirt. Ensure ventilation around the instrument.

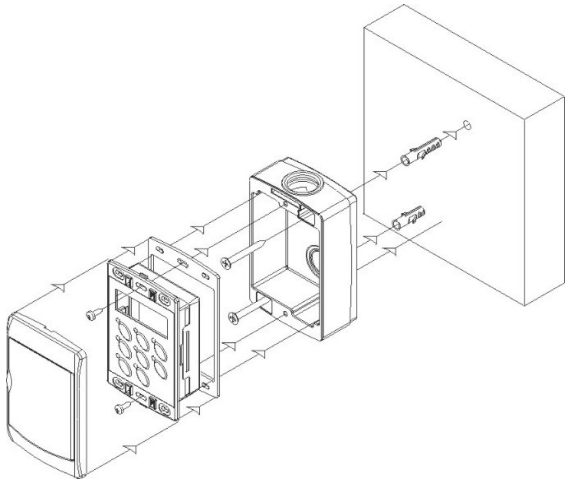


56.2 VI613 PANEL CUT-OUT

The remote terminals are designer for panel mounting (panel cut-out 72x56 mm) and screwed with two screws.
For IP65 use gasket RGW-V (optional).



WALL MOUNTING: use the vertical V-KIT (black, white and grey) as described in the following scheme:



57. ELECTRICAL CONNECTIONS

The instrument is provided with:

- 2 removable terminal blocks MOLEX MICROFIT 14 and 18 ways for power supply voltage / digital and analogue inputs and modulating outputs
- 1 removable terminal blocks AMP 12 ways for the relay outputs
- 5 ways connector for TTL RS485 interface outputs

Wiring cables:

CWCXA15-KIT	IC206CX 1.5mt
CWCXA30-KIT	IC206CX 3.0mt
CWCXB15-KIT	IC208CX 1.5mt
CWCXB30-KIT	IC208CX 3.0mt

Wire size:

- signal cable AWG 24
- power supply cable AWG 22
- relay output AWG 17

General notes:

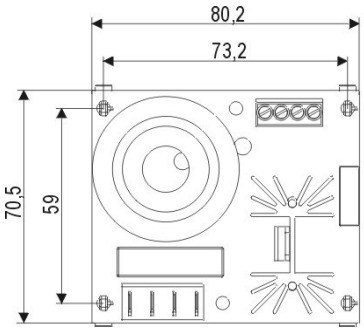
- Check the connecitons and the line voltage before turning on the power supply.
- Keep low voltage cables, such as analogue/digital inputs/outputs and probes, away from power cables and terminals.
- Respect the maximum load current of each relay output, in case of power loads use filtered contactors.
- Some contactors can produce very high electrical stresses on the relay contacts mounted in the device. Dixell suggests to carefully check the technical documentation of the contactors and follow the instructions contained in this doumentation (commercial documentation is not a reference for theese information). To protect the relay contacts of the device, verify the need to use electrical disturbance suppressors or excess voltage protections

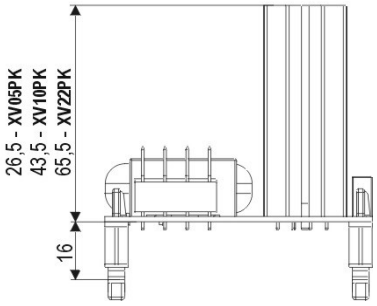
58. ACCESSORIES

58.1 MONOPHASE FAN CONTROL: 230VAC AND CUT PHASE CONTROL

Models	XV05PK	XV10PK	XV22PK
Power	500W	1000W	2200W

Ampere	2A	4A	9.5A





Power supply			
230Vac	Input		
0 - 230Vac	output		
-10 - 65°C	Operating temperature		
Naylon supports			
D	15mm		
Height			
Model	**XV05PK**	**XV10PK**	**XW22PK**
Y	25mm	42mm	64mm
Connections			
A 1(+), 2(-)	**PWM** input control		
B 3(+), 4(-)	**PWM** output repetition signal		
F	Phase		
N	Neutral		
5 - 6	Fan output		
Terminals 3 and 4 allows to connect another board in parallel to control two separate fans with the same input control.			
Terminals 1 / 2 / 3 / 4 are for screw for a 2.5mm wire			
Terminals 5 / 6 / F / N are 6,3mm faston			

58.2 WIRING KIT

CWCXA15-KIT e CWCXA30-KIT: wiring kit for IC106CX (lenght of 1,5mt or 3mt)
CWCXB15-KIT e CWCXB30-KIT: wiring kit for IC108CX (lenght of 1,5mt o 3mt)

58.3 TRANSFORMER

TF10 trasnformer models: **230/12 Vac** , **230 /24 Vac**, **110 / 12 Vac, 24 / 12 Vac**

58.4 XJ485CX

TTL/RS485 converter to connect the Ichill to a monitoring system

58.5 RT314 KIT

Relay module (DIN rail mounting)

58.6 HOT KEY:

Parameters copying key

59. TECHNICAL DATA

59.1 SUPPLY VOLTAGE

Power Supply:	12Vac/dc -10% ÷ 15%, 50/60Hz, or 24Vac/dc -10% ÷ 10%, 50/60Hz
Consumption:	Max. 10VA
Connectors:	Molex connectors for power supply, probes connection, digital inputs, analog outputs) STELVIO screw connectors for LAN connection STELVIO screw connectors for relay

59.2 ANALOGUE INPUTS

Number of inputs:	4 (NTC, PTC, Digital input) 2 (NTC, PTC, 4..20mA, 0..5V, Digital input)
Type of analogue input: **(configurable via software parameter)**	NTC (-50T110°C; 10KΩ±1% a 25°C) PTC (-50T150°C; 990Ω±1% a 25°C) Rathiometric: 0.5..4.5V Current: 4..20mA Digital input (free contact)
Operation range:	-50°C ÷ 110°C (-58 °F ÷ 230°F) NTC probe -50°C ÷ 150°C (-58 °F ÷ 302°F) PTC probe 0 bar ÷ 50 bar (0 psi ÷ 302 psi) pressure probe
Resolution:	0.1 °C 1 °F 0.1 bar 1 psi

59.3 DIGITAL INPUT

Type: **(configurable via software parameter)**	Free contact not opto-insulated
Number of inputs:	11
Notes: ⚠	Don't supply voltage to the digital inputs in order to not cause damage to the instrument

59.4 ANALOGUE OUTPUTS

Type:	Non opto-insulated, internal power
Number of outputs:	4
Type of analogue output: **(configurable via software parameter)**	4 configurable outputs: - OUT1/OUT2: 0-10Vdc - OUT3 and OUT 3: • 0-10Vdc • PWM (to use with Dixell XV series fan controllers)
Maximum load:	40mA
Accuracy:	±2% full scale
Note: ⚠	The electrical devices controlled by these analogue outputs must be powered separately with another transformer (do not use the same secondary of the controller's power) in order to prevent the outputs from malfunctioning or being damaged.

59.5 DIGITAL OUTPUTS

Type:	Relays with NO contacts
Number of outputs:	6: IC106CX model 8: IC108CX model
Maximum load:	5A(250Vac) SPST 5(2)A
Note: ⚠	Verify maximum current of the loads and maximum current of the common line of the relay (10A max). There is double insulation between the digital outputs and the low voltage of the rest of the circuit. Do not use different voltages for the two groups of relays. Some contactors can produce very high electrical stresses on the relay contacts mounted in the device.

	Dixell suggests to carefully check the technical documentation of the contactors and follow the instructions contained in this doumentation (commercial documentation is not a reference for theese information). To protect the relay contacts of the device, verify the need to use electrical disturbance suppressors or excess voltage protections

59.6 CHARACTERISTIC PLASTIC HOUSING

Dimensions:	Frontal panel 32x74mm; depht 60mm
Mounting:	Panel mounting in a 29x71mm panel cut-out
Material:	Thermoplastic PC-ABS
Selfhestinguish:	V0 (UL94)
IP protection:	IP65

59.7 OPERATING AND STORAGE TEMPERATURE

Operating temperature:	-10°C ÷ 55°C
Storege temperature:	-30°C ÷ 85°C
Operating humidity:	20% ÷ 85% (not condensing)

60. INSTALLATION

The device must not be installed in environments where the following situations are present:

- Temperature and humidity outside the range stipulated in the data plate. Frequent and sudden changes in temperature and/or humidity
- Direct sunlight and weathering in general
- High mechanical stress (vibrations and/or knocks)
- Sulphur and ammonia gas, smoke and salt spray that can cause corrosion and/or oxidation
- Presence of flammable or explosive gas
- Dust
- Devices that generate magnetic interference

Position the device inside the electrical panels, paying attention to the following:

- the distance between the device and the electrical power components
- the distance between the device and the power cables
- sufficient passage for the cooling air

Always comply with the laws and regulations applicable in the country where the device is installed.
Always protect the device for it to always be accessible solely by authorised personnel.
In case of malfunctions, always contact the relative distributor for the device to be repaired.

GENERAL RULES

Comply with the following recommendations during the installation process in order to prevent the device from malfunctioning.

- Separate the signal cables from the power cables (it is recommended to use BELDEN 8772-type shielded cables) in order to prevent malfunction due to electromagnetic interference; do not use the same electrical conduit to install high voltage cabling and low voltage cabling.
- The ground connection of the secondary coil of the transformer that powers the device can result in a bad performance; where possible, this connection should be avoided.

Dixell

EMERSON

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