**Application program for pCO¹ pCO² pCOC and pCOXS**


# Standard Modular Chiller HP
# 1/8 compressors with CAREL driver

Program code: **FLSTDmMCDE**

**LEGGI E CONSERVA QUESTE ISTRUZIONI**

**READ AND SAVE THESE INSTRUCTIONS**

CAREL

Tecnologia ed Evoluzione


**We wish to save you time and money!**
**We can assure you that the thorough reading of this manual will guarantee correct installation and safe use of the product described.**

# IMPORTANT WARNINGS

**BEFORE INSTALLING OR OPERATING ON THE DEVICE, CAREFULLY READ THE INSTRUCTIONS IN THIS MANUAL.**

**The instrument for which this software is dedicated has been designed to operate without risks for the established purposes, provided that:**

- the conditions described in the installation and operating manual for the device in question are observed
- the installation of the software, operation and maintenance are performed according to the instructions provided in this manual, by qualified personnel.

**Any different use or changes that have not been previously authorised by the manufacturer, are considered improper. Liability for injures or damage caused by improper use lies exclusively with the user.**

## Contents

# 1 INTRODUCTION AND FUNCTIONS PERFORMED BY THE PROGRAM

**Type of units controlled**

| | |
|---|---|
| Cooling only condensing unit | Condensing unit with heat pump |
| Air / water chiller only | Air / water chiller + freecooling |
| Air / water total recovery | Air / water chiller + heat pump |
| Air / water chiller only | Air / water chiller + heat pump (reversal on water circ.) |

**Type of control**
Proportional or proportional + integral control on evaporator water inlet temperature probe
Dead zone control by time on evaporator water outlet probe

**Type of compressors**
Tandem hermetic compressors
Semi-hermetic compressors with max. 1 load step
Semi-hermetic compressors with max. 3 load steps

**Maximum number of compressors**
From 1 to 4 with max. 3 load steps per compressor (1 compressor for each pCO* board, excluding pCO$^{XS}$).
From 1 to 8 with max. 1 load step per compressor (2 compressors for each pCO* board, excluding pCO$^{XS}$).
From 4 to 8 with no load steps (tandem compressors, 4 compressors for each pCO* board, excluding pCO$^{XS}$).

**Rotation of compressor calls**
Rotation of each compressor with FIFO logic.
Rotation of all the compressors with LIFO logic.
Rotation based on the operating hours of each compressor.
Custom rotation (logic set by the user).

**Condenser control**
Condenser control according to temperature or pressure
Fans can be managed in ON/OFF mode or by a 0/10V modulating signal.

**Type of defrost**
Global defrosting of all the pCO* units connected to the network: Independent / Simultaneous / Separate.
Local defrosting of the individual pCO* unit: Separate / Simultaneous

**Safety devices on each refrigerant circuit**
High pressure (pressure switch/transducer)
Low pressure (pressure switch)
Differential oil pressure switch
Compressor thermal cutout
Condenser fan thermal cutout.

**System safety devices**
Serious alarm input (stops the whole unit), available on both MASTER and SLAVE units
Flow switch (stops the whole unit), available on both MASTER and SLAVE units
Pump thermal cutout (stops the whole unit)
Remote on/off input without alarm signal

**Other functions**
Alarm logging
Management of the Built-In terminal (on pCO² and pCO$^{XS}$)
Management of the pGD terminal
Management of ratiometric probes for pressure control (on pCO¹ and pCO$^{XS}$)
Management of a phase cutting inverter (on pCO¹ and pCO$^{XS}$)
EVD driver for electronic valve control
Multi-language management
Management of time bands with change of set point or ON/OFF
Management of set point compensation based on the outside temperature
Management of GSM and analogue modem
Management of pump rotation
Management of fan coil enabling signal.

**Accessories**
Supervision with RS422 or RS485 serial card.

**WARNINGS:** **The information contained in this manual is valid starting from version 1.0 of the application software. As of version 1.0, this application software is not compatible with BIOS versions prior to 3.45 and BOOT versions prior to 3.01.**

# 2 THE USER TERMINAL

The system features a terminal with LCD (4 rows by 20 columns). There are three types of user terminal: Built-in with just 6 buttons, external (connected by telephone cable) with 15 buttons or external PGD0, that is, with serigraphic functions. All of these terminals can be used to perform all the operations allowed by the program. The user terminal displays the operating conditions of the unit at all times, and is used to modify the parameters; the terminal is not required for operation, and can be disconnected from the main board.

## 2.1 LEDs under the buttons

Three LEDs are located under the rubber buttons of the external terminal, four under the buttons on the BUILT-IN terminal, indicated as follows:

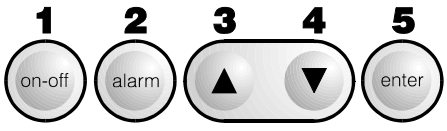
| | | |
|---|---|---|
| ON/OFF button | (external display) | Green LED – indicates that the unit is ON; flashes when OFF from the supervisor or remote digital input |
| ENTER button | (external display) | Yellow LED – indicates that the instrument is correctly powered |
| ALARM button | (common) | Red LED – indicates active alarms |
| ENTER button | (built-in display) | Yellow LED – see ON/OFF button (external display) |
| PROG button | (built-in display) | Green LED – indicates that the screen displayed is not in the Menu branch |
| ESC button | (built-in display) | Green LED – indicates that the screen displayed is in the Menu branch |

## 2.2 Buttons on the external LCD-PGD0 with 15 buttons

Functions of the buttons on the external terminal

| Button | | Description |
|---|---|---|
|  | MENU | if pressed in all loops except for Manufacturer,. returns to the main screen in the Menu branch (M0)<br>if pressed in the Manufacturer loop, returns to the manufacturer selection screen<br>in the Menu branch displays the unit status and the reading of the control probes |
|  | MAINT. | goes to the first screen in the Maintenance loop (A0)<br>in the maintenance loop checks the status of the devices, internal log, status of the modem, accesses functions for performing maintenance and calibration, and forcing the devices on. |
|  | PRINTER | temporary display of the pLAN address of the board connected |
|  | INPUTS AND OUTPUTS | goes to the first screen in the I/O loop (I0)<br>the I/O loop displays the status of the digital and analogue inputs and outputs. It also displays the status of the electronic valve driver |
|  | CLOCK | goes to the first screen in the Clock loop (K0)<br>the clock loop is used to display / set the time and date and program the time bands. |
|  | SET POINT | goes to the screen for setting the temperature set point (S0)<br>the loop is also used to display and set the set point for heating operation and heat recovery, if enabled |
|  | PROGRAM | goes to the screen for entering the user password (P0)<br>the user loop is used to display / program the unit parameters |
|  | MENU+PROG | goes to the screen for entering the manufacture password (Z0)<br>the manufacturer loop is used to configure the type of unit and select the devices connected and the functions enabled |
|  | INFO | if pressed on the shared terminal, switches the board displayed |
|  | RED | with the unit off enables heating management in the unit configurations where chiller / heat pump operation is envisaged. |
|  | BLUE | with the unit off enables cooling management in the unit configurations where chiller / heat pump operation is envisaged |
| | | |

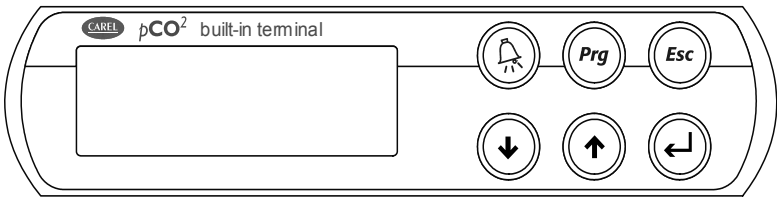
Functions of the silicon rubber buttons:




1. **ON/OFF** button: used to start and stop the unit.
2. **ALARM** button: displays the alarms, cancels them and mutes the alarm buzzer

3. **UP ARROW**: has two functions, 1. scrolls to the previous screens in the same branch when the cursor is in the home position; 2. increases the value of a setting field when the cursor is in the field; if in a selection field, pressing the arrow button displays the previous option
4. **DOWN ARROW**: has two functions, 1. scrolls to the next screens in the same branch when the cursor is in the home position; 2. decreases the value of a setting field when the cursor is in the field; if in a selection field, pressing the arrow button displays the next option
5. **ENTER** button: used to move the cursor between the home position and the setting or selection fields, and to save the values set for the parameters after the cursor has exited the setting fields.

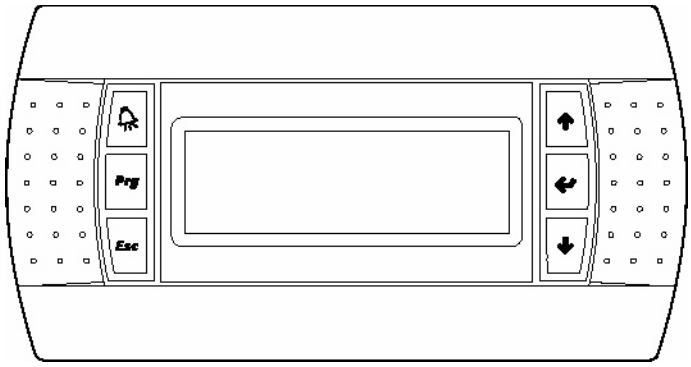
## 2.3 Built-in display (for pCO² or pCO$^{XS}$)




| ALARM | PROG | ESC |
|---|---|---|
| | | |
| UP | DOWN | ENTER |

For the functions of the Alarm, Up Arrow, Down Arrow and Enter buttons on the Built-in terminal, see the external terminal.
**LOOP OF SCREENS**: as there are no buttons that provide direct access to the loop of screens, simply press the Prog button to display the list of the loops, then use the arrow buttons to move to the row with the desired loop and press Enter to access the loop.
**ON/OFF**: as there is no ON/OFF button, the unit is switched on or off by entering screen M2 under the PROG branch.
**COOLING HEATING CHANGEOVER**: as there are no Red and Blue buttons to change the operating mode, enter the corresponding screen under the PROG branch.
This is a local terminal and cannot switch between the units.

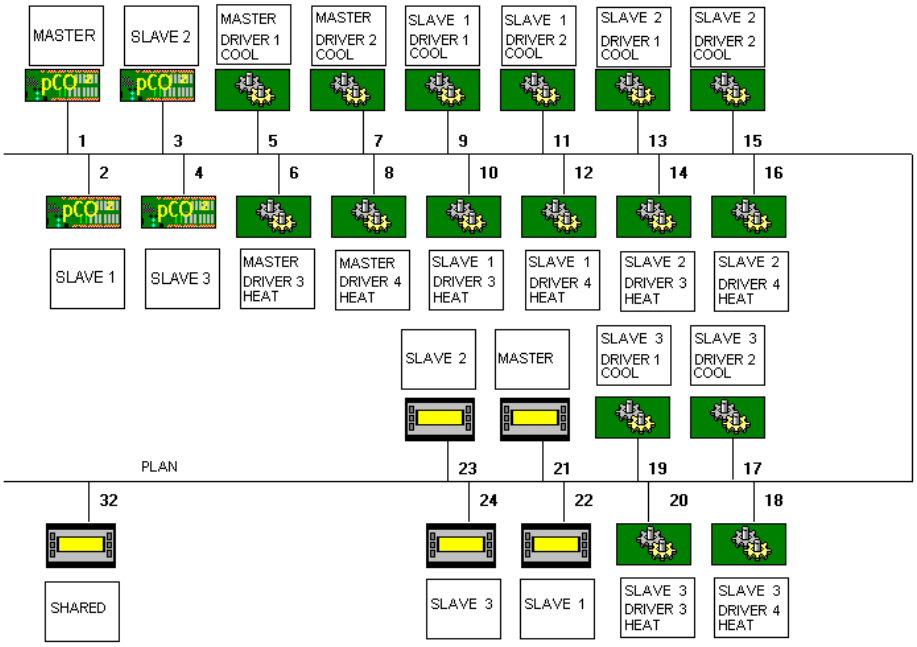
## 2.4 PGD0 display




The operation of the PGD0 terminal is very similar to that of the Built-In terminal.
**CHANGE UNIT**: as there is no INFO button to move from one pCO to the other with the shared terminal, enter screen M3 under the PROG branch, which is used to switch between the currently connected unit and the other units present in the pLAN. After 5 minutes, if no button is pressed the application will display the first screen in the menu loop.
Codes:
**PGD0000F00** semigraphical display for panel mounting
**PGD0000W00** semigraphical display for wall mounting.

# 3 pLAN MANAGEMENT BETWEEN BOARDS

The pLAN network identifies a physical connection between the boards (pCO[1], pCO[2], pCO[XS] or pCO[C]) and the external terminals.
pLAN=**p**.CO **L**.ocal **A**.rea **N**.etwork. The purpose of the pLAN network connection between the boards is to exchange variables, according to the logic decided by the program, so as the units can operate together.
The variables exchanged between the boards are established by the program, as is the direction of exchange, and therefore there are no user settings; the only operation required by the user involves the electrical connections.
The diagram of the pLAN network is shown below.




The main screen M0 shows the address of the board connected in the bottom left corner.
The terminal ind.32 can display all the boards without needing the other terminals.
For the corresponding details see Chap. 2.

## 3.1 How to assign the pLAN addresses

The pLAN addresses must be unique and set according to the figure shown above.
There are various methods for assigning the pLAN address.

### 3.1.1 PGD0 terminal

To set the address of a PGD0 terminal, proceed as follows:

1. Power up the terminal
2. Press the Up + Down + Enter buttons until the “display address setting” screen is displayed
3. Enter the numeric pLAN address (21,22,23….) with the Up and Down buttons and then confirm by pressing Enter
4. The “No link” screen will be displayed
5. If the “No Link” screen is not displayed, press Up + Down + Enter again
6. Once the “display address setting” screen is displayed, press Enter 3 times

When the “adr Priv/shard” screen is displayed, set the correct values and confirm with “YES”

### 3.1.2 Setting the addresses on the pCO[1]-pCO[XS]-pCO[C]

Description of the operations to be completed for setting the pLAN address of the pCO[1]-pCO[XS]-pCO[C] boards.

1. Disconnect power from the pCO1 board and connect a 4x20 LCD / PGD0 terminal with pLAN address “0”
2. Power up the pCO1 board, holding the Alarm + Up buttons on the terminal until a screen is displayed
3. When the “pLAN Address” screen is displayed, perform the operations indicated, that is, enter the numeric pLAN address (1,2,3 or 4) with the Up and Down buttons and then confirm by pressing Enter
4. Disconnect power from the pCO1 board
5. If necessary assign the correct pLAN address to the external terminal
6. Power up the pCO1 board

### 3.1.3 Setting the address on the pCO[2], external terminals and valve drivers

The pLAN addresses of these devices are set using binary logic by changing the position of the dipswitches located on the rear of the external 4x20 LCD terminals, on the pCO boards[2] and inside the electronic valve drivers, only when the devices are not powered. For further information, see the specific device manual.

# 4 SELECTING THE LANGUAGE

When the unit is started, as default a screen is displayed where the language to be used can be selected.
This screen remains active for 30 seconds, after which the application automatically skips to the main menu (screen M0).
This function can be deactivated. To do this simply:

1. Go to the Program branch (screen P0)
2. Set the correct password.
3. Go to the Various parameters sub-branch
4. Press the down arrow button until reaching screen "R9"
5. Choose "N" for the item "Display language screen".

In any case, the language can be changed at any time. To do this, simply go to screen "A2" in the "MAINT" branch.

# 5 STARTING FOR THE FIRST TIME

After having checked the connections between the various boards and terminals, power up the pCO* board/boards. On power-up, the software automatically installs the default values chosen by CAREL for chiller and driver configuration parameters. This section explains how to restore the default values and to return to the starting conditions. When starting for the first time, this operation is not required.
The following procedure is used to restore all the configuration parameters to the default values selected by CAREL.

**CAUTION! this procedure irreversibly deletes any programming performed by the user.**

As resetting the default values is an operation that involves each pCO* board, when more than one board is present, the procedure must be repeated for the all the boards. The procedure is identical for all the boards. Proceed as follows:

- press the "menu" and "prog" buttons on the LCD terminal at the same time (go to the manufacturer branch on the PGD0 terminal). When pressed, the LEDs corresponding to the "menu" and "prog" buttons will come on;
- enter the password using the "arrow" buttons and press Enter: this enters the "manufacturer" configuration branch:

```
+--------------------+
¦Insert            Z0¦
¦manufactory         ¦
¦password            ¦
¦              0000  ¦
+--------------------+
```

- enter the "Initialisation" branch from the default installation screen:

```
+--------------------+
¦Reset all         V0¦
¦parameters          ¦
¦to default values  N¦
¦Please wait...      ¦
+--------------------+
```

- press the "enter" button so as to position the cursor over the letter "N", and using the arrow buttons change this to "Y"; the message "please wait..." will appear; after a few seconds this disappears: at this stage, the default values have been installed completely.

## 5.1 Switching the unit on/off

There are two ways of switching the unit on/off:

1. System ON/OFF
2. Circuit ON/OFF

The unit status can be controlled from the keypad, digital input (this function can be enabled) and supervisor (this function can be enabled)

Switching the unit on/off from the keypad using the ON/OFF button has priority over the other modes; when pressing the button the corresponding green LED will be switched on/off, depending on the status.
The unit can be switched on/off from the supervisor and/or digital input only if switched on from the keypad; switching the unit off from the supervisor and/or digital input is signalled by the flashing of the green LED corresponding to the ON/OFF button and by a special message on the main menu screen.

### 5.1.1 System ON/OFF

This function is performed by the master board: if on, all the slaves making up the system can also be switched on, vice-versa if off.

### 5.1.2 Circuit ON/OFF

This function is performed by each slave board: only if the master board is on can the individual slave boards be switched on/off by the supervisor.

When the system is first started, make sure that all the boards are on, querying them from the shared terminal. To do this, refer to the paragraph on the "USER TERMINAL", which describes the meaning of the various buttons and LEDs on the keypad used.

# 6 LIST OF INPUTS/OUTPUTS

Following is a list of the inputs and outputs for each the type of unit; each unit type has been given a number. This number is the main parameter of the program, and can be selected in the manufacturer menu.

**CHILLER ONLY UNITS CONFIGURATION "0"**
AIR/WATER units with maximum 8 tandem hermetic compressors.

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout | Pump thermal cutout 2 | Pump thermal cutout | Pump thermal cutout 2 | Pump thermal cutout | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout |
| ID 7 | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout |
| ID10 | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout |
| ID11 | | | | | High press. switch 1 | High press. switch 3 |
| ID12 | | | | | High press. switch 2 | High press. switch 4 |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | Outside set point | | Water inlet temp. | |
| B2 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside set point | | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 |
| B4 | Water inlet temp. | | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside set point | |
| B6 | | | Water outlet temp. 1 | Water outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Compressor 1 | Compressor 5 | Compressor 1 | Compressor 5 | Evap. pump 1 | |
| NO2 | Compressor 2 | Compressor 6 | Compressor 2 | Compressor 6 | Compressor 1 | Compressor 5 |
| NO3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Compressor 2 | Compressor 6 |
| NO 4 | Compressor 3 | Compressor 7 | Compressor 3 | Compressor 7 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 |
| NO 5 | Compressor 4 | Compressor 8 | Compressor 4 | Compressor 8 | | |
| NO 6 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Compressor 3 | Compressor 7 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Compressor 4 | Compressor 8 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 |
| NO 9 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | | |
| NO10 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | | | | | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 |
| NO13 | | | | | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | Inverter cond. fan 1 | Inverter cond. fan 3 |
| Y2 | | | | | Inverter cond. fan 2 | Inverter cond. fan 4 |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 3 | Inverter cond. fan 1 | Inverter cond. fan 3 | | |
| Y4 | Inverter cond. fan 2 | Inverter cond. fan 4 | Inverter cond. fan 2 | Inverter cond. fan 4 | | |

## CHILLER UNITS WITH FREECOOLING CONFIGURATION "1"

AIR/WATER units with maximum 8 tandem hermetic compressors.

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout | Pump thermal cutout 2 | Pump thermal cutout | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout |
| ID 7 | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout |
| ID10 | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout |
| ID11 | | | | | High press. switch 1 | High press. switch 3 |
| ID12 | | | | | High press. switch 2 | High press. switch 4 |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | Outside temperature | | Water inlet temp. | |
| B2 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | Freecooling temperature | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside temperature | | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 |
| B4 | Water inlet temp. | | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside temperature | |
| B6 | Freecooling temperature | | Water outlet temp. 1 | Water outlet temp. 2 | Freecooling temperature | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| NO1 | Compressor 1 | Compressor 5 | Compressor 1 | Compressor 5 | Evap. pump 1 | |
| NO2 | Compressor 2 | Compressor 6 | Compressor 2 | Compressor 6 | Compressor 1 | Compressor 5 |
| NO3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Compressor 2 | Compressor 6 |
| NO 4 | Compressor 3 | Compressor 7 | Compressor 3 | Compressor 7 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 |
| NO 5 | Compressor 4 | Compressor 8 | Compressor 4 | Compressor 8 | | |
| NO 6 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Compressor 3 | Compressor 7 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Compressor 4 | Compressor 8 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 |
| NO 9 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 |
| NO10 | On/off freecooling valve | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | On/off freecooling valve | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | | | | | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 |
| NO13 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | On/off freecooling valve | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| Y1 | Modul. freecooling valve | | Modul. freecooling valve | | Inverter cond. fan 1 | Inverter cond. fan 3 |
| Y2 | | | | | Modul. freecooling valve | Inverter cond. fan 4 |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 3 | Inverter cond. fan 1 | Inverter cond. fan 3 | | |
| Y4 | Inverter cond. fan 2 | Inverter cond. fan 4 | Inverter cond. fan 2 | Inverter cond. fan 4 | | |

## CHILLER UNITS WITH HEAT PUMP CONFIGURATION "2"

AIR/WATER units with maximum 8 tandem hermetic compressors.

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout 1 | Pump thermal cutout 2 | Heating/cooling selection | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout |
| ID 7 | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout |
| ID10 | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout |
| ID11 | Heating/cooling selection | | Heating/cooling selection | | High press. switch 1 | High press. switch 3 |
| ID12 | | | | | High press. switch 2 | High press. switch 4 |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | Outside set point | | Water inlet temp. | |
| B2 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside set point | | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 |
| B4 | Water inlet temp. | | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside set point | |
| B6 | | | Water outlet temp. 1 | Water outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| NO1 | Compressor 1 | Compressor 5 | Compressor 1 | Compressor 5 | Evap. pump 1 | |
| NO2 | Compressor 2 | Compressor 6 | Compressor 2 | Compressor 6 | Compressor 1 | Compressor 5 |
| NO3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Compressor 2 | Compressor 6 |
| NO 4 | Compressor 3 | Compressor 7 | Compressor 3 | Compressor 7 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 |
| NO 5 | Compressor 4 | Compressor 8 | Compressor 4 | Compressor 8 | 4-way valve circuit 1 | 4-way valve circuit 3 |
| NO 6 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Compressor 3 | Compressor 7 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Compressor 4 | Compressor 8 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 |
| NO 9 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | 4-way valve circuit 2 | 4-way valve circuit 4 |
| NO10 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | 4-way valve circuit 1 | 4-way valve circuit 3 | 4-way valve circuit 1 | 4-way valve circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 |
| NO13 | 4-way valve circuit 2 | 4-way valve circuit 4 | 4-way valve circuit 2 | 4-way valve circuit 4 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| Y1 | | | | | Inverter cond. fan 1 | Inverter cond. fan 3 |
| Y2 | | | | | Inverter cond. fan 2 | Inverter cond. fan 4 |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 3 | Inverter cond. fan 1 | Inverter cond. fan 3 | | |
| Y4 | Inverter cond. fan 2 | Inverter cond. fan 4 | Inverter cond. fan 2 | Inverter cond. fan 4 | | |

## CHILLER UNITS WITH HEAT PUMP AND TOTAL RECOVERY CONFIGURATION "3"

AIR/WATER units with maximum 8 tandem hermetic compressors.

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout 1 | Pump thermal cutout 2 | Heating/cooling selection | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout |
| ID 7 | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout |
| ID10 | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout |
| ID11 | Heating/cooling selection | | Heating/cooling selection | | High press. switch 1 | High press. switch 3 |
| ID12 | | | | | High press. switch 2 | High press. switch 4 |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | Recovery inlet temp. | | Water inlet temp. | |
| B2 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | Recovery outlet temp. | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Recovery inlet temp. | | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 |
| B4 | Water inlet temp. | | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Recovery inlet temp. | |
| B6 | Recovery outlet temp. | | Water outlet temp. 1 | Water outlet temp. 2 | Recovery outlet temp. | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) |
| NO1 | Compressor 1 | Compressor 5 | Compressor 1 | Compressor 5 | Evap. pump 1 | |
| NO2 | Compressor 2 | Compressor 6 | Compressor 2 | Compressor 6 | Compressor 1 | Compressor 5 |
| NO3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Compressor 2 | Compressor 6 |
| NO 4 | Compressor 3 | Compressor 7 | Compressor 3 | Compressor 7 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 |
| NO 5 | Compressor 4 | Compressor 8 | Compressor 4 | Compressor 8 | Valve A | |
| NO 6 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Compressor 3 | Compressor 7 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Compressor 4 | Compressor 8 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 |
| NO 9 | Condenser fans | Condenser fans | Condenser fans | Condenser fans | Valve B | |
| NO10 | Valve C | | Valve C | | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | Valve A | | Valve A | | Condenser fans | Condenser fans |
| NO13 | Valve B | | Valve B | | Valve C | |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) |
| Y1 | | | | | Inverter cond. fan | Inverter cond. fan |
| Y2 | | | | | | |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 3 | Inverter cond. fan 1 | Inverter cond. fan 3 | | |
| Y4 | Inverter cond. fan 2 | Inverter cond. fan 4 | Inverter cond. fan 2 | Inverter cond. fan 4 | | |

## COOLING ONLY CONDENSING UNITS CONFIGURATION "4"

AIR/AIR units with maximum 8 tandem hermetic compressors.

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Fan thermal cutout | | Fan thermal cutout | | Fan thermal cutout | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout |
| ID 7 | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout |
| ID10 | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout |
| ID11 | | | | | High press. switch 1 | High press. switch 3 |
| ID12 | | | | | High press. switch 2 | High press. switch 4 |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | Remote comp. control | | | |
| B2 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | | | Air outlet temp. 1 | Air outlet temp. 2 |
| B3 | Remote comp. control | | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 |
| B4 | | | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 |
| B5 | Air outlet temp. 1 | Air outlet temp. 2 | | | Remote comp. control | |
| B6 | | | Air outlet temp. 1 | Air outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) |
| NO1 | Compressor 1 | Compressor 5 | Compressor 1 | Compressor 5 | Circulation Fan | |
| NO2 | Compressor 2 | Compressor 6 | Compressor 2 | Compressor 6 | Compressor 1 | Compressor 5 |
| NO3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Compressor 2 | Compressor 6 |
| NO 4 | Compressor 3 | Compressor 7 | Compressor 3 | Compressor 7 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 |
| NO 5 | Compressor 4 | Compressor 8 | Compressor 4 | Compressor 8 | | |
| NO 6 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Compressor 3 | Compressor 7 |
| NO 7 | Circulation Fan | | Circulation Fan | | Compressor 4 | Compressor 8 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 |
| NO 9 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | | |
| NO10 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | | | | | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 |
| NO13 | | | | | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) | Master (address 1) | Slave (address 2) |
| Y1 | | | | | Inverter cond. fan 1 | Inverter cond. fan 3 |
| Y2 | | | | | Inverter cond. fan 2 | Inverter cond. fan 4 |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 3 | Inverter cond. fan 1 | Inverter cond. fan 3 | | |
| Y4 | Inverter cond. fan 2 | Inverter cond. fan 4 | Inverter cond. fan 2 | Inverter cond. fan 4 | | |

## CONDENSING UNITS WITH HEAT PUMP CONFIGURATION "5"

AIR/AIR units with maximum 8 tandem hermetic compressors.

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Fan thermal cutout | | Fan thermal cutout | | Heating/cooling selection | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout |
| ID 7 | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout |
| ID10 | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout |
| ID11 | Heating/cooling selection | | Heating/cooling selection | | High press. switch 1 | High press. switch 3 |
| ID12 | | | | | High press. switch 2 | High press. switch 4 |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | Remote comp. control | | | |
| B2 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | | | Air outlet temp. 1 | Air outlet temp. 2 |
| B3 | Remote comp. control | | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 |
| B4 | | | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 |
| B5 | Air outlet temp. 1 | Air outlet temp. 2 | | | Remote comp. control | |
| B6 | | | Air outlet temp. 1 | Air outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| NO1 | Compressor 1 | Compressor 5 | Compressor 1 | Compressor 5 | Circulation Fan | |
| NO2 | Compressor 2 | Compressor 6 | Compressor 2 | Compressor 6 | Compressor 1 | Compressor 5 |
| NO3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Compressor 2 | Compressor 6 |
| NO 4 | Compressor 3 | Compressor 7 | Compressor 3 | Compressor 7 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 |
| NO 5 | Compressor 4 | Compressor 8 | Compressor 4 | Compressor 8 | 4-way valve circuit 1 | 4-way valve circuit 3 |
| NO 6 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Compressor 3 | Compressor 7 |
| NO 7 | Circulation Fan | | Circulation Fan | | Compressor 4 | Compressor 8 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 |
| NO 9 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | 4-way valve circuit 2 | 4-way valve circuit 4 |
| NO10 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | 4-way valve circuit 1 | 4-way valve circuit 3 | 4-way valve circuit 1 | 4-way valve circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 |
| NO13 | 4-way valve circuit 2 | 4-way valve circuit 4 | 4-way valve circuit 2 | 4-way valve circuit 4 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| Y1 | | | | | Inverter cond. fan 1 | Inverter cond. fan 3 |
| Y2 | | | | | Inverter cond. fan 2 | Inverter cond. fan 4 |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 3 | Inverter cond. fan 1 | Inverter cond. fan 3 | | |
| Y4 | Inverter cond. fan 2 | Inverter cond. fan 4 | Inverter cond. fan 2 | Inverter cond. fan 4 | | |

## CHILLER ONLY UNITS CONFIGURATION "6"

WATER/WATER units with maximum 8 tandem hermetic compressors.

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout |
| ID 7 | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout |
| ID10 | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout |
| ID11 | | | | | High press. switch 1 | High press. switch 3 |
| ID12 | | | | | High press. switch 2 | High press. switch 4 |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| B1 | Cond. inlet temp. 1 | Cond. inlet temp. 2 | Outside set point | | Water inlet temp. | |
| B2 | Cond. outlet temp. 1 | Cond. outlet temp. 2 | | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside set point | | High pressure circuit 1 | High pressure circuit 3 | Cond. inlet temp. 1 | Cond. inlet temp. 2 |
| B4 | Water inlet temp. | | High pressure circuit 2 | High pressure circuit 4 | Cond. outlet temp. 1 | Cond. outlet temp. 2 |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside set point | |
| B6 | | | Water outlet temp. 1 | Water outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. inlet temp. 1 | Cond. inlet temp. 2 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. outlet temp. 1 | Cond. outlet temp. 2 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| NO1 | Compressor 1 | Compressor 5 | Compressor 1 | Compressor 5 | Evap. pump 1 | |
| NO2 | Compressor 2 | Compressor 6 | Compressor 2 | Compressor 6 | Compressor 1 | Compressor 5 |
| NO3 | Liquid solenoid circ. 1 | Liquid solenoid circ. 3 | Liquid solenoid circ. 1 | Liquid solenoid circ. 3 | Compressor 2 | Compressor 6 |
| NO 4 | Compressor 3 | Compressor 7 | Compressor 3 | Compressor 7 | Liquid solenoid circ. 1 | Liquid solenoid circ. 3 |
| NO 5 | Compressor 4 | Compressor 8 | Compressor 4 | Compressor 8 | | |
| NO 6 | Liquid solenoid circ. 2 | Liquid solenoid circ. 4 | Liquid solenoid circ. 2 | Liquid solenoid circ. 4 | Compressor 3 | Compressor 7 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Compressor 4 | Compressor 8 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Liquid solenoid circ. 2 | Liquid solenoid circ. 4 |
| NO 9 | | | | | Cond. pump 1 | |
| NO10 | | | | | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | | | | | | |
| NO13 | Cond. pump 1 | | Cond. pump 1 | | | |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| Y1 | | | | | | |
| Y2 | | | | | | |
| Y3 | | | | | | |
| Y4 | | | | | | |

## CHILLER / HEAT PUMP UNITS WITH REVERSAL ON WATER CIRC. CONFIGURATION "7"

WATER/WATER units with maximum 8 tandem hermetic compressors.

### DIGITAL INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout 1 | Pump thermal cutout 2 | Heating/cooling selection | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout | Comp. 1 thermal cutout | Comp. 5 thermal cutout |
| ID 7 | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout | Comp. 2 thermal cutout | Comp. 6 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout | Comp. 3 thermal cutout | Comp. 7 thermal cutout |
| ID10 | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout | Comp. 4 thermal cutout | Comp. 8 thermal cutout |
| ID11 | Heating/cooling selection | | Heating/cooling selection | | High press. switch 1 | High press. switch 3 |
| ID12 | | | | | High press. switch 2 | High press. switch 4 |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| B1 | Cond. inlet temp. 1 | Cond. inlet temp. 2 | Outside set point | | Water inlet temp. | |
| B2 | Cond. outlet temp. 1 | Cond. outlet temp. 2 | | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside set point | | High pressure circuit 1 | High pressure circuit 3 | Cond. inlet temp. 1 | Cond. inlet temp. 2 |
| B4 | Water inlet temp. | | High pressure circuit 2 | High pressure circuit 4 | Cond. outlet temp. 1 | Cond. outlet temp. 2 |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside set point | |
| B6 | | | Water outlet temp. 1 | Water outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. inlet temp. 1 | Cond. inlet temp. 2 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. outlet temp. 1 | Cond. outlet temp. 2 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| NO1 | Compressor 1 | Compressor 5 | Compressor 1 | Compressor 5 | Evap. pump 1 | |
| NO2 | Compressor 2 | Compressor 6 | Compressor 2 | Compressor 6 | Compressor 1 | Compressor 5 |
| NO3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Compressor 2 | Compressor 6 |
| NO 4 | Compressor 3 | Compressor 7 | Compressor 3 | Compressor 7 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 |
| NO 5 | Compressor 4 | Compressor 8 | Compressor 4 | Compressor 8 | Reversing valve water | |
| NO 6 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Compressor 3 | Compressor 7 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Compressor 4 | Compressor 8 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 |
| NO 9 | | | | | Cond. pump 1 | |
| NO10 | | | | | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | Reversing valve water | | Reversing valve water | | | |
| NO13 | Cond. pump 1 | | Cond. pump 1 | | | |

### ANALOGUE OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** | **Master (address 1)** | **Slave (address 2)** |
| Y1 | | | | | | |
| Y2 | | | | | | |
| Y3 | | | | | | |
| Y4 | | | | | | |

## CHILLER ONLY UNIT CONFIGURATION "8"

AIR/WATER units with maximum 8 semi-hermetic compressors (1 load step per compressor).

### DIGITAL INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout | Pump thermal cutout 2 | Pump thermal cutout | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 |
| ID 7 | Fan 1 thermal cutout | Fan 3 thermal cutout | Fan 1 thermal cutout | Fan 3 thermal cutout | Fan 1 thermal cutout | Fan 3 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 |
| ID10 | Fan 2 thermal cutout | Fan 4 thermal cutout | Fan 2 thermal cutout | Fan 4 thermal cutout | Fan 2 thermal cutout | Fan 4 thermal cutout |
| ID11 | Comp. 1 thermal cutout | Comp. 3 thermal cutout | Comp. 1 thermal cutout | Comp. 3 thermal cutout | High press. switch 1 / Comp. 1 thermal cutout | High press. switch 3 / Comp. 3 thermal cutout |
| ID12 | Comp. 2 thermal cutout | Comp. 4 thermal cutout | Comp. 2 thermal cutout | Comp. 4 thermal cutout | High press. switch 2 / Comp. 2 thermal cutout | High press. switch 4 / Comp. 4 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | Outside set point | | Water inlet temp. | |
| B2 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside set point | | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 |
| B4 | Water inlet temp. | | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside set point | |
| B6 | | | Water outlet temp. 1 | Water outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.3 | Winding A comp.1 | Winding A comp.3 | Evap. pump 1 | |
| NO2 | Winding B comp.1 | Winding B comp.3 | Winding B comp.1 | Winding B comp.3 | Winding A comp.1 | Winding A comp.3 |
| NO3 | Capacity-control comp.1 | Capacity-control comp.3 | Capacity-control comp.1 | Capacity-control comp.3 | Winding B comp.1 | Winding B comp.3 |
| NO 4 | Winding A comp.2 | Winding A comp.4 | Winding A comp.2 | Winding A comp.4 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 |
| NO 5 | Winding B comp.2 | Winding B comp.4 | Winding B comp.2 | Winding B comp.4 | Capacity-control comp.1 | Capacity-control comp.3 |
| NO 6 | Capacity-control comp.2 | Capacity-control comp.4 | Capacity-control comp.2 | Capacity-control comp.4 | Winding A comp.2 | Winding A comp.4 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Winding B comp.2 | Winding B comp.4 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 |
| NO 9 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Capacity-control comp.2 | Capacity-control comp.4 |
| NO10 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 |
| NO13 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 |

### ANALOGUE OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | Inverter cond. fan 1 | Inverter cond. fan 3 |
| Y2 | | | | | Inverter cond. fan 2 | Inverter cond. fan 4 |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 3 | Inverter cond. fan 1 | Inverter cond. fan 3 | | |
| Y4 | Inverter cond. fan 2 | Inverter cond. fan 4 | Inverter cond. fan 2 | Inverter cond. fan 4 | | |

## CHILLER UNITS WITH FREECOOLING CONFIGURATION "9"

AIR/WATER units with maximum 8 semi-hermetic compressors (1 load step per compressor).

### DIGITAL INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout | Pump thermal cutout 2 | Pump thermal cutout | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 |
| ID 7 | Fan 1 thermal cutout | Fan 3 thermal cutout | Fan 1 thermal cutout | Fan 3 thermal cutout | Fan 1 thermal cutout | Fan 3 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 |
| ID10 | Fan 2 thermal cutout | Fan 4 thermal cutout | Fan 2 thermal cutout | Fan 4 thermal cutout | Fan 2 thermal cutout | Fan 4 thermal cutout |
| ID11 | Comp. 1 thermal cutout | Comp. 3 thermal cutout | Comp. 1 thermal cutout | Comp. 3 thermal cutout | High press. switch 1 / Comp. 1 thermal cutout | High press. switch 3 / Comp. 3 thermal cutout |
| ID12 | Comp. 2 thermal cutout | Comp. 4 thermal cutout | Comp. 2 thermal cutout | Comp. 4 thermal cutout | High press. switch 2 / Comp. 2 thermal cutout | High press. switch 4 / Comp. 4 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | Outside temperature | | Water inlet temp. | |
| B2 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | Freecooling temperature | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside temperature | | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 |
| B4 | Water inlet temp. | | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside temperature | |
| B6 | Freecooling temperature | | Water outlet temp. 1 | Water outlet temp. 2 | Freecooling temperature | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.3 | Winding A comp.1 | Winding A comp.3 | Evap. pump 1 | |
| NO2 | Winding B comp.1 | Winding B comp.3 | Winding B comp.1 | Winding B comp.3 | Winding A comp.1 | Winding A comp.3 |
| NO3 | Capacity-control comp.1 | Capacity-control comp.3 | Capacity-control comp.1 | Capacity-control comp.3 | Winding B comp.1 | Winding B comp.3 |
| NO 4 | Winding A comp.2 | Winding A comp.4 | Winding A comp.2 | Winding A comp.4 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 |
| NO 5 | Winding B comp.2 | Winding B comp.4 | Winding B comp.2 | Winding B comp.4 | Capacity-control comp.1 | Capacity-control comp.3 |
| NO 6 | Capacity-control comp.2 | Capacity-control comp.4 | Capacity-control comp.2 | Capacity-control comp.4 | Winding A comp.2 | Winding A comp.4 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Winding B comp.2 | Winding B comp.4 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 |
| NO 9 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Capacity-control comp.2 | Capacity-control comp.4 |
| NO10 | Freecooling On/Off | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Freecooling On/Off | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Antifreeze heater 2 |
| NO11 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Antifreeze heater 2 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 |
| NO13 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Freecooling On/Off | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 |

### ANALOGUE OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | Mod. freecooling valve | | Mod. freecooling valve | | Inverter cond. fan 1 | Inverter cond. fan 3 |
| Y2 | | | | | Mod. freecooling valve | Inverter cond. fan 4 |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 3 | Inverter cond. fan 1 | Inverter cond. fan 3 | | |
| Y4 | Inverter cond. fan 2 | Inverter cond. fan 4 | Inverter cond. fan 2 | Inverter cond. fan 4 | | |

## CHILLERS WITH HEAT PUMP CONFIGURATION "10"

AIR/WATER units with maximum 8 semi-hermetic compressors (1 load step per compressor).

### DIGITAL INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Heating/cooling selection | | Heating/cooling selection | | Heating/cooling selection | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 |
| ID 7 | Fan 1 thermal cutout | Fan 3 thermal cutout | Fan 1 thermal cutout | Fan 3 thermal cutout | Fan 1 thermal cutout | Fan 3 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 |
| ID10 | Fan 2 thermal cutout | Fan 4 thermal cutout | Fan 2 thermal cutout | Fan 4 thermal cutout | Fan 2 thermal cutout | Fan 4 thermal cutout |
| ID11 | Comp. 1 thermal cutout | Comp. 3 thermal cutout | Comp. 1 thermal cutout | Comp. 3 thermal cutout | High press. switch 1 / Comp. 1 thermal cutout | High press. switch 3 / Comp. 3 thermal cutout |
| ID12 | Comp. 2 thermal cutout | Comp. 4 thermal cutout | Comp. 2 thermal cutout | Comp. 4 thermal cutout | High press. switch 2 / Comp. 2 thermal cutout | High press. switch 4 / Comp. 4 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | Outside set point | | Water inlet temp. | |
| B2 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside set point | | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 |
| B4 | Water inlet temp. | | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside set point | |
| B6 | | | Water outlet temp. 1 | Water outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.3 | Winding A comp.1 | Winding A comp.3 | Evap. pump 1 | |
| NO2 | Winding B comp.1 | Winding B comp.3 | Winding B comp.1 | Winding B comp.3 | Winding A comp.1 | Winding A comp.3 |
| NO3 | Capacity-control comp.1 | Capacity-control comp.3 | Capacity-control comp.1 | Capacity-control comp.3 | Winding B comp.1 | Winding B comp.3 |
| NO 4 | Winding A comp.2 | Winding A comp.4 | Winding A comp.2 | Winding A comp.4 | 4-way valve circuit 1 | 4-way valve circuit 3 |
| NO 5 | Winding B comp.2 | Winding B comp.4 | Winding B comp.2 | Winding B comp.4 | Capacity-control comp.1 | Capacity-control comp.3 |
| NO 6 | Capacity-control comp.2 | Capacity-control comp.4 | Capacity-control comp.2 | Capacity-control comp.4 | Winding A comp.2 | Winding A comp.4 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Winding B comp.2 | Winding B comp.4 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | 4-way valve circuit 2 | 4-way valve circuit 4 |
| NO 9 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Capacity-control comp.2 | Capacity-control comp.4 |
| NO10 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | 4-way valve circuit 1 | 4-way valve circuit 3 | 4-way valve circuit 1 | 4-way valve circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 |
| NO13 | 4-way valve circuit 2 | 4-way valve circuit 4 | 4-way valve circuit 2 | 4-way valve circuit 4 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 |

### ANALOGUE OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | Inverter cond. fan 1 | Inverter cond. fan 3 |
| Y2 | | | | | Inverter cond. fan 2 | Inverter cond. fan 4 |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 3 | Inverter cond. fan 1 | Inverter cond. fan 3 | | |
| Y4 | Inverter cond. fan 2 | Inverter cond. fan 4 | Inverter cond. fan 2 | Inverter cond. fan 4 | | |

## CHILLER UNITS WITH HEAT PUMP AND TOTAL RECOVERY CONFIGURATION "11"

AIR/WATER units with maximum 8 semi-hermetic compressors (1 load step per compressor).

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Heating/cooling selection | | Heating/cooling selection | | Heating/cooling selection | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 |
| ID 7 | Fan 1 thermal cutout | Fan 3 thermal cutout | Fan 1 thermal cutout | Fan 3 thermal cutout | Fan 1 thermal cutout | Fan 3 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 |
| ID10 | | | | | | |
| ID11 | Comp. 1 thermal cutout | Comp. 3 thermal cutout | Comp. 1 thermal cutout | Comp. 3 thermal cutout | High press. switch 1 / Comp. 1 thermal cutout | High press. switch 3 / Comp. 3 thermal cutout |
| ID12 | Comp. 2 thermal cutout | Comp. 4 thermal cutout | Comp. 2 thermal cutout | Comp. 4 thermal cutout | High press. switch 2 / Comp. 2 thermal cutout | High press. switch 4 / Comp. 4 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | Recovery inlet temp. | | Water inlet temp. | |
| B2 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | Recovery outlet temp. | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Recovery inlet temp. | | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 |
| B4 | Water inlet temp. | | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Recovery inlet temp. | |
| B6 | Recovery outlet temp. | | Water outlet temp. 1 | Water outlet temp. 2 | Recovery outlet temp. | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.3 | Winding A comp.1 | Winding A comp.3 | Evap. pump 1 | |
| NO2 | Winding B comp.1 | Winding B comp.3 | Winding B comp.1 | Winding B comp.3 | Winding A comp.1 | Winding A comp.3 |
| NO3 | Capacity-control comp.1 | Capacity-control comp.3 | Capacity-control comp.1 | Capacity-control comp.3 | Winding B comp.1 | Winding B comp.3 |
| NO 4 | Winding A comp.2 | Winding A comp.4 | Winding A comp.2 | Winding A comp.4 | Valve A | |
| NO 5 | Winding B comp.2 | Winding B comp.4 | Winding B comp.2 | Winding B comp.4 | Capacity-control comp.1 | Capacity-control comp.3 |
| NO 6 | Capacity-control comp.2 | Capacity-control comp.4 | Capacity-control comp.2 | Capacity-control comp.4 | Winding A comp.2 | Winding A comp.4 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Winding B comp.2 | Winding B comp.4 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Valve B | |
| NO 9 | Cond. fan 1 circuit 1/2 | Cond. fan circuit ¾ | Cond. fan 1 circuit 1/2 | Cond. fan circuit ¾ | Capacity-control comp.2 | Capacity-control comp.4 |
| NO10 | Valve C | | Valve C | | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | Valve A | | Valve A | | Cond. fan 1 circuit 1/2 | Cond. fan 1 circuit 3/4 |
| NO13 | Valve B | | Valve B | | Valve C | |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | Inverter cond. fan 1 | Inverter cond. fan 3 |
| Y2 | | | | | | |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 3 | Inverter cond. fan 1 | Inverter cond. fan 3 | | |
| Y4 | Inverter cond. fan 2 | Inverter cond. fan 4 | Inverter cond. fan 2 | Inverter cond. fan 4 | | |

## AIR/AIR CONDENSING UNITS CONFIGURATION "12"

AIR/AIR units with maximum 8 semi-hermetic compressors (1 load step per compressor).

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Main fan thermal cutout | | Main fan thermal cutout | | Main fan thermal cutout | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 |
| ID 7 | Fan 1 thermal cutout | Fan 3 thermal cutout | Fan 1 thermal cutout | Fan 3 thermal cutout | Fan 1 thermal cutout | Fan 3 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 |
| ID10 | Fan 2 thermal cutout | Fan 4 thermal cutout | Fan 2 thermal cutout | Fan 4 thermal cutout | Fan 2 thermal cutout | Fan 4 thermal cutout |
| ID11 | Comp. 1 thermal cutout | Comp. 3 thermal cutout | Comp. 1 thermal cutout | Comp. 3 thermal cutout | High press. switch 1 / Comp. 1 thermal cutout | High press. switch 3 / Comp. 3 thermal cutout |
| ID12 | Comp. 2 thermal cutout | Comp. 4 thermal cutout | Comp. 2 thermal cutout | Comp. 4 thermal cutout | High press. switch 2 / Comp. 2 thermal cutout | High press. switch 4 / Comp. 4 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | Remote comp. control | | | |
| B2 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | | | Air outlet temp. 1 | Air outlet temp. 2 |
| B3 | Remote comp. control | | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 |
| B4 | | | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 |
| B5 | Air outlet temp. 1 | Air outlet temp. 2 | | | Remote comp. control | |
| B6 | | | Air outlet temp. 1 | Air outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.3 | Winding A comp.1 | Winding A comp.3 | Circulation Fan | |
| NO2 | Winding B comp.1 | Winding B comp.3 | Winding B comp.1 | Winding B comp.3 | Winding A comp.1 | Winding A comp.3 |
| NO3 | Capacity-control comp.1 | Capacity-control comp.3 | Capacity-control comp.1 | Capacity-control comp.3 | Winding B comp.1 | Winding B comp.3 |
| NO 4 | Winding A comp.2 | Winding A comp.4 | Winding A comp.2 | Winding A comp.4 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 |
| NO 5 | Winding B comp.2 | Winding B comp.4 | Winding B comp.2 | Winding B comp.4 | Capacity-control comp.1 | Capacity-control comp.3 |
| NO 6 | Capacity-control comp.2 | Capacity-control comp.4 | Capacity-control comp.2 | Capacity-control comp.4 | Winding A comp.2 | Winding A comp.4 |
| NO 7 | Circulation Fan | | Circulation Fan | | Winding B comp.2 | Winding B comp.4 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 |
| NO 9 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 | Capacity-control comp.2 | Capacity-control comp.4 |
| NO10 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Cond. fan 1 circuit 1 | Cond. fan 1 circuit 3 |
| NO13 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Cond. fan 1 circuit 2 or Cond. fan 2 circuit 1 | Cond. fan 1 circuit 4 or Cond. fan 2 circuit 3 |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | Inverter cond. fan 1 | Inverter cond. fan 3 |
| Y2 | | | | | Inverter cond. fan 2 | Inverter cond. fan 4 |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 3 | Inverter cond. fan 1 | Inverter cond. fan 3 | | |
| Y4 | Inverter cond. fan 2 | Inverter cond. fan 4 | Inverter cond. fan 2 | Inverter cond. fan 4 | | |

## CONDENSING CHILLER UNITS WITH HEAT PUMP CONFIGURATION "13"

AIR/AIR units with maximum 8 semi-hermetic compressors (1 load step per compressor).

### DIGITAL INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Heating/cooling selection | | Heating/cooling selection | | Heating/cooling selection | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 |
| ID 7 | Fan 1 thermal cutout | Fan 3 thermal cutout | Fan 1 thermal cutout | Fan 3 thermal cutout | Fan 1 thermal cutout | Fan 3 thermal cutout |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 |
| ID10 | Fan 2 thermal cutout | Fan 4 thermal cutout | Fan 2 thermal cutout | Fan 4 thermal cutout | Fan 2 thermal cutout | Fan 4 thermal cutout |
| ID11 | Comp. 1 thermal cutout | Comp. 3 thermal cutout | Comp. 1 thermal cutout | Comp. 3 thermal cutout | High press. switch 1 / Comp. 1 thermal cutout | High press. switch 3 / Comp. 3 thermal cutout |
| ID12 | Comp. 2 thermal cutout | Comp. 4 thermal cutout | Comp. 2 thermal cutout | Comp. 4 thermal cutout | High press. switch 2 / Comp. 2 thermal cutout | High press. switch 4 / Comp. 4 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | Remote comp. control | | | |
| B2 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | | | Air outlet temp. 1 | Air outlet temp. 2 |
| B3 | Remote comp. control | | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. Circ. 1 | Cond. temp. circuit 3 |
| B4 | | | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. Circ. 2 | Cond. temp. circuit 4 |
| B5 | Air outlet temp. 1 | Air outlet temp. 2 | | | Remote comp. control | |
| B6 | | | Air outlet temp. 1 | Air outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. temp. circuit 1 | Cond. temp. circuit 3 | High press. transducers circ. 1 | High press. transducers circ. 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. temp. circuit 2 | Cond. temp. circuit 4 | High press. transducers circ. 2 | High press. transducers circ. 4 |

### DIGITAL OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.3 | Winding A comp.1 | Winding A comp.3 | Main fan | |
| NO2 | Winding B comp.1 | Winding B comp.3 | Winding B comp.1 | Winding B comp.3 | Winding A comp.1 | Winding A comp.3 |
| NO3 | Capacity-control comp.1 | Capacity-control comp.3 | Capacity-control comp.1 | Capacity-control comp.3 | Winding B comp.1 | Winding B comp.3 |
| NO 4 | Winding A comp.2 | Winding A comp.4 | Winding A comp.2 | Winding A comp.4 | 4-way valve C1 | 4-way valve C3 |
| NO 5 | Winding B comp.2 | Winding B comp.4 | Winding B comp.2 | Winding B comp.4 | Capacity-control comp.1 | Capacity-control comp.3 |
| NO 6 | Capacity-control comp.2 | Capacity-control comp.4 | Capacity-control comp.2 | Capacity-control comp.4 | Winding A comp.2 | Winding A comp.4 |
| NO 7 | Main fan | | Main fan | | Winding B comp.2 | Winding B comp.4 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | 4-way valve C2 | 4-way valve C4 |
| NO 9 | Cond. fan C1 | Cond. fan C1 | Cond. fan C1 | Cond. fan C1 | Capacity-control comp.2 | Capacity-control comp.4 |
| NO10 | Cond. fan C2 | Cond. fan C2 | Cond. fan C2 | Cond. fan C2 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | 4-way valve C1 | 4-way valve C3 | 4-way valve C1 | 4-way valve C3 | Cond. fan C1 | Cond. fan C3 |
| NO13 | 4-way valve C2 | 4-way valve C4 | 4-way valve C2 | 4-way valve C4 | Cond. fan C2 | Cond. fan C4 |

### ANALOGUE OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | Inverter cond. fan 1 | Inverter cond. fan 3 |
| Y2 | | | | | Inverter cond. fan 2 | Inverter cond. fan 4 |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 3 | Inverter cond. fan 1 | Inverter cond. fan 3 | | |
| Y4 | Inverter cond. fan 2 | Inverter cond. fan 4 | Inverter cond. fan 2 | Inverter cond. fan 4 | | |

## CHILLER ONLY UNITS CONFIGURATION "14"

WATER/WATER units with maximum 8 semi-hermetic compressors (1 load step per compressor).

### DIGITAL INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 |
| ID 7 | Condenser water flow switch | Condenser water flow switch (can be enabled) | Condenser water flow switch | Condenser water flow switch (can be enabled) | Condenser water flow switch | Condenser water flow switch (can be enabled) |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 |
| ID10 | Condenser pump thermal cutout | | Condenser pump thermal cutout | | Condenser pump thermal cutout | |
| ID11 | Comp. 1 thermal cutout | Comp. 3 thermal cutout | Comp. 1 thermal cutout | Comp. 3 thermal cutout | High press. switch 1 / Comp. 1 thermal cutout | High press. switch 3 / Comp. 3 thermal cutout |
| ID12 | Comp. 2 thermal cutout | Comp. 4 thermal cutout | Comp. 2 thermal cutout | Comp. 4 thermal cutout | High press. switch 2 / Comp. 2 thermal cutout | High press. switch 4 / Comp. 4 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. inlet temp.. 1 | Evap water outlet temp. 2 | Outside set point | | Evap water inlet temp. | |
| B2 | Cond. outlet temp. 1 | Cond. inlet temp.. 2 | | | Evap water outlet temp. 1 | Evap water outlet temp. 2 |
| B3 | Outside set point | Cond. outlet temp. 2 | High pressure circuit 1 | High pressure circuit 3 | Cond. inlet temp.. 1 | Cond. inlet temp.. 2 |
| B4 | Evap water inlet temp. | | High pressure circuit 2 | High pressure circuit 4 | Cond. outlet temp. 1 | Cond. outlet temp. 2 |
| B5 | Evap water outlet temp. 1 | Evap water outlet temp. 2 | Evap water inlet temp. | | Outside set point | |
| B6 | | | Evap water outlet temp. 1 | Evap water outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. inlet temp.. 1 | Cond. inlet temp.. 2 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. outlet temp. 1 | Cond. outlet temp. 2 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.3 | Winding A comp.1 | Winding A comp.3 | Evap. pump 1 | |
| NO2 | Winding B comp.1 | Winding B comp.3 | Winding B comp.1 | Winding B comp.3 | Winding A comp.1 | Winding A comp.3 |
| NO3 | Capacity-control comp.1 | Capacity-control comp.3 | Capacity-control comp.1 | Capacity-control comp.3 | Winding B comp.1 | Winding B comp.3 |
| NO 4 | Winding A comp.2 | Winding A comp.4 | Winding A comp.2 | Winding A comp.4 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 |
| NO 5 | Winding B comp.2 | Winding B comp.4 | Winding B comp.2 | Winding B comp.4 | Capacity-control comp.1 | Capacity-control comp.3 |
| NO 6 | Capacity-control comp.2 | Capacity-control comp.4 | Capacity-control comp.2 | Capacity-control comp.4 | Winding A comp.2 | Winding A comp.4 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Winding B comp.2 | Winding B comp.4 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 |
| NO 9 | Condenser pump | | Condenser pump | | Capacity-control comp.2 | Capacity-control comp.4 |
| NO10 | | | | | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 | Condenser pump | |
| NO13 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 | | |

### ANALOGUE OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | | |
| Y2 | | | | | | |
| Y3 | | | | | | |
| Y4 | | | | | | |

## COOLING/HEATING UNITS WITH REVERSAL ON WATER CIRC. CONFIGURATION "15"

WATER/WATER units with maximum 8 semi-hermetic compressors (1 load step per compressor).

### DIGITAL INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Heating/cooling selection | | Heating/cooling selection | | Heating/cooling selection | |
| ID 5 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 | Low press. switch 1 | Low press. switch 3 |
| ID 6 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 | Oil differential 1 | Oil differential 3 |
| ID 7 | Condenser water flow switch | Condenser water flow switch (can be enabled) | Condenser water flow switch | Condenser water flow switch (can be enabled) | Condenser water flow switch | Condenser water flow switch (can be enabled) |
| ID 8 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 | Low press. switch 2 | Low press. switch 4 |
| ID 9 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 | Oil differential 2 | Oil differential 4 |
| ID10 | Condenser pump thermal cutout | | Condenser pump thermal cutout | | Condenser pump thermal cutout | |
| ID11 | Comp. 1 thermal cutout | Comp. 3 thermal cutout | Comp. 1 thermal cutout | Comp. 3 thermal cutout | High press. switch 1 / Comp. 1 thermal cutout | High press. switch 3 / Comp. 3 thermal cutout |
| ID12 | Comp. 2 thermal cutout | Comp. 4 thermal cutout | Comp. 2 thermal cutout | Comp. 4 thermal cutout | High press. switch 2 / Comp. 2 thermal cutout | High press. switch 4 / Comp. 4 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 3 | High press. switch 1 | High press. switch 3 | | |
| ID14 | High press. switch 2 | High press. switch 4 | High press. switch 2 | High press. switch 4 | | |

### ANALOGUE INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. inlet temp.. 1 | Cond. inlet temp. 2 | Outside set point | | Evap water inlet temp. | |
| B2 | Cond. outlet temp. 1 | Cond. outlet temp. 2 | | | Evap water outlet temp. 1 | Evap water outlet temp. 2 |
| B3 | Outside set point | | High pressure circuit 1 | High pressure circuit 3 | Cond. inlet temp. 1 | Cond. inlet temp. 2 |
| B4 | Evap water inlet temp. | | High pressure circuit 2 | High pressure circuit 4 | Cond. outlet temp. 1 | Cond. outlet temp. 2 |
| B5 | Evap water outlet temp. 1 | Evap water outlet temp. 2 | Evap water inlet temp. | | Outside set point | |
| B6 | | | Evap water outlet temp. 1 | Evap water outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 3 | Cond. inlet temp.. 1 | Cond. inlet temp. 2 | High pressure circuit 1 | High pressure circuit 3 |
| B8 | High pressure circuit 2 | High pressure circuit 4 | Cond. outlet temp. 1 | Cond. outlet temp. 2 | High pressure circuit 2 | High pressure circuit 4 |

### DIGITAL OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.3 | Winding A comp.1 | Winding A comp.3 | Evap. pump 1 | |
| NO2 | Winding B comp.1 | Winding B comp.3 | Winding B comp.1 | Winding B comp.3 | Winding A comp.1 | Winding A comp.3 |
| NO3 | Capacity-control comp.1 | Capacity-control comp.3 | Capacity-control comp.1 | Capacity-control comp.3 | Winding B comp.1 | Winding B comp.3 |
| NO 4 | Winding A comp.2 | Winding A comp.4 | Winding A comp.2 | Winding A comp.4 | Liq. solenoid circuit 1 | Liq. solenoid circuit 3 |
| NO 5 | Winding B comp.2 | Winding B comp.4 | Winding B comp.2 | Winding B comp.4 | Capacity-control comp.1 | Capacity-control comp.3 |
| NO 6 | Capacity-control comp.2 | Capacity-control comp.4 | Capacity-control comp.2 | Capacity-control comp.4 | Winding A comp.2 | Winding A comp.4 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Winding B comp.2 | Winding B comp.4 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Liq. solenoid circuit 2 | Liq. solenoid circuit 4 |
| NO 9 | Condenser pump | | Condenser pump | | Capacity-control comp.2 | Capacity-control comp.4 |
| NO10 | Heat/Cool valve | | Heat/Cool valve | | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | General alarm | General alarm |
| NO12 | Liquid solenoid circ. 1 | Liq. solenoid circuit 3 | Liquid solenoid circ. 1 | Liq. solenoid circuit 3 | Condenser pump | |
| NO13 | Liquid solenoid circ. 2 | Liq. solenoid circuit 4 | Liquid solenoid circ. 2 | Liq. solenoid circuit 4 | Heat/Cool valve | |

### ANALOGUE OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | | |
| Y2 | | | | | | |
| Y3 | | | | | | |
| Y4 | | | | | | |

## CHILLER ONLY UNITS CONFIGURATION "16"

AIR/WATER units with maximum 4 semi-hermetic compressors (up to 3 load steps per comp.).

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout | |
| ID 5 | Low pressure switch 1 | Low pressure switch 2 | Low pressure switch 1 | Low pressure switch 2 | Low pressure switch 1 | Low pressure switch 2 |
| ID 6 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 |
| ID 7 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 |
| ID 8 | Fan 2 cutout circuit 1 | Fan 2 cutout circuit 2 | Fan 2 cutout circuit 1 | Fan 2 cutout circuit 2 | Fan 2 cutout circuit 1 | Fan 2 cutout circuit 2 |
| ID 9 | Fan 3 cutout circuit 1 | Fan 3 cutout circuit 2 | Fan 3 cutout circuit 1 | Fan 3 cutout circuit 2 | Fan 3 cutout circuit 1 | Fan 3 cutout circuit 2 |
| ID10 | | | | | | |
| ID11 | | | | | High pressure switch 1 | High pressure switch 2 |
| ID12 | | | | | Comp. 1 thermal cutout | Comp. 3 thermal cutout |
| ID13 | High pressure switch 1 | High pressure switch 2 | High pressure switch 1 | High pressure switch 2 | | |
| ID14 | Comp. 1 thermal cutout | Comp. 3 thermal cutout | Comp. 1 thermal cutout | Comp. 3 thermal cutout | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 2 | Outside set point | | Water inlet temp. | |
| B2 | | | | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside set point | | High pressure circuit 1 | High pressure circuit 2 | Cond. temp. circuit 1 | Cond. temp. circuit 2 |
| B4 | Water inlet temp. | | | | | |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside set point | |
| B6 | | | Water outlet temp. 1 | Water outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 2 | Cond. temp. circuit 1 | Cond. temp. circuit 2 | High pressure circuit 1 | High pressure circuit 2 |
| B8 | | | | | | |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.2 | Winding A comp.1 | Winding A comp.2 | Evap. pump 1 | |
| NO2 | Winding B comp.1 | Winding B comp.2 | Winding B comp.1 | Winding B comp.2 | Winding A comp.1 | Winding A comp.2 |
| NO3 | Step 1 comp.1 | Step 1 comp.2 | Step 1 comp.1 | Step 1 comp.2 | Winding B comp.1 | Winding B comp.2 |
| NO 4 | Step 2 comp.1 | Step 2 comp.2 | Step 2 comp.1 | Step 2 comp.2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 |
| NO 5 | Step 3 comp.1 | Step 3 comp.2 | Step 3 comp.1 | Step 3 comp.2 | Condenser fan 3 Circ. 1 | Condenser fan 3 Circ. 2 |
| NO 6 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 | Step 1 comp.1 | Step 1 comp.2 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Step 2 comp.1 | Step 2 comp.2 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Step 3 comp.1 | Step 3 comp.2 |
| NO 9 | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 | Condenser fan 2 Circ. 1 | Condenser fan 2 Circ. 2 |
| NO10 | Cond. fan 2 Circ. 1 | Cond. fan 2 Circ. 2 | Cond. fan 2 Circ. 1 | Cond. fan 2 Circ. 2 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Cond. fan 3 Circ. 1 | Cond. fan 3 Circ. 2 | Cond. fan 3 Circ. 1 | Cond. fan 3 Circ. 2 | General alarm | General alarm |
| NO12 | | | | | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 |
| NO13 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | | |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | Inverter cond. fan1 | Inverter cond. fan 2 |
| Y2 | | | | | | |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 2 | Inverter cond. fan1 | Inverter cond. fan 2 | | |
| Y4 | | | | | | |

## CHILLER UNITS WITH FREECOOLING CONFIGURATION "17"

AIR/WATER units with maximum 4 semi-hermetic compressors (up to 3 load steps per comp.).

### DIGITAL INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout | |
| ID 5 | Low press. switch 1 | Low press. switch 2 | Low press. switch 1 | Low press. switch 2 | Low press. switch 1 | Low press. switch 2 |
| ID 6 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 |
| ID 7 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 |
| ID 8 | Fan 2 cutout circuit 1 | Fan 2 cutout circuit 2 | Fan 2 cutout circuit 1 | Fan 2 cutout circuit 2 | Fan 2 cutout circuit 1 | Fan 2 cutout circuit 2 |
| ID 9 | Fan 3 cutout circuit 1 | Fan 3 cutout circuit 2 | Fan 3 cutout circuit 1 | Fan 3 cutout circuit 2 | Fan 3 cutout circuit 1 | Fan 3 cutout circuit 2 |
| ID10 | | | | | | |
| ID11 | | | | | High press. switch 1 | High press. switch 2 |
| ID12 | | | | | Comp. 1 thermal cutout | Comp. 3 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 2 | High press. switch 1 | High press. switch 2 | | |
| ID14 | Comp. 1 thermal cutout | Comp. 3 thermal cutout | Comp. 1 thermal cutout | Comp. 3 thermal cutout | | |

### ANALOGUE INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 2 | Outside set point | | Water inlet temp. | |
| B2 | Outside temperature | | Freecooling temperature | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside set point | | High pressure circuit 1 | High pressure circuit 2 | Cond. temp. circuit 1 | Cond. temp. circuit 2 |
| B4 | Water inlet temp. | | | | Outside temperature | |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside set point | |
| B6 | Freecooling temperature | | Water outlet temp. 1 | Water outlet temp. 2 | Freecooling temperature | |
| B7 | High pressure circuit 1 | High pressure circuit 2 | Cond. temp. circuit 1 | Cond. temp. circuit 2 | High pressure circuit 1 | High pressure circuit 2 |
| B8 | | | Outside temperature | | | |

### DIGITAL OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.2 | Winding A comp.1 | Winding A comp.2 | Evap. pump 1 | |
| NO2 | Winding B comp.1 | Winding B comp.2 | Winding B comp.1 | Winding B comp.2 | Winding A comp.1 | Winding A comp.2 |
| NO3 | Step 1 comp.1 | Step 1 comp.2 | Step 1 comp.1 | Step 1 comp.2 | Winding B comp.1 | Winding B comp.2 |
| NO 4 | Step 2 comp.1 | Step 2 comp.2 | Step 2 comp.1 | Step 2 comp.2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 |
| NO 5 | Step 3 comp.1 | Step 3 comp.2 | Step 3 comp.1 | Step 3 comp.2 | Condenser fan 3 Circ. 1 | Condenser fan 3 Circ. 2 |
| NO 6 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 | Step 1 comp.1 | Step 1 comp.2 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Step 2 comp.1 | Step 2 comp.2 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Step 3 comp.1 | Step 3 comp.2 |
| NO 9 | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 | Condenser fan 2 Circ. 1 | Condenser fan 2 Circ. 2 |
| NO10 | Cond. fan 2 Circ. 1 | Cond. fan 2 Circ. 2 | Cond. fan 2 Circ. 1 | Cond. fan 2 Circ. 2 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Cond. fan 3 Circ. 1 | Cond. fan 3 Circ. 2 | Cond. fan 3 Circ. 1 | Cond. fan 3 Circ. 2 | General alarm | General alarm |
| NO12 | Freecooling On / Off | | Freecooling On / Off | | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 |
| NO13 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | Freecooling On / Off | |

### ANALOGUE OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | Mod. freecooling valve | | Mod. freecooling valve | | Inverter cond. fan1 | Inverter cond. fan 2 |
| Y2 | | | | | Mod. freecooling valve | |
| Y3 | Inverter cond. fan1 | Inverter cond. fan 2 | Inverter cond. fan 1 | Inverter cond. fan 2 | | |
| Y4 | | | | | | |

## CHILLERS WITH HEAT PUMP CONFIGURATION "18"

AIR/WATER units with maximum 4 semi-hermetic compressors (up to 3 load steps per comp.).

### DIGITAL INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout 1 | Pump thermal cutout 2 | Heating / cooling selection | |
| ID 5 | Low press. switch 1 | Low press. switch 2 | Low press. switch 1 | Low press. switch 2 | Low press. switch 1 | Low press. switch 2 |
| ID 6 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 |
| ID 7 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 |
| ID 8 | Fan 2 cutout circuit 1 | Fan 2 cutout circuit 2 | Fan 2 cutout circuit 1 | Fan 2 cutout circuit 2 | Fan 2 cutout circuit 1 | Fan 2 cutout circuit 2 |
| ID 9 | Fan 3 cutout circuit 1 | Fan 3 cutout circuit 2 | Fan 3 cutout circuit 1 | Fan 3 cutout circuit 2 | Fan 3 cutout circuit 1 | Fan 3 cutout circuit 2 |
| ID10 | | | | | Pump thermal cutout | |
| ID11 | Heating / cooling selection | | Heating / cooling selection | | High press. switch 1 | High press. switch 2 |
| ID12 | | | | | Comp. 1 thermal cutout | Comp. 2 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 2 | High press. switch 1 | High press. switch 2 | | |
| ID14 | Comp. 1 thermal cutout | Comp. 2 thermal cutout | Comp. 1 thermal cutout | Comp. 2 thermal cutout | | |

### ANALOGUE INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 2 | Outside set point | | Water inlet temp. | |
| B2 | | | | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside set point | | High pressure circuit 1 | High pressure circuit 2 | Cond. temp. circuit 1 | Cond. temp. circuit 2 |
| B4 | Water inlet temp. | | | | | |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside set point | |
| B6 | | | Water outlet temp. 1 | Water outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 2 | Cond. temp. circuit 1 | Cond. temp. circuit 2 | High pressure circuit 1 | High pressure circuit 2 |
| B8 | | | | | | |

### DIGITAL OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.2 | Winding A comp.1 | Winding A comp.2 | Evap. pump 1 | |
| NO2 | Winding B comp.1 | Winding B comp.2 | Winding B comp.1 | Winding B comp.2 | Winding A comp.1 | Winding A comp.2 |
| NO3 | Step 1 comp.1 | Step 1 comp.2 | Step 1 comp.1 | Step 1 comp.2 | Winding B comp.1 | Winding B comp.2 |
| NO 4 | Step 2 comp.1 | Step 2 comp.2 | Step 2 comp.1 | Step 2 comp.2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 |
| NO 5 | Step 3 comp.1 | Step 3 comp.2 | Step 3 comp.1 | Step 3 comp.2 | 4-way valve circuit 1 | 4-way valve circuit 2 |
| NO 6 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 | Step 1 comp.1 | Step 1 comp.2 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Step 2 comp.1 | Step 2 comp.2 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Step 3 comp.1 | Step 3 comp.2 |
| NO 9 | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 | Condenser fan 2 Circ. 1 | Condenser fan 2 Circ. 2 |
| NO10 | Condenser fan 2 Circ. 1 | Condenser fan 2 Circ. 2 | Condenser fan 2 Circ. 1 | Condenser fan 2 Circ. 2 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | 4-way valve circuit 1 | 4-way valve circuit 2 | 4-way valve circuit 1 | 4-way valve circuit 2 | General alarm | General alarm |
| NO12 | Condenser fan 3 Circ. 1 | Condenser fan 3 Circ. 2 | Condenser fan 3 Circ. 1 | Condenser fan 3 Circ. 2 | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 |
| NO13 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | Condenser fan 3 Circ. 1 | Condenser fan 3 Circ. 2 |

### ANALOGUE OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | Inverter cond. fan1 | Inverter cond. fan 2 |
| Y2 | | | | | | |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 2 | Inverter cond. fan1 | Inverter cond. fan 2 | | |
| Y4 | | | | | | |

## CHILLERS WITH HEAT PUMP AND TOTAL RECOVERY CONFIGURATION "19"

AIR/WATER units with maximum 4 semi-hermetic compressors (up to 3 load steps per comp.).

### DIGITAL INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout 1 | Pump thermal cutout 2 | Heating / cooling selection | |
| ID 5 | Low pressure switch 1 | Low pressure switch 2 | Low pressure switch 1 | Low pressure switch 2 | Low press. switch 1 | Low press. switch 2 |
| ID 6 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 |
| ID 7 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 |
| ID 8 | | | | | | |
| ID 9 | | | | | | |
| ID10 | | | | | Pump thermal cutout | |
| ID11 | Heating / cooling selection | | Heating / cooling selection | | High press. switch 1 | High press. switch 2 |
| ID12 | | | | | Comp. 1 thermal cutout | Comp. 2 thermal cutout |
| ID13 | High pressure switch 1 | High pressure switch 2 | High pressure switch 1 | High pressure switch 2 | | |
| ID14 | Comp. 1 thermal cutout | Comp. 2 thermal cutout | Comp. 1 thermal cutout | Comp. 2 thermal cutout | | |

### ANALOGUE INPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 2 | Outside set point | | Water inlet temp. | |
| B2 | Recovery boiler inlet temp. | | Recovery boiler outlet temp. | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside set point | | High pressure circuit 1 | High pressure circuit 2 | Cond. temp. circuit 1 | Cond. temp. circuit 2 |
| B4 | Water inlet temp. | | | | Recovery boiler inlet temp. | |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside set point | |
| B6 | Recovery boiler outlet temp. | | Water outlet temp. 1 | Water outlet temp. 2 | Recovery boiler outlet temp. | |
| B7 | High pressure circuit 1 | High pressure circuit 2 | Cond. temp. circuit 1 | Cond. temp. circuit 2 | High pressure circuit 1 | High pressure circuit 2 |
| B8 | | | Recovery boiler inlet temp. | | | |

### DIGITAL OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.2 | Winding A comp.1 | Winding A comp.2 | Evap. pump 1 | |
| NO2 | Winding B comp.1 | Winding B comp.2 | Winding B comp.1 | Winding B comp.2 | Winding A comp.1 | Winding A comp.2 |
| NO3 | Step 1 comp.1 | Step 1 comp.2 | Step 1 comp.1 | Step 1 comp.2 | Winding B comp.1 | Winding B comp.2 |
| NO 4 | Step 2 comp.1 | Step 2 comp.2 | Step 2 comp.1 | Step 2 comp.2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 |
| NO 5 | Step 3 comp.1 | Step 3 comp.2 | Step 3 comp.1 | Step 3 comp.2 | Valve A | |
| NO 6 | Liquid solenoid circuit.1 | Liq. solenoid circuit 2 | Liquid solenoid circuit.1 | Liq. solenoid circuit 2 | Step 1 comp.1 | Step 1 comp.2 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Step 2 comp.1 | Step 2 comp.2 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Step 3 comp.1 | Step 3 comp.2 |
| NO 9 | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 | Valve B | |
| NO10 | Valve B | | Valve B | | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Valve A | | Valve A | | General alarm | General alarm |
| NO12 | Valve C | | Valve C | | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 |
| NO13 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | Valve C | |

### ANALOGUE OUTPUTS

| No. | pCO$^2$ MEDIUM | | pCO$^1$ MEDIUM | | pCO$^C$ MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | Inverter cond. fan1 | Inverter cond. fan 2 |
| Y2 | | | | | | |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 2 | Inverter cond. fan1 | Inverter cond. fan 2 | | |
| Y4 | | | | | | |

## CONDENSING UNITS CONFIGURATION "20"

AIR/AIR units with maximum 4 semi-hermetic compressors (up to 3 load steps per comp.).

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Main fan thermal cutout | | Main fan thermal cutout | | Main fan thermal cutout | |
| ID 5 | Low press. switch 1 | Low press. switch 2 | Low press. switch 1 | Low press. switch 2 | Low press. switch 1 | Low press. switch 2 |
| ID 6 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 |
| ID 7 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 | Fan 1 cutout circuit 1 | Fan 1 cutout circuit 2 |
| ID 8 | Fan 2 cutout circuit 1 | Fan 2 cutout circuit 2 | Fan 2 cutout circuit 1 | Fan 2 cutout circuit 2 | Fan 2 cutout circuit 1 | Fan 2 cutout circuit 2 |
| ID 9 | Fan 3 cutout circuit 1 | Fan 3 cutout circuit 2 | Fan 3 cutout circuit 1 | Fan 3 cutout circuit 2 | Fan 3 cutout circuit 1 | Fan 3 cutout circuit 2 |
| ID10 | | | | | | |
| ID11 | | | | | High press. switch 1 | High press. switch 2 |
| ID12 | | | | | Comp. 1 thermal cutout | Comp. 2 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 2 | High press. switch 1 | High press. switch 2 | | |
| ID14 | Comp. 1 thermal cutout | Comp. 2 thermal cutout | Comp. 1 thermal cutout | Comp. 2 thermal cutout | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 2 | Remote comp. control | | | |
| B2 | | | | | Air outlet temp. 1 | Air outlet temp. 2 |
| B3 | Remote comp. control | | High pressure circuit 1 | High pressure circuit 2 | Cond. temp. circuit 1 | Cond. temp. circuit 2 |
| B4 | | | | | | |
| B5 | Air outlet temp. 1 | Air outlet temp. 2 | | | Remote comp. control | |
| B6 | | | Air outlet temp. 1 | Air outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 2 | Cond. temp. circuit 1 | Cond. temp. circuit 2 | High pressure circuit 1 | High pressure circuit 2 |
| B8 | | | | | | |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.2 | Winding A comp.1 | Winding A comp.2 | Circulation Fan | |
| NO2 | Winding B comp.1 | Winding B comp.2 | Winding B comp.1 | Winding B comp.2 | Winding A comp.1 | Winding A comp.2 |
| NO3 | Step 1 comp.1 | Step 1 comp.2 | Step 1 comp.1 | Step 1 comp.2 | Winding B comp.1 | Winding B comp.2 |
| NO 4 | Step 2 comp.1 | Step 2 comp.2 | Step 2 comp.1 | Step 2 comp.2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 |
| NO 5 | Step 3 comp.1 | Step 3 comp.2 | Step 3 comp.1 | Step 3 comp.2 | Condenser fan 3 Circ. 1 | Condenser fan 3 Circ. 2 |
| NO 6 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 | Step 1 comp.1 | Step 1 comp.2 |
| NO 7 | Circulation Fan | | Circulation Fan | | Step 2 comp.1 | Step 2 comp.2 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Step 3 comp.1 | Step 3 comp.2 |
| NO 9 | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 | Condenser fan 2 Circ. 1 | Condenser fan 2 Circ. 2 |
| NO10 | Condenser fan 2 Circ. 1 | Condenser fan 2 Circ. 2 | Condenser fan 2 Circ. 1 | Condenser fan 2 Circ. 2 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Condenser fan 3 Circ. 1 | Condenser fan 3 Circ. 2 | Condenser fan 3 Circ. 1 | Condenser fan 3 Circ. 2 | General alarm | General alarm |
| NO12 | | | | | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 |
| NO13 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | | |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | Inverter cond. fan1 | Inverter cond. fan 2 |
| Y2 | | | | | | |
| Y3 | Inverter cond. fan1 | Inverter cond. fan 2 | Inverter cond. fan 1 | Inverter cond. fan 2 | | |
| Y4 | | | | | | |

## CONDENSING UNITS WITH HEAT PUMP CONFIGURATION "21"

AIR/AIR units with maximum 4 semi-hermetic compressors (up to 3 load steps per comp.).

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | Master (address 1) | Slave (addresses 2/3/4) | Master (address 1) | Slave (addresses 2/3/4) | Master (address 1) | Slave (addresses 2/3/4) |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | | | | | Heating / cooling selection | |
| ID 5 | Low press. switch 1 | Low press. switch 2 | Low press. switch 1 | Low press. switch 2 | Low press. switch 1 | Low press. switch 2 |
| ID 6 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 |
| ID 7 | Fan cutout circuit 1 | Fan cutout circuit 2 | Fan cutout circuit 1 | Fan cutout circuit 2 | Fan cutout circuit 1 | Fan cutout circuit 2 |
| ID 8 | Fan cutout circuit 1 | Fan cutout circuit 2 | Fan cutout circuit 1 | Fan cutout circuit 2 | Fan cutout circuit 1 | Fan cutout circuit 2 |
| ID 9 | Fan cutout circuit 1 | Fan cutout circuit 2 | Fan cutout circuit 1 | Fan cutout circuit 2 | Fan cutout circuit 1 | Fan cutout circuit 2 |
| ID10 | | | | | | |
| ID11 | Heating / cooling selection | | Heating / cooling selection | | High press. switch 1 | High press. switch 2 |
| ID12 | | | | | Comp. 1 thermal cutout | Comp. 2 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 2 | High press. switch 1 | High press. switch 2 | | |
| ID14 | Comp. 1 thermal cutout | Comp. 2 thermal cutout | Comp. 1 thermal cutout | Comp. 2 thermal cutout | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | Master (address 1) | Slave (addresses 2/3/4) | Master (address 1) | Slave (addresses 2/3/4) | Master (address 1) | Slave (addresses 2/3/4) |
| B1 | Cond. temp. circuit 1 | Cond. temp. circuit 2 | Remote comp. control | | | |
| B2 | | | | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Remote comp. control | | High pressure circuit 1 | High pressure circuit 2 | Cond. temp. circuit 1 | Cond. temp. circuit 2 |
| B4 | | | | | | |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | | | Remote comp. control | |
| B6 | | | Water outlet temp. 1 | Water outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 2 | Cond. temp. circuit 1 | Cond. temp. circuit 2 | High pressure circuit 1 | High pressure circuit 2 |
| B8 | | | | | | |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | Master (address 1) | Slave (addresses 2/3/4) | Master (address 1) | Slave (addresses 2/3/4) | Master (address 1) | Slave (addresses 2/3/4) |
| NO1 | Winding A comp.1 | Winding A comp.2 | Winding A comp.1 | Winding A comp.2 | Circulation Fan | |
| NO2 | Winding B comp.1 | Winding B comp.2 | Winding B comp.1 | Winding B comp.2 | Winding A comp.1 | Winding A comp.2 |
| NO3 | Step 1 comp.1 | Step 1 comp.2 | Step 1 comp.1 | Step 1 comp.2 | Winding B comp.1 | Winding B comp.2 |
| NO 4 | Step 2 comp.1 | Step 2 comp.2 | Step 2 comp.1 | Step 2 comp.2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 |
| NO 5 | Step 3 comp.1 | Step 3 comp.2 | Step 3 comp.1 | Step 3 comp.2 | Cond. fan 3Circ. 1 | Cond. fan 3 Circ. 2 |
| NO 6 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 | Step 1 comp.1 | Step 1 comp.2 |
| NO 7 | Circulation Fan | | Circulation Fan | | Step 2 comp.1 | Step 2 comp.2 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Step 3 comp.1 | Step 3 comp.2 |
| NO 9 | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 | Condenser fan 2 Circ. 1 | Condenser fan 2 Circ. 2 |
| NO10 | Condenser fan 2 Circ. 1 | Condenser fan 2 Circ. 2 | Condenser fan 2 Circ. 1 | Condenser fan 2 Circ. 2 | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Condenser fan 3 Circ. 1 | Condenser fan 3 Circ. 2 | Condenser fan 3 Circ. 1 | Condenser fan 3 Circ. 2 | General alarm | General alarm |
| NO12 | 4-way valve | 4-way valve | 4-way valve | 4-way valve | Condenser fan 1 Circ. 1 | Condenser fan 1 Circ. 2 |
| NO13 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | 4-way valve | 4-way valve |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | Master (address 1) | Slave (addresses 2/3/4) | Master (address 1) | Slave (addresses 2/3/4) | Master (address 1) | Slave (addresses 2/3/4) |
| Y1 | | | | | Inverter cond. fan 1 | Inverter cond. fan 2 |
| Y2 | | | | | | |
| Y3 | Inverter cond. fan 1 | Inverter cond. fan 2 | Inverter cond. fan 1 | Inverter cond. fan 2 | | |
| Y4 | | | | | | |

## CHILLER ONLY UNITS CONFIGURATION "22"

WATER/WATER units with maximum 4 semi-hermetic compressors (up to 3 load steps per comp.).

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout 1 | Pump thermal cutout 2 | Pump thermal cutout | |
| ID 5 | Low press. switch 1 | Low press. switch 2 | Low press. switch 1 | Low press. switch 2 | Low press. switch 1 | Low press. switch 2 |
| ID 6 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 |
| ID 7 | Condenser flow switch | Condenser flow switch (can be enabled) | Condenser flow switch | Condenser flow switch (can be enabled) | Condenser flow switch | Condenser flow switch (can be enabled) |
| ID 8 | | | | | | |
| ID 9 | | | | | | |
| ID10 | Condenser pump thermal cutout | | Condenser pump thermal cutout | | Condenser pump thermal cutout | |
| ID11 | | | | | High press. switch 1 | High press. switch 2 |
| ID12 | | | | | Compressor 1 thermal cutout | Compressor 2 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 2 | High press. switch 1 | High press. switch 2 | | |
| ID14 | Compressor 1 thermal cutout | Compressor 2 thermal cutout | Compressor 1 thermal cutout | Compressor 2 thermal cutout | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Water outlet temp. 1 | Water outlet temp. 2 | Outside set point | | Water inlet temp. | |
| B2 | Cond. inlet temp. 1 | Cond. inlet temp. 2 | | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside set point | | High pressure circuit 1 | High pressure circuit 2 | Cond. inlet temp. 1 | Cond. inlet temp. 2 |
| B4 | Water inlet temp. | | | | Cond. outlet temp. 1 | Cond. outlet temp. 2 |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside set point | |
| B6 | | | Water outlet temp. 1 | Water outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 2 | Cond. inlet temp. 1 | Cond. inlet temp. 2 | High pressure circuit 1 | High pressure circuit 2 |
| B8 | | | Cond. outlet temp. 1 | Cond. outlet temp. 2 | | |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.2 | Winding A comp.1 | Winding A comp.2 | Evap. pump 1 | |
| NO2 | Winding B comp.1 | Winding B comp.2 | Winding B comp.1 | Winding B comp.2 | Winding A comp.1 | Winding A comp.2 |
| NO3 | Step 1 comp.1 | Step 1 comp.2 | Step 1 comp.1 | Step 1 comp.2 | Winding B comp.1 | Winding B comp.2 |
| NO 4 | Step 2 comp.1 | Step 2 comp.2 | Step 2 comp.1 | Step 2 comp.2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 |
| NO 5 | Step 3 comp.1 | Step 3 comp.2 | Step 3 comp.1 | Step 3 comp.2 | | |
| NO 6 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 | Step 1 comp.1 | Step 1 comp.2 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Step 2 comp.1 | Step 2 comp.2 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Step 3 comp.1 | Step 3 comp.2 |
| NO 9 | | | | | Condenser pump | |
| NO10 | Condenser pump | | Condenser pump | | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | | | | | General alarm | General alarm |
| NO12 | | | | | | |
| NO13 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | | |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | | |
| Y2 | | | | | | |
| Y3 | | | | | | |
| Y4 | | | | | | |

## COOLING/HEATING UNITS WITH REVERSAL ON WATER CIRC. CONFIGURATION "23"

WATER/WATER units with maximum 4 semi-hermetic compressors (up to 3 load steps per comp.).

### DIGITAL INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| ID 1 | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) | Serious alarm | Serious alarm (can be enabled) |
| ID 2 | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) | Evaporator flow switch | Evaporator flow switch (enable) |
| ID 3 | Remote ON/OFF | | Remote ON/OFF | | Remote ON/OFF | |
| ID 4 | Evaporator pump 1 thermal cutout | Evaporator pump 2 thermal cutout | Evaporator pump 1 thermal cutout | Evaporator pump 2 thermal cutout | Heating / cooling selection | |
| ID 5 | Low press. switch 1 | Low press. switch 2 | Low press. switch 1 | Low press. switch 2 | Low press. switch 1 | Low press. switch 2 |
| ID 6 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 | Oil differential 1 | Oil differential 2 |
| ID 7 | Condenser flow switch | Condenser flow switch (can be enabled) | Condenser flow switch | Condenser flow switch (can be enabled) | Condenser flow switch | Condenser flow switch (can be enabled) |
| ID 8 | | | | | | |
| ID 9 | | | | | Evaporator pump thermal cutout | |
| ID10 | Condenser pump thermal cutout | | Condenser pump thermal cutout | | Condenser pump thermal cutout | |
| ID11 | Heating / cooling selection | | Heating / cooling selection | | High press. switch 1 | High press. switch 2 |
| ID12 | | | | | Compressor 1 thermal cutout | Compressor 2 thermal cutout |
| ID13 | High press. switch 1 | High press. switch 2 | High press. switch 1 | High press. switch 2 | | |
| ID14 | Compressor 1 thermal cutout | Compressor 2 thermal cutout | Compressor 1 thermal cutout | Compressor 2 thermal cutout | | |

### ANALOGUE INPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| B1 | Cond. inlet temp. 1 | Cond. inlet temp. 2 | Outside set point | | Water inlet temp. | |
| B2 | Cond. outlet temp. 1 | Cond. outlet temp. 2 | | | Water outlet temp. 1 | Water outlet temp. 2 |
| B3 | Outside set point | | High pressure circuit 1 | High pressure circuit 2 | Cond. inlet temp. 1 | Cond. inlet temp. 2 |
| B4 | Water inlet temp. | | | | Cond. outlet temp. 1 | Cond. outlet temp. 2 |
| B5 | Water outlet temp. 1 | Water outlet temp. 2 | Water inlet temp. | | Outside set point | |
| B6 | | | Water outlet temp. 1 | Water outlet temp. 2 | | |
| B7 | High pressure circuit 1 | High pressure circuit 2 | Cond. inlet temp. 1 | Cond. inlet temp. 2 | High pressure circuit 1 | High pressure circuit 2 |
| B8 | | | Cond. outlet temp. 1 | Cond. outlet temp. 2 | | |

### DIGITAL OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| NO1 | Winding A comp.1 | Winding A comp.2 | Winding A comp.1 | Winding A comp.2 | Evap. pump 1 | |
| NO2 | Winding B comp.2 | Winding B comp.2 | Winding B comp.2 | Winding B comp.2 | Winding A comp.1 | Winding A comp.2 |
| NO3 | Step 1 comp.1 | Step 1 comp.2 | Step 1 comp.1 | Step 1 comp.2 | Winding B comp.1 | Winding B comp.2 |
| NO 4 | Step 2 comp.1 | Step 2 comp.2 | Step 2 comp.1 | Step 2 comp.2 | Liq. solenoid circuit 1 | Liq. solenoid circuit 2 |
| NO 5 | Step 3 comp.1 | Step 3 comp.2 | Step 3 comp.1 | Step 3 comp.2 | Reversing valve water | |
| NO 6 | Liquid solenoid circ. 1 | Liquid solenoid circ. 2 | Liquid solenoid circ. 1 | Liquid solenoid circ. 2 | Step 1 comp.1 | Step 1 comp.2 |
| NO 7 | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Evap. pump 1 | Evap. pump 2 / Disable fan coil | Step 2 comp.1 | Step 2 comp.2 |
| NO 8 | General alarm | General alarm | General alarm | General alarm | Step 3 comp.1 | Step 3 comp.2 |
| NO 9 | | | | | Condenser pump | |
| NO10 | Condenser pump | | Condenser pump | | Antifreeze heater 1 | Antifreeze heater 2 |
| NO11 | Reversing valve water | | Reversing valve water | | General alarm | General alarm |
| NO12 | | | | | | |
| NO13 | Antifreeze heater 1 | Antifreeze heater 2 | Antifreeze heater 1 | Antifreeze heater 2 | | |

### ANALOGUE OUTPUTS

| No. | pCO² MEDIUM | | pCO¹ MEDIUM | | pCO^C MEDIUM | |
|---|---|---|---|---|---|---|
| | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** | **Master (address 1)** | **Slave (addresses 2/3/4)** |
| Y1 | | | | | | |
| Y2 | | | | | | |
| Y3 | | | | | | |
| Y4 | | | | | | |

**AIR/WATER UNITS WITH MAXIMUM 4 HERMETIC COMPRESSORS pCO$^{XS}$**

Chiller only - CONFIGURATION "0".

### DIGITAL INPUTS

| | |
|---|---|
| ID 1 | High press. switch 1 |
| ID 2 | Evaporator flow switch |
| ID 3 | Remote ON/OFF |
| ID 4 | Pump thermal cutout |
| ID 5 | Low press. switch 1 |
| ID 6 | Comp. 1 thermal cutout |

### ANALOGUE INPUTS

| | |
|---|---|
| B1 | Outside set point |
| B2 | High pressure circuit 1 |
| B3 | Water inlet temp. |
| B4 | Water outlet temp. 1 |

### DIGITAL OUTPUTS

| | |
|---|---|
| NO1 | Evap. pump 1 |
| NO2 | Compressor 1 |
| NO3 | Antifreeze heater 1 |
| NO 4 | Liq. solenoid circuit 1 |
| NO 5 | General alarm |

### ANALOGUE OUTPUTS

| | |
|---|---|
| Y1 | Inverter cond. fan 1 |
| Y2 | |
| Y3 | Speed controller cond. fan 1 |

# 7 LIST OF PARAMETERS

This table contains the list of all the parameters that appear on the screens, with the corresponding description.
**Parameter:** string that appears on the screen;
**Ref.:** reference code for the screen in the application, index of the screen;
**Description:** synthetic description of the parameter;
**M/S:** parameter visible only on the Master unit, only on the Slave unit or on both
**Range:** range of values allowed for the parameter;
**Default:** default value of the parameter
**UOM:** unit of measure for the value in question;
**User value:** column available for comments by the user.

**IMPORTANT: <u>Not all the screens listed below are shown by scrolling the cursor on the display; when enabling a specific type of configuration, certain screens associated with such configuration will be displayed that previously were not visible. The display therefore depends on the configuration!</u>**

| Parameter | Ref. | Description | M/S | Range | Default | UOM | User value |
|---|---|---|---|---|---|---|---|
| **MAIN SCREEN** | | **15-button terminal MENU button** | | **PGD0 6-button or Built-In terminal ESC button** | | | |
| **12:30 19/03/04** | M0 | Current date and time | M/S | | | | |
| **Inlet Water Ext.Control Outlet Water** | M0 | Main control parameters | M/S | | | | |
| **U:1** | M0 | pLAN address of the board | M/S | | | | |
| **UNIT ON/ OFF BY ALARM/ OFF BY SUPERV. / OFF BY TIME Z./ OFF BY DIG.IN. / OFF BY KEYB. / MANUAL / OFF BY SLAVE** | M0 | Unit status | M/S | | | | |
| **Summer mode/ Winter mode** | M1 | Operating mode | M/S | | | | |
| **Cooling** | M1 | Cooling operation active | M/S | | | | |
| **Heating** | M1 | Heating operation active | M/S | | | | |
| **Frecool / HPPrev circ 1-2 / Recover / User / Rec+User / Defrost / Rec+Heat / User+Heat** | M1 | Unit status | M/S | | | | |
| **Defrost circ 1-2 / Pumpdown** | M1 | Status of the circuits | M/S | | | | |
| **Active steps 01/02** | M1 | Active temperature control steps | M/S | | | | |
| **MAINTENANCE** | | **15-button terminal MAINTENANCE button** | | **PGD0 6-button or Built-In terminal PRG and MAINTENANCE button in the menu** | | | |
| **Codice: FLASTDMMCDE** | A0 | Software code | M/S | | | | |
| **Ver. 1.0 19/03/2004** | A0 | Software version and date | M/S | | | | |
| **Bios:x.xx xx/xx/xx** | A1 | Version and date of the bios installed | M/S | | | | |
| **Boot:x.xx xx/xx/xx** | A1 | Version and date of the boot installed | M/S | | | | |
| **Manual c.:+030221250** | A1 | Manual code | M/S | | | | |
| **Ver. x.x xx/xx/xx** | A1 | Version and date of the manual | M/S | | | | |
| **Language used: ENGLISH** | A2 | Current language of the interface | M/S | | | | |
| **Main pump 1 / Main fan** | A3 | Pump 1 operating hours | M | | | hours | |
| **Main pump 2** | A3 | Pump 2 operating hours | M | | | hours | |
| **Hour meter Compressor 1** | A4 | Compressor 1 operating hours | M | | | hours | |
| **Hour meter Compressor 2** | A4 | Compressor 2 operating hours | M | | | hours | |
| **Hour meter Compressor 3** | A5 | Compressor 3 operating hours | S | | | hours | |
| **Hour meter Compressor 4** | A5 | Compressor 4 operating hours | S | | | hours | |
| **History alarm** | A6 | See Chapter 23 | M/S | | | | |
| **State:** | A7 | Current status of the modem | M | | | | |
| **Field:** | A7 | Percentage reception of the GSM modem | M | | | % | |
| **Insert maintanace password** | A8 | Enter password to access to the protected screens in the maintenance branch | M/S | 0 to 9999 | 1234 | hours | |
| **Main pump/fan hour meter Threshold** | Aa | Alarm 040 activation threshold “evaporator fan/pump maintenance alarm” | M/S | 0 to 999 | 10 | hours | |
| **Req.reset** | Aa | Reset pump/fan operating hours | M/S | 0 to 1 | 0 | | |
| **Compressor 1 hour meter** | Ab | Alarm 041 activation threshold “Compressor 1 maintenance alarm” | M | 0 to 999 | 10 | hours | |
| **Req.reset** | Ab | Reset compressor 1 operating hours | M | 0 to 1 | 0 | | |
| **Compressor 2 hour meter** | Ac | Alarm 042 activation threshold “Compressor 2 maintenance alarm” | M | 0 to 999 | 10 | hours | |
| **Req.reset** | Ac | Reset compressor 2 operating hours | M | 0 to 1 | 0 | | |
| **Compressor 3 hour meter** | Ad | Alarm 043 activation threshold “Compressor 3 maintenance alarm” | S | 0 to 999 | 10 | hours | |
| **Req.reset** | Ad | Reset compressor 3 operating hours | S | 0 to 1 | 0 | | |
| **Compressor 4 hour meter** | Ae | Alarm 044 activation threshold “Compressor 4 maintenance alarm” | S | 0 to 999 | 10 | hours | |
| **Req.reset** | Ae | Reset compressor 4 operating hours | S | 0 to 1 | 0 | | |
| **Inputs probes B1..B4** | Af | Calibration of probes B1 to B4 | M/S | -9.9T9.9 | 0 | °C | |
| **Inputs probes B5..B8** | Ag | Calibration of probes B5 to B8 | M/S | -9.9T9.9 | 0 | °C | |
| **Enable compressors C1..C8** | Ah | Enable compressors C1 to C8 (if present) | M | 0 to 1 | 1 | | |
| **Erase historical memory board** | Ai | Delete the log memory from application, the data logged by the bios management is not deleted | M/S | 0 to 1 | 0 | | |
| **Manual mng. D:1 EEV Position** | Aj | Valve control mode for Driver 1 | M/S | AUTO/MAN | AUTO | | |
| **Steps Opening** | Aj | Current position of driver 1 | M/S | 0 to 999 | 0 | step | |
| **Position** | Aj | Current position of EEV | M/S | | | step | |
| **Manual mng. D:2 EEV Position** | Ak | Valve control mode for Driver 2 | M/S | AUTO/MAN | AUTO | | |
| **Steps Opening** | Ak | Number of steps for manual valve opening Driver2 | M/S | 0 to 999 | 0 | step | |
| **Position** | Ak | Current position of driver 2 | M/S | | | step | |
| **Manual mng. D:3 EEV Position** | Al | Valve control mode for Driver 3 | M/S | AUTO/MAN | AUTO | | |

| Parameter | Ref. | Description | M/S | Range | Default | UOM | User value |
|---|---|---|---|---|---|---|---|
| **Steps Opening** | Al | Number of steps for manual valve opening Driver3 | M/S | 0 to 999 | 0 | step | |
| **Position** | Al | Current position of driver 3 | M/S | | | step | |
| **Manual mng. D:4 EEV Position** | Am | Valve control mode for Driver 4 | M/S | AUTO/MAN | AUTO | | |
| **Steps Opening** | Am | Number of steps for manual valve opening Driver4 | M/S | 0 to 999 | 0 | step | |
| **Position** | Am | Current position of driver 4 | M/S | | | step | |
| **Driver 1 status** | An | Current status of driver 1 | M/S | | | | |
| **Go ahead?** | An | Reset alarm condition on driver 1 | M/S | N/Y | N | | |
| **Driver 2 status** | Ao | Current status of driver 2 | M/S | | | | |
| **Go ahead?** | Ao | Reset alarm condition on driver 2 | M/S | N/Y | N | | |
| **Driver 3 status** | Ap | Current status of driver 3 | M/S | | | | |
| **Go ahead?** | Ap | Reset alarm condition on driver 3 | M/S | N/Y | N | | |
| **Driver 4 status** | Aq | Current status of driver 4 | M/S | | | | |
| **Go ahead?** | Aq | Reset alarm condition on driver 4 | M/S | N/Y | N | | |
| **Send sms test** | Ar | Functional test of the send SMS procedure | M/S | N/Y | N | | |
| **New password maintanace** | As | Enter new Maintenance password | M | 0 to 9999 | 1234 | | |
| **CLOCK** | | **15-button terminal CLOCK button** | **PGD0 6-button or Built-In terminal PRG and CLOCK button in the menu** | | | | |
| **Time:** | K1 | Set current hour | M/S | 0 to 23 | | hours | |
| | | Set current minute | M/S | 0 to 59 | | minutes | |
| **Date:** | K1 | Set current day | M/S | 1 to 31 | | | |
| | | Set current month | M/S | 1 to 12 | | | |
| | | Set current year | M/S | 0 to 99 | | | |
| **Insert clock password** | K2 | Enter Clock password | M/S | 0 to 9999 | | | |
| **Timezone On-off unit** | K3 | Enable the ON/OFF time bands | M/S | N/Y | | | |
| **Temp.setpoint** | K3 | Enable the set point time bands | M/S | N/Y | | | |
| **On-off unit F1-1 F1-2** | K4 | Start and end hours and minutes of time bands F1-1 and F1-2 | M/S | 0 to 23<br>0 to 59 | | Hours<br>minutes | |
| **On-off unit F2** | K5 | Start and end hours and minutes of time band F2 | M/S | 0 to 23<br>0 to 59 | | Hours<br>minutes | |
| **On-off unit Mon::...Sun:** | K6 | Select ON/OFF time bands (F1,F2,F3,F4) for each day | M/S | F1,F2,F3,F4 | | | |
| **set point temp. Timezone1 start** | K7 | Start and end hours and minutes for temperature band 1 | M/S | 0 to 23<br>0 to 59 | | Hours<br>minutes | |
| **Summer** | K7 | Cooling temperature set point band 1 | M/S | See P1 | | °C | |
| **Winter** | K7 | Heating temperature set point band 1 | M/S | See P1 | | °C | |
| **set point temp. Timezone2 start** | K8 | Start and end hours and minutes for temperature band 2 | M/S | 0 to 23<br>0 to 59 | | Hours<br>minutes | |
| **Summer** | K8 | Cooling temperature set point band 2 | M/S | See P1 | | °C | |
| **Winter** | K8 | Heating temperature set point band 2 | M/S | See P1 | | °C | |
| **set point temp. Timezone3 start** | K7 | Start and end hours and minutes for temperature band 3 | M/S | 0 to 23<br>0 to 59 | | Hours<br>minutes | |
| **Summer** | K7 | Cooling temperature set point band 3 | M/S | See P1 | | °C | |
| **Winter** | K7 | Heating temperature set point band 3 | M/S | See P1 | | °C | |
| **set point temp. Timezone4 start** | K8 | Start and end hours and minutes for temperature band 4 | M/S | 0 to 23<br>0 to 59 | | Hours<br>minutes | |
| **Summer** | K8 | Cooling temperature set point band 4 | M/S | See P1 | | °C | |
| **Winter** | K8 | Heating temperature set point band 4 | M/S | See P1 | | °C | |
| **New password clock:** | Ka | Enter new clock password | M/S | | | | |
| **SET POINT** | | **15-button terminal SET POINT button** | **PGD0 6-button or Built-In terminal PRG and SET POINT buttons in the menu** | | | | |
| **Actual setpoint** | S0 | Current set point | M/S | | | °C | |
| **Summer setpoint** | S1 | Cooling set point | M/S | See P1 | 12.0 | °C | |
| **Winter setpoint** | S1 | Heating set point | M/S | See P1 | | °C | |
| **RECOVER Priority** | S2 | Select utility with higher priority | M/S | EVAPORAT....REC OVERY | | | |
| **set point** | S2 | Recovery set point | M/S | -99.9T99.9 | 45.0 | °C | |
| **Diff.** | S2 | Recovery differential | M/S | 0T99.9 | 3.0 | °C | |
| **USER** | | **15-button terminal PROG button** | **PGD0 6-button or Built-In terminal PRG and USER buttons in the menu** | | | | |
| **Insert user password** | P0 | Enter password to access the programming branch | M/S | | 1234 | | |
| **TEMPERATURE CONTROL→** | | | | | | | |
| **Regolation temperature band** | P1 | Temperature control band | M | 0T99.9 | 3.0 | °C | |
| **Summer temperat. setpoint limits Low** | P2 | Lower limit of the cooling set point | M | -99.9T99.9 | 7.0 | °C | |
| **High** | P2 | Upper limit of the cooling set point | M | -99.9T99.9 | 17.0 | °C | |
| **Winter temperat. setpoint limits Low** | P3 | Lower limit of the heating set point | M | -99.9T99.9 | 40.0 | °C | |
| **High** | P3 | Upper limit of the heating set point | M | -99.9T99.9 | 50.0 | °C | |
| **Type regolation temperature** | P4 | Type of temperature control | M | INLET/OUTLET | INLET | | |
| **Inlet regulation input Type** | P5 | Type of temperature control | M | PROP/P+I | PROP | | |
| **Integration t.** | P5 | Integral time for P+I control | M | 0 to 9999 | 600 | s | |
| **Outlet regulation Rec.max time** | P6 | Maximum time to increase the request | M | 0 to 9999 | 20 | s | |
| **Rec.min time** | P6 | Minimum time to increase the request | M | 0 to 9999 | 20 | s | |
| **Outlet regulation Max time OFF** | P7 | Maximum time to decrease the request | M | 0 to 9999 | 10 | s | |
| **Max time ON** | P7 | Minimum time to decrease the request | M | 0 to 9999 | 10 | s | |
| **Delta temperature in which change the time** | P8 | Differential within which the increase and decrease times vary | M | -99.9T99.9 | 2.0 | °C | |
| **Force off Outlet regolation Summer** | P9 | Force cooling shutdown | M | -99.9T99.9 | 5.0 | °C | |
| **Winter o Winter/Rec.** | P9 | Force heating shutdown | M | -99.9T99.9 | 47.0 | °C | |
| **Fancoils enable summer set** | Pa | Cooling set point to enable fan coils | M | -99.9T99.9 | 0 | °C | |
| **winter set** | Pa | Heating set point to enable fan coils | M | -99.9T99.9 | 0 | °C | |
| **Diff.** | Pa | Set point differential to enable fan coils | M | 0T99.9 | 0 | °C | |

| Parameter | Ref. | Description | M/S | Range | Default | UOM | User value |
|---|---|---|---|---|---|---|---|
| **External setpoint Enable** | Pb | Enable outside set point | M | N/Y | N | | |
| **Min** | Pb | Minimum limit of outside set point | M | -99.9T99.9 | 0 | °C | |
| **Max** | Pb | Maximum limit of outside set point | M | -99.9T99.9 | 50.0 | °C | |
| **Compensat.temp. setpoint enable** | Pc | Enable set point compensation | M | N/Y | N | | |
| **Compensation max** | Pc | Maximum set point compensation | M | -99.9T99.9 | 5.0 | °C | |
| **Summer compens. Start temp.** | Pd | Start temperature for set point compensation in cooling | M | -99.9T99.9 | 25.0 | °C | |
| **End temp.** | Pd | End temperature for set point compensation in cooling | M | -99.9T99.9 | 35.0 | °C | |
| **Winter compens. Start temp.** | Pe | Start temperature for set point compensation in heating | M | -99.9T99.9 | 0.0 | °C | |
| **End temp.** | Pe | End temperature for set point compensation in heating | M | -99.9T99.9 | 10.0 | °C | |
| **FREECOOLING →** | | | | | | | |
| **Reg.type** | X1 | Type of freecooling control | M | PROP/P+I | P+I | | |
| **Integration t.** | X1 | Integral time for P+I control | M | 0 to 9999 | 150 | s | |
| **Setp. offset** | X1 | Freecooling control set point offset | M | 0T99.9 | 5.0 | °C | |
| **Delta min.** | X2 | Minimum freecooling delta | M | 0T99.9 | 5.0 | °C | |
| **Delta max.** | X2 | Maximum freecooling delta | M | 0T99.9 | 10.0 | °C | |
| **Diff.** | X3 | Freecooling band | M | 20T99.9 | 4.0 | °C | |
| **Comps delay** | X3 | Compressor start delay after freecooling | M | 0 to 500 | 5 | minutes | |
| **Max open threshold valve** | X4 | Max. valve opening threshold for freecooling valve | M | 25 to 100 | 50 | % | |
| **Min open threshold inverter** | X5 | Minimum condens. inverter start threshold | M | 0 to 75 | 50 | % | |
| **DEFROST →** | | | | | | | |
| **Defrost config. Probe** | Q0 | Select defrost probe | M/S | TEMPERATURE PRESSURE PRESS.SWITCH | TEMPERATURE | | |
| **Global** | Q0 | Select the type of defrost for all the boards | M/S | SIMULTANEOUS SEPARATE INDEPENDENT | SIMULTANEOUS | | |
| **Local** | Q0 | Type of local defrost for the individual board, only if the global defrost is configured as independent. | M/S | SIMULTANEOUS SEPARATE | SIMULTANEOUS | | |
| **Start** | Q1 | Start defrost temperature/pressure set point | M/S | -99.9 to 99.9 | 2.0 | °C/bar | |
| **Stop** | Q1 | End defrost temperature/pressure set point | M/S | -99.9 to 99.9 | 12.0 | °C/bar | |
| **Delay time** | Q2 | Defrost request delay | M/S | 1 to 32000 | 1800 | s | |
| **Maximum time** | Q2 | Maximum defrost duration | M/S | 0 to 32000 | 300 | s | |
| **Compressors force off when defrost begins/ends for** | Q3 | Forced compressor shutdown at start and end defrost | M/S | 0 to 999 | 60 | s | |
| **Reversing cycle delay** | Q4 | Valve reversing delay from start of defrost status | M/S | 0 to 999 | 10 | s | |
| **VARIOUS PARAMETERS →** | | | | | | | |
| **Min.time between main pump/fan and compressors start** | R0 | Minimum time between start of pump/fan and compressors | M | 0 to 999 | 5 | s | |
| **Delay off switching the main pump/fan off start** | R1 | Pump/fan stop delay | M | 0 to 999 | 5 | s | |
| **Hours number pumps rotation** | R2 | Number of hours for pump rotation (0= rotation by starts) | M | 0 to 32767 | 0 | h | |
| **Digital input remote On/Off** | R3 | Enable on/off from digital input | M | 0 to 1 | 0 | | |
| **Digital input remote Sum/Win** | R3 | Enable cooling/heating from digital input | M | 0 to 1 | 0 | | |
| **Supervisory remote On/Off** | R4 | Enable ON/OFF from supervisor | M | 0 to 1 | 0 | | |
| **Supervisory remote Sum/Win** | R4 | Enable heating/cooling from supervisor | M | 0 to 1 | 0 | | |
| **Supervisory protocol type** | R5 | Select type of supervisor protocol | M | CAREL MODBUS LONWORKS Rs232 ANALOGUE MODEM GSM MODEM WINLOAD | CAREL | | |
| **Supervisory Communication speed:** | R6 | Select communication speed | M/S | 1200, 2400, 4800, 9600, 19200 | 19200 | bps | |
| **Identificat.No.** | R6 | Identification number of the board in the supervision network | M/S | 0 to 200 | 1 | | |
| **Max.phone n.:** | R7 | Maximum number of items present in the address book | M/S | 1 to 4 | 1 | | |
| **Phone book number:** | R7 | Number of the item extracted from the address book | M/S | 0 to 5 | 0 | | |
| **Modem password** | R7 | Password of the modem required to receive data | M/S | 0 to 9999 | 0 | | |
| **Send Sms test** | R8 | Text displayed in the SMS sent | M/S | | | | |
| **Enable language mask at startup** | R9 | Enable the screen for selecting the language on application power-up | M/S | 0 to 1 | 1 | | |
| **New password user** | Ra | Enter the new user password | M/S | 0 to 9999 | 1234 | | |

| Parameter | Ref. | Description | M/S | Range | Default | UOM | User value |
|---|---|---|---|---|---|---|---|
| **MANUFACTURER** | | **15-button terminal PROG + MENU buttons** | | **PGD0 6-button or Built-In terminal PRG and MANUFACTURER buttons in the menu** | | | |
| **Insert manufactory password** | Z0 | Enter password to access the manufacturer branch | M/S | 0 to 9999 | 1234 | | |
| **CONFIGURATION →** | | | | | | | |
| **Unit config.** | C0 | Define the type of unit | M | 0 to 23 | 16 | | |
| **Probes enable B1..B3** | C1 | Enable probes from B1 to B3 | M/S | N to Y | N/N/N | | |
| **Probes enable B4..B6** | C2 | Enable probes from B4 to B6 | M/S | N to Y | N/Y/N | | |
| **Probes enable B7..B8** | C3 | Enable probes from B7 to B8 | M/S | N to Y | N/N | | |
| **Local comp.number** | C4 | Number of compressors configured for the board | M/S | 1 to 4 | 1 | | |
| **Total comp.number** | C4 | Total number of compressors in the installation | M | 0 to 8 | 1 | | |
| **Unloads per comp.** | C4 | Number of load steps per compressor | M | 0 to 1 units CpCp<br>0 to 3 units CCpp | 3 | | |
| **Number driver for circuit** | C5 | Number of drivers per circuit | M/S | 0 to 2 | 0 | | |
| **Bi flow valve present** | C5 | Enable management of bi-directional valves | M/S | N to Y | N | | |
| **Board clock Enable** | C6 | Enable the functions of the clock card | M/S | N to Y | N | | |
| **Enable control fancoils** | C7 | Enable the fan coil management functions | M | N to Y | N | | |
| **Number of evaporator pumps** | C7 | Number of evaporator pumps | M | 0 to 2 | 1 | | |
| **Evap./Condenser flow alarm and Serious alarm Enable** | C8 | Enable flow switch alarm and serious alarm on the Slave units | S | N to Y | Y | | |
| **Type input analog B1** | C9 | Configuration of the type of probe connected to analogue input B1 | M/S | NTC, PT1000, 0 to 1V, 0 to 10V, 0 to 20mA, 4 to 20mA, 0 to 5V | 4 to 20mA | | |
| **Type input analog B2** | Ca | Configuration of the type of probe connected to analogue input B2 | M/S | NTC, PT1000, 0 to 1V, 0 to 10V, 0 to 20mA, 4 to 20mA, 0 to 5V | 4 to 20mA | | |
| **Type input analog B3** | Cb | Configuration of the type of probe connected to analogue input B3 | M/S | NTC, PT1000, 0 to 1V, 0 to 10V, 0 to 20mA, 4 to 20mA, 0 to 5V | 4 to 20mA | | |
| **Type input analog B4** | Cc | Configuration of the type of probe connected to analogue input B4 | M/S | NTC, PT1000, 0 to 1V, 0 to 10V, 0 to 20mA, 4 to 20mA, 0 to 5V | 4 to 20mA | | |
| **Type input analog B5** | Cd | Configuration of the type of probe connected to analogue input B5 | M/S | NTC, PT1000, 0 to 1V, 0 to 10V, 0 to 20mA, 4 to 20mA, 0 to 5V | 4 to 20mA | | |
| **Type input analog B6** | Ce | Configuration of the type of probe connected to analogue input B6 | M/S | NTC, PT1000, 0 to 1V, 0 to 10V, 0 to 20mA, 4 to 20mA, 0 to 5V | 4 to 20mA | | |
| **Type input analog B7** | Cf | Configuration of the type of probe connected to analogue input B7 | M/S | NTC, PT1000, 0 to 1V, 0 to 10V, 0 to 20mA, 4 to 20mA, 0 to 5V | 4 to 20mA | | |
| **Type input analog B8** | Cg | Configuration of the type of probe connected to analogue input B7 | M/S | NTC, PT1000, 0 to 1V, 0 to 10V, 0 to 20mA, 4 to 20mA, 0 to 5V | 4 to 20mA | | |
| **Config. probe B1 Min value** | Ch | Minimum value of probe B1 | M/S | -300 to 1500 | 0 | °C / % / bar | |
| **Max value** | Ch | Maximum value of probe B1 | M/S | 0 to 1500 | 0 | °C / % / bar | |
| **Config. probe B2 Min value** | Ci | Minimum value of probe B2 | M/S | -300 to 1500 | 0 | °C / % / bar | |
| **Max value** | Ci | Maximum value of probe B2 | M/S | 0 to 1500 | 0 | °C / % / bar | |
| **Config. probe B3 Min value** | Cj | Minimum value of probe B3 | M/S | -300 to 1500 | 0 | °C / % / bar | |
| **Max value** | Cj | Maximum value of probe B3 | M/S | 0 to 1500 | 0 | °C / % / bar | |
| **Config. probe B4 Min value** | Ck | Minimum value of probe B4 | M/S | -300 to 1500 | 0 | °C / % / bar | |
| **Max value** | Ck | Maximum value of probe B4 | M/S | 0 to 1500 | 0 | °C / % / bar | |
| **Config. probe B5 Min value** | Cl | Minimum value of probe B5 | M/S | -300 to 1500 | 0 | °C / % / bar | |
| **Max value** | Cl | Maximum value of probe B5 | M/S | 0 to 1500 | 0 | °C / % / bar | |
| **Config. probe B6 Min value** | Cm | Minimum value of probe B6 | M/S | -300 to 1500 | 0 | °C / % / bar | |
| **Max value** | Cm | Maximum value of probe B6 | M/S | 0 to 1500 | 0 | °C / % / bar | |
| **Config. probe B7 Min value** | Cn | Minimum value of probe B7 | M/S | -300 to 1500 | 0 | °C / % / bar | |
| **Max value** | Cn | Maximum value of probe B7 | M/S | 0 to 1500 | 0 | °C / % / bar | |
| **Config. probe B8 Min value** | Co | Minimum value of probe B8 | M/S | -300 to 1500 | 0 | °C / % / bar | |
| **Max value** | Co | Maximum value of probe B8 | M/S | 0 to 1500 | 0 | °C / % / bar | |
| **Condensation enable** | Cp | Enable and configure the type of condenser control | M/S | NONE<br>PRESS.<br>TEMP. | PRESS. | | |
| **Type** | Cp | Select the type of condenser management | M/S | INVERTER<br>STEPS | INVERTER | | |
| **Condensation** | Cq | Define the type of condenser | M/S | SINGLE<br>SEPAR. | SINGLE | | |
| **N.Fans for circuit** | Cq | Number of fans per circuit | M/S | 1 to 3 | 1 | | |
| **Rete freq.** | Cr | Frequency of the electrical network | M/S | 50 / 60 / err | 50 | Hz | |
| **PWM Fase cut Triac max.:** | Cs | Maximum voltage threshold for Triac | M/S | 0 to 100 | 75 | % | |
| **Triac min.:** | Cs | Minimum voltage threshold for Triac | M/S | 0 to 100 | 25 | % | |
| **Range wave** | Cs | Triac impulse duration | M/S | 0 to 10.0 | 25 | ms | |

| Parameter | Ref. | Description | M/S | Range | Default | UOM | User value |
|---|---|---|---|---|---|---|---|
| **PARAMETERS →** | | | | | | | |
| **Rotation comp.** | G0 | Select the type of compressor rotation | M | L.I.F.O.<br>F.I.F.O.<br>TIME<br>CUSTOM | F.I.F.O. | | |
| **Turn On oder** | G1 | Select the starting order of the compressors | M | 0 to 8 | 0 | | |
| **Turn Off oder** | G1 | Select the stopping order of the compressors | M | 0 to 8 | 0 | | |
| **Config.pump down Enable** | G2 | Enable pump down | M/S | N to Y | N | | |
| **Maximum time** | G2 | Maximum pump down time | M/S | 0 to 999 | 60 | s | |
| **Start-up mode** | G3 | Configure the type of compressors and load step start | M | CppCppCpp<br>CCCpppppp | CppCppCpp | | |
| **Start-up unl.mode** | G3 | Configure the type of load step start | M | p1p2p3p1p2p3<br>p1p1p1p2p2p2 | p1p2p3p1p2<br>p3 | | |
| **Unloadres configuration Logic** | G4 | Configure the load step logic | M | N.C.<br>N.O. | N.C. | | |
| **Condensation set point** | G5 | Condenser control set point | M/S | 0 to 99.9 | 14.0 | Bar / °C | |
| **Diff.** | G5 | Condenser control differential | M/S | 0 to 99.9 | 2.0 | Bar / °C | |
| **Inverter Max.speed** | G6 | Maximum inverter speed | M/S | 0 to 10.0 | 10.0 | V | |
| **Min.speed** | G6 | Minimum speed inverter | M/S | 0 to 10.0 | 0 | V | |
| **Speed up time** | G6 | Inverter speed-up time | M/S | 0 to 999 | 0 | s | |
| **HP prevent Enable** | G7 | Enable high pressure prevention | M/S | N to Y | N | | |
| **Probe** | G7 | Select the probe for the high pressure prevention function | M/S | PRESSURE<br>TEMPERATURE | PRESSURE | | |
| **Hp Prevenz. set point** | G8 | High pressure prevention set point | M/S | -99.9 to 99.9 | 20.0 | Bar / °C | |
| **Diff.** | G8 | High pressure prevention set point differential | M/S | 0 to 99.9 | 2.0 | Bar / °C | |
| **Fan function type with condensar probe broken** | G9 | Behaviour of the software in the event of condenser probe fault | M/S | FORCE OFF,<br>FORCE ON WITH COMP ON,<br>LINKED TO OUT. TEMP. | FORCE ON WITH COMP ON | | |
| **Condensation with temp.external set point** | Ga | Condenser control set point on outside temperature (only with probe fault) | M/S | 0T99.9 | 15.0 | °C | |
| **Diff.** | Ga | Condenser control differential on outside temperature (only with probe fault) | M/S | 0T99.9 | 5.0 | °C | |
| **Transducers high pressure alarm set point** | Gb | High pressure alarm set point from transducer | M/S | -99.9 to 99.9 | 21.0 | bar | |
| **Diff.** | Gb | High pressure alarm set point differential from transducer | M/S | 0 to 99.9 | 2.0 | Bar / °C | |
| **Antifreeze alarm set point** | Gc | Antifreeze alarm set point | M/S | -99.9 to 99.9 | 3.0 | Bar / °C | |
| **Diff.** | Gc | Antifreeze alarm set point differential | M/S | 0 to 99.9 | 2.0 | Bar / °C | |
| **Antifreeze alarm Reset** | Gd | Type of antifreeze alarm reset | M/S | MANUAL<br>AUTOMATIC | MANUAL | | |
| **Dwlay** | Gd | Antifreeze alarm delay | M/S | 0 to 540 | 0 | s | |
| **Antifreez.heater set point** | Ge | Set point for activation of the antifreeze heater | M/S | -99.9T99.9 | 5.0 | °C | |
| **Diff.** | Ge | Set point differential for activation of the antifreeze heater | M/S | 0T99.9 | 1.0 | °C | |
| **Unit config. freecooling Valve type** | Gf | Select the type of freecooling valve | M | 0 to 10V<br>ON/OFF | 0 to 10V | | |
| **Antifreeze Te** | Gf | Antifreeze threshold to stop freecooling on out. temp. | M | -99.9T99.9 | -20.0 | °C | |
| **Reversing valve logic** | Gg | Logic of the cycle reversing valves | M | N.C.<br>N.O. | N.C. | | |
| **Remote compressors control management type** | Gh | Type of management of compressor remote control | M | STEPS<br>PROPORTIONAL | STEPS | | |
| **Alarm rele activation for** | Ge | Select the alarm management relay | M | MASTER<br>MST + SLV | MASTER | | |
| **CAREL EXV DRIVERS →** | | | | | | | |
| **Manuf. COMM-CH LOP protection LOP limit** | L1 | LOP threshold in chiller operation | M/S | -70.0T50.0 | -40.0 | °C | |
| **Int. factor** | L1 | Integral time for LOP management in chiller operation | M/S | 0 to 25.5 | 40 | s | |
| **Manuf. COMM-Hp LOP protection LOP limit** | L2 | LOP threshold in heat pump operation | M/S | -70.0T50.0 | -40.0 | °C | |
| **Int. factor** | L2 | Integral time for LOP management in heat pump operation | M/S | 0 to 25.5 | 40 | s | |
| **Manuf. COMM-DF LOP protection LOP limit** | L3 | LOP threshold in defrost operation | M/S | -70.0T50.0 | -40.0 | °C | |
| **Int. factor** | L3 | Integral time for LOP management in defrost operation | M/S | 0 to 25.5 | 40 | s | |
| **Manuf. COMM-CH MOP limit** | L4 | MOP threshold in chiller operation | M/S | -50.0T99.9 | 40.0 | °C | |
| **Int. factor** | L4 | Integral time for LOP management in chiller operation | M/S | 0 to 25.5 | 40 | s | |
| **Start-up delay** | L4 | Delay at start-up of the MOP alarm in chiller operation | M/S | 0 to 500 | 60 | s | |
| **Manuf. COMM-HP MOP limit** | L5 | MOP threshold in heat pump operation | M/S | -50.0T99.9 | 40.0 | °C | |
| **Int. factor** | L5 | Integral time for LOP management in heat pump operation | M/S | 0 to 25.5 | 40 | s | |
| **Start-up delay** | L5 | Delay at start-up of the MOP alarm in heat pump operation | M/S | 0 to 500 | 60 | s | |
| **Manuf. COMM-DF MOP limit** | L6 | MOP threshold in defrost operation | M/S | -50.0T99.9 | 40.0 | °C | |
| **Int. factor** | L6 | Integral time for LOP management in defrost operation | M/S | 0 to 25.5 | 40 | s | |
| **Start-up delay** | L6 | Delay at start-up of the MOP alarm in defrost operation | M/S | 0 to 500 | 60 | s | |
| **Manuf. COMM-CH Hi TCond.protection HiTcond limit** | L7 | High condensing temperature protection threshold in chiller operation | M/S | 0T99.9 | 75.0 | °C | |
| **Int. factor** | L7 | Integral time for high condensing temperature threshold in chiller operation | M/S | 0 to 255 | 40 | s | |
| **Manuf. COMM-HP Hi TCond.protection HiTcond limit** | L8 | High condensing temperature protection threshold in heat pump operation | M/S | 0T99.9 | 75.0 | °C | |
| **Int. factor** | L8 | Integral time for high condensing temperature threshold in heat pump operation | M/S | 0 to 255 | 40 | s | |

| Parameter | Ref. | Description | M/S | Range | Default | UOM | User value |
|---|---|---|---|---|---|---|---|
| **Manuf. COMM-DF Hi TCond.protection HiTcond limit** | L9 | High condensing temperature protection threshold in defrost operation | M/S | 0T99.9 | 75.0 | °C | |
| **Int. factor** | L9 | Integral time for high condensing temperature threshold in defrost operation | M/S | 0 to 255 | 40 | s | |
| **Manuf. COMM-CH Suction temp. high limit** | La | High suction temperature threshold in chiller operation | M/S | -99.9T99.9 | 30.0 | °C | |
| **Manuf. COMM-HP Suction temp. high limit** | Lb | High suction temperature threshold in heat pump operation | M/S | -99.9T99.9 | 30.0 | °C | |
| **Manuf. COMM-DF Suction temp. high limit** | Lc | High suction temperature threshold in defrost operation | M/S | -99.9T99.9 | 30.0 | °C | |
| **Manuf. COMM Custom valve conf. Minimum steps** | Ld | Custom Valve: minimum steps | M/S | 0 to 8100 | 0 | Steps | |
| **Maximum steps** | Ld | Custom Valve: maximum steps | M/S | 0 to 8100 | 1600 | Steps | |
| **Manuf. COMM Custom valve conf. Minimum steps** | Ld | Custom Valve: minimum steps | M/S | 0 to 8100 | 0 | Steps | |
| **Manuf. COMM Custom valve conf. Closing steps** | Le | Custom Valve: closing steps | M/S | 0 to 8100 | 3600 | Steps | |
| **Back steps** | Le | Custom Valve: return steps | M/S | 0 to 8100 | 0 | Steps | |
| **Manuf. COMM Custom valve conf. Opening EXTRAs** | Lf | Custom Valve: enable extra step in opening | M/S | N/Y | N | | |
| **ClosingEXTRAs** | Lf | Custom Valve: enable extra step in closing | M/S | N/Y | N | | |
| **Manuf. COMM Custom valve conf. Phase current** | Lg | Custom Valve: operating current | M/S | 0 to 1000 | 250 | mA | |
| **Still current** | Lg | Custom Valve: standby current | M/S | 0 to 1000 | 100 | mA | |
| **Manuf. COMM Custom valve conf. Step rate** | Lh | Custom Valve: frequency | M/S | 32 to 501 | 100 | Hz | |
| **Duty-cycle** | Lh | Custom Valve: duty cycle | M/S | 0 to 100 | 50 | % | |
| **Manuf. COMM Evap.pressure probe Min value** | Li | Minimum evap. pressure probe value | M/S | -9.9 to 99.9 | -0.5 | bar | |
| **Max value** | Li | Maximum evap. pressure probe value | M/S | 3.5 to 99.9 | 7.0 | bar | |
| **Manuf. COMM Alarms delay Low SHeat** | Lj | Low superheating alarm delay | M/S | 0 to 3600 | 0 | s | |
| **High TSuct** | Lj | High inlet temperature alarm delay | M/S | 0 to 3600 | 0 | s | |
| **Manuf. COMM Alarms delay LOP** | Lk | LOP alarm delay | M/S | 0 to 3600 | 0 | s | |
| **MOP** | Lk | MOP alarm delay | M/S | 0 to 3600 | 0 | s | |
| **Manuf. COMM Refrigerant** | Ll | Select the type of refrigerant | M/S | ---, R22, R134a, R404a, R407c, R410a, R507c, R290, R600, R600a, R717-NH3, R744 | R407c | | |
| **Parameter Valve type** | B0/E0/ F0/J0 | Select the type of valve | M/S | See Par. 8.1 | CUSTOM | | |
| **Battery presence** | B0/E0/ F0/J0 | Enable backup battery | M/S | N/Y | N | | |
| **Circuit/EEV Ratio** | B1/E1/ F1/J1 | Percentage ratio between cooling capacity and driver power | M/S | 0 to 100 | 60 | % | |
| **Parameter-CH SHeat set.** | B2/F2 | Superheat set point in chiller operation | M/S | 20.0T50.0 | 6.0 | °C | |
| **Dead zone** | B2/F2 | Dead zone in chiller mode | M/S | 0T9.9 | 0 | °C | |
| **Parameter-CH Prop. factor** | B3/F3 | PID control –proportional gain in chiller operation | M/S | 0 to 99.9 | 2.5 | | |
| **Int. factor** | B3/F3 | PID control – integral time in chiller operation | M/S | 0 to 999 | 25 | s | |
| **Diff. factor** | B3/F3 | PID control –derivative time in chiller operation | M/S | 0 to 99.9 | 2.5 | s | |
| **Parameter-CH Low SHeat protection Low limit** | B4/F4 | Threshold for low superheat protection in chiller operation | M/S | -4.0T21.0 | 2.0 | °C | |
| **Int. factor** | B4/F4 | Integral time for low superheat protection threshold in chiller operation | M/S | 0 to 30.0 | 1.0 | s | |
| **Parameter-DF SHeat set.** | B5/F5 | Superheat set point in defrost operation | M/S | 20.0T50.0 | 6.0 | °C | |
| **Dead zone** | B5/F5 | Dead zone in chiller mode | M/S | 0T9.9 | 0 | °C | |
| **Parameter-DF Prop. factor** | B6/F6 | PID control – proportional gain in defrost operation | M/S | 0 to 99.9 | 2.5 | | |
| **Int. factor** | B6/F6 | PID control – integral time in defrost operation | M/S | 0 to 999 | 25 | s | |
| **Diff. factor** | B6/F6 | PID control – derivative time in defrost operation | M/S | 0 to 99.9 | 2.5 | s | |
| **Parameter-DF Low SHeat protection Low limit** | B7/F7 | Threshold for low superheat protection in defrost operation | M/S | -4.0T21.0 | 2.0 | °C | |
| **Int. factor** | B7/F7 | Integral time for low superheat protection threshold in defrost operation | M/S | 0 to 30.0 | 1.0 | s | |
| **Parameter-HP SHeat set.** | B8/E2/ F8/J2 | Superheat set point in heat pump operation | M/S | 20.0T50.0 | 6.0 | °C | |
| **Dead zone** | B8/E2/ F8/J2 | PID control – proportional gain in heat pump operation | M/S | 0T9.9 | 0 | °C | |
| **Parameter-HP Prop. factor** | B9/E3/ F9/J3 | PID control – integral time in heat pump operation | M/S | 0 to 999 | 25 | s | |
| **Int. factor** | B9/E3/ F9/J3 | PID control – derivative time in heat pump operation | M/S | 0 to 99.9 | 2.5 | s | |
| **Diff. Factor** | Ba/E4/ Fa/J4 | Threshold per low superheat protection in heat pump operation | M/S | -4.0T21.0 | 2.0 | °C | |
| **Parameter-HP Low SHeat protection Low limit** | Ba/E4/ Fa/J4 | Integral time threshold low superheat protection in heat pump operation | M/S | 0 to 30.0 | 1.0 | s | |
| **TIMES →** | | | | | | | |
| **Unit config. Compressors PW time** | T0 | Part-winding time | M/S | 0 to 9990 | 1000 | s | |
| **Minimum comps power-on time** | T1 | Minimum compressor on time | M | 0 to 9999 | 60 | s | |

| Parameter | Ref. | Description | M/S | Range | Default | UOM | User value |
|---|---|---|---|---|---|---|---|
| **Minimum comps power-off time** | T1 | Minimum compressor off time | M | 0 to 9999 | 360 | s | |
| **Min time betw. diff.comp start** | T2 | Minimum time between starts of different compressors | M | 0 to 9999 | 10 | s | |
| **Min time betw. Same comp starts** | T2 | Minimum time between starts of the same compressor | M | 0 to 9999 | 450 | s | |
| **Unloadres configuration Delay time** | T3 | Minimum time between load steps | M | 0 to 99 | 2 | s | |
| **Prevent Unloads switching on delay** | T4 | Delay in activating load step in the event of high pressure pre-alarm | M/S | 0 to 99 | 0 | s | |
| **Exit delay** | T4 | Delay in exiting high pressure pre-alarm | M/S | 0 to 999 | 0 | s | |
| **Al flow evaporator Startup delay** | T5 | Evaporator flow switch alarm delay at start-up | M/S | 0 to 999 | 15 | s | |
| **Run delay** | T5 | Evaporator flow switch alarm delay in stable operation | M/S | 0 to 999 | 3 | s | |
| **Al flow Condensator Startup delay** | T6 | Condenser flow switch alarm delay at start-up | M/S | 0 to 999 | 15 | s | |
| **Run delay** | T6 | Condenser flow switch alarm delay in stable operation | M/S | 0 to 999 | 3 | s | |
| **Low pressure alarm Startup delay** | T7 | Low pressure alarm delay at start-up | M/S | 0 to 999 | 40 | s | |
| **Run delay** | T7 | Low pressure alarm delay in stable operation | M/S | 0 to 999 | 0 | s | |
| **Differential oil alarm Startup delay** | T7 | Oil differential alarm delay at start-up | M/S | 0 to 999 | 120 | s | |
| **Run delay** | T7 | Oil differential alarm delay in stable operation | M/S | 0 to 999 | 10 | s | |
| **INITIALISATION →** | | | | | | | |
| **Reset all parameters to default values** | V0 | Reset unit to the default values | M/S | N/Y | N | | |
| **new password Manufactory: Maintanace: User:** | V1 | Modify the password to access the manufacturer, maintenance and user branches. | M/S | 0 to 9999 | 1234 | | |
| **INPUTS/OUTPUTS** | | **15-button terminal INPUT/OUTPUT button** | **PGD0 6-button or Built-In terminal PRG and INPUT/OUTPUT buttons in the menu** | | | | |
| **pCO IN/OUT →** | | | | | | | |
| **Inputs analog 1-2:** | I0 | Value of the probes connected to analogue inputs 1 and 2 | M/S | | | % / °C / bar | |
| **Inputs analog 3-4:** | I1 | Value of the probes connected to analogue inputs 3 and 4 | M/S | | | % / °C / bar | |
| **Inputs analog 5-6:** | I2 | Value of the probes connected to analogue inputs 5 and 6 | M/S | | | % / °C / bar | |
| **Inputs analog 7-8:** | I3 | Value of the probes connected to analogue inputs 7 and 8 | M/S | | | % / °C / bar | |
| **Dig.Input 1-3:** | I4 | Status of digital inputs from 1 to 3 | M/S | | | | |
| **Dig.Input 4-6:** | I5 | Status of digital inputs from 4 to 6 | M/S | | | | |
| **Dig.Input 7-9:** | I6 | Status of digital inputs from 7 to 9 | M/S | | | | |
| **Dig.Input 10-12:** | I7 | Status of digital inputs from 10 to 12 | M/S | | | | |
| **Dig.Input 13-14:** | I8 | Status of digital inputs from 13 to 14 | M/S | | | | |
| **Dig.Output 1-3:** | I9 | Status of digital outputs from 1 to 3 | M/S | | | | |
| **Dig.Output 4-6:** | Ia | Status of digital outputs from 4 to 6 | M/S | | | | |
| **Dig.Output 7-9:** | Ib | Status of digital outputs from 7 to 9 | M/S | | | | |
| **Dig.Output 10-11:** | Ic | Status of digital outputs from 10 to 11 | M/S | | | | |
| **Dig.Output 12-13:** | Id | Status of digital outputs from 12 to 13 | M/S | | | | |
| **Output analog 1-2:** | Ie | Status of analogue outputs from 1 to 2 | M/S | | | V | |
| **Output analog 3-4:** | If | Status of analogue outputs from 3 to 4 | M/S | | | V | |
| **DRIVERS IN/OUT →** | | | | | | | |
| **Driver 1 Circ.1 EEV** | N0 | Valve operating mode | M/S | | | | |
| **Valve Position** | N0 | Current valve position | M/S | | | Step | |
| **Power request** | N0 | Compressor capacity requested | M/S | | | % | |
| **Driver 1 Circ.1 SuperHeat** | N1 | Current SuperHeat | M/S | | | °C | |
| **Evap.Temp.** | N1 | Current evaporation temperature | M/S | | | °C | |
| **Suct.Temp.** | N1 | Current suction temperature | M/S | | | °C | |
| **Driver 1 Circ.1 Evap.Press.** | N2 | Current evaporation pressure | M/S | | | Bar | |
| **Evap.Temp.** | N2 | Current evaporation temperature | M/S | | | °C | |
| **Driver 1 Circ.1 Cond.Press.** | N3 | Current condensing pressure | M/S | | | Bar | |
| **Cond.Temp.** | N3 | Current condensing temperature | M/S | | | °C | |
| **batt.state** | N4 | Current battery status | M/S | | | | |
| **Driver 2 Circ.1 EEV** | N5 | Valve operating mode | M/S | | | | |
| **Valve Position** | N5 | Current valve position | M/S | | | Step | |
| **Power request** | N5 | Compressor capacity requested | M/S | | | % | |
| **Driver 2 Circ.1 SuperHeat** | N6 | Current SuperHeat | M/S | | | °C | |
| **Evap.Temp.** | N6 | Current evaporation temperature | M/S | | | °C | |
| **Suct.Temp.** | N6 | Current suction temperature | M/S | | | °C | |
| **Driver 2 Circ.1 Evap.Press.** | N7 | Current evaporation pressure | M/S | | | Bar | |
| **Evap.Temp.** | N7 | Current evaporation temperature | M/S | | | °C | |
| **Driver 2 Circ.1 Cond.Press.** | N8 | Current condensing pressure | M/S | | | Bar | |
| **Cond.Temp.** | N8 | Current condensing temperature | M/S | | | °C | |
| **batt.state** | N9 | Current battery status | M/S | | | | |
| **Driver 1 Circ.2 EEV** | Na | Valve operating mode | M/S | | | | |
| **Valve Position** | Na | Current valve position | M/S | | | Step | |
| **Power request** | Na | Compressor capacity requested | M/S | | | % | |
| **Driver 1 Circ.2 SuperHeat** | Nb | Current SuperHeat | M/S | | | °C | |
| **Evap.Temp.** | Nb | Current evaporation temperature | M/S | | | °C | |
| **Suct.Temp.** | Nb | Current suction temperature | M/S | | | °C | |
| **Driver 1 Circ.2 Evap.Press.** | Nc | Current evaporation pressure | M/S | | | Bar | |
| **Evap.Temp.** | Nc | Current evaporation temperature | M/S | | | °C | |

| Parameter | Ref. | Description | M/S | Range | Default | UOM | User value |
|---|---|---|---|---|---|---|---|
| **Driver 1 Circ.2 Cond.Press.** | Nd | Current condensing pressure | M/S | | | Bar | |
| **Cond.Temp.** | Nd | Current condensing temperature | M/S | | | °C | |
| **batt.state** | Ne | Current battery status | M/S | | | | |
| **Driver 2 Circ.2 EEV** | Nf | Valve operating mode | M/S | | | | |
| **Valve Position** | Nf | Current valve position | M/S | | | Step | |
| **Power request** | Nf | Compressor capacity requested | M/S | | | % | |
| **Driver 2 Circ.2 SuperHeat** | Ng | Current SuperHeat | M/S | | | °C | |
| **Evap.Temp.** | Ng | Current evaporation temperature | M/S | | | °C | |
| **Suct.Temp.** | Ng | Current suction temperature | M/S | | | °C | |
| **Driver 2 Circ.2 Evap.Press.** | Nh | Current evaporation pressure | M/S | | | Bar | |
| **Evap.Temp.** | Nh | Current evaporation temperature | M/S | | | °C | |
| **Driver 2 Circ.2 Cond.Press.** | Ni | Current condensing pressure | M/S | | | Bar | |
| **Cond.Temp.** | Ni | Current condensing temperature | M/S | | | °C | |
| **batt.state** | Nj | Current battery status | M/S | | | | |
| **Firmware version Circuit 1 Driver 1** | Nk | Driver firmware, hardware and software version 1 | M/S | | | | |
| **Driver 2** | Nk | Driver firmware, hardware and software version 2 | M/S | | | | |
| **Firmware version Circuit 2 Driver 1** | Nk | Driver firmware, hardware and software version 1 | M/S | | | | |
| **Driver 2** | Nk | Driver firmware, hardware and software version 2 | M/S | | | | |

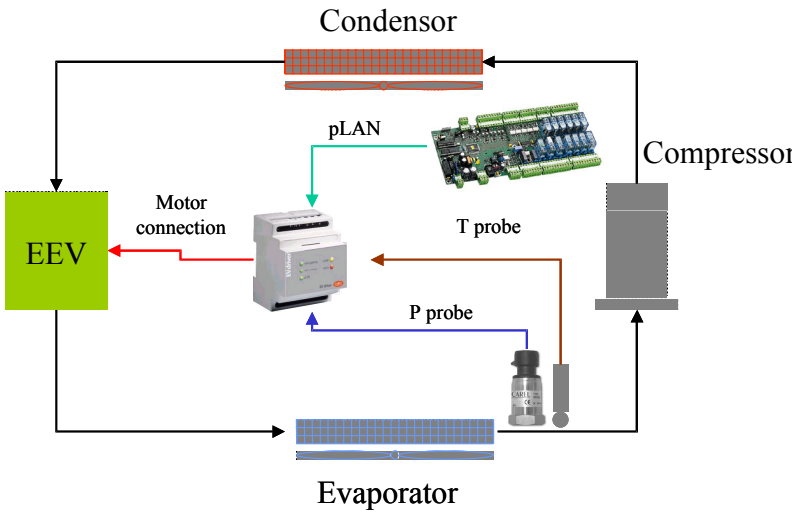
# 8 ELECTRONIC EXPANSION VALVE

The EVDriver module for the control of electronic expansion valves (EEV) in pLAN networks allows superheating control on the suction side for a more efficient and versatile operation of the refrigerating unit.

Efficient because the optimisation and stabilisation of the flow of refrigerant to the evaporator increases the overall performance of the installation, at the same time guaranteeing the safety (less activations of the low pressure switch, less return of liquid refrigerant to the compressor,…). In addition, if the EEV is correctly sized, the use of floating condensing (and evaporation) pressure or a low set point significantly increases the efficiency of the installation, guaranteeing lower energy consumption, with higher refrigerating performance.

Versatile because the electronic expansion valve allows the use of refrigeration units with different refrigerant capacities and operating in different conditions.

The use of an expansion valve requires the installation not only of the EVDriver and the expansion valve, but also of a temperature sensor and a pressure transducer, both fitted at the end of the evaporator on the refrigerant side (on the compressor intake pipe). See the diagram to the side to better understand the typical layout of the installation.




The priorities to be considered for the optimum control of the refrigeration system involve achieving a high and constant refrigerating efficiency, as well as low and stable superheating values.

The heart of the control system is a PID control algorithm, with settable superheating coefficients.

The following values can also be set:

| | |
|---|---|
| LOW | (Low superheating with programmable integral time and threshold) |
| LOP | (Low evaporation pressure, operating only in transients, with programmable integral time and threshold) |
| MOP | (High evaporation pressure, with programmable integral time and threshold) |
| HiTcond | (High condensing pressure, activated with condensing pressure probe read by pCO, with programmable integral time and threshold) |

## 8.1 Driver parameters

This section explains the fundamental parameters for setting up the driver. The description of the parameters includes the screen code, in brackets (see Chap. "LIST OF PARAMETERS") to assist the identification of the parameter. Each pCO* board can manage a maximum of four drivers. As the configuration is identical for both, this section will only describe the configuration of the first driver.

For the installation of the optimum values of the parameters described below, refer to the instruction sheet enclosed with the electronic valve driver.

### Type of valve and use of the battery (B0/E0/F0/J0)

The first screen is used to set the type of valve and the presence of the battery. The following valves are possible:

- Alco (EX5, EX6, EX7, EX8)
- Sporlan (SEI 0.5, SEI 1, SEI 2, SEI 3.5, SEI 6, SEI 8.5, SEH 100, SEH 175, SEH 250)
- Danfoss (ETS50, ETS100)
- CAREL E2V
- Custom Valve (when the valve used is not described above).

### Percentage ratio circ./EEV (B1/E1/F1/J1)

This indicates the ratio, expressed as a percentage, between the maximum cooling capacity of the circuit controlled by the EVDriver and the capacity attainable with the maximum opening of the expansion valve, *in the same normal operating conditions*. Normal operating conditions refer to all the installation variables that affect the refrigerating performance and the installation of the valve (condensing subcooling temperature, superheating, pressure drop,...).

### Superheat set point in CH/HP/DF operation (B2/F2/B8/F8/E2/J2/B5/F5)

Set point for superheating control. Values lower than 3°C are recommended.

Dead zone for superheating control. For temperatures between *Sheat Set – SH Dead zone and Sheat Set + SH Dead zone* the control is not active. For example, a dead zone value of 1°C, with a set point of 5°C, means that the superheating is free to change between 4°C and 6°C without the controller attempting to modify it. Outside of this interval, the algorithm starts controlling again. Values above 2°C are recommended.

**Warning**: The suffix -CH indicates that these parameters are used in chiller operation. The parameters must also be configured for heat pump and defrost operation.

### PID parameters in CH/HP/DF operation (B3/B6/B9/F3/F6/F9E3/J3)

Constants used in the PID control of the EVDriver. These represent respectively:

- Proportional gain
- Integral time constant
- Derivative time constant

In this case too the configuration must be completed for all three types of operation.

### Low superheat threshold in CH/HP/DF operation (B4/B7/BA/F4/F7/FA/E4/J4)

Low superheating threshold and corresponding integral constant for the activation of the low superheat protection. This protection function tends to close the valve. If the integral constant is equal to zero the protection is disabled. In this case too the configuration must be completed for all three types of operation.

### LOP threshold in CH/HP/DF operation (l2/l3/l4)

Low suction pressure threshold and corresponding integral constant for the activation of the LOP protection. This protection function tends to open the electronic valve. If the integral constant is equal to zero the protection is disabled. In this case too the configuration must be completed for all three types of operation.

### MOP threshold in CH/HP/DF operation (l4/l5/l6)

High suction pressure threshold and corresponding integral constant for the activation of the MOP protection. This protection function tends to close the electronic valves. In the event where the integral constant is equal to zero the protection is disabled. In this case too the configuration must be completed for all three types of operation

### High condensing temperature threshold in CH/HP/DF operation (l7/l8/l9)

High condensing temperature threshold and corresponding integral constant for the activation of the protection function. This protection function tends to close the electronic valves. If the integral constant is equal to zero the protection is disabled. In this case too the configuration must be completed for all three types of operation.

### Refrigerant (lL)

Type of refrigerant used in the unit.

### Configuration of the evaporation pressure probe (LI)

This screen is used to set the minimum and maximum values for the range of the refrigerant pressure probe installed at the outlet of the evaporator connected to the driver.

## 8.2 Special “Ignore” function

This function is found under the maintenance branch

```
+--------------------+
|Driver 1 status   Aj|
|                    |
|VALVE OPEN RESTART  |
|Go ahead? N         |
+--------------------+
```

There are three alarm conditions that prevent the driver from performing the normal control functions (one of these is displayed above):

- open valve → during the last blackout the valve was not closed completely
- recharge battery → the battery is not working correctly or alternatively is discharged or not connected
- reboot EEPROM → EEPROM malfunction

When one of these conditions is active, the following alarm is displayed:

```
+--------------------+
|               AL110|
|D1 Circ1:Waiting for|
|Eeprom/batt.charged |
|or open valve error |
+--------------------+
```

By using the “Ignore” function, these alarms can be ignored so as to allow the valve to be controlled by the driver (which otherwise would continue to keep it closed).

WARNING! deleting the alarms means ignoring them, and consequently it is recommended to carefully check that the system is not damaged or malfunctioning or becomes unreliable (e.g.: if “recharge battery” is signalled, it probably means that the battery is not charged or is not connected, etc. Consequently, in the event of a blackout, it may not be able to close the valve. The valve would thus remain open when the installation starts again). If none of the three alarms described above is present, the following screen is displayed:

```
+--------------------+
¦Driver 1 status   Aj¦
¦                    ¦
¦NO WARNINGS         ¦
¦                    ¦
+--------------------+
```

# 9 CONTROL

## 9.1 Control set point

Inputs used:

- Analogue input for remote set point variation
- Supervisor serial network

Parameters used:

- Control set point
- Enable remote set point from analogue input
- Limits for the calculation of remote set point from analogue input
- Display set point used by the control

### 9.1.1 Description of operation

Temperature control, irrespective of the type, is based on the setting of two fundamental parameters: control set point and band. The control set point can be changed according to special operating requirements of the unit. There are three different methods for changing the control set point:

1. Setting on the screen: by accessing the special screen, the user can directly set the value of the parameter.
2. Setting from the supervisor: if connected to a supervisory system, by accessing the special addresses, the cooling or heating set point can be set.
3. Setting from analogue input: enabling the remote set point control from analogue input (0 to V / 0 to 10 V / 4 to 20 mA selectable), allows compensation of the control set point by a proportional value between the two limits for the conversion of the input signal set.

All the above conditions may be active at the same time, while condition "1" is always present; the compensation of the set point from analogue input can be enabled by a special parameter, while setting from the supervisor is only possible using a board that is configured and connected for communication to a serial supervisor system.

## 9.2 Temperature control

Two distinct modes are available for the operation of the temperature controller:

- Control depending on the temperature of the water measured by the probe located at the evaporator inlet
- Control depending on the temperature of the water measured by the probe located at the evaporator outlet

The first case involves proportional control based on the absolute value of the temperature measured by the probe; the second case involves dead zone control based on the time the temperature measured by the probe remains over certain thresholds.

## 9.3 Inlet temperature control

Inputs used

- Inlet temperature

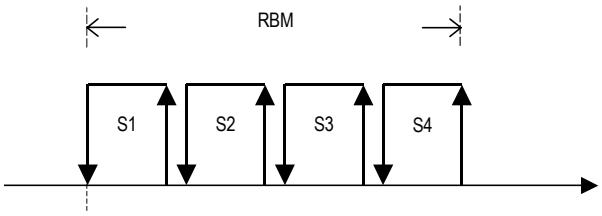
Parameters used:

- Control set point
- Proportional band for inlet control.
- Type of control (proportional or proportional + integral)
- Integral time (if proportional + integral control is enabled)
- Type of unit
- Total number of compressors
- Number of load steps

Outputs used

- All the compressors and the corresponding load steps

### 9.3.1 Description of operation

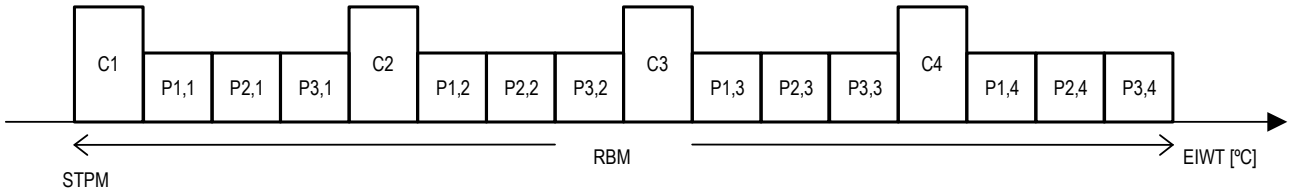



STPM Control set point
RBM Control band
EIWT Evaporator water inlet temperature
S Control steps
1…4

**Fig. 9.1** Proportional temperature control based on the reading of the inlet probe

The temperature control depends on the values measured by the temperature probe located at the evaporator inlet, and follows proportional logic. Depending on the total number of compressors configured and the number of load steps per compressor, the control band set will be divided into a number of steps of the same amplitude. When the various thresholds are exceeded, a compressor load step will be activated.
The following relationships are applied to determine of the activation thresholds:
Total number of control steps = Number of compressors + (Number of compressors * Number load steps/compressor).
Proportional step amplitude = Proportional control band / Total number of control steps
Step activation threshold = Control set point + (Proportional step amplitude * Progressive step [1,2,3,…]).

Example of temperature control in units with 4 compressors and 3 load steps each, in chiller operation.




| | |
|---|---|
| STPM | Control set point |
| RBM | Control band |
| EIWT | Evaporator water inlet temperature |
| C 1…4 | Compressors |
| P 1…4,1…4 | Compressor load steps |

**Fig. 9.2** Semi-hermetic compressors with proportional control

## 9.4 Outlet temperature control

Inputs used

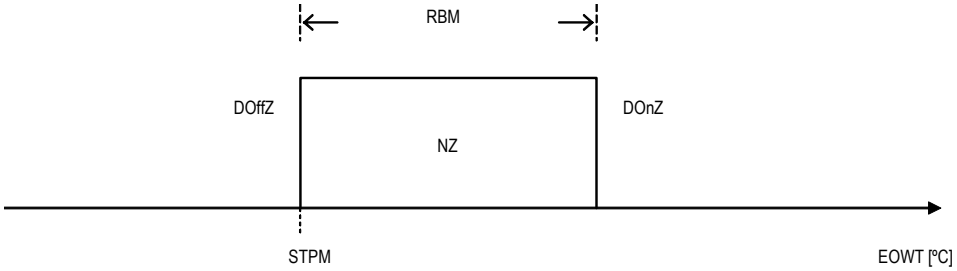
- Outlet temperature

Parameters used

- Control set point
- Dead zone for outlet control
- Step activation delay
- Step deactivation delay
- Cooling outlet temperature limit
- Heating outlet temperature limit
- Minimum compressor on time
- Differential comprising the variation in the on time.
- Minimum compressor off time
- Differential comprising the variation in the off time.

Outputs used

- All the compressors and the corresponding load steps



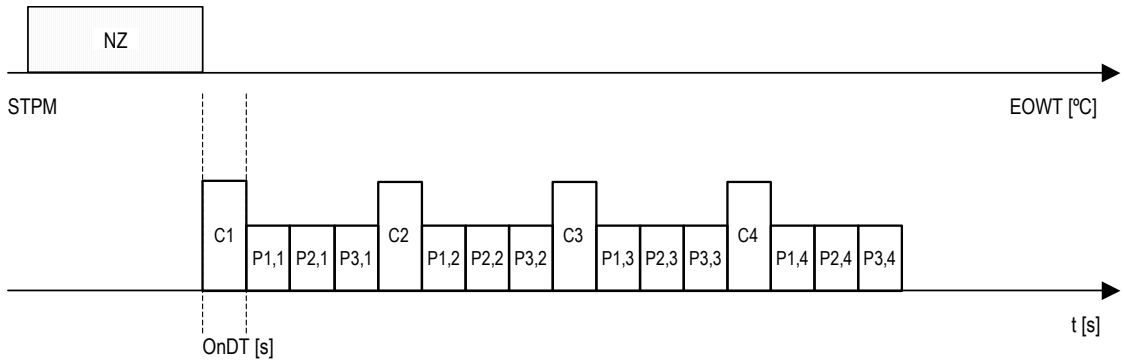

### 9.4.1 Description of operation

| | |
|---|---|
| STPM | Control set point |
| RBM | Control band |
| NZ | Dead zone |
| EOWT | Evaporator water outlet temperature |
| DOnZ | Device start zone |
| DOffZ | Device stop zone |

**Fig. 9.3** Temperature control with dead zone based on the reading of the outlet probe

A temperature dead zone is identified based on the set point and band.
Temperature values between the set point and set point + band (STPM ≤ Temperature ≤ STPM+RBM) will not switch any compressors On/Off.
Temperature values above set point + band (Temperature > STPM+RBM) will activate the compressors
Temperature values below the set point (Temperature < STPM) will deactivate the compressors

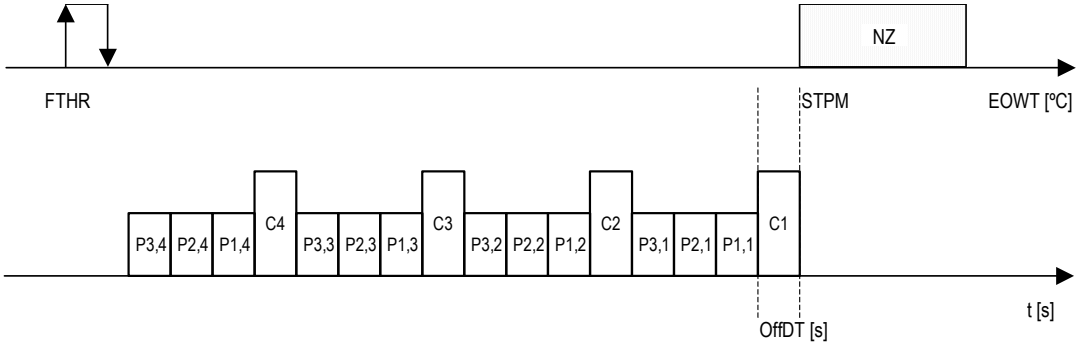
A temperature threshold is envisaged, for both cooling operation and heating operation, below/above which the devices installed will in any case be stopped, in order to avoid excessive cooling/heating output produced by the unit.
Example of temperature control in units with 4 compressors and 3 load steps each, in chiller operation:




| | |
|---|---|
| STPM | Control set point |
| NZ | Dead zone |
| EOWT | Evaporator water outlet temperature |
| C 1…4 | Compressors |
| P 1…4,1…4 | Compressor load steps |
| t | Time |

**Fig. 9.4** Semi-hermetic compressors with dead zone control [start]

When the temperature is greater than STP_M + NZ, the devices are activated with a delay between the activations equal to the value set for the parameter “delay between starts in dead zone”.




| | |
|---|---|
| STPM | Control set point |
| NZ | Dead zone |
| EOWT | Evaporator water outlet temperature |
| FTHR | Forced shutdown threshold |
| C 1…4 | Compressors |
| P 1…4,1…4 | Compressor load steps |
| T | Time |

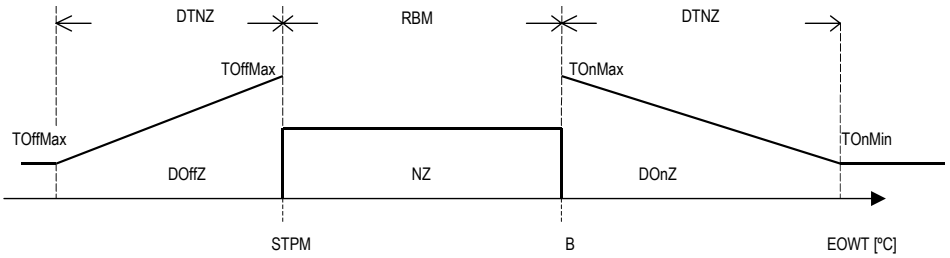
**Fig. 9.5** Semi-hermetic compressors with dead zone control [stop]

When the temperature is less than STP_M, the devices are deactivated with a delay between deactivations equal to the value set for the parameter “delay between stops in dead zone”.
When the temperature falls below the minimum limit FTHR, the devices are switched off even if the delay time set has not elapsed; this helps avoid the activation of the antifreeze protection.

The user may also set a variable time between calls depending on how far the temperature is out of the dead zone. Specifically, the step request / deactivation time decreases (within certain limits) depending on the deviation of the temperature.

To do this, the following parameters need to be configured:

- Maximum compressor on time
- Minimum compressor on time
- Differential comprising the variation in the type of call.
- Maximum compressor off time
- Minimum compressor off time
- Differential comprising the variation in the off time.




STPM Control set point
RBM Control band
NZ Dead zone
EOWT Evaporator water outlet temperature
DOnZ Device start zone
DOffZ Device stop zone
DTNZ Differential comprising the variation in the time

The following cases are therefore possible in the start phase:

1. Inlet temperature equal to point b
   type of call equal to “Maximum compressor on time”
2. Outlet temp. between point b and (point b + DTNZ)
   type of call between “Max on time” and “Min on time”
3. Outlet temp. greater than or equal to (point b + DTNZ)
   type of call equal to “Min on time”

The following cases, on the other hand, are possible in the stop phase:

1. Inlet temperature equal to point STPM
   type of call equal to “Maximum compressor off time”
2. Outlet temp. between point STPM and (point STPM - DTNZ)
   type of call between” Max off time” and “Min off time”
3. Outlet temp. greater than or equal to (point STPM - DTNZ)
   type of call equal to “Min off time”

The function is disabled if the “minimum compressor on / off time” is equal to the maximum time.

# 10 COMPRESSOR ROTATION

The compressor calls are rotated so as to balance the number of operating hours and starts between the devices.
Rotation is only performed between the compressors and not between the load steps.
The rotation function automatically excludes any compressors with alarms or timers in progress.
If a compressor stops due to an alarm, another compressor will immediately be started.
Four different types of rotation can be set:

## 10.1 Management with LIFO rotation

The first compressor to start will be the last to stop.

- Start: C1,C2,C3,C4,C5,C6,...,C8.
- Stop: C8,C7,C6,C5,C4,C3,...,C1.

## 10.2 Management with FIFO rotation

The first compressor to start will be the first to stop.
Initially there may be large differences between on the operating hours of the various compressors, however in normal operating conditions the number of hours will tend to balance out.

- Start: C1,C2,C3,C4,C5,...C8
- Stop: C1,C2,C3,C4,C5,...C8.

## 10.3 Management based on the number of compressor operating hours

With this type of rotation, when a compressor is called, the one with the lowest number of operating hours starts. When stopping the opposite occurs, that is, when deactivation is requested, the compressor with the highest number of operating hours will stop.

## 10.4 Management with custom rotation

The user assigns a personal order for the activation and deactivation of the compressors.

# 11 CONDENSING UNIT CONTROL

Inputs used

- Analogue input Bn (respectively B3 for pCO2, B1 for pCO[1], B5 for pCO[C])

Parameters used

- Type of unit
- Type of remote control management
- Type of analogue input Bn

Outputs used

- All compressors

## 11.1 Description of operation

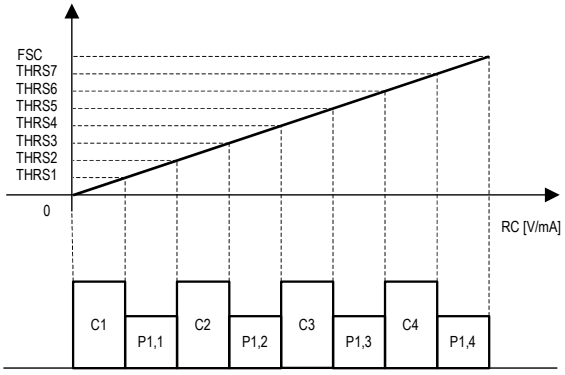
Condensing unit control involves the devices being called by a proportional voltage or current signal supplied by an external controller. The type of analogue input can be selected between 0 to 1 V, 0 to 10 V and 4 to 20 mA.
Two control modes are featured: proportional or steps, selected by a dedicated user parameter. As the compressors are called by an external controller, the corresponding control probes and parameters are not used.

## 11.2 Proportional control

Below is a description of operation with proportional control, when a 0 to 1 V analogue input is used.

```
+--------------------+
| Remote           Gh|
| compressors        |
| control management |
| type PROPORTIONAL  |
+--------------------+
```

The compressor requests depend on the analogue input Bn, with continuous variation of the input signal, the board calculates the number of steps required based on the voltage value measured:
Analogue input 0 V 0% request (no compressor on)
Analogue input 1 V 100% request (all the compressors on)




FSC Analogue input end scale
THR S1…7 Activation threshold step 1…7
RC Remote control signal
C 1…4 Compressors
P 1,1…4 Compressor load steps

**Fig. 11.1** Condensing unit with proportional control

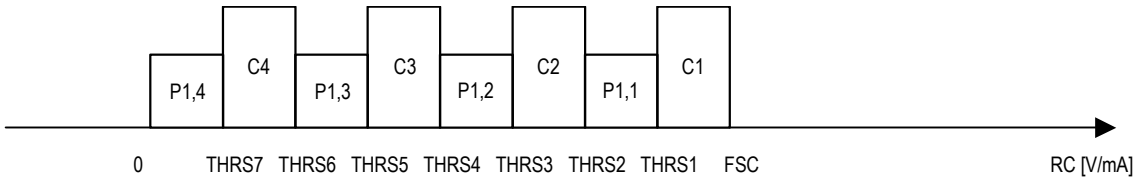
Example of control of a unit with 4 semi-hermetic compressors:
Number of pCOx boards = 2
Total number of compressors = 4
Number of compressors per board = 2
Number of load steps per compressor = 1
Total number of steps = Total number of compressors + (Total number of compressors * Number of load steps per compressor) = 4 + 4 * 1 = 8
Amplitude of each step = Analogue input end scale / Total number of steps = 1 / 8 = 0.125V
If the analogue input Bn measures 0.25 Volts, two steps will be requested, therefore one compressor and one of its load steps will be activated (the switching of the load step relay will depend on the logic set).
Two safety thresholds are calculated for the total activation or deactivation of the compressors, if exceeded.
These thresholds are calculated according to the following relationships.
Forced shutdown threshold = Analogue input end scale / Total number of steps / 2 = 1 / 8 / 2 = 0.0625V ➔ 0.0V
Forced start threshold = Analogue input end scale – Forced shutdown threshold = 1 – 0.0625 = 0.9375V ➔ 0.9V.
If the reading of the analogue input Bn is less than the value of the forced shutdown threshold calculated, the devices will be stopped unconditionally.
If the reading of the analogue input Bn is greater than the value of the forced start threshold calculated, the devices will be started unconditionally.

# 11.3 Stepped control

Below is a description of operation with stepped control, using a 0 to 1 V analogue input.

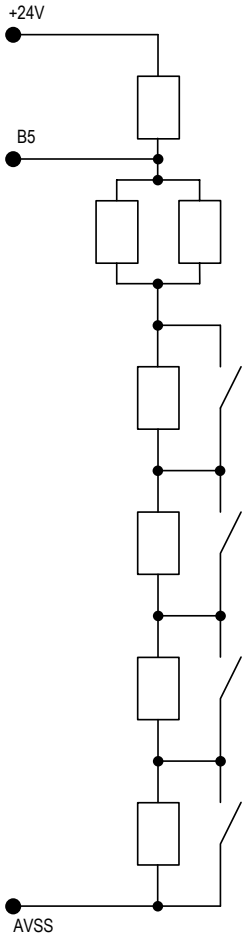
```
+--------------------+
| Remote           Gh|
| compressors        |
| control management |
| type STEPS         |
+--------------------+
```

The compressor requests depend on the analogue input Bn, using a voltage divider or equivalent circuit to supply precise voltages that correspond to the activation or deactivation of the compressors and the relative load steps




FSC Analogue input end scale
THR S1…7 Activation threshold step 1…7
RC Remote control signal
C 1…4 Compressors
P 1,1…4 Compressor load steps

**Fig. 11.2** Condensing unit with stepped control




Example of control of a unit with 4 semi-hermetic compressors:

Number of pCOx boards = 2
Total number of compressors = 4
Number of compressors per board = 2
Number of load steps per compressor = 1

Total number of steps = Total number of compressors + (Total number of compressors * Number of load steps per compressor) = 4 + 4 * 1 = 8
Amplitude of each step = Analogue input end scale / Total number of steps = 1 / 8 = 0.125V

If the analogue input Bn measures 0.680 Volt, two steps will be requested, therefore one compressor and one of its load steps will be activated (the switching of the load step relay will depend on the logic set).

Following is a connection example of a resistive voltage divider for controlling condensing units by steps.
The diagram features a list of the components, indicating the values of the resistors used for the control.
N.B. The resistors must have the following characteristics:
Power dissipated = 0.25W
Precision = 1%

| **Number of control steps** | **2** | **3** | **4** |
|---|---|---|---|
| | 8.2 kOhm | 5.6 kOhm | 5.6 kOhm |
| | 2 x 180 Ohm | 2 x 82 Ohm | 2 x 62 Ohm |
| | 180 Ohm | 82 Ohm | 62 Ohm |
| | 180 Ohm | 82 Ohm | 62 Ohm |

**Fig. 11.3** Example of resistive voltage divider for stepped condensing unit control

# 12 CONTROL OF WATER/WATER UNITS WITH REVERSAL ON THE WATER CIRCUIT

Inputs used
- Evaporator water inlet temperature
- Evaporator water outlet temperature
- Condenser water inlet temperature
- Condenser water outlet temperature

Parameters used
- Type of unit
- Minimum evaporator outlet threshold
- Reversing valve logic

Outputs used
- Water circuit reversing valve

## 12.1 Description of operation

The water/water units with reversal on the water circuit feature control based on the values measured by different probes, based on whether the unit is in cooling or heating operation.
In chiller operation, the compressors are activated / deactivated based on the temperature values measured by the probes installed on the evaporator inlet and/or outlet.
In heat pump operation, the compressors are activated / deactivated based on the temperature values measured by the probes installed on the condenser inlet and/or outlet.
Heating operation is allowed only if the temperature measured at the evaporator outlet is greater than the minimum evaporator outlet threshold set.
The operating logic of the digital output for the reversal of the water circuit depends on the setting of the corresponding manufacturer parameter.
The configuration set by CAREL is:
- chiller operation relay energised
- heating operation relay de-energised

## 12.2 Cooling / Heating operation

Inputs used:
- Cooling/Heating digital input
- Supervisor serial network

Parameters used:
- Type of unit
- Enable change cooling/heating from digital input
- Enable change cooling/heating from supervisor serial network
- Logic of 4-way reversing valve in refrigerant / water circuit

Outputs used:
- Refrigerant / water circuit reversing valve

### 12.2.1 Description of operation

In chiller + heat pump units, the changeover from cooling to heating operation and vice-versa occurs as described below. The changeover in operating mode is only possible when the unit is off (circulating pump off). “Cooling” operation means that the unit is in chiller mode (production of cold water). “Heating” means that the unit is in heat pump mode (production of hot water).
The order that the various conditions are listed in represents the increasing priority of each (1 = maximum priority).
1. Digital input: if enabled by user parameter, changeover is possible by controlling the dedicated digital input.
2. Supervisor: if enabled by user parameter, changeover is possible by controlling the dedicated parameter via serial line.
3. Keypad: the changeover in operating mode is performed using the blue and red buttons
   Blue button: “cooling” operation
   Red button: “heating” operation

Whatever mode is selected, the type of operation is displayed by the LEDs corresponding to the blue and red buttons on the display:
- the LED corresponding to the blue button indicates operation in “cooling” mode
- the LED corresponding to the red button indicates operation in “heating” mode”.

In any case, screen M1 always shows the unit status.

# 13 PUMP DOWN

Inputs used

- ON/OFF from the keypad
- ON/OFF from digital input
- ON/OFF from the supervisor
- Low pressure switch

Parameters used

- Enable pump down
- Maximum pump down time

Outputs used

- Compressors
- Liquid solenoid

## 13.1 Description of operation

When the conditions for the activation of the pump down function are true, the liquid solenoid valve will be closed and the compressor kept on until the end pump down conditions are true.

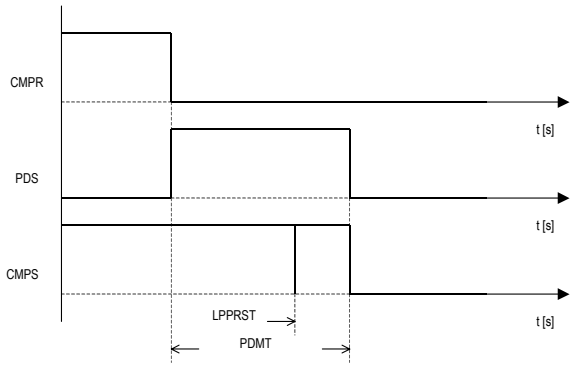
## 13.2 Start pump down

The pump down procedure is activated when the compressor stops, either when the compressor request is absent or when the unit is shutdown.
As the control system operates in master-slave mode, and the individual slave boards can be switched off using the ON/OFF button on the shared display, the pump down procedure will be only performed on the circuits controlled by the slave boards that have been switched off.
If the compressor is shutdown due to a specific or circuit alarm, or the unit is shutdown due to a serious alarm, the pump down procedure will not be performed.
In units with hermetic compressors in tandem configuration, the pump down procedure will not be performed.

## 13.3 End pump down

The end of the pump down procedure may be dictated by the activation of the low pressure switch or when the time exceeds the maximum threshold set.

```
+--------------------+
|Config.pump down  G2|
|                    |
|Enable            N |
|Maximum time    000s|
+--------------------+
```




| | |
|---|---|
| CMPR | Status of the compressor request |
| PDS | Status of the pump down procedure |
| CMPS | Status of the compressor |
| LPPRST | End pump down by activation of the low pressure switch |
| PDMT | End pump down when exceeding maximum time |
| t | Time |

**Fig. 13.1** Pump down procedure

# 14 CONDENSER CONTROL

Inputs used
- High pressure transducer circuit 1
- High pressure transducer circuit 2
- Condenser temperature probe circuit 1
- Condenser temperature probe circuit 2

Parameters used
- Select type of condenser control: none/pressure/temperature
- Type of condenser (Single / Separate)
- Condenser control set point
- Condenser control band
- Number of fans per coil
- Enable prevent function
- Prevent threshold
- Prevent differential
- Output voltage at minimum inverter speed
- Output voltage at maximum inverter speed
- Inverter speed-up time

Outputs used
- Condenser fan 1
- Condenser fan 2
- Condenser fan 3
- Condenser fan speed controller circuit 1
- Condenser fan speed controller circuit 2

## 14.1 ON/OFF condenser control linked to compressor operation

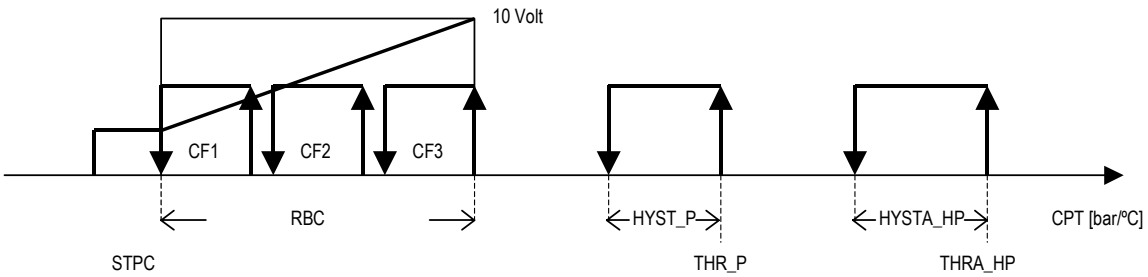
The operation of the fans depends exclusively on the operation of the compressors:
Compressor OFF = fan OFF
Compressor ON = fan ON
No pressure transducers need to be installed.

## 14.2 ON/OFF condenser control linked to the pressure or temperature sensor

The operation of the fans is subordinate to the operation of the compressors and to the value read by the pressure or temperature sensors, according to a set point and a band. When the pressure/temperature is less than or equal to the set point, all the fans are off; when the pressure/temperature rises to the set-point + band, all the fans are started.
Single- or separate-coil condenser control can be selected; with single-coil condenser control, the fans are controlled according to the highest pressure/temperature; with separate-coil condenser control, each pressure/temperature sensor controls its own fan.

## 14.3 Modulating condenser control linked to the pressure or temperature sensor

The fans are controlled using a 0/10V or PWM analogue output proportional to the request of the pressure/temperature sensor.
Single- or separate-coil condenser control can be selected; with single-coil condenser control, the fans are controlled according to the highest pressure/temperature; with separate-coil condenser control, each pressure/temperature sensor controls its own fan or group of fans.
If the lower limit of the ramp is greater than 0V, the line will not be proportional but rather, as seen in the first section of the graph, one step below the set point.




STPC Condenser control set point
RBC Condenser control band
THR_P High condenser pressure prevention threshold

HYST_P High condenser pressure prevention hysteresis
THRA_HP High condenser pressure alarm threshold
HYSTA_HP High condenser pressure alarm hysteresis
CPT Condensing pressure / temperature
CF 1…3 Condenser fans

**Fig. 14.1** Control of the condensing devices and alarms

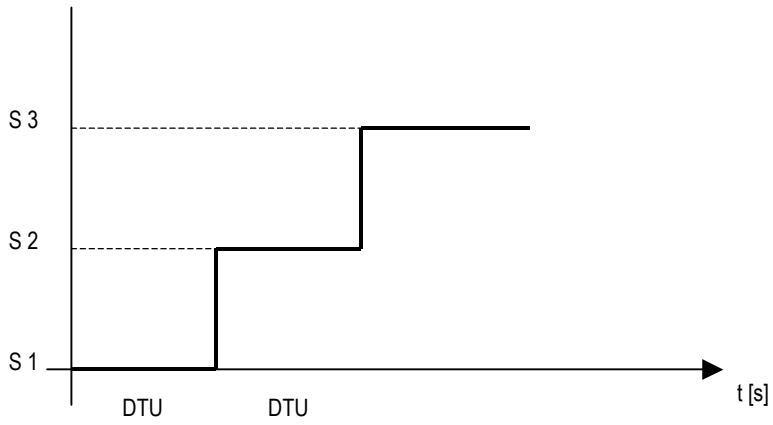
## 14.4 Prevent function

This function can be enabled in the manufacturer branch, and prevents the circuits from being shutdown due to a high pressure alarm. When the compressors are on, once reaching the set threshold, the capacity of the compressor is controlled until the pressure returns below the set point - differential.
When the compressors are off, once having reached the set threshold, the fans are started at maximum speed until the pressure returns below the set point - hysteresis.
In units with tandem hermetic compressors, the prevent function stops one of the compressors that is on by performing a rotation, so as to force off a different device each time.
In units with capacity-controlled semi-hermetic compressors, the prevent function activates the load steps, while attempting to avoid shutting down the compressor.

```
+--------------------+
|HP prevent        G7|
|Enable             N|
|Probe  PRESSURE     |
|                    |
+--------------------+
```

In addition, a delay can be set for the activation of the individual load steps (this is valid for compressors with more than one load step) so as to allow the gradual decrease in capacity, as well as and a delay for the deactivation of the prevent function, which maintains the condition active even if the pressure/temperature is less than the threshold-hysteresis (CPT < THR_P - HYST_P).

```
+--------------------+
|Prevent      T4|    |
|Unloads switching on|
|delay            60s|
|Exit delay       60s|
+--------------------+
```




DTU Load step activation delay time
S 1…3 Load steps
t Time

**Fig. 14.2** Forcing of compressor load steps to prevent high condensing pressure

# 15 DEFROST CONTROL FOR AIR/WATER UNITS

Inputs used

- Coil temperature circuit 1
- Coil temperature circuit 2
- Defrost pressure switch circuit 1
- Defrost pressure switch circuit 2

Parameters used

- Type of global defrost
- Type of local defrost
- Start defrost threshold
- End defrost threshold
- Defrost delay time
- Maximum defrost time
- Forced compressor shutdown time for reversal of the refrigerant circuit
- Reverse cycle delay

Outputs used

- Compressor 1
- Compressor 2
- Compressor 3
- Compressor 4
- 4-way reversing valve circuit 1
- 4-way reversing valve circuit 2
- Condenser fans circuit 1
- Condenser fans circuit 2

## 15.1 Types of defrost

### 15.1.1 Simultaneous global / Simultaneous local

Only one circuit needs to enter in the defrost cycle for all the circuits to be forced to defrost.
The circuits which do not require defrost (temperature greater than the end defrost set point) stop and go to standby; as soon as all the circuits end their defrost cycle the compressors can start again in heat pump operation.

### 15.1.2 Separate global / Simultaneous local

This type of defrost involves separate defrosts between the various pCO* boards making up the system, and a simultaneous defrost in the circuits controlled by the same pCO* board.
The first pCO* board that requests defrost starts defrosting (simultaneous for the circuits controlled by that board), while the other boards, even if they require defrost, go to standby (continue to operate in heat pump mode) until the first ends its defrost; only at the end of this will the following units start the procedure, placing the other boards that require defrost in standby.

### 15.1.3 Separate global / Separate local

The circuits are defrosted separately between both the boards and the circuits; the first circuit that requires defrosting starts the procedure, while the others wait and then proceed with the individual defrosts sequentially.

### 15.1.4 Independent global / Simultaneous local

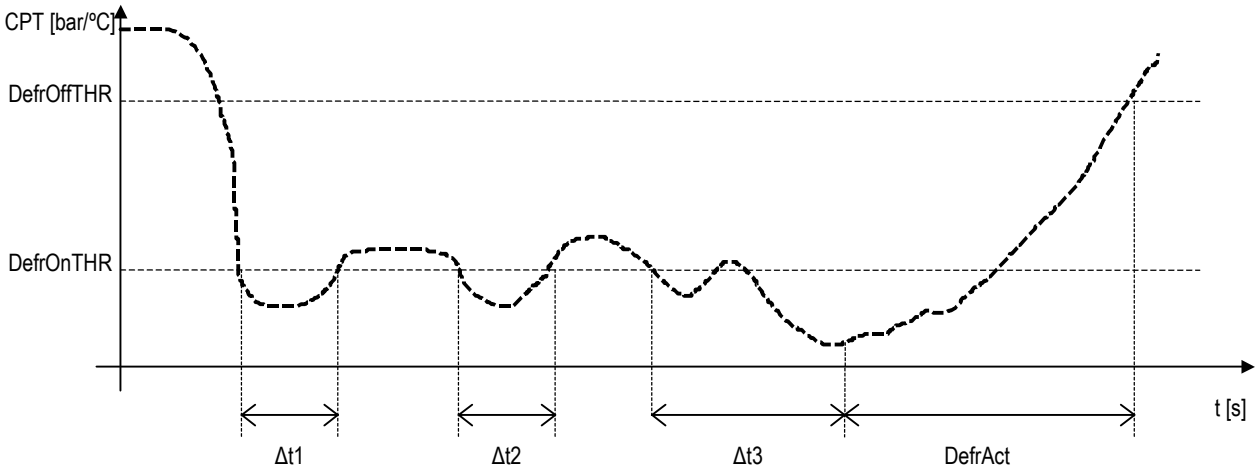
The various pCO* boards making up the system can complete the defrost procedure absolutely independently, starting and ending at different times, even overlapping.
The circuits controlled by each board perform the defrost in simultaneous mode, starting and ending at the same time

### 15.1.5 Independent global / Separate local

The various pCO* boards making up the system can complete the defrost procedure absolutely independently, starting and ending at different times, even overlapping.
The circuits controlled by each board perform the defrost in separate mode, starting and ending sequentially.

```
+--------------------+
|Defrost config.  Q0 |
|Probe  TEMPERATURE  |
|Global SIMULTANEOUS |
|Local SIMULTANEOUS  |
+--------------------+
```

# 15.2 Defrosting a circuit with time/temperature control




| | |
|---|---|
| DefrOffTHR | End defrost threshold |
| DefrONTHR | Start defrost threshold |
| CPT | Condensing pressure/temperature |
| Δt 1…3 | Partial duration of the pressure/temperature in the defrost activation zone |
| DefrAct | Defrost active |
| t | Time |

**Fig. 15.1** Defrost control

## 15.2.1 Description of operation

If the temperature/pressure of a coil remains below the start defrost set point for a cumulative time equal to the defrost delay time, the circuit in question will start a defrost cycle:

- the compressor/compressors in the circuit in question stop for a set time
- the refrigerant circuit is reversed using 4-way valve after a set delay
- the fan in question is switched off (if the pressure probes are present, the fan can be started at a certain threshold to prevent the circuit from reaching the high pressure alarm)

The circuit exits the defrost cycle if the temperature/pressure exceeds the end threshold, or after a maximum time, if the defrost cycle exceeds the maximum set threshold time.

# 15.3 Defrosting a circuit with time/pressure switch control

The activation / deactivation of the defrost cycle depends on the status of the high pressure switch in the circuit.
For this purpose, the analogue input used to measure the temperature of the condenser coil will be used as a digital input for reading of the status of the pressure switch.
A free contact is required, which, if open, starts the defrost procedure, vice-versa if closed.
For defrost by pressure switch the duration of the procedure is also bound by the maximum threshold set, with the defrost ending after the maximum time.

```
+--------------------+
|Defrost           Q1|
|                    |
|Start        00.0ßC |
|Stop         00.0ßC |
+--------------------+
```

```
+--------------------+
|Defrost           Q2|
|                    |
|Delay time    00000s|
|Maximum time  00000s|
+--------------------+
```

```
+--------------------+
|Defrost           Q3|
|Compressors force   |
|off when defrost    |
|begins/ends for 000s|
+--------------------+
```

```
+--------------------+
|Defrost           Q4 |
|                    |
|Reversing cycle     |
|delay           000s|
+--------------------+
```

# 16 CONTROL OF HEAT RECOVERY UNITS

Inputs used

- Evaporator water inlet temperature
- Evaporator water outlet temperature
- Recovery water inlet temperature
- Recovery water outlet temperature

Parameters used

- Priority recovery / utility
- Recovery control set point
- Recovery control band

Outputs used

- Valve A
- Valve B
- Valve C

## 16.1 Recovery priority

COOLING OPERATION

When the utility temperature controller is not at temperature and the recovery temperature controller is at temperature the unit will be in ***chiller only*** operation. The compressors are controlled according to the evaporator water temperature. When the utility temperature controller is not at temperature and the recovery temperature controller is not at temperature the unit will be in ***chiller + recovery*** operation. The compressors are controlled according to the recovery water temperature. When the utility temperature controller is at temperature and the recovery temperature controller is not at temperature the unit will be in ***recovery-only*** operation. The compressors are controlled according to the recovery water temperature.

HEATING OPERATION

When the utility temperature controller is not at temperature and the recovery temperature controller is at temperature the unit will be in ***heat pump*** operation. The compressors are controlled according to the evaporator water temperature. When the utility temperature controller is not at temperature and the recovery temperature controller is not at temperature the unit will be in ***recovery-only*** operation. The compressors are controlled according to the recovery water temperature. When the utility temperature controller is at temperature and the recovery temperature controller is not at temperature the unit will be in ***recovery-only*** operation. The compressors are controlled according to the recovery water temperature. If a defrost is required the unit will be in ***defrost*** operation.

## 16.2 Utility priority

COOLING OPERATION

When the utility temperature controller is not at temperature and the recovery temperature controller is at temperature the unit will be in ***chiller only*** operation. The compressors are controlled according to the evaporator water temperature.
When the utility temperature controller is not at temperature and the recovery temperature controller is not at temperature the unit will be in ***chiller + recovery*** operation. The compressors are controlled according to the evaporator water temperature.
When the utility temperature controller is at temperature and the recovery temperature controller is not at temperature the unit will be in ***recovery-only*** operation. The compressors are controlled according to the recovery water temperature.

HEATING OPERATION

When the utility temperature controller is not at temperature and the recovery temperature controller is at temperature the unit will be in ***heat pump*** operation. The compressors are controlled according to the evaporator water temperature.
When the utility temperature controller is not at temperature and the recovery temperature controller is not at temperature the unit will be in ***heat pump*** operation . The compressors are controlled according to the evaporator water temperature.
When the utility temperature controller is at temperature and the recovery temperature controller is not at temperature the unit will be in ***recovery-only*** operation. The compressors are controlled according to the recovery water temperature.
If a defrost is required the unit will be in ***defrost*** operation.

### 16.2.1 Valves

The different unit operating modes are controlled by three digital outputs connected to different valves, according to the following configurations:

**Cooling operation**

| | **Valve A (recovery)** | **Valve B (utility)** | **Valve C (cooling / heating)** |
|---|---|---|---|
| **Chiller-only** | OFF | ON | OFF |
| **Chiller + Recovery** | ON | ON | OFF |
| **Recovery-only** | ON | OFF | OFF |

**Table 16.1** Configuration of the valves in cooling operation (units with heat recovery)

**Heating operation**

| | Valve A (recovery) | Valve B (utility) | Valve C (cooling / heating) |
|---|---|---|---|
| **Heat pump** | OFF | ON | ON |
| **Recovery-only** | ON | OFF | ON |
| **Defrost** | OFF | OFF | ON |

**Table 16.2** Configuration of the valves in heating operation (units with heat recovery)

## 16.2.2 NOTES ON the condenser fans

In all unit operating modes, except for chiller+ recovery, the condenser fans are controlled according to the procedures described in the corresponding chapter.

# 17 FREECOOLING CONTROL

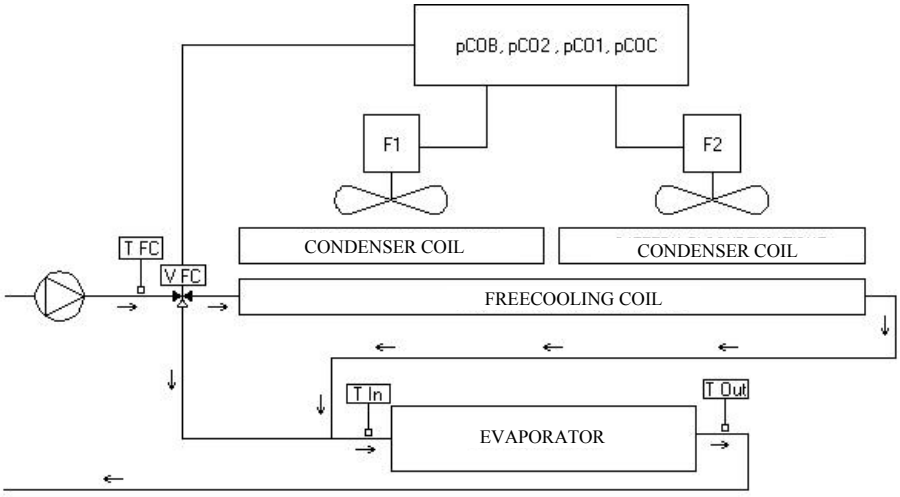
Inputs used
- Evaporator water outlet temperature
- Freecooling coil water inlet temperature
- Outside air temperature

Parameters used
- Type of unit
- Number of units
- Type of condenser control
- Number of fans
- Type of freecooling valve
- Type of freecooling control
- Integral time
- Control set point
- Control set point offset
- Minimum freecooling delta
- Maximum freecooling delta
- Freecooling control band
- Maximum freecooling valve opening threshold
- Minimum condenser speed control threshold
- Freecooling antifreeze threshold
- Compressor activation delay

Outputs used
- Condenser fans
- Condenser fan speed control
- ON/OFF freecooling valve
- 3-way freecooling valve

## 17.1 Description of operation

Freecooling control exploits the temperature of the outside air to assist in the cooling of the utility water. This function uses a heat exchanger, through which a special valve deviates a certain quantity of return water from the system.
The favourable outside air temperature conditions thus cool the water prior to its return, and the activation of the cooling devices is therefore delayed. Freecooling is envisaged for air/water units in internal freecooling mode, that is, with the freecooling coil housed inside the unit near the condenser coil/coils, with which it shares the control of the condenser fan/fans.




FCT Freecooling coil inlet temperature
FCV Freecooling valve
EIWT Evaporator water inlet temperature
EOWT Evaporator water outlet temperature
Pcob PCOB control board
CF 1…2 Condenser fans
CEXC Condenser coil
FCEXC Freecooling coil
EEXC Evaporator coil

**Fig. 17.1** Diagram of units with freecooling control

## 17.2 Activation of the freecooling function

The freecooling function is based on the relationship that compares the temperature measured by the outside temperature probe, the temperature measured by the temperature probe located al the freecooling coil inlet, and the set freecooling delta.

**Outside temp. < Freecooling IN temp. – Freecooling delta**

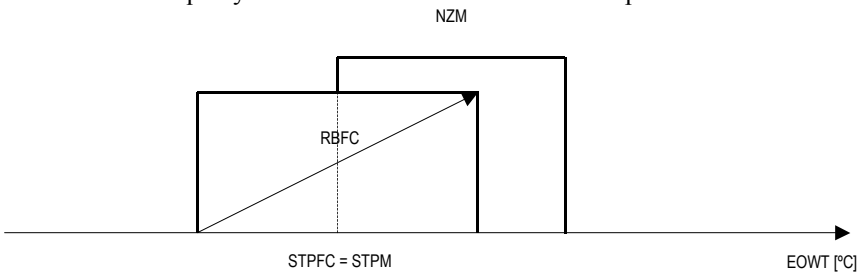
If this condition is true, the freecooling function will be enabled, by activating/deactivating the dedicated devices.

## 17.3 Freecooling thermostat

The freecooling function uses the control set point calculated (considering any compensation) and the freecooling control differential set. Control is based on the water temperature measured by the probe located at the evaporator outlet, considering the effective cooling contribution of the freecooling exchanger in the different outside temperature conditions. Two different control modes can be selected: proportional, proportional + integral, in the latter case the integral constant will need to be set.
The set point for freecooling control will be determined based on the required water temperature. Depending on the type of control adopted for the compressors (inlet – outlet), as the temperature references are different, two distinct control graphs will be identified.
In units with outlet control and dead zone, the freecooling control set point will correspond to the compressor control set point.

STPFC = STPM

The proportional control band will be equally distributed on both sides of the set point:



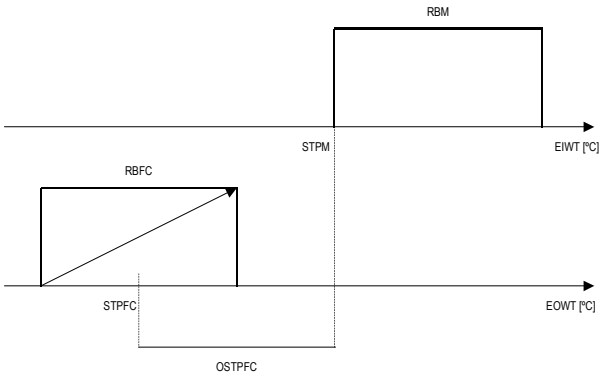

| | |
|---|---|
| NZM | Dead zone control |
| RBFC | Freecooling control band |
| STPFC | Freecooling control set point |
| STPM | Control set point |
| EOWT | Evaporator water outlet temperature |

**Fig. 17.2** Freecooling thermostat with outlet control

In units with inlet control and lateral proportional band, the freecooling control set point will consider an offset compared to the compressor control set point to compensate for the presence of the evaporator coil:

STPFC = STPM – OSTPFC

The proportional control band will be equally distributed on both sides of the set point




| | |
|---|---|
| RBM | Control band |
| STPM | Control set point |
| EIWT | Evaporator water inlet temperature |
| RBFC | Freecooling control band |
| STPFC | Freecooling control set point |
| OSTPFC | Freecooling control set point offset |
| EOWT | Evaporator water outlet temperature |

**Fig. 17.3** Freecooling thermostat with inlet control

In the freecooling control band, the activation thresholds are calculated for the dedicated devices, such as valves, fans or speed controllers, depending on the mode selected.
As the fans and/or speed controllers are shared between freecooling and condenser control, if one or more compressors belonging to a certain refrigerant circuit are started, priority will be given to condenser control so as to safeguard the circuit.
The freecooling valve will in any case be kept completely open to maximise thermal performance, even with minimum ventilating capacity.
So as to optimise the efficiency of the freecooling function during the transients when the unit starts and in stable operation, a bypass time is envisaged for the thermostatic control of the compressors. This time has the task of delaying the start of the compressors so as to allow the freecooling function to reach stable conditions and the bring the efficiency of the unit to the rated value; only after this time, with main thermostat not yet satisfied, will the compressors be started. When the time set is equal to 0, the function will be disabled.
During the operation of the unit, the same parameter is used by the freecooling function to re-evaluate the operating conditions of the unit according to the value measured by the outside temperature probe.
A further temperature delta can be set, which identifies a second threshold; below this value the efficiency of the freecooling coil is considered high enough as to be able to completely satisfy the thermal load of the installation by combined operation of the valve and fans only.
If the compressors are on, the outside temperature falls below the "maximum delta" set, according to the relationship:

**Outside T. ≤ Freecooling Inlet T.– "Maximum delta" in freecooling**

and the condition remains for a continuous time equal to the compressor bypass time set, the compressors will be stopped and operation will switch to freecooling only so as to satisfy the requirements of the load with the lowest possible energy expense.
Once the bypass time elapses, the thermostatic control of the compressors will re-evaluate the request.
An antifreeze threshold is also envisaged, based on the value of the outside air temperature, so as to protect the exchanger during operation in cold environments.
If the temperature of the outside air is less than the threshold, the valve that controls the flow of water inside the freecooling exchanger will be opened and the main circulating pump started (if off) to pump the fluid and prevent frost forming in the exchanger.

In the case of a 0 to 10 V valve, the percentage of opening will depend on the unit operating status:

- with the unit off the valve will open to 100% of capacity
- with the unit on the valve will open to 10% of capacity

In the case of an on/off valve, the valve will always open to the maximum value, irrespective of the unit operating mode.
All the procedures will end as soon as the outside air temperature exceeds a fixed hysteresis of 1.0ºC above the set threshold.

## 17.4 Deactivation of the freecooling function

There are two main reasons for the freecooling valve to close, the first depending on the outside temperature, and the second depending on the desired control temperature.

The freecooling valve will be closed if the freecooling conditions are no longer present

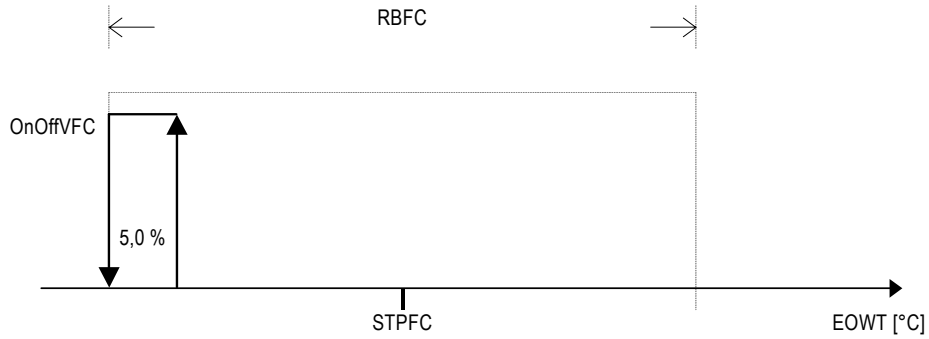
Outside T. ≥ (Freecooling T. – (Freecooling delta) + 1.5ºC

The freecooling valve will be closed if the freecooling thermostat is satisfied.

The reading of the water temperature probe located at the evaporator outlet is controlled for safety reasons. Based on the set thresholds, an antifreeze pre-alarm is managed, which will activate any post-heaters and deactivate the freecooling devices, as well as an antifreeze alarm that shuts down the entire unit.
Other system safety devices, such as: serious alarm from digital input, pump thermal cutout, broken control probe, broken antifreeze control probe, evaporator flow switch alarm and the phase monitor alarm, will cause the complete shutdown of the unit, and consequently stop the freecooling function.

# 17.5 ON/OFF freecooling valve

## 17.5.1 Proportional control




RBFC Freecooling control band
STPFC Freecooling control set point
EOWT Evaporator water outlet temperature
OnOff_VFC ON/OFF freecooling valve

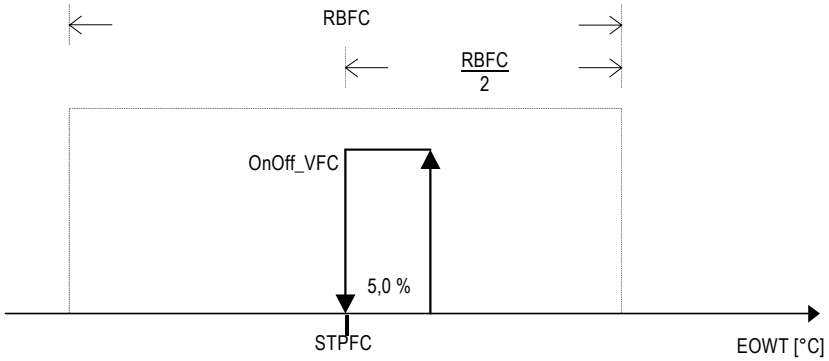
**Fig. 17.4** ON/OFF freecooling valve - proportional control

If the temperature conditions allow freecooling control, the ON/OFF freecooling valve will be activated as soon as the temperature exceeds the activation threshold for the step in question by a temperature value equal to:

**STPFC – RBFC + 5.0 % RBFC**

The amplitude of the step is fixed at 5% of the freecooling control differential.

## 17.5.2 Proportional + integral control




RBFC Freecooling control band
STPFC Freecooling control set point
EOWT Evaporator water outlet temperature
OnOff_VFC ON/OFF freecooling valve

**Fig. 17.5** ON/OFF freecooling valve - proportional + integral control

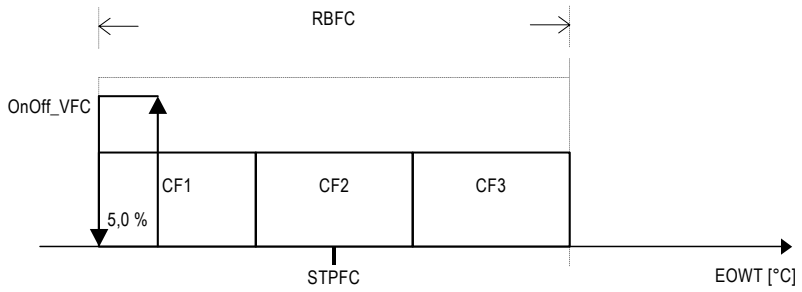
If the temperature conditions allow freecooling control, the ON/OFF freecooling valve will be activated as soon as the temperature exceeds the activation threshold for the step in question by a temperature value equal to:

**STPFC + 5.0 % RBFC**

The amplitude of the step is fixed at 5% of the freecooling control differential.

# 17.6 ON/OFF freecooling valve with stepped condenser control

## 17.6.1 Proportional control




RBFC Freecooling control band
STPFC Freecooling control set point
EOWT Evaporator water outlet temperature
OnOff_VFC ON/OFF freecooling valve
CF 1…3 Condenser fans

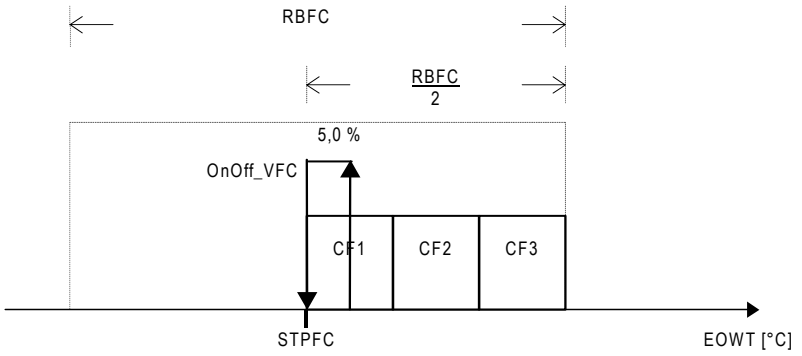
**Fig. 17.6** ON/OFF freecooling valve - stepped condenser control - proportional control

Example of freecooling control with ON/OFF valve and three condenser control steps.
The activation step of the ON/OFF valve will in any case be positioned in the first part of the control differential, and its amplitude will be 5% of the differential.
The activation steps of the condenser fans will be positioned proportionally inside the freecooling differential.
To calculate the amplitude of each step, use the following equation:

$$CFn = \frac{RBFC}{\text{(No. Master fans x Number boards)}}$$

It is assumed that all the circuits controlled by the different pCO boards making up the system are equivalent and the same number of devices are controlled.

## 17.6.2 Proportional + integral control




RBFC Freecooling control band
STPFC Freecooling control set point
EOWT Evaporator water outlet temperature
OnOff_VFC ON/OFF freecooling valve
CF 1…3 Condenser fans

**Fig. 17.7** ON/OFF freecooling valve - stepped condenser control - proportional + integral control

Example of freecooling control with ON/OFF valve and three condenser control steps.

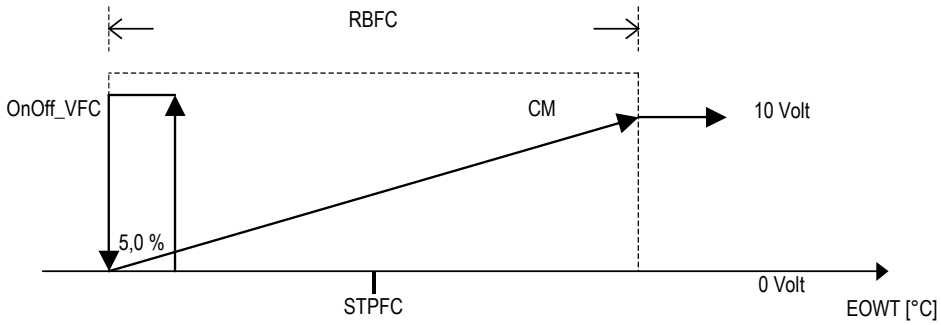
The devices, either valves or fans, will be activated in the second half of the control differential, due to the integral control. The activation of the devices will be bound by the integral constant, and will be slower as the value attributed to the specific parameter increases. The amplitude of the valve control step will be equal to 5.0% of the control differential. The amplitude of the fan control steps will be calculated as follows:

$$CFn = \frac{RBFC}{\text{(No. Master fans x Number boards)}}$$

It is assumed that all the circuits controlled by the different pCO boards making up the system are equivalent and the same number of devices are controlled.

# 17.7 ON/OFF freecooling valve with condenser control by inverter

## 17.7.1 Proportional control

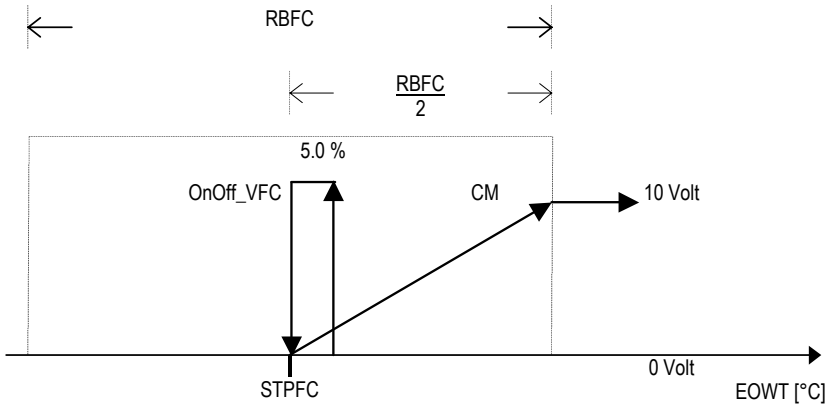



RBFC Freecooling control band
STPFC Freecooling control set point
EOWT Evaporator water outlet temperature
OnOff_VFC ON/OFF freecooling valve
CM Modulating condenser control

**Fig. 17.8** ON/OFF freecooling valve - proportional condenser control - proportional control

The activation step of the ON/OFF valve will in any case be positioned in the first part of the control differential, and its amplitude will be 5% of the differential.
The proportional ramp for the control of the condenser inverter analogue output will be calculated across the entire control differential; the 0-10 Volt value may be limited at the lower end based on the minimum output voltage value set on the screen.
All the proportional outputs relating to the different units making up the system are controlled in parallel.

## 17.7.2 Proportional + integral control




RBFC Freecooling control band
STPFC Freecooling control set point
EOWT Evaporator water outlet temperature
OnOff_VFC ON/OFF freecooling valve
CM Modulating condenser control

**Fig. 17.9** ON/OFF freecooling valve - proportional condenser control - proportional + integral control

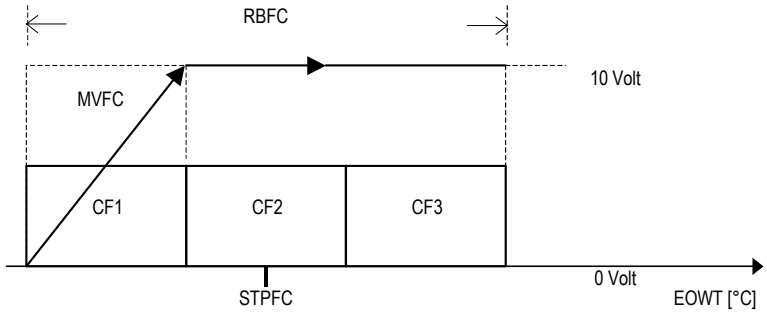
The devices, either valves or fans, will be activated in the second half of the control differential, due to the integral control. The activation of the devices will be bound by the integral constant, and will be slower as the value attributed to the specific parameter increases. The amplitude of the valve control step will be equal to 5.0% of the control differential. All the proportional outputs relating to the different units making up the system are controlled in parallel..

# 17.8 0 to 10 Volt freecooling valve

The proportional control of the freecooling valve depends on whether stepped condenser control or a condenser inverter is used. Below are the control diagrams for both situations.

# 17.9 0 to 10 Volt freecooling valve with stepped condenser control

## 17.9.1 Proportional control




RBFC Freecooling control band
STPFC Freecooling control set point
EOWT Evaporator water outlet temperature
MCFC Modulating freecooling valve
CF 1…3 Condenser fans

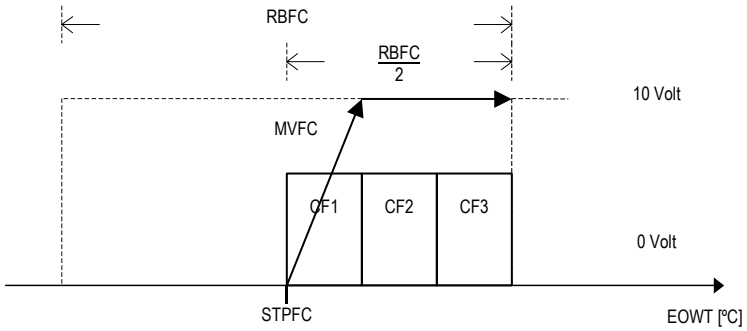
**Fig. 17.10** 0 to 10 V freecooling valve - stepped condenser control - proportional control

The freecooling valve proportional control ramp is calculated inside the first condenser fan activation step, in this way, when the first fan is started, the valve will be completely open, and thus there will be maximum water flow through the freecooling coil. The activation steps of the condenser fans will be positioned proportionally inside the freecooling differential. To calculate the amplitude of each step, use the following equation:

$$\mathbf{CFn} = \frac{\mathbf{RBFC}}{\mathbf{(No.\ Master\ fans\ x\ Number\ boards)}}$$

It is assumed that all the circuits controlled by the different pCO boards making up the system are equivalent and the same number of devices are controlled.

## 17.9.2 Proportional + integral control




RBFC Freecooling control band
STPFC Freecooling control set point
EOWT Evaporator water outlet temperature
MCFC Modulating freecooling valve
CF 1…3 Condenser fans

**Fig. 17.11** 0 to 10 V freecooling valve - stepped condenser control - proportional + integral control

The devices, either valves or fans, will be activated in the second half of the control differential, due to the integral control. The activation of the devices will be bound by the integral constant set, and will be slower as the value attributed to the specific parameter increases.
The freecooling valve proportional control ramp will be calculated inside the first fan activation step; in this way, when the first fan is started, the valve will be completely open, and thus there will be maximum water flow through the freecooling coil. The activation steps of the fans will be positioned proportionally inside the freecooling differential.

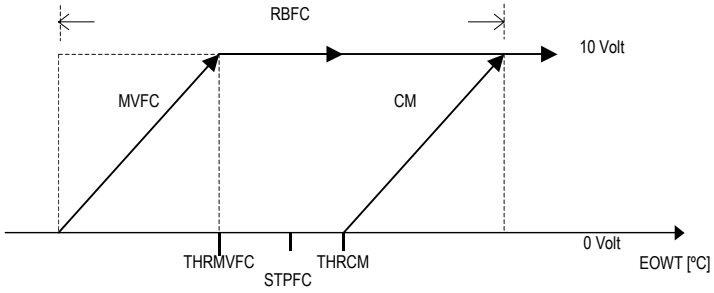
To calculate the amplitude of each step, use the following equation:

$$CFn = \frac{RBFC}{(\text{No. Master fans} \times \text{Number boards})}$$

It is assumed that all the circuits controlled by the different pCO boards making up the system are equivalent and the same number of devices are controlled.

# 17.10 0 to 10 Volt freecooling valve with condenser control by inverter

## 17.10.1 Proportional control




| | |
|---|---|
| RBFC | Freecooling control band |
| STPFC | Freecooling control set point |
| EOWT | Evaporator water outlet temperature |
| MVFC | Modulating freecooling valve |
| CM | Modulating condenser control |
| THRMVFC | Maximum valve opening threshold, percentage |
| THRCM | Modulating condenser control minimum speed threshold, percentage |

**Fig. 17.12** 0 to 10 V freecooling valve - proportional condenser control - proportional control

The proportional freecooling valve control ramp will be calculated inside the area determined by the thresholds:
**STPFC – RBFC / 2**
**STPFC – RBFC / 2 + THRMVFC**

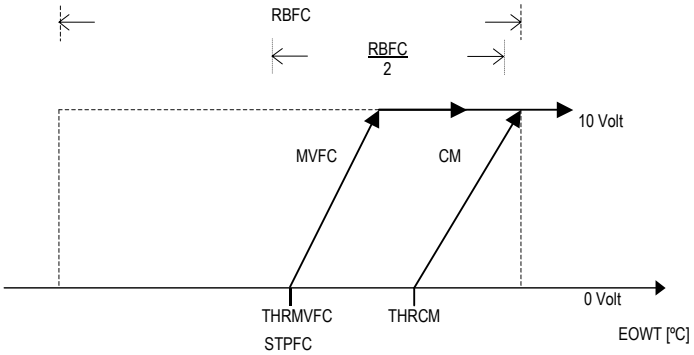
**STPFC –RBFC / 2 + THRCM**
**STPFC + RBFC / 2**

The start/end points of the two control ramps can be modified as desired by the user, by setting the value of the thresholds (see the graph) expressed as a percentage of the freecooling differential.
For the freecooling valve, the field of setting ranges from 25 to 100% of the differential.
For the condenser inverter, the field of setting ranges from 0 to 75% of the differential.

Example:

| | |
|---|---|
| Control set point = | 12.0 ºC |
| Freecooling differential = | 4.0 ºC |
| Freecooling valve threshold % = | 40% |
| Condenser inverter threshold % = | 80% |
| | |
| Freecooling valve control proportional area = | 10.0T11.6ºC |
| Control set point – Freecooling differential / 2 = | 10.0ºC |
| Maximum valve opening threshold % = | 1.6ºC |
| | |
| Condenser inverter control proportional area = | 13.2T16.0ºC |
| Control set point – Freecooling differential / 2 = | 10.0ºC |
| Control set point –Freecooling differential / 2 + Minimum inverter speed threshold % = | 13.2ºC |

## 17.11 Proportional + integral control




| | |
|---|---|
| RBFC | Freecooling control band |
| STPFC | Freecooling control set point |
| EOWT | Evaporator water outlet temperature |
| MVFC | Modulating freecooling valve |
| CM | Modulating condenser control |
| THRMVFC | Maximum valve opening threshold, percentage |
| THRCM | Modulating condenser control minimum speed threshold, percentage |

**Fig. 17.13** 0 to 10 V freecooling valve - proportional condenser control - proportional + integral control

The devices, either valves or fans, will be activated in the second half of the control differential, due to the integral control. The activation of the devices will be bound by the integral constant, and will be slower as the value attributed to the specific parameter increases.

# 18 ANTIFREEZE CONTROL

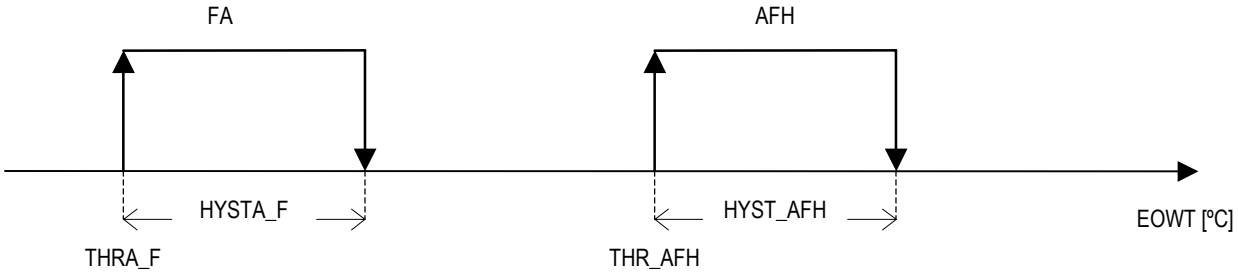
Inputs used:
- Evaporator water outlet temperature

Parameters used:
- Enable evaporator outlet probe
- Antifreeze heater set point
- Antifreeze heater differential
- Antifreeze alarm set point
- Antifreeze alarm differential
- Type of alarm reset
- Alarm signal delay time

Outputs used:
- Antifreeze heater
- General alarm relay
- All the outputs relating to the compressors
- Main circulating pump

## 18.1 Description of operation

Each pCO unit can manage the antifreeze control function, as long as the evaporator water outlet temperature probe is connected and enabled.




| | |
|---|---|
| THRA_F | Antifreeze alarm threshold |
| HYSTA_F | Antifreeze alarm hysteresis |
| FA | Antifreeze alarm |
| THR_AFH | Antifreeze heater threshold |
| HYST_AFH | Antifreeze heater hysteresis |
| AFH | Antifreeze heater |
| EOWT | Evaporator water outlet temperature |

**Fig. 18.1** Antifreeze heater control – antifreeze alarm

Antifreeze control is always active, even when the unit is off, in cooling and heating operation.

The antifreeze alarm is a system alarm, and consequently in multi-board systems, when activated on any unit causes the total shutdown of the unit.

The type of alarm reset can be selected, automatic or manual; if automatic reset is selected, the alarm signal will be delayed from the start of the main circulating pump, to give the unit time to pump all the chilled liquid and avoid alarms in the initial start-up phase.

## 18.2 Antifreeze heater

Each circuit features an antifreeze heater to prevent the activation of the alarm and consequently the shutdown of the unit.
This heating element is activated and deactivated depending on a set threshold and hysteresis. The activation of a heating element in any of the circuits causes the shutdown of the active cooling devices, either compressors or freecooling devices.

# 19 PUMP ROTATION

Inputs used
- pump alarms

Parameters used
- enable pump 2
- type of pump rotation
- number of hours for pump rotation

Outputs used
- pump 1
- pump 2

The user can decide to use a second pump for the circulation of the water. In this case, pump number two is controlled by slave board no. 1. The two pumps never operate at the same time, and two types of rotation are available:
- based on the number of operating hours
- based on the number of starts.

The pumps are also rotated in the event of flow switch or pump thermal cutout alarms.

If an alarm is activated, the procedure will be the following:
assuming that pump 1 is operating, while pump 2 is off.
- pump alarm 1 → pump 1 off, pump 2 on, unit on.
- pump alarm 2 → pump 1 off (due to previous alarm), pump 2 off, unit off.

Pump number two is managed by the software as an alternative to the relay for the deactivation of the utilities (see the following paragraph).

# 20 INSTALLATION START-UP MODE

Inputs used
- unit on/off

Parameters used
- enable utility deactivation

Outputs used
- deactivate utilities

This function is very useful during the start-up of the installation, when the temperature of the water is very high, and therefore deactivating the utilities (fan coils etc.) will help the water loop reach the operating temperature faster.

This function is managed as an alternative to the second pump.

# 21 AUXILIARY FUNCTIONS

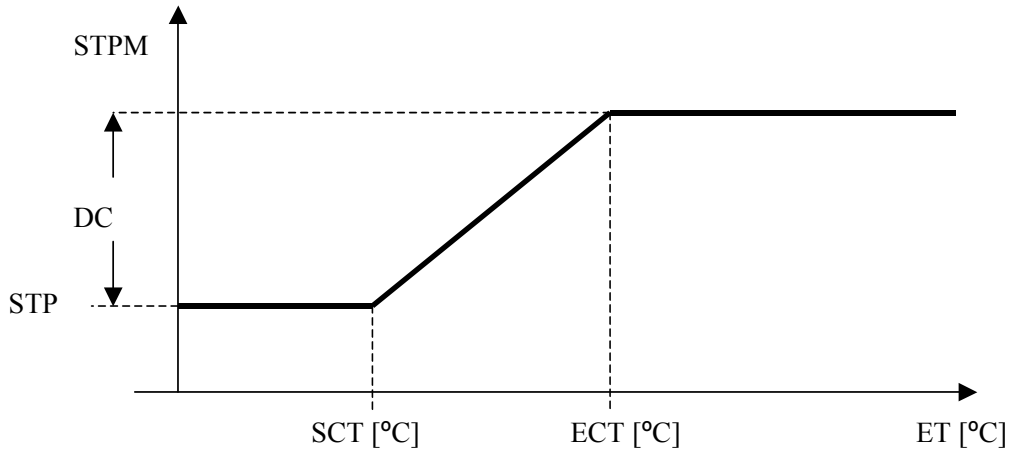
## 21.1 Temperature set point compensation

Inputs used
- outside air temperature

Parameters used
- enable compensation
- compensation differential
- start compensation temperature in cooling
- end compensation temperature in cooling
- start compensation temperature in heating
- end compensation temperature in heating

Outputs used
- Control set point

The temperature set point can be automatically "compensated" for reasons of comfort. Imagine, for example, a commercial installation where people frequently enter and exit the premises; if the inside temperature is 10°C lower than the outside temperature, the temperature difference may disturb people and compromise their health. Indeed, for optimum comfort the maximum difference between inside and outside temperature should not exceed 6°C. To overcome this problem, based on the outside temperature, the software will increase or decrease (in cooling and heating operation respectively) the control set point by a certain value so as to compensate for the temperature difference between the outside and inside, as seen in the diagram below:




| | |
|---|---|
| ET | Outside temperature |
| STPM | Control set point |
| SCT | Start compensation temperature in cooling |
| ECT | End compensation temperature in cooling |
| STP | Cooling set point, as set on the screen |
| DC | Compensation differential |

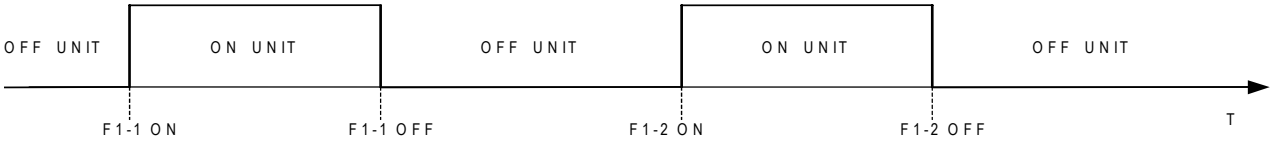
## 21.2 Time bands

If the system is fitted with a clock (optional on $pCO^1$, $pCO^C$ and $pCO^{XS}$, as standard on $pCO^2$), the time bands function can be enabled.
These screens are only present on the master. Two types of time bands can be managed:
- Unit ON/OFF
- Different set points for different time bands

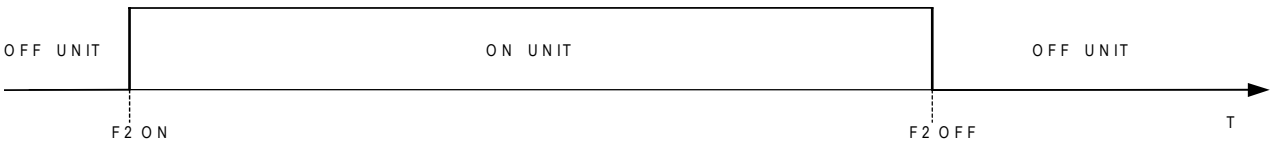
The two types can be used at the same time.

### 21.2.1 Time bands with unit ON/OFF

The user can decide to switch the unit off at different times of the day or on different days of the week.
If selecting "F1", on that day the software will behave as follows:



If selecting “F2”, on that day the software will behave as follows:




### 21.2.2 Time bands with different set points

Three different set points can be set for the same day, in both cooling and heating modes.
Based on the current time and the time bands, the software will use the correct set point.
Outside of the selected time bands, the software will use the set point defined on screen S1.
In heat recovery mode, the time bands will act on the evaporator set point.
The final set point is in any case always adjusted by the outside compensation function if enabled, and by the outside set point, if set.

# 22 ALARMS

## 22.1 General description

The alarms are divided into three categories
Signal-only alarms (signal on the display, buzzer, alarm relay)
Circuit alarms (deactivate only the corresponding circuit, signal on the display, buzzer, alarm relay)
Serious alarms (deactivate the entire system, signal on the display, buzzer, alarm relay)

### 22.1.1 Signal-only alarms

- Unit maintenance alarm
- Compressor maintenance alarm
- Clock card fault or not connected alarm

### 22.1.2 Circuit alarms

- High pressure switch / transducer alarm
- Low pressure alarm
- Compressor thermal cutout alarm
- Oil differential alarm
- Fan thermal cutout alarm
- Alarms deriving from the electronic valve driver (see the following paragraph).

### 22.1.3 Serious alarms

- No water flow alarm
- Evaporator antifreeze alarm
- Serious alarm from digital input
- Pump thermal cutout alarm
- Unit disconnected from network alarm

## 22.2 Alarms deriving from the driver

Below is a list of all the alarms relating to the management of the electronic valve driver. The list relates to a single driver, and consequently if a series of drivers are installed, each of these will feature the following alarms:

- probe error (malfunction or breakage of the temperature and/or pressure probe);
- stepper motor error (fault in motor valve connections);
- EEPROM error (EEPROM malfunction in read or write);
- battery error (battery malfunction);
- high pressure at EXV driver (the operating pressure has exceeded the max. threshold MOP);
- low pressure at EXV driver (the operating pressure has exceeded the min. threshold LOP);
- low superheat alarm (superheating alarm);
- valve not closed during shutdown (valve not completely closed after the last blackout);
- high suction temperature alarm (the operating temperature has exceeded the max. threshold);
- standby due to EEPROM/battery charge error or valve open (the system is blocked due to a problem during the start-up of the driver, see the special “ignore” function);
- LAN disconnected (malfunction or fault in the 485 communication between the pCO* and driver).

## 22.3 Table of alarms

| Code | Alarm description | Generated by | Circ. 1 OFF | Circ. 2 OFF | Cond. OFF | Pump OFF | System OFF | Reset Aut/Man | Delay | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| AL001 | Serious alarm | DIN | X | X | X | X | X | man | / | Can be enabled on both master and slave |
| AL002 | Antifreeze alarm | DIN | X | X | X | | X | settable | / | Settable type of reset<br>If automatic reset, set delay from start of main pump |
| AL003 | Evaporator pump thermal cutout | DIN | X | X | X | X | X | man | / | Reverse pumps if second pump enabled |
| AL004 | Condenser pump thermal cutout | DIN | X | X | X | X | X | man | / | |
| AL005 | Evaporator flow switch | DIN | X | X | X | | X | man | Settable | Can be enabled on both master and slave<br>Settable delay at start and in stable op. |
| AL006 | Condenser flow switch | DIN | X | X | X | | X | man | Settable | Can be enabled on both master and slave<br>Settable delay at start and in stable op. |
| AL007 | Main fan thermal cutout | DIN | X | X | X | X | X | man | / | |
| AL008 | Evaporator pump 2 thermal cutout | Slave 1 | | | | | | man | / | Reverse pumps |
| AL010 | Low pressure switch circuit 1 | DIN | X | | | | | man | Settable | Settable delay at start and in stable op. |
| AL011 | Low pressure switch circuit 2 | DIN | | X | | | | man | Settable | Settable delay at start and in stable op. |
| AL012 | High pressure switch circuit 1 | DIN | X | | | | | man | / | |
| AL013 | High pressure switch circuit 2 | DIN | | X | | | | man | / | |
| AL014 | Oil differential pressure switch circuit 1 | DIN | X | | | | | man | Settable | Settable delay at start and in stable op. |
| AL015 | Oil differential pressure switch circuit 2 | DIN | | X | | | | man | Settable | Settable delay at start and in stable op. |
| AL016 | Compressor 1 thermal cutout | DIN | Comp. 1 | | | | | man | / | |
| AL017 | Compressor 2 thermal cutout | DIN | Comp. 2 | Comp. 2 | | | | man | / | |
| AL018 | Compressor 3 thermal cutout | DIN | | Comp. 3 | | | | man | / | Only with tandem hermetic compressors |
| AL019 | Compressor 4 thermal cutout | DIN | | Comp. 4 | | | | man | / | Only with tandem hermetic compressors |
| AL020 | Condenser fan 1 thermal cutout | DIN | | | X | | | man | / | |
| AL021 | Condenser fan 2 thermal cutout | DIN | | | X | | | man | / | |
| AL022 | Condenser fan 3 thermal cutout | DIN | | | X | | | man | / | |
| AL023 | High pressure from transducer circuit 1 | AIN | X | | | | | man | / | |
| AL024 | High pressure from transducer circuit 2 | AIN | | X | | | | man | / | |
| AL030 | Probe B1 fault | AIN | X | X | X | X | X | man | 60 s | |
| AL031 | Probe B2 fault | AIN | X | X | X | X | X | man | 60 s | |
| AL032 | Probe B3 fault | AIN | | | | | | man | 60 s | |
| AL033 | Probe B4 fault | AIN | | | | | | man | 60 s | |
| AL034 | Probe B5 fault | AIN | | | | | | man | 60 s | |
| AL035 | Probe B6 fault | AIN | | | | | | man | 60 s | |
| AL036 | Probe B7 fault | AIN | | | | | | man | 60 s | |
| AL037 | Probe B8 fault | AIN | | | | | | man | 60 s | |
| AL040 | Fan/Pump maintenance | sistema | | | | | | man | / | |
| AL041 | Compressor 1 maintenance | sistema | | | | | | man.. | / | |
| AL042 | Compressor 2 maintenance | sistema | | | | | | man. | / | |
| AL043 | Compressor 3 maintenance | sistema | | | | | | man. | / | |
| AL044 | Compressor 4 maintenance | sistema | | | | | | man. | / | |
| AL045 | Pump 2 maintenance | pLAN | X | X | X | X | X | man. | | |
| AL050 | Unit 1 offline | pLAN | X | X | X | X | X | auto. | 60 s/ 30 s | total shutdown of the devices due to no control |
| AL051 | Unit 2 offline | pLAN | X | X | X | X | X | auto. | 60 s/ 30 s | |
| AL052 | Unit 3 offline | pLAN | X | X | X | X | X | auto. | 60 s/ 30 s | |
| AL053 | Unit 4 offline | pLAN | | | | | | man. | 60 s/ 30 s | |
| AL054 | Main fan thermal cutout | sistema | X | X | X | X | X | man | / | Air / Air units only |
| AL055 | 32k clock card fault | sistema | X | X | X | | X | settable | / | Time bands OFF |
| AL56 | Driver 1 circuit 1 offline | Driver 1 | X | | | | | man. | 60 s/ 30 s | |
| AL57 | Driver 2 circuit 1 offline | Driver 2 | X | | | | | man. | 60 s/ 30 s | |
| AL58 | Driver 1 circuit 2 offline | Driver 3 | | X | | | | man. | 60 s/ 30 s | |
| AL59 | Driver 2 circuit 2 offline | Driver 4 | | X | | | | man. | 60 s/ 30 s | |
| AL60 | Alarms present | pLAN | | | | | | auto. | | |
| AL101 | Probe error | Driver 1 | X | | | | | man. | | |
| AL102 | EEPROM error | Driver 1 | X | | | | | man. | | |
| AL103 | Solenoid valve motor error | Driver 1 | X | | | | | man. | | |

| Code | Alarm description | Generated by | Circ. 1 OFF | Circ. 2 OFF | Cond. OFF | Pump OFF | System OFF | Reset Aut/Man | Delay | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| **AL104** | **Battery error** | **Driver 1** | | | | | | **man.** | | |
| **AL105** | **High evaporation pressure (MOP)** | **Driver 1** | | | | | | **man.** | **settable** | |
| **AL106** | **Low evaporation pressure (LOP)** | **Driver 1** | | | | | | **man.** | **settable** | |
| **AL107** | **Low superheat** | **Driver 1** | **X** | | | | | **man.** | **settable** | |
| **AL108** | **Valve not closed during shutdown** | **Driver 1** | **X** | | | | | **man.** | | |
| **AL109** | **High suction temperature** | **Driver 1** | **X** | | | | | | **settable** | |
| **AL110** | **Standby due to EEPROM/battery charge error or valve open** | **Driver 1** | **X** | | | | | **man.** | | |
| **AL111** | **Probe error** | **Driver 2** | **X** | | | | | **man.** | | |
| **AL112** | **EEPROM error** | **Driver 2** | **X** | | | | | **man.** | | |
| **AL113** | **Solenoid valve motor error** | **Driver 2** | **X** | | | | | **man.** | | |
| **AL114** | **Battery error** | **Driver 2** | | | | | | **man.** | | |
| **AL115** | **High evaporation pressure (MOP)** | **Driver 2** | | | | | | **man.** | **settable** | |
| **AL116** | **Low evaporation pressure (LOP)** | **Driver 2** | | | | | | **man.** | **settable** | |
| **AL117** | **Low superheat** | **Driver 2** | **X** | | | | | **man.** | **settable** | |
| **AL118** | **Valve not closed during shutdown** | **Driver 2** | **X** | | | | | **man.** | | |
| **AL119** | **High suction temperature** | **Driver 2** | **X** | | | | | | **settable** | |
| **AL120** | **Standby due to EEPROM/battery charge error or valve open** | **Driver 2** | **X** | | | | | **man.** | | |
| **AL121** | **Probe error** | **Driver 3** | | **X** | | | | **man.** | | |
| **AL122** | **EEPROM error** | **Driver 3** | | **X** | | | | **man.** | | |
| **AL123** | **Solenoid valve motor error** | **Driver 3** | | **X** | | | | **man.** | | |
| **AL124** | **Battery error** | **Driver 3** | | | | | | **man.** | | |
| **AL125** | **High evaporation pressure (MOP)** | **Driver 3** | | | | | | **man.** | **settable** | |
| **AL126** | **Low evaporation pressure (LOP)** | **Driver 3** | | | | | | **man.** | **settable** | |
| **AL127** | **Low superheat** | **Driver 3** | | **X** | | | | **man.** | **settable** | |
| **AL128** | **Valve not closed during shutdown** | **Driver 3** | | **X** | | | | **man.** | | |
| **AL129** | **High suction temperature** | **Driver 3** | | **X** | | | | | **settable** | |
| **AL130** | **Standby due to EEPROM/battery charge error or valve open** | **Driver 3** | | **X** | | | | **man.** | | |
| **AL131** | **Probe error** | Driver 4 | | **X** | | | | **man.** | | |
| **AL132** | **EEPROM error** | Driver 4 | | **X** | | | | **man.** | | |
| **AL133** | **Solenoid valve motor error** | Driver 4 | | **X** | | | | **man.** | | |
| **AL134** | **Battery error** | Driver 4 | | | | | | **man.** | | |
| **AL135** | **High evaporation pressure (MOP)** | Driver 4 | | | | | | **man.** | **settable** | |
| **AL136** | **Low evaporation pressure (LOP)** | Driver 4 | | | | | | **man.** | **settable** | |
| **AL137** | **Low superheat** | Driver 4 | | **X** | | | | **man.** | **settable** | |
| **AL138** | **Valve not closed during shutdown** | Driver 4 | | **X** | | | | **man.** | | |
| **AL139** | **High suction temperature** | Driver 4 | | **X** | | | | **man.** | **settable** | |
| **AL140** | **Standby due to EEPROM/battery charge error or valve open** | Driver 4 | | **X** | | | | | | |

**Table 22.1** Table of alarms

# 23 ALARM LOG

The alarm log is used to save the operating status of the standard chiller when the alarms are generated. Each record saved to the memory represents an event that can be displayed. The log is useful in troubleshooting any faults as it represents a "snapshot" of the installation at the moment the alarm was generated, and may suggest the possible causes and solutions of the faults. The program features two types of log, the BASIC log and the ADVANCED log.

## 23.1 Basic log

The pCO* boards can save the events in the BASIC log that is always present on the various boards. If the clock card (optional on pCO[1],pCO[XS] and pCO[C], built-in on pCO[2]) is not fitted, the BASIC log only displays the alarm code.
A maximum number of 100 events can be saved; on reaching the one hundredth alarm, that is, the last space available in the memory, the next alarm overwrites the oldest alarm (001), which is thus deleted, and so on for the following events. The events saved, available on maintenance screen "Ai" protected by password, cannot be deleted by the user,. The BASIC log screen is accessible by pressing the MAINTENANCE button, and has the following layout:

```
+--------------------+
¦History alarm    137¦
¦AL103 09:19 19/11/03¦
¦Set  12.0 Step 01/04¦
¦T.In 13.0 T.Usc 11.1¦
+--------------------+
```

The following data are saved for each alarm, corresponding to the status of the standard chiller at the moment when the alarm occurred:

- alarm code
- time
- date
- chronological number of the event (0 to 99)
- current set point
- number of steps currently activated (compressors + load steps)
- evaporator inlet temperature
- evaporator outlet temperature

The chronological number of the event indicates the "age" of the event in the list of 100 events available. The alarm number 001 is the first event after the BASIC log was enabled, and therefore the oldest.
If the cursor is moved to the chronological number, the "history" of the alarms can be scrolled using the arrow buttons, from 0 to 100.
For example, from position 001 pressing the down arrow has no effect.
If 15 alarms have been saved and the log is in position 015, pressing the up arrow has no effect.

## 23.2 Advanced log

The events are saved to the 1MB or 2MB memory expansion, permanently connected to the board. The advantages and characteristics are listed below:

- Log by event: a typical log by event is the alarm log. If an alarm is activated, the alarm can be saved together with other significant values (temperature, pressure, set point, etc.).
- Log by time: a typical log by time is the log of temperature/pressure values. The temperature and pressure values are saved at regular intervals.
- Log of the logs: this saves the last alarms/temperature/pressure values recorded before a serious alarm. Unlike the data saved by the event and time logs, these data are not overwritten when the memory is full.
- Possibility to choose the values to be saved and the saving method at any time. The "WinLOAD" program can be used to define the values to be saved and the saving method, using a practical "Wizard". WinLOAD does not need the application software "files", as it can directly request the information required from the application software installed on the pCO[1] – pCO[2].
- 1MB dedicated flash memory. The system saves the data to the 1MB flash memory on the memory expansion (code PCO200MEM0). As an example, 1MB of memory can contain 5000 alarm events with 5 values for each alarm, and save 2 values, for example temperature and pressure, every 5 minutes for 6 months.
- Possibility to define up to 7 different log configurations. Typically each check will have configured a log of alarms, a log of the values of control (temperature/humidity/pressure) and some "log of the logs".
- Lookup the data saved from the LCD terminal (external or built-in) or from a connected PC.
- "Black box" operation. The memory expansion that contains the logs can be removed from the pCO² of the controlled unit and inserted in another pCO² to lookup the data saved. This pCO² does not need to run the same software as the original.
- Reliability of the data saved. The data are saved to FLASH memory that does not require batteries that may discharge. If following a software update the previously saved data are incompatible with the new software, all the data will be deleted (following confirmation).

# 24 SUPERVISOR

The unit can be interfaced to a local or remote supervisor/telemaintenance system. The accessories available for the pCO* boards include an optional RS485serial communication card, supplied separately to the pCO* board (for the installation of the optional serial communication cards, refer to the pCO* board installation manual).

The software can manage the following supervision protocols:

- CAREL
- Modbus
- LonWorks (by optional board)
- Trend (by optional board)
- Bacnet (by external gateway)

If the serial communication values, such as the serial address and communication speed, are set correctly, the parameters shown in the following table will be sent by the unit. Setting the serial identification number to 0 disables communication with the serial supervisor system.
The following is a list of the variables that are managed by the supervisor.

| Flow | Type | Index | Screen | Description |
|---|---|---|---|---|
| OUT | D | 1 | | Unit On/Off. On the master starts all the connected units. On each single slave, enables the unit to start. |
| OUT | D | 10 | I9 | Digital output 1 |
| OUT | D | 11 | I9 | Digital output 2 |
| OUT | D | 12 | I9 | Digital output 3 |
| OUT | D | 13 | Ia | Digital output 4 |
| OUT | D | 14 | Ia | Digital output 5 |
| OUT | D | 15 | Ia | Digital output 6 |
| OUT | D | 16 | Ib | Digital output 7 |
| OUT | D | 17 | Ib | Digital output 8 |
| OUT | D | 18 | Ib | Digital output 9 |
| OUT | D | 19 | Ib | Digital output 10 |
| OUT | D | 20 | Ib | Digital output 11 |
| OUT | D | 21 | Ib | Digital output 12 |
| OUT | D | 22 | Ib | Digital output 13 |
| OUT | D | 23 | | Enable driver 1 |
| OUT | D | 24 | | Enable driver 2 |
| OUT | D | 25 | | Enable driver 3 |
| OUT | D | 26 | | Enable driver 4 |
| OUT | D | 27 | | Enable pump 2 |
| OUT | D | 28 | | Indicates if the unit is the MASTER |
| OUT | D | 29 | | Indicates if the unit is a SLAVE |
| IN/OUT | D | 30 | C1 | Enable analogue input 1 |
| IN/OUT | D | 31 | C1 | Enable analogue input 2 |
| IN/OUT | D | 32 | C1 | Enable analogue input 3 |
| IN/OUT | D | 33 | C2 | Enable analogue input 4 |
| IN/OUT | D | 34 | C2 | Enable analogue input 5 |
| IN/OUT | D | 35 | C2 | Enable analogue input 6 |
| IN/OUT | D | 36 | C3 | Enable analogue input 7 |
| IN/OUT | D | 37 | C3 | Enable analogue input 8 |
| IN/OUT | D | 38 | C7 | Enable management of the fan coils |
| OUT | D | 39 | | The board is a $pCO^1$ |
| OUT | D | 40 | | Main pump (or Main fan) |
| OUT | D | 41 | | Condenser pump |
| IN/OUT | D | 42 | | On/Off from supervisor |
| OUT | D | 43 | | The board is a $pCO^2$ |
| IN/OUT | D | 44 | | Select chiller/HP mode from supervisor |
| OUT | D | 45 | | The board is a $pCO^C$ |
| OUT | D | 46 | | Enable freecooling based on the configuration |
| OUT | D | 47 | | AIR/AIR unit selected: 0=Main_Pump, 1=Main_Fan |
| OUT | D | 48 | | WATER/WATER unit selected: enable condenser pump |
| OUT | D | 49 | | Digital input for selecting chiller / HP mode |
| OUT | D | 50 | | Enable digital input for selecting chiller / HP mode |
| OUT | D | 51 | | Operating mode: 0=chiller, 1=heat pump |
| OUT | D | 52 | | The board is a $pCO^{XS}$ |
| IN/OUT | D | 53 | Cq | Select type of condenser: 0=single, 1=double |
| OUT | D | 54 | | Not air unit |
| OUT | D | 55 | | Status of pump 2 |
| IN/OUT | D | 56 | Cp | Select operation, inverter or stepped:<br>0 = inverter; 1 = stepped |
| IN/OUT | D | 57 | | Reset the alarms |
| IN/OUT | D | 58 | Gf | Select type of freecooling valve: On / Off |
| OUT | D | 59 | | Select type of freecooling valve: 0 / 10V |
| IN/OUT | D | 60 | G4 | Select capacity control logic: 0=normally closed, 1=normally open |
| IN/OUT | D | 61 | Gg | Select 4-way valve logic: 0=normally closed, 1=normally open |

| Flow | Type | Index | Screen | Description |
|---|---|---|---|---|
| OUT | D | 62 | | Analogue output 1 used as digital input |
| OUT | D | 63 | | Analogue output 2 used as digital input |
| IN/OUT | D | 64 | S2 | Recovery priority |
| OUT | D | 65 | | Unit 1 online |
| OUT | D | 66 | | Compressor 3 enabled |
| OUT | D | 67 | | Compressor 4 enabled |
| OUT | D | 68 | | Compressor 1 enabled |
| OUT | D | 69 | | Compressor 2 enabled |
| OUT | D | 70 | | General alarm |
| OUT | D | 71 | | Antifreeze alarm |
| OUT | D | 72 | AL016 | Compressor 1 thermal cutout |
| OUT | D | 73 | AL017 | Compressor 2 thermal cutout |
| OUT | D | 74 | AL018 | Compressor 3 thermal cutout |
| OUT | D | 75 | AL019 | Compressor 4 thermal cutout |
| OUT | D | 76 | | Condenser flow switch alarm |
| OUT | D | 77 | | Evaporator flow switch alarm |
| OUT | D | 78 | AL012 | High pressure alarm circuit 1 (pressure switch) |
| OUT | D | 79 | AL013 | High pressure alarm circuit 2 (pressure switch) |
| OUT | D | 80 | AL014 | Oil differential alarm circuit 1 |
| OUT | D | 81 | AL015 | Oil differential alarm circuit 2 |
| OUT | D | 82 | AL010 | Low pressure alarm circuit 1 |
| OUT | D | 83 | AL011 | Low pressure alarm circuit 2 |
| OUT | D | 84 | AL023 | High pressure transducer alarm 1 |
| OUT | D | 85 | AL024 | High pressure transducer alarm 2 |
| OUT | D | 86 | AL001 | Serious alarm from digital input |
| OUT | D | 87 | AL020 | Condenser fan 1 thermal cutout alarm |
| OUT | D | 88 | AL021 | Condenser fan 2 thermal cutout alarm |
| OUT | D | 89 | AL022 | Condenser fan 3 thermal cutout alarm |
| OUT | D | 90 | AL007 | Main fan thermal cutout alarm |
| OUT | D | 91 | AL004 | Condenser pump thermal cutout alarm |
| OUT | D | 92 | AL003 | Evaporator pump thermal cutout alarm |
| OUT | D | 93 | AL050 | Unit 1 disconnected alarm |
| OUT | D | 94 | AL051 | Unit 2 disconnected alarm |
| OUT | D | 95 | AL052 | Unit 3 disconnected alarm |
| OUT | D | 96 | AL053 | Unit 4 disconnected alarm |
| OUT | D | 97 | AL030 | Probe B1 broken or disconnected alarm |
| OUT | D | 98 | AL031 | Probe B2 broken or disconnected alarm |
| OUT | D | 99 | AL032 | Probe B3 broken or disconnected alarm |
| OUT | D | 100 | AL033 | Probe B4 broken or disconnected alarm |
| OUT | D | 101 | AL034 | Probe B5 broken or disconnected alarm |
| OUT | D | 102 | AL035 | Probe B6 broken or disconnected alarm |
| OUT | D | 103 | AL036 | Probe B7 broken or disconnected alarm |
| OUT | D | 104 | AL037 | Probe B8 broken or disconnected alarm |
| OUT | D | 105 | AL040 | Main pump or main fan maintenance alarm |
| OUT | D | 106 | AL041 | Compressor 1 maintenance alarm |
| OUT | D | 107 | AL042 | Compressor 2 maintenance alarm |
| OUT | D | 108 | AL043 | Compressor 3 maintenance alarm |
| OUT | D | 109 | AL044 | Compressor 4 maintenance alarm |
| OUT | D | 110 | AL055 | 32k clock card broken or not connected alarm |
| OUT | D | 111 | | Request step 1 |
| OUT | D | 112 | | Request step 2 |
| OUT | D | 113 | | Request step 3 |
| OUT | D | 114 | | Request step 4 |
| OUT | D | 115 | | Enable defrost pressure |
| OUT | D | 116 | | Not water/water unit |
| OUT | D | 117 | | Unit with recovery |
| OUT | D | 118 | | Unit without outside set point |
| OUT | D | 119 | | Unit with heat pump |
| OUT | D | 120 | | Analogue output 1 used |
| OUT | D | 121 | | Analogue output 2 used |
| IN/OUT | D | 122 | Pc | Enable set point compensation with outside temperature |
| IN/OUT | D | 123 | Pb | Unit with outside set point |
| IN/OUT | D | 124 | Ah | Enable compressor 1 |
| IN/OUT | D | 125 | Ah | Enable compressor 2 |
| IN/OUT | D | 126 | Ah | Enable compressor 3 |
| IN/OUT | D | 127 | AL101 | Enable compressor 4 |
| IN/OUT | D | 128 | AL102 | Enable compressor 5 |
| IN/OUT | D | 129 | AL103 | Enable compressor 6 |
| IN/OUT | D | 130 | AL104 | Enable compressor 7 |
| IN/OUT | D | 131 | AL105 | Enable compressor 8 |
| OUT | D | 132 | AL106 | Unit OFF |
| OUT | D | 133 | AL107 | Driver 1 circuit 1 Probe error |
| OUT | D | 134 | AL108 | Driver 1 circuit 1 EEPROM error |
| OUT | D | 135 | AL109 | Driver 1 circuit 1 Solenoid valve motor error |
| OUT | D | 136 | AL110 | Driver 1 circuit 1 Battery error |

| Flow | Type | Index | Screen | Description |
|---|---|---|---|---|
| OUT | D | 137 | AL111 | Driver 1 circuit 1 High evaporation pressure (MOP) |
| OUT | D | 138 | AL112 | Driver 1 circuit 1 Low evaporation pressure (LOP) |
| OUT | D | 139 | AL113 | Driver 1 circuit 1 Low superheat |
| OUT | D | 140 | AL114 | Driver 1 circuit 1 Valve not closed during shutdown |
| OUT | D | 141 | AL115 | Driver 1 circuit 1 High suction temperature |
| OUT | D | 142 | AL116 | Driver 1 circuit 1 Standby due to EEPROM/battery charge error or valve open |
| OUT | D | 143 | AL117 | Driver 2 circuit 1 Probe error |
| OUT | D | 144 | AL118 | Driver 2 circuit 1 EEPROM error |
| OUT | D | 145 | AL119 | Driver 2 circuit 1 Solenoid valve motor error |
| OUT | D | 146 | AL120 | Driver 2 circuit 1 Battery error |
| OUT | D | 147 | AL121 | Driver 2 circuit 1 High evaporation pressure (MOP) |
| OUT | D | 148 | AL122 | Driver 2 circuit 1 Low evaporation pressure (LOP) |
| OUT | D | 149 | AL123 | Driver 2 circuit 1 Low superheat |
| OUT | D | 150 | AL124 | Driver 2 circuit 1 Valve not closed during shutdown |
| OUT | D | 151 | AL125 | Driver 2 circuit 1 High suction temperature |
| OUT | D | 152 | AL126 | Driver 2 circuit 1 Standby due to EEPROM/battery charge error or valve open |
| OUT | D | 153 | AL127 | Driver 1 circuit 2 Probe error |
| OUT | D | 154 | AL128 | Driver 1 circuit 2 EEPROM error |
| OUT | D | 155 | AL129 | Driver 1 circuit 2 Solenoid valve motor error |
| OUT | D | 156 | AL130 | Driver 1 circuit 2 Battery error |
| OUT | D | 157 | AL131 | Driver 1 circuit 2 High evaporation pressure (MOP) |
| OUT | D | 158 | AL132 | Driver 1 circuit 2 Low evaporation pressure (LOP) |
| OUT | D | 159 | AL133 | Driver 1 circuit 2 Low superheat |
| OUT | D | 160 | AL134 | Driver 1 circuit 2 Valve not closed during shutdown |
| OUT | D | 161 | AL135 | Driver 1 circuit 2 High suction temperature |
| OUT | D | 162 | AL136 | Driver 1 circuit 2 Standby due to EEPROM/battery charge error or valve open |
| OUT | D | 163 | AL137 | Driver 2 circuit 2 Probe error |
| OUT | D | 164 | AL138 | Driver 2 circuit 2 EEPROM error |
| OUT | D | 165 | AL139 | Driver 2 circuit 2 Solenoid valve motor error |
| OUT | D | 166 | AL140 | Driver 2 circuit 2 Battery error |
| OUT | D | 167 | Ah | Driver 2 circuit 2 High evaporation pressure (MOP) |
| OUT | D | 168 | Ah | Driver 2 circuit 2 Low evaporation pressure (LOP) |
| OUT | D | 169 | Ah | Driver 2 circuit 2 Low superheat |
| OUT | D | 170 | Ah | Driver 2 circuit 2 Valve not closed during shutdown |
| OUT | D | 171 | Ah | Driver 2 circuit 2 High suction temperature |
| OUT | D | 172 | | Driver 2 circuit 2 Standby due to EEPROM/battery charge error or valve open |
| OUT | D | 173 | AL056 | Driver 1 circuit 1 Offline |
| OUT | D | 174 | AL057 | Driver 2 circuit 1 Offline |
| OUT | D | 175 | AL058 | Driver 1 circuit 2 Offline |
| OUT | D | 176 | AL059 | Driver 2 circuit 2 Offline |
| OUT | D | 177 | | High pressure prevent circuit 1 |
| OUT | D | 178 | | High pressure prevent circuit 2 |
| OUT | D | 179 | | Confirm change time/date |
| OUT | D | 180 | | Inlet probe enabled |
| OUT | D | 181 | | Outlet probe enabled |
| OUT | D | 182 | M1 | Unit in cooling mode |
| OUT | D | 183 | M1 | Unit in heating mode |

**Table 24.1** Digital supervisor variables

| Flow | Type | Index | Screen | Description |
|---|---|---|---|---|
| OUT | A | 1 | I0 | Analogue input 1 |
| OUT | A | 2 | I0 | Analogue input 2 |
| OUT | A | 3 | I1 | Analogue input 3 |
| OUT | A | 4 | I1 | Analogue input 4 |
| OUT | A | 5 | I2 | Analogue input 5 |
| OUT | A | 6 | I2 | Analogue input 6 |
| OUT | A | 7 | I3 | Analogue input 7 |
| OUT | A | 8 | I3 | Analogue input 8 |
| OUT | A | 9 | Ie | Analogue output 1 |
| OUT | A | 10 | Ie | Analogue output 2 |
| IN/OUT | A | 11 | S1 | Cooling set point (evaporator set point) |
| IN/OUT | A | 12 | S1 | Heating set point (evaporator set point) |
| IN/OUT | A | 13 | | Condenser control set point |
| IN/OUT | A | 14 | S0 | Current set point |
| IN/OUT | A | 15 | P1 | Temperature control band |
| IN/OUT | A | 16 | | Minimum freecooling delta |
| IN/OUT | A | 17 | | Freecooling differential |
| IN/OUT | A | 18 | | Start defrost set point |
| IN/OUT | A | 19 | | End defrost set point |
| IN/OUT | A | 20 | | Cooling set point lower limit |
| IN/OUT | A | 21 | | Cooling set point upper limit |
| IN/OUT | A | 22 | | Heating set point lower limit |
| IN/OUT | A | 23 | | Heating set point upper limit |

| Flow | Type | Index | Screen | Description |
|---|---|---|---|---|
| IN/OUT | A | 24 | | Recovery control set point |
| IN/OUT | A | 25 | | Recovery control differential |
| OUT | A | 26 | | Status of analogue output 1 |
| OUT | A | 27 | | Status of analogue output 2 |
| OUT | A | 28 | | Condenser control differential |
| OUT | A | 29 | | Current SuperHeat driver 1 |
| OUT | A | 30 | | Current SuperHeat driver 2 |
| OUT | A | 31 | | Current SuperHeat driver 3 |
| OUT | A | 32 | | Current SuperHeat driver 4 |
| OUT | A | 33 | | Saturation temperature Driver 1 |
| OUT | A | 34 | | Saturation temperature Driver 2 |
| OUT | A | 35 | | Saturation temperature Driver 3 |
| OUT | A | 36 | | Saturation temperature Driver 4 |
| OUT | A | 37 | | Suction temperature Driver 1 |
| OUT | A | 38 | | Suction temperature Driver 2 |
| OUT | A | 39 | | Suction temperature Driver 3 |
| OUT | A | 40 | | Suction temperature Driver 4 |
| OUT | A | 41 | | Suction pressure Driver 1 |
| OUT | A | 42 | | Suction pressure Driver 2 |
| OUT | A | 43 | | Suction pressure Driver 3 |
| OUT | A | 44 | | Suction pressure Driver 4 |
| OUT | A | 45 | | Main inlet temperature |
| IN/OUT | A | 46 | | Main outlet temperature |

**Table 24.2** Analogue supervisor variables

| Flow | Type | Index | Screen | Description |
|---|---|---|---|---|
| OUT | I | 1 | | STEFA supervisor |
| OUT | I | 2 | | STEFA supervisor |
| OUT | I | 3 | | STEFA supervisor |
| OUT | I | 4 | | STEFA supervisor |
| OUT | I | 5 | | STEFA supervisor |
| OUT | I | 6 | | STEFA supervisor |
| OUT | I | 7 | | STEFA supervisor |
| OUT | I | 8 | | STEFA supervisor |
| OUT | I | 9 | | STEFA supervisor |
| OUT | I | 10 | | Compressor remote control |
| OUT | I | 11 | M1 | Recovery mode:<br>1 = recovery-only<br>2 = chiller<br>3 = chiller + recovery<br>4 = defrost<br>5 = recovery-only<br>6 = heat pump |
| OUT | I | 12 | M0 | Unit status:<br>0 = unit active<br>1 = off from alarm<br>2 = off from supervisor<br>3 = off from time bands<br>4 = off from digital input (DIN3)<br>5 = off local (keypad on terminal)<br>6 = manual operation |
| IN/OUT | I | 13 | Cp | Fan control:<br>0 = none<br>1 = pressure<br>2 = temperature |
| OUT | I | 20 | A3 | Main pump operating hour count (high byte) |
| OUT | I | 21 | A3 | Main pump operating hour count (low byte) |
| OUT | I | 22 | A4 | Compressor 1 operating hour count (high byte) |
| OUT | I | 23 | A4 | Compressor 1 operating hour count (low byte) |
| OUT | I | 24 | A4 | Compressor 2 operating hour count (high byte) |
| OUT | I | 25 | A4 | Compressor 2 operating hour count (low byte) |
| OUT | I | 26 | A5 | Compressor 3 operating hour count (high byte) |
| OUT | I | 27 | A5 | Compressor 3 operating hour count (low byte) |
| OUT | I | 28 | A5 | Compressor 4 operating hour count (high byte) |
| OUT | I | 29 | A5 | Compressor 3 operating hour count (low byte) |
| OUT | I | 30 | | Device configuration for all units:<br>0 = CCCC<br>1 = CPCP<br>2 = CPPP<br>[C = compressor; P = load step] |
| IN/OUT | I | 31 | C0 | Select type of unit: 0 to 23 (see manual) |
| OUT | I | 32 | | Type of circuit (physical) =<br>0 = water / air<br>1 = air /air<br>2 = water / water |
| IN/OUT | I | 33 | C4 | Total number of compressors on the unit |
| IN/OUT | I | 34 | C4 | Number of compressors per unit (same for all units) |
| IN/OUT | I | 35 | C4 | Number of load steps per compressor (same for all units) |

| Flow | Type | Index | Screen | Description | |
|---|---|---|---|---|---|
| IN/OUT | I | 36 | | Number of condenser fans (1-3 with single condenser, 1-2 with double condenser) | |
| OUT | I | 37 | | Inverter speed circuit 1 | |
| OUT | I | 38 | | Inverter speed circuit 2 | |
| OUT | I | 39 | | Opening of freecooling valve | |
| OUT | I | 40 | | Status of analogue output 1 | |
| OUT | I | 41 | | Status of analogue output 2 | |
| IN/OUT | I | 42 | Q0 | Type of defrost :<br>0 = Temperature<br>1 = Pressure<br>2 = Pressure switch | |
| IN/OUT | I | 43 | Q2 | Delay time at start of defrost | |
| IN/OUT | I | 44 | Q2 | Maximum defrost duration | |
| IN/OUT | I | 45 | Q3 | Enable force compressors off when the defrost starts or ends | |
| OUT | I | 46 | | pLAN address | |
| IN/OUT | I | 47 | C5 | Driver number | |
| IN/OUT | I | 48 | B2 | SuperHeat set point for driver 1 circuit 1 in chiller operation | |
| IN/OUT | I | 49 | F2 | SuperHeat set point for driver 2 circuit 1 in chiller operation | |
| IN/OUT | I | 50 | B8 | SuperHeat set point for driver 1 circuit 2 in chiller operation | |
| IN/OUT | I | 51 | E2 | SuperHeat set point for driver 2 circuit 2 in chiller operation | |
| IN/OUT | I | 52 | f8 | SuperHeat set point for driver 1 circuit 1 in heat pump operation | |
| IN/OUT | I | 53 | J2 | SuperHeat set point for driver 2 circuit 1 in heat pump operation | |
| IN/OUT | I | 54 | B5 | SuperHeat set point for driver 1 circuit 2 in heat pump operation | |
| IN/OUT | I | 55 | F5 | SuperHeat set point for driver 2 circuit 2 in heat pump operation | |
| IN/OUT | I | 56 | L4 | SuperHeat set point for driver 1 circuit 1 in defrost operation | |
| IN/OUT | I | 56 | 0 | SuperHeat set point for driver 2 circuit 1 in defrost operation | |
| IN/OUT | I | 58 | L6 | SuperHeat set point for driver 1 circuit 2 in defrost operation | |
| IN/OUT | I | 59 | L3 | SuperHeat set point for driver 2 circuit 2 in defrost operation | |
| IN/OUT | I | 60 | L5 | MOP limit in chiller operation | |
| IN/OUT | I | 61 | L2 | LOP limit in chiller operation | |
| IN/OUT | I | 62 | | MOP limit in defrost operation | |
| IN/OUT | I | 63 | | LOP limit in defrost operation | |
| IN/OUT | I | 64 | | MOP limit in heat pump operation | |
| IN/OUT | I | 65 | | LOP limit in heat pump operation | |
| IN/OUT | I | 66 | | Set minutes | |
| IN/OUT | I | 67 | | Set hour | |
| OUT | I | 68 | | Current minutes | |
| OUT | I | 69 | | Current hour | |
| OUT | I | 70 | | Type of probe connected to analogue input 1 | |
| OUT | I | 71 | | Type of probe connected to analogue input 2 | |
| OUT | I | 72 | | Type of probe connected to analogue input 3 | |
| OUT | I | 73 | | Type of probe connected to analogue input 4 | |
| OUT | I | 74 | | Type of probe connected to analogue input 5 | |
| OUT | I | 75 | | Type of probe connected to analogue input 6 | |
| OUT | I | 76 | | Type of probe connected to analogue input 7 | |
| OUT | I | 77 | | Type of probe connected to analogue input 8 | |
| OUT | I | 78 | | Total steps of the unit | |
| OUT | I | 79 | | Active step on the unit | |
| OUT | I | 80 | | Current valve position for driver 1 circuit 1 | |
| OUT | I | 81 | | Current valve position for driver 2 circuit 1 | |
| OUT | I | 82 | | Current valve position for driver 1 circuit 2 | |
| OUT | I | 83 | | Current valve position for driver 2 circuit 2 | |
| OUT | I | 84 | M1 | Unit operating status :<br>0 = Freecooling OFF<br>1 = Freecooling ON<br>2 = n.c.<br>3 = HP Prevent compressor 1<br>4 = HP Prevent compressor 2<br>5 = HP Prevent compressors 1 and 2 | 6 = n.c.<br>7 = Recovery<br>8 = Utility<br>9 = Rec+Utility<br>10 = Defrost<br>11 = Rec+Heat<br>12 = Utility+Heat |
| OUT | I | 85 | M1 | Unit operating status :<br>0 = Defrost compressor 1<br>1 = Defrost compressor 2<br>2 = Defrost compressors 1 and 2<br>3 = PumpDown | |

**Table 24.3** Integer supervisor variables

Key :

| | |
|---|---|
| A | Analogue variable |
| D | Digital variable |
| I | Integer variable |

| | | |
|---|---|---|
| IN | Input variable | pCO ← Supervisor |
| OUT | Output variable | pCO → Supervisor |
| IN/OUT | Input/output variable | pCO←→ Supervisor |

# 25 OTHER PROTOCOLS

## 25.1 RS232 protocol (connection by analogue modem)

The user can install an analogue modem to interface the pCO* peripheral to a remote supervisor, without requiring a gateway. The protocol allows the pCO* board to be managed by the remote supervisor as a network node with **a single Slave unit connected**.

## 25.2 GSM protocol

Selecting the GSM protocol allows SMS messages to be sent to and received from GSM telephones. In fact, using a GSM modem the pCO* boards send an SMS message to the selected telephone in the event of alarms, and can receive messages from the telephone at any time. The user can in fact modify all the read-write parameters available to the supervisor (see the table of Supervisor variables).
The message received by the user contains:

- the name of the application
- the number of the unit sending the message
- a short text that can be customised by the user
- alarm code
- time
- date
- chronological number of the event (0 to 99)
- current set point
- number of steps currently activated (compressors + load steps)
- evaporator inlet temperature
- evaporator outlet temperature

The GSM modem can be connected to board number 1 only or alternatively to each pCO* board

For the syntax of the SMS message sent to the pCO* and the use of the above table, refer to the manual: *GSM modem protocol for pCO2 (code+030220330).*

**N.B. When the GSM protocol is active, no calls can be made from the remote supervisor to the pCO* board.**

**Notes**:

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