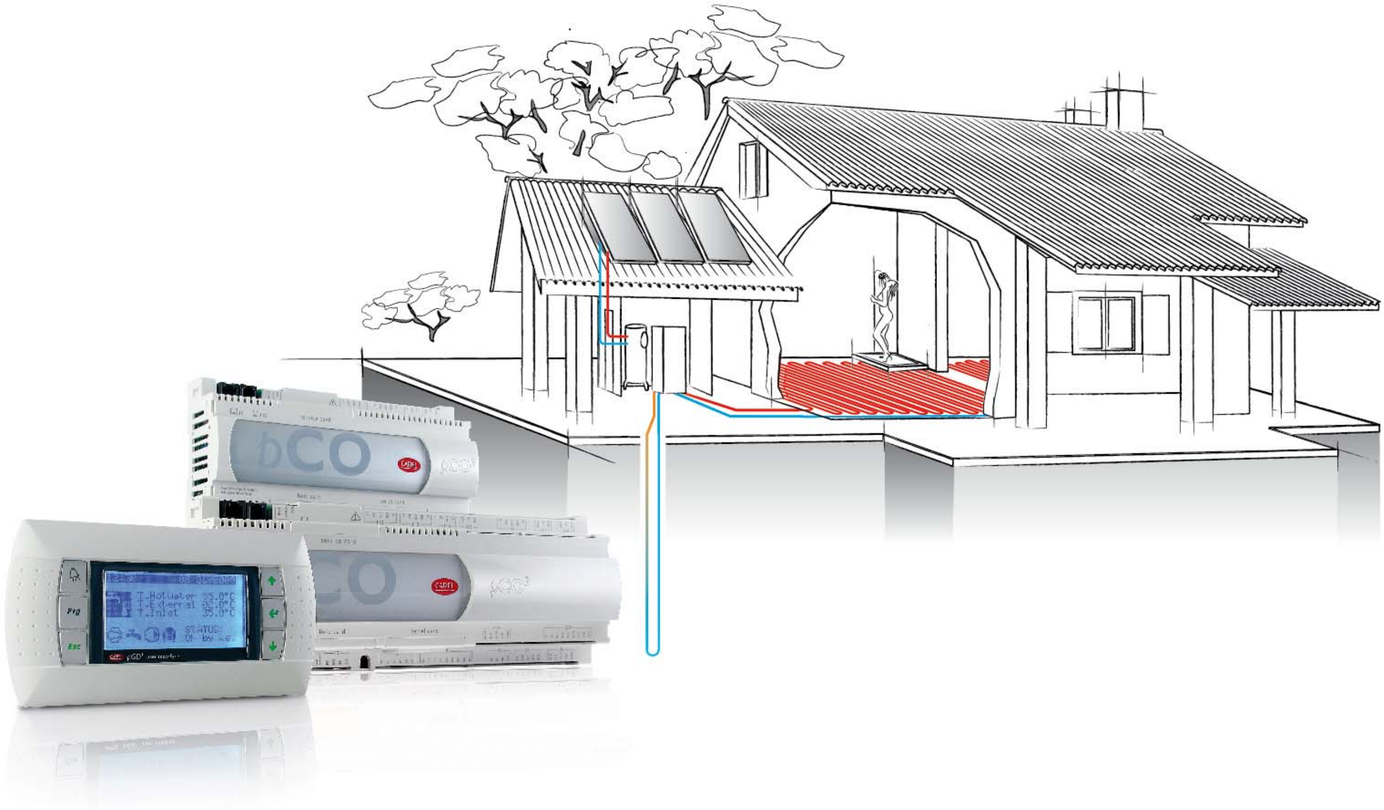
Smart HP

Application geothermal heat pumps management
Part No. FLSTDmHPGE



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READ AND SAVE THESE INSTRUCTIONS

ENG

User Manual

Integrated Control Solutions & Energy Savings

CAUTION

CAREL develops its products based on the company's multiple decade experience in the field of HVAC, on continuous investment in product technology innovation, on rigorous quality processes and procedures with in-circuit tests and 100% functional tests on all products, and on the most innovative production technologies available on the market. CAREL and its subsidiaries/affiliates, however, do not guarantee that all of the features of the product and software included will meet the requirements of the final application, even if they are manufactured with state-of-the-art technology.
The customer (manufacturer, designer or installer of the final equipment) assumes all responsibility and risk regarding product configuration to obtain the results expected upon the final specific installation and/or equipment.
Under these circumstances, unless other agreements have been made, CAREL can act as a consultant for the success of the final unit/application start-up, but under no conditions can CAREL be held responsible for the correct operation of the final equipment/installation.

CAREL's product is a high-tech product, whose function is specified in the technical documentation supplied with the product. The documentation can also be downloaded prior to purchase from the internet site www.CAREL.com.
Every CAREL product, in relation to its advanced technical level, requires phases for qualification / configuration /programming / commissioning in order to best operate in the specific application. The lack of this design phase, as indicated in the User Manual, can result in malfunction of the final product for which CAREL cannot be held responsible.
Only qualified personnel may install or perform technical assistance on this product.
The final customer must use the product within the limits of the modes described in product documentation.

Without excluding the customer from the due observance of the additional warnings illustrated in this manual, which must be observed at all times, the following warnings must be observed for every CAREL product:

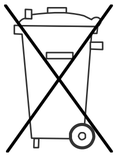
- Avoid getting the electronic circuits wet. Rain, humidity, all liquids and condensate contain corrosive minerals that my damage the electronic circuits. The product must be used and stored in areas the meet the temperature and humidity limits specified in the User Manual.
- Do not install the equipment in extremely hot areas. Very high temperatures may reduce the life-time or damage of electronic equipment. Plastic parts may deform or melt. The product must be used and stored in areas the meet the temperature and humidity limits specified in the User Manual.
- Do not attempt to open the device except according to the method described in the User Manual.
- Do not drop, impact, or shake the device as the internal circuits and mechanisms may be irreparably damaged.
- Do not use corrosive chemicals, solvents or harsh detergents to clean the device.
- Do not use the product in application environments other than those specified in the technical manual.

All of the above listed recommendations are also valid for controllers, serial boards, programming keys, or any other accessory in the CAREL product offering.
CAREL has a policy of continuous development. Thus, CAREL reserves the right to make any changes and/or improvement to any of the products described in this document without prior notice.

The technical data in this manual may be changed without prior notice.

CAREL's responsibility for its products is outlined in CAREL's general sales terms that are provided on the Internet site www.CAREL.com and/or by specific customer agreements. In particular, within the limits of the applicable legislation, under no terms will CAREL, its employees, or its subsidiaries/affiliates be responsible for any losses in profits or sales, loss of data or information, costs for replacement goods or services, damages to things or individuals, interruptions in business; or direct, indirect, accidental, capital, coverage, punitive, special and/or consequential damages of any type, regardless if these are contractual, extra-contractual, or due to negligence or other responsibility on installation, use, or impossibility to use the product, even if CAREL or its subsidiaries/affiliates have been advised of the possibility of damages.

DISPOSAL



USER INFORMATION FOR THE CORRECT DISPOSAL OF WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE).

In regard to European Directive 2002/96/EC and Italian legislation dated 27 January 2003 and the current relative national legislation, we inform you that:

- There exists the obligation to not dispose of WEEE with municipal waste and to perform, for separate collection for these wastes.
- Public or private collection systems must be used for disposal as required by local law. Equipment at the end of its life-time may also be returned to the distributor upon the purchase of new, similar equipment.
- This equipment may contain hazardous substances. Improper use or disposal may have negative effects on human health and the environment.
- The symbol (crossed-out wheeled bin) provided on the product, its packaging, and on the instruction sheet indicate that the equipment entered the market after 13 August 2005 and is subject to separate collection.
- Should the electric and electronic equipment be disposed of incorrectly, the sanctions established by the current local laws are applicable.

ICON KEY

	NOTE: to place special attention on important subjects, especially for the practical use of the various product functions.
	CAUTION: informs the user of critical topics for the use of the product.
	TUTORIAL: accompanies the user through simple example configurations of the more common settings.

INDEX

1. INTRODUCTION

1.1 Main Characteristics

Smart HP is CAREL's new solution for the management of geothermal heat pumps.
The Smart HP software installed in the programmable pCO³ board allows you to:

- Control the heat pump
- Produce hot water with the integration of thermal solar panels
- Manage six different rooms organized on two schedulers/zones
- Use the electronic expansion valve
- Use serials to make installations "modular"
- Completely customise the installation by selecting the control board from among the different sizes available (Small, Medium and Large) based on your specific needs
- Connect the installations to BMS systems.
- Save energy and consequently money thanks to the integration of the unit + installation management.
- Improve system management, which can be set using a simple graphic user interface (pGD1).

This CAREL product is certified by the well-tested and proven reliability of the pCO³ control board.

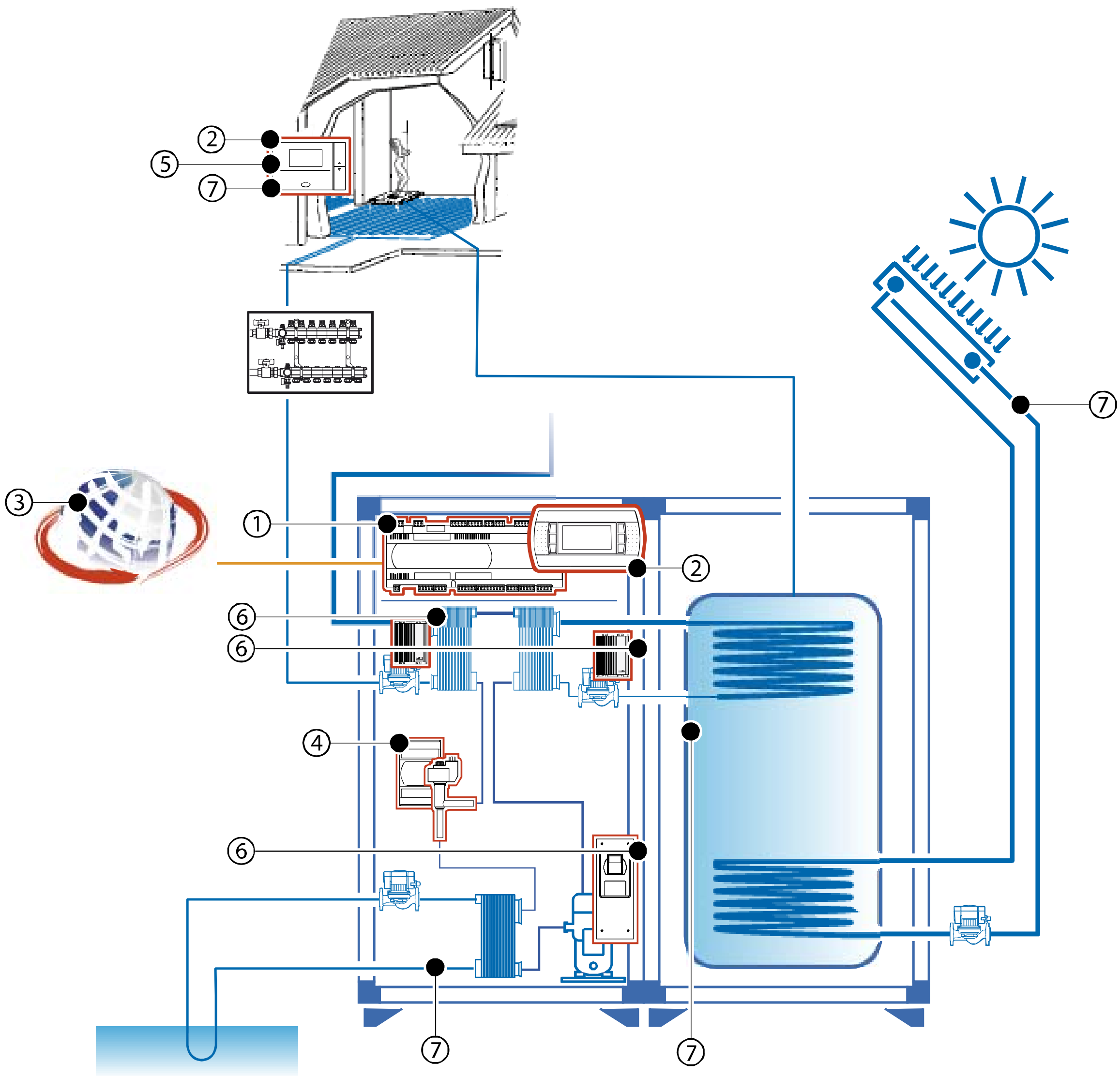


Fig. 1.a

Key

1	Controller
2	System User Interface
3	Connection to BMS
4	Driver and electronic expansion valve
5	Zone Control, ex. Clima or Serial Probes ...
6	Compressor/Pump Inverter and Speed Control
7	A few system probes

1.2 Parts and Accessories

The figure below shows the system architecture formed by the pCO³ programmable platform on which the Smart HP application and its components and accessories will be installed.

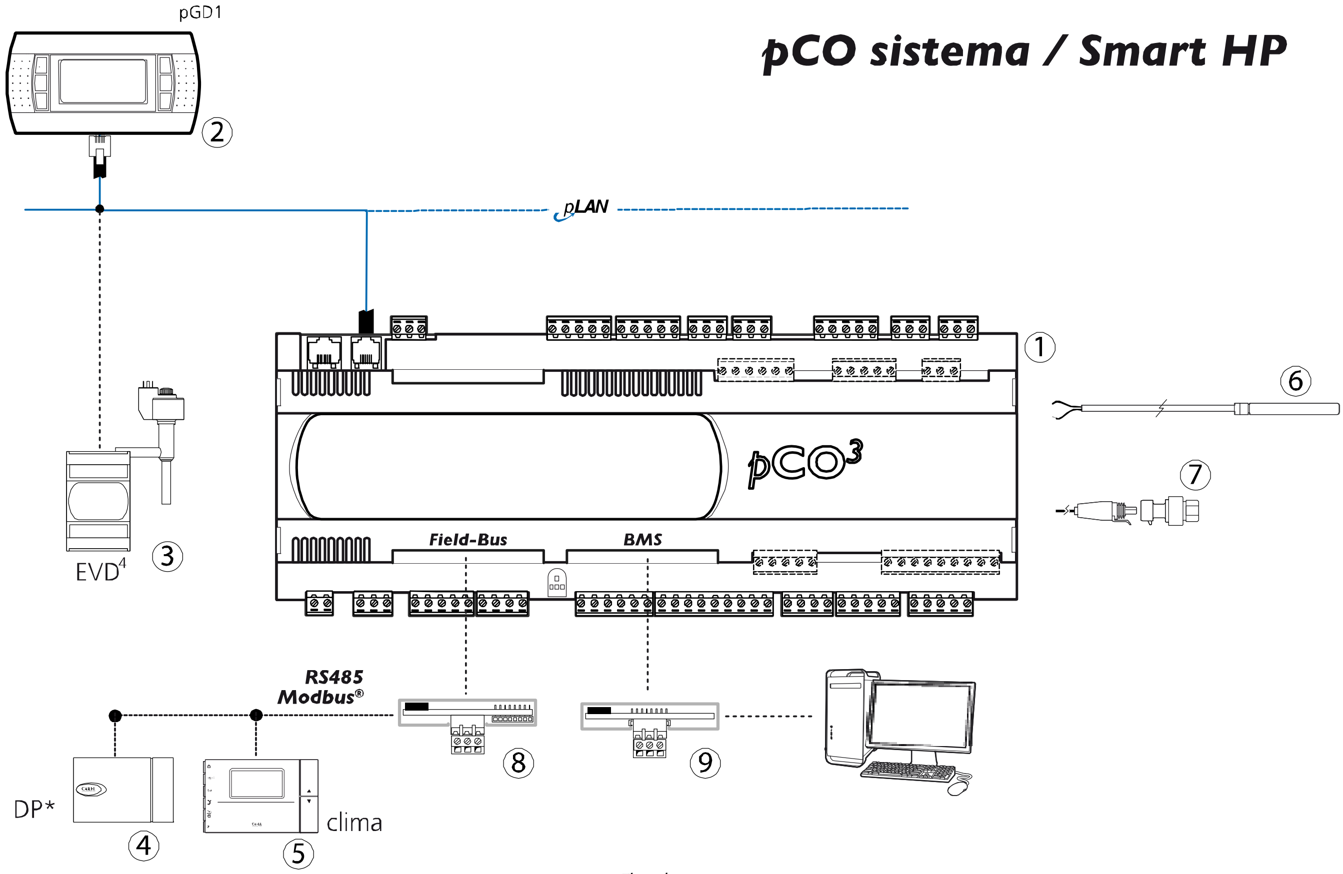


Fig. 1.b

Key

	Description	Part No.
1	Small, Medium, Large pCO³ Controller board	PCO3000A*0 / PCO3000B*0
2	pDG1 panel or wall installation + telephone line	PGD1000**0 + S90CONN00*
3	Electronic expansion valve driver	EVD0000440 + E2V**BS*00
4	Wall probe with serial output	DPW**14000
5	Clima Environmental thermostat/humidistat	ADC*000**0
6	Temperature sensors	TSC1500030, NTC*****00
7	Pressure sensors	SPKT00***0
8	Serial board for Field-Bus	PCO100FD10
9	Serial board for BMS	Depends on the supervisor connected

1.3 I/O Configurations - Unit Type (Default)

From the main menu, using the submenus dedicated to the manufacturer, you can use the "Configure unit Type" parameter (H. Manufacturer → a. Configuration), to select the I/O configuration type from the default list. Smart HP offers six different pre-loaded configurations that can be selected using the abovementioned parameter. All of the units operate with water/water.

Type	Hardware	Description	Installation Control	Compressors	Reversible
1	pCO³ Small	Heating + ACS	1 mixing zone	1 on/off	NO
2	pCO³ Small	Heating + ACS + High temperature desuperheater	1 mixing zone	1 on/off	NO
3	pCO³ Medium	Heating + ACS + High temperature desuperheater	1 mixing zone + room T+H probe	2 on/off	NO
4	pCO³ Medium	Heating / Cooling + ACS + High Temperature Desuperheater	1 mixing zone + room T+H probe	2 on/off	SI Gas side
5	pCO³ Medium + EVD400	Heating / Cooling + ACS + High Temperature Desuperheater	1 mixing zone + room T+H probe	2 on/off	SI Gas side
6	pCO³ Medium + EVD400	Heating / Cooling + ACS + High Temperature Desuperheater + Solar Heater Integration	1 mixing zone + room T+H probe	2 on/off	SI Gas side

The following pages show the schematic drawings for the different configuration pre-loaded on the Smart HP.

1.3.1 Unit “Type 1”: Water-Water Unit, Only Hot

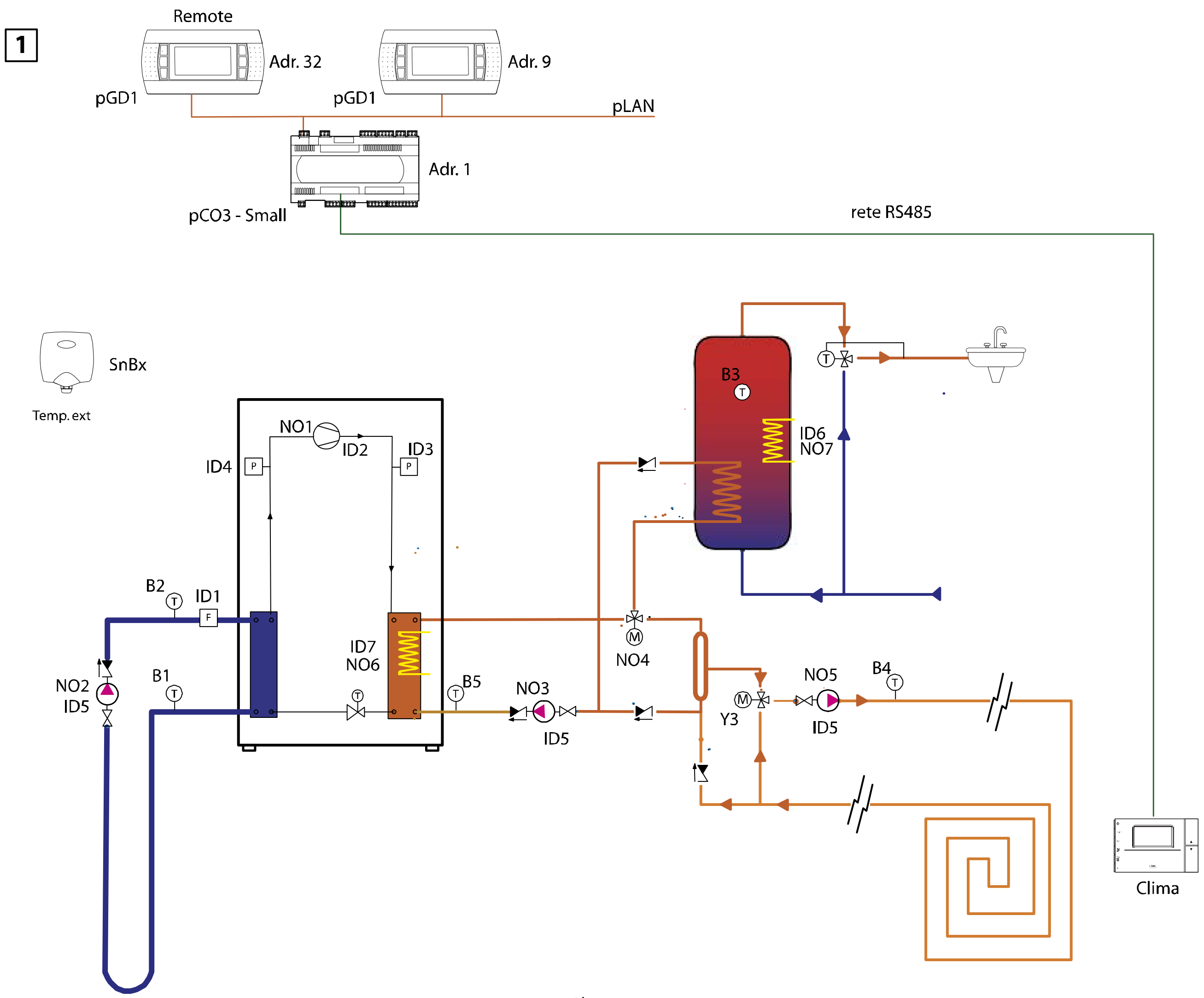


Fig. 1.c

Analogue Inputs

No.	Description
B1	Geothermal Circuit Outlet Temperature
B2	Geothermal Circuit Return Temperature
B3	Domestic Water Control Temperature
B4	Mixing Circuit Outlet Temperature
B5	Installation Return Temperature

Analogue Inputs Via RS485 Bus

No.	Description
Sn.B1	Outside Temperature Probe
Sn.B2	Outside Humidity Probe

Digital Inputs

No.	Description
ID1	Geothermal Field Side Flow Switch
ID2	Compressor 1 Thermal Overload Switch
ID3	High Pressure Switch
ID4	Low Pressure Switch
ID5	Unit/Installation Pump Thermal Overload Switch
ID6	ACS Storage Heater Thermal Overload Switch
ID7	Furnace/Heater Alarm addition
ID8	On-Off Remote

Analogue Outputs

No.	Description
Y1	
Y2	Modulating Geothermal Pump
Y3	3-way Installation valve
Y4	

Digital Outputs

No.	Description
NO1	Compressor 1
NO2	Geothermal pump
NO3	Primary circuit pump
NO4	Domestic Water/Installation Deviation Valve
NO5	Mixing circuit pump
NO6	Integrated Furnace/Heater Installation
NO7	ACS Storage Electric Heater
NO8	General Alarm

1.3.2 Unit "type 2": Water-water Unit, Only Hot Water with High Temperature Circuit from Desuperheater

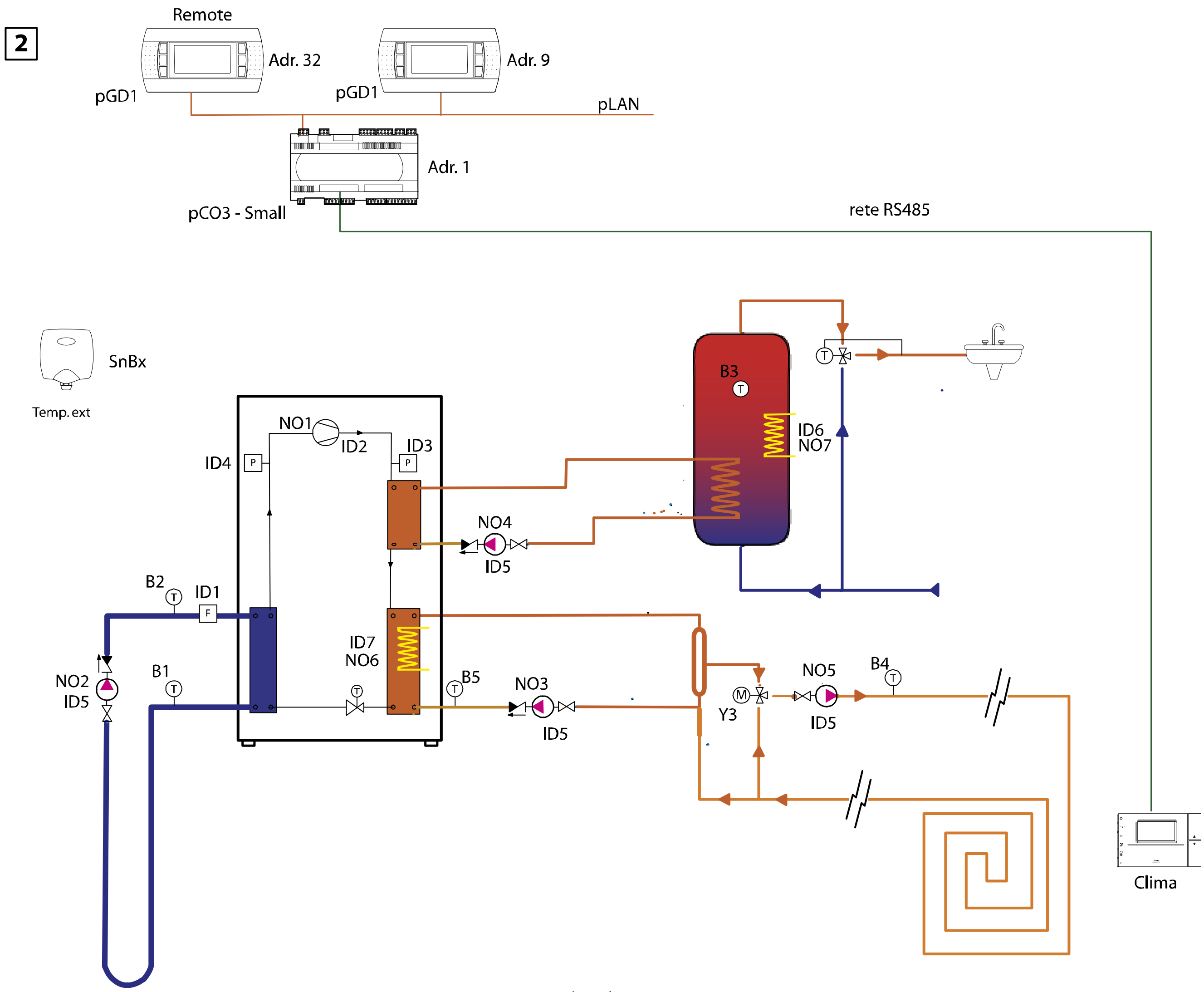


Fig. 1.d

Analogue Inputs

No.	Description
B1	Geothermal Circuit Outlet Temperature
B2	Geothermal Circuit Return Temperature
B3	Domestic Water Control Temperature
B4	Mixing Installation Outlet Temperature
B5	Installation Return Temperature

Analogue Inputs Via RS485 Bus

No.	Description
Sn.B1	Outside Temperature Probe
Sn.B2	Outside Humidity Probe

Digital Inputs

No.	Description
ID1	Geothermal Field Side Flow Switch
ID2	Compressor 1 Thermal Overload Switch
ID3	High Pressure Switch
ID4	Low Pressure Switch
ID5	Unit/Installation Pump Thermal Overload Switch
ID6	ACS Storage Heater Thermal Overload Switch
ID7	Furnace/Heater Alarm addition
ID8	On-Off remote

Analogue Outputs

No.	Description
Y1	Modulating Domestic Water Pump
Y2	Modulating Geothermal Pump
Y3	3-way Installation valve
Y4	

Digital Outputs

No.	Description
NO1	Compressor 1
NO2	Geothermal Pump
NO3	Primary Circuit Pump
NO4	Modulating Domestic Water Pump
NO5	Mixing Circuit Pump
NO6	Installation Integrated Furnace/Heater
NO7	ACS Storage Electric Heater
NO8	General Alarm

1.3.3 Unit "Type 3": Water-Water Unit, Only Hot, 2 Compressors, Single Circuit

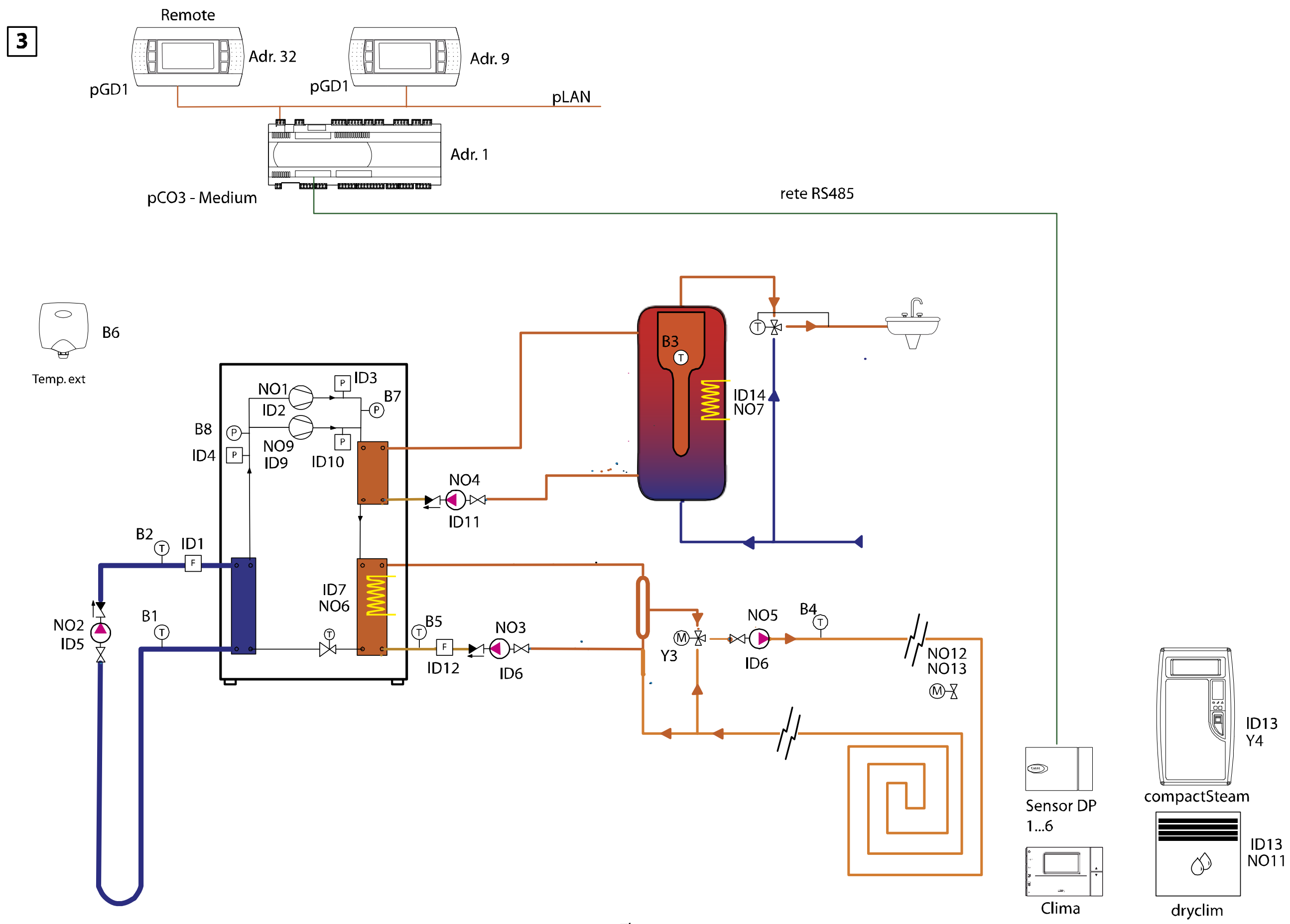


Fig. 1.e

Analogue Inputs

No.	Description
B1	Geothermal Circuit Outlet Temp.
B2	Return Circuit Outlet Temp.
B3	Domestic Water Control Temperature
B4	Mixing Installation Outlet Temperature
B5	Installation Return Temperature
B6	Outside Air Temp.
B7	High Pressure Transducer
B8	High Pressure Transducer

Analogue Inputs Via RS485 Bus

No.	Description
Sn.B1	Outside Temperature Probe
Sn.B2	Outside Humidity Probe
Sn.Bx	Room 1 Temperature Probe
Sn.By	Room 1 Humidity Probe

Up To Six Rooms From Probes

Digital Inputs

No.	Description
ID1	Geothermal Field Side Flow Switch
ID2	Compressor 1 Thermal Overload Switch
ID3	High Pressure Switch Comp. 1
ID4	Low Pressure Switch
ID5	Geothermal Circuit Pump Thermal Overload Switch
ID6	Primary/Mixing Circuit Pump Thermal Overload Switch
ID7	Furnace/Heater Alarm addition
ID8	On-Off Remote
ID9	Compressor 2 Thermal Overload Switch
ID10	High Pressure Switch Comp. 2
ID11	Domestic Water Pump Thermal Overload Switch
ID12	Primary Circuit Flow Switch
ID13	Humidifier/Dehumidifier Alarm
ID14	ACS Storage Heater Thermal Overload Switch

Analogue Outputs

No.	Description
Y1	Modulating Domestic Water Pump
Y2	Modulating Geothermal Pump
Y3	3-way Installation valve
Y4	Humidifier

Digital Outputs

No.	Description
NO1	Compressor 1
NO2	Geothermal Pump
NO3	Primary Circuit Pump
NO4	Domestic Water Circuit Pump
NO5	Mixing Circuit Outlet Pump
NO6	Installation Integrated Furnace/Heater
NO7	ACS Storage Electric Heater
NO8	General Alarm
NO9	Compressor 2
NO10	Recovery Fan
NO11	Dehumidifier
NO12	Control Zone 1
NO13	Control Zone 2

1.3.4 Unit "Type 4": Reversible Water-water Unit with 2 Compressors, Single Circuit

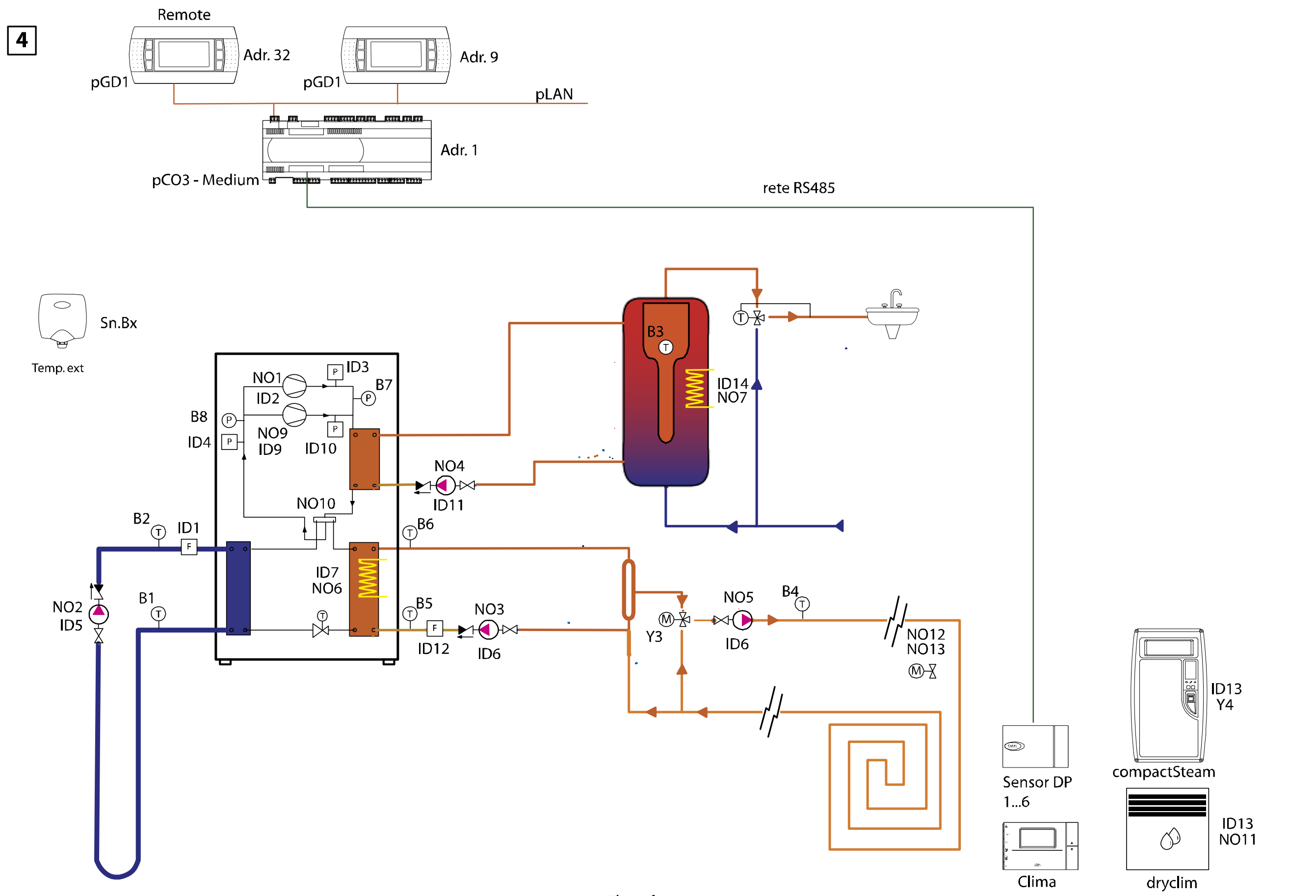


Fig. 1.f

Analogue Inputs

No.	Description
B1	Geothermal Circuit Outlet Temp.
B2	Return Circuit Outlet Temp.
B3	Domestic Water Control Temperature
B4	Mixing Installation Outlet Temperature
B5	Installation Return Temperature
B6	Primary Installation Outlet Temperature
B7	High Pressure Transducer
B8	Low Pressure Transducer

Analogue Inputs Via RS485 Bus

No.	Description
Sn.B1	Outside Temperature Probe
Sn.B2	Outside Humidity Probe
Sm.Bx	Room 1 Temperature Probe
Sm.By	Room 1 Humidity Probe

Up To Six Rooms From Serial Probes Or Clima

Digital Inputs

No.	Description
ID1	Geothermal Field Side Flow Switch
ID2	Compressor 1 Thermal Overload Switch
ID3	High Pressure Switch Comp. 1
ID4	Low Pressure Switch
ID5	Geothermal Circuit Pump Thermal Overload Switch
ID6	Primary/Mixing Circuits Pump Overload Switch
ID7	Furnace/Heater Alarm addition
ID8	On-Off Remote
ID9	Compressor 2 Thermal Overload Switch
ID10	High Pressure Switch Comp. 2
ID11	Domestic Water Pump Thermal Overload Switch
ID12	Primary Circuit Flow Switch
ID13	Humidifier/Dehumidifier Alarm
ID14	ACS Storage Heater Thermal Overload Switch

Analogue Outputs

No.	Description
Y1	Modulating Domestic Water Pump
Y2	Modulating Geothermal Pump
Y3	3-way Installation valve
Y4	Humidifier

Digital Outputs

No.	Description
NO1	Compressor 1
NO2	Geothermal Pump
NO3	Primary Circuit Pump
NO4	Domestic Water Circuit Pump
NO5	Mixing Circuit Outlet Pump
NO6	Installation Integrated Furnace/Heater
NO7	ACS Storage Electric Heater
NO8	General Alarm / Recovery Fan
NO9	Compressor 2
NO10	Cycle Reversal 4-way Valve
NO11	Dehumidifier
NO12	Zone 1
NO13	Zone 2

1.3.5 Unit "Type 5": Reversible Water-water Unit with 2 Compressors, Single Circuit with Electronic Expansion Valve

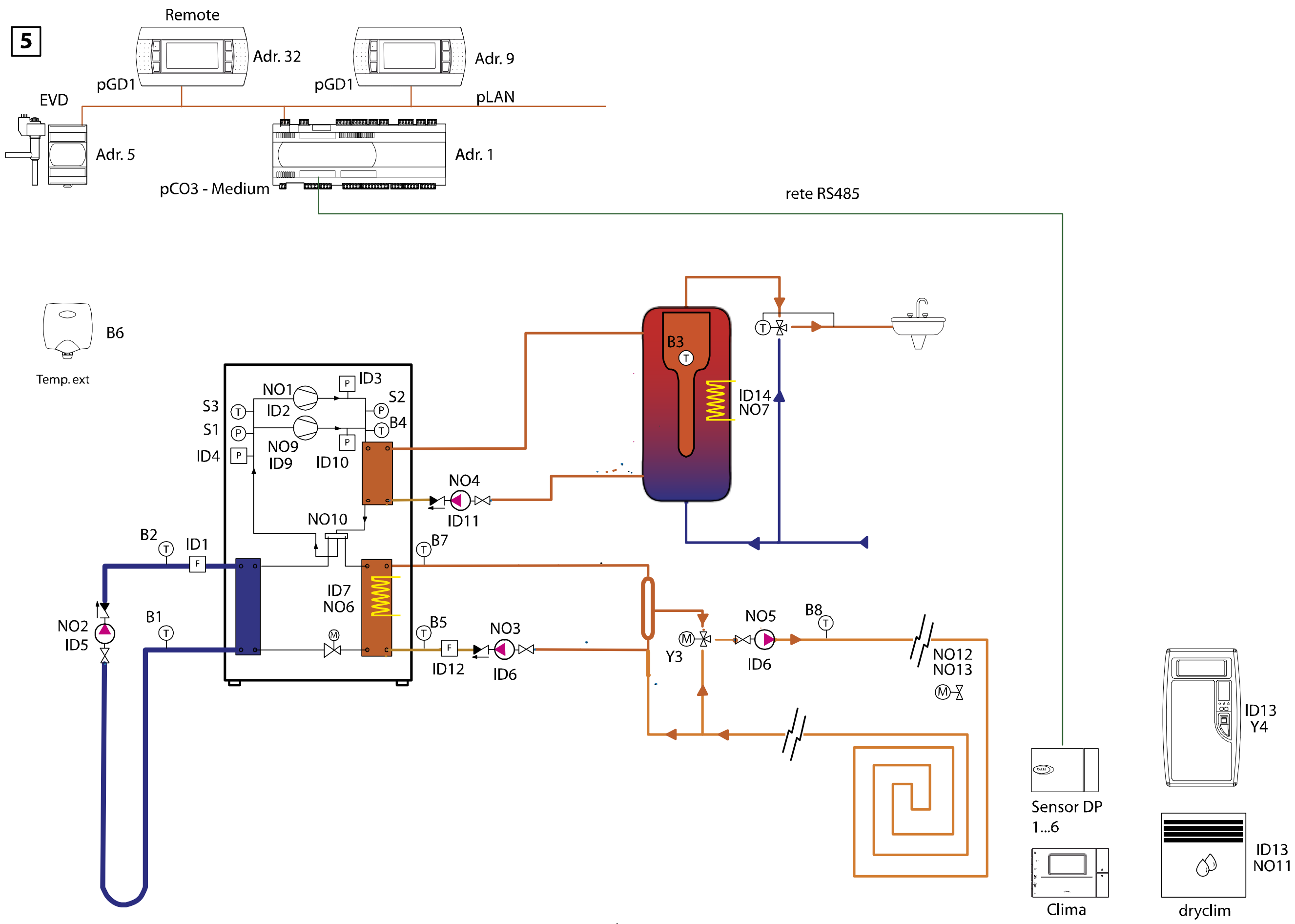


Fig. 1.g

Analogue Inputs

No.	Description
B1	Geothermal Circuit Outlet Temp.
B2	Geothermal Circuit Return Temperature
B3	Domestic Water Control Temperature
B4	Exhaust Gas Temp. (Comp. Outlet)
B5	Installation Return Temperature
B6	Outside Air Temp.
B7	Primary Installation Outlet Temperature
B8	Mixing Installation Outlet Temperature

EVD 400 Analogue Inputs

No.	Description
S1	Low Pressure Transducer
S2	High Pressure Transducer
S3	Compressor Intake Gas Temp.

Analogue Inputs Via RS485 Bus

No.	Description
Sn.B1	Outside Temperature Probe (Opt.)
Sn.B2	Outside Humidity Probe (Opt.)
Sm.Bx	Room 1 Temperature Probe
Sm.By	Room 1 Humidity Probe

Up To Six Rooms From Serial Probes Or Clima

Digital Inputs

No.	Description
ID1	Geothermal Field Side Flow Switch
ID2	Compressor 1 Thermal Overload Switch
ID3	High Pressure Switch Comp. 1
ID4	Low Pressure Switch
ID5	Geothermal Circuit Pump Thermal Overload Switch
ID6	Primary/Mixing Circuits Pump Overload Switch
ID7	Furnace/Heater Alarm addition
ID8	On-Off remote
ID9	Compressor 2 Thermal Overload Switch
ID10	High Pressure Switch Comp. 2
ID11	Domestic Water Pump Thermal Overload Switch
ID12	Primary Circuit Flow Switch
ID13	Humidifier/Dehumidifier Alarm
ID14	ACS Storage Heater Thermal Overload Switch

Analogue Outputs

No.	Description
Y1	Modulating Domestic Water Pump
Y2	Modulating Geothermal Pump
Y3	3-way Installation valve
Y4	Humidifier

***EVD400* Analogue Outputs**

No.	Description
EVD	EVD Control Impulse Output

Digital Outputs

No.	Description
NO1	Compressor 1
NO2	Geothermal Pump
NO3	Primary Circuit Pump
NO4	Domestic Water Circuit Pump
NO5	Mixing Circuit Pump
NO6	Installation Integrated Furnace/Heater
NO7	ACS Storage Heater
NO8	General Alarm / Fan(s) Recovery
NO9	Compressor 2
NO10	Cycle Reversal 4-way Valve
NO11	Dehumidifier
NO12	Zone 1
NO13	Zone 2

1.3.6 Unit “Type 6”: Reversible Water-water Unit with 2 Compressors, Single Circuit, Electronic Expansion Valve and Solar Heating Installation

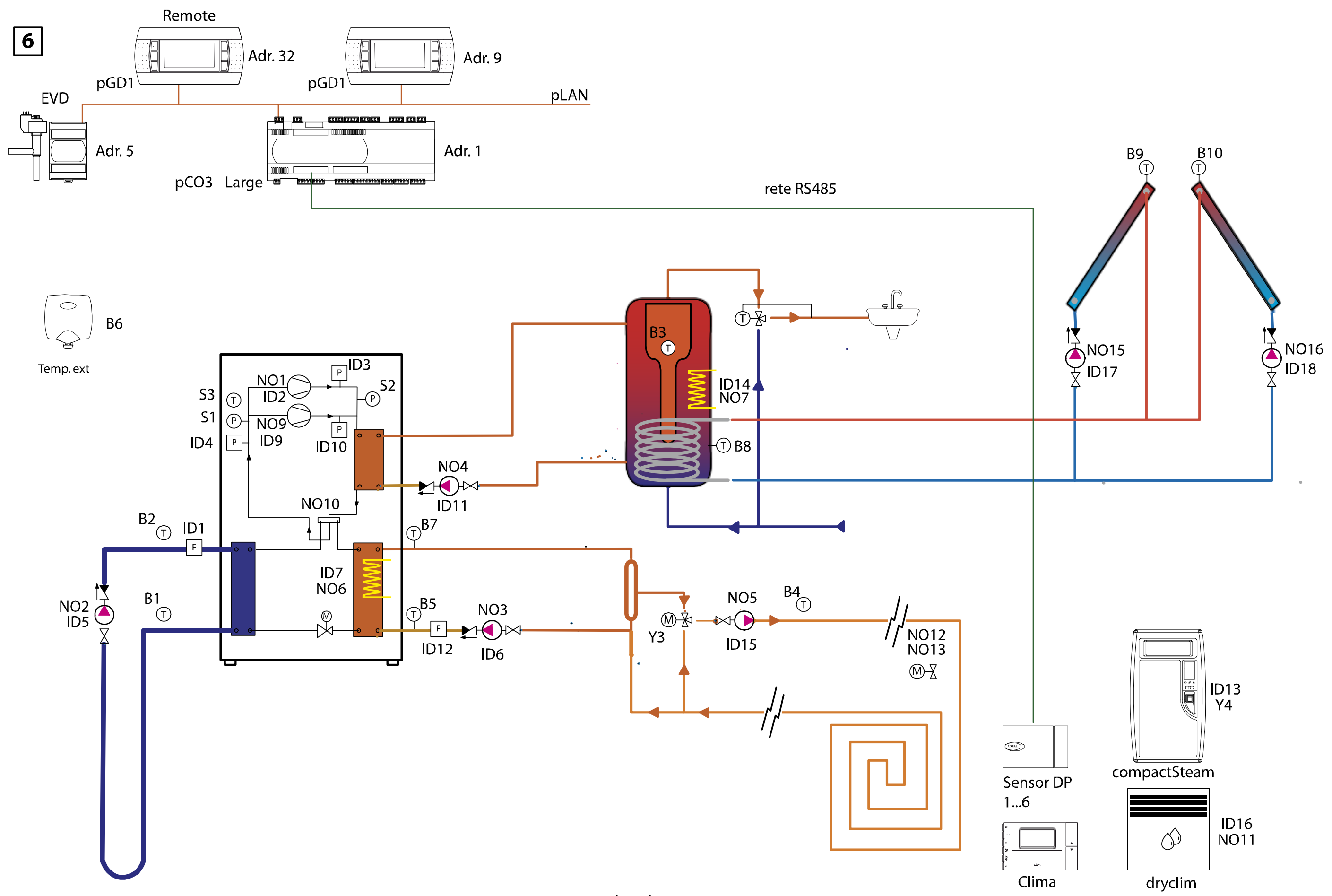


Fig. 1.h

Analogue Inputs

No.	Description
B1	Geothermal Outlet Temp.
B2	Return Outlet Temp.
B3	Domestic Water Control Temperature
B4	Mixing Circuit Outlet Temp.
B5	Installation Return Temperature
B6	Outside Temp.
B7	Primary Circuit Outlet Temp.
B8	ACS Tank Lower Temp.
B9	Solar Manifold 1 Temp.
B10	Solar Manifold 2 Temp.

B9 and B10 must be connected to PT1000 probes

EVD 400 Analogue Inputs

No.	Description
S1	Low Pressure Transducer
S2	High Pressure Transducer
S3	Compressor Intake Gas Temp.

.

Analogue Inputs Via RS485 Bus

No.	Description
Sn.B1	Outside Temperature Probe (Opt.)
Sn.B2	Outside Humidity Probe (Opt.)
Sm.Bx	Room 1 Temperature Probe
Sm.By	Room 1 Humidity Probe

Up To Six Rooms From Serial Probes

Digital Inputs

No.	Description
ID1	Geothermal Field Side Flow Switch
ID2	Compressor 1 Thermal Overload Switch
ID3	High Pressure Switch Compressor 1
ID4	Low Pressure Switch
ID5	Geothermal Pump Thermal Overload Switch
ID6	Primary Circuit Pump Thermal Overload Switch
ID7	Installation Integrated Furnace/Heater Alarm
ID8	On-Off Remote
ID9	Compressor 2 Thermal Overload Switch
ID10	High Pressure Switch Compressor 2
ID11	Domestic Water Pump Thermal Overload Switch
ID12	Primary Circuit Flow Switch
ID13	Humidifier/Dehumidifier Alarm
ID14	ACS Storage Heater Thermal Overload Switch
ID15	Mixing Circuit Pump Thermal Overload Switch
ID16	Dehumidifier Alarm
ID17	Solar Circuit Pump 1 Thermal Overload Switch
ID18	Solar Circuit Pump 2 Thermal Overload Switch

Analogue Outputs

No.	Description
Y1	Modulating Domestic Water Pump
Y2	Modulating Geothermal Pump
Y3	3-way Installation valve
Y4	Humidifier
Y5	
Y6	

***EVD400* Analogue Outputs**

No.	Description
EVD	EVD Control Impulse Output

Digital Outputs

No.	Description
NO1	Compressor 1
NO2	Geothermal Pump
NO3	Primary Circuit Pump
NO4	Domestic Water Circuit Pump
NO5	Mixing Circuit Pump
NO6	Installation Integrated Furnace/Heater
NO7	ACS Storage Heater
NO8	General Alarm
NO9	Compressor 2
NO10	Cycle Reversal 4-way Valve
NO11	Dehumidifier
NO12	Control Zone 1
NO13	Control Zone 2
NO14	Recovery Fan
NO15	Solar Circuit Pump 1 Control
NO16	Solar Circuit Pump 2 Control
NO17	
NO18	

2. HARDWARE CHARACTERISTICS AND INSTALLATION

2.1 Characteristics of pCO³ Board

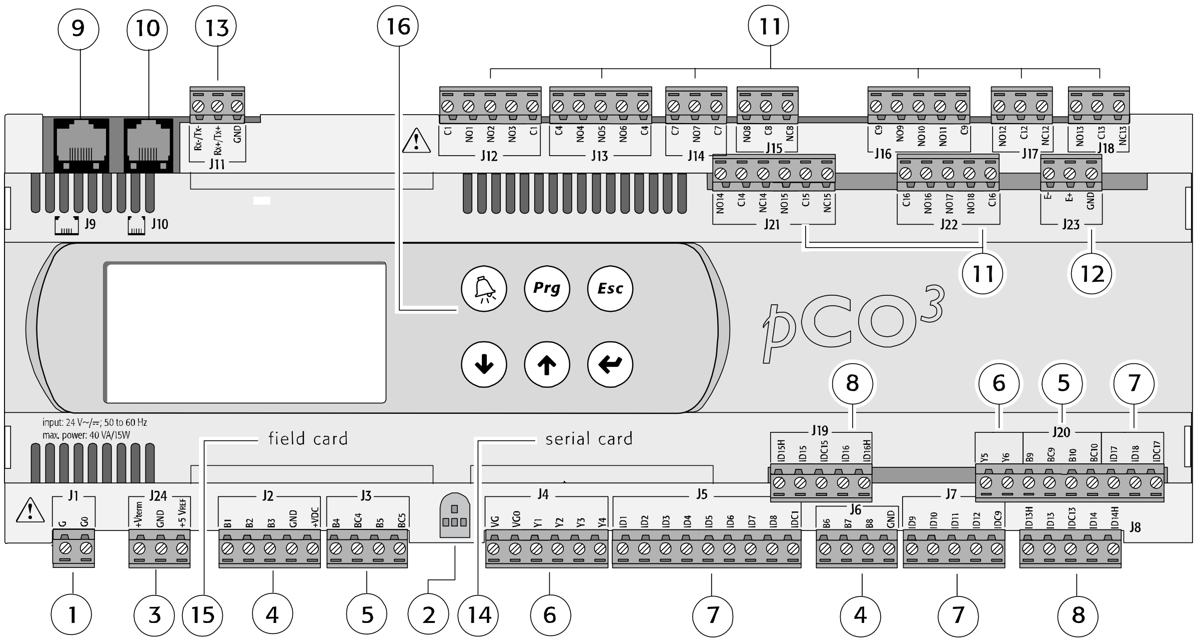


Fig. 2.a

Key

1	Power supply connector	G, G0
2	Yellow LED indicating power supply active and three status LEDs	
3	Additional power supply for terminal and 0-5 V ratiometric probes	+Vterm, GND, +5 VREF
4	Universal analogue inputs: NTC 0 - 1 V, 0 - 5 V - ratiometric, 0 -10 V, 0 -20 mA, 4 -20 mA	B1, B2, B3, GND, +VDC e B6, B7, B8, GND
5	Passive analogue inputs: NTC, PT1000, ON/OFF	B4, BC4, B5, BC5 e B9, BC9, B10, BC10
6	Analogue outputs: 0 -10 V	VG, VG0, Y1, Y2, Y3, Y4 e Y5, Y6
7	Digital inputs, 24 V AC/V DC	ID1, ID2, ID3, ID4, ID5, ID6, ID7, ID8, IDC1, e ID9, ID10, ID11, ID12, IDC9 e ID17, ID18, IDC17
8	Digital inputs: 230 V AC or 24 V AC/V DC	ID13H,ID13, IDC13, ID14, ID14H e ID15H, ID15, IDC15, ID16, ID16H
9	Connector for display terminal (external panel with direct messages)	
10	Connector for standard terminal in pCO series and for download of application program	
11	Relay digital outputs	C1, NO1, NO2, NO3, C1 e C4, NO4, NO5, NO6, C4 e C7, NO7, C7 e NO8, C8, NC8 e C9, N09, N10, NO11, C9 e NO12, C12, NC12 e NO13, C13, NC13 e NO14, C14, NC14, NO15, C15, NC15 e C16, NO16, NO17, NO18, C16
12	Connector for I/O expansion board	E-, E+, GND
13	Local pLAN network connector	Rx-/Tx-, Rx+/Tx+, GND
14	Flap to insert the supervision and telemaintenance option	
15	Flap to insert the Field Card option	
16	Built-in terminal (LCD, keys and LED).	

Models e Characteristics	pCO³ SMALL	pCO³ MEDIUM	pCO³ LARGE
No. Analogue Inputs	5	8	10
No. Digital Inputs	8	14	18
No. Analogue Outputs	4	4	6
No. Digital Outputs	8	13	18
Modbus RTU/CAREL Protocol	PCOS004850		
LonWorks Protocol	PCO10000F0		
BACnet Ethernet Protocol	PCO1000WB0		
BACnet MS/TP Protocol	PCO1000BA0		
http/FTP/SNMP Protocol	PCO1000WB0		
Setup for modem, GSM modem, SMS	PCO100MDM0		

Product Certifications:

IEC EN 50155: “Railway applications. Electronic equipment used on rolling stock”;

UL 873 and C22.2 No.24-93: “Temperature-indicating and regulating equipment”; and Regulation EC 37/2005 dated 12 January 2005. In particular, if the electronic control is equipped with CAREL standard NTC probes, it is compliant with EN 13485, “ Thermometers for measuring the air and product temperature for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream. Tests, performance, suitability”.

2.2 Installation

2.2.1 How to Install

Caution:
Environmental Conditions
Avoid installing the pCO board and terminal in areas with the following conditions:

- Temperature and humidity do not comply with the values for operation of the product
- Strong vibrations or impacts;
- Exposure to harsh and polluted atmosphere (ex. sulphuric and ammonia gasses, salt fogs, fumes) with consequential corrosion and/or oxidation
- High levels of magnetic and/or radio frequency interference (therefore avoid installation of the units near transmitting antennas)
- Exposure of the pCO board to direct sunlight and other weather conditions
- Ample and rapid environmental temperature changes
- Areas containing explosives or mixes of flammable gasses
- Exposition to dust (formation of corrosive layers with resulting oxidation and reduction of insulation)

Location of the instrument inside the panel
The position of the instrument inside the electrical cabinet must be selected to ensure consistent physical separation of the instrument from power parts (solenoids, teleroutors, drives, inverters, etc.) and from the cables connected to them. Positioning the instrument too near these types of parts may lead to random malfunctions that are not immediately detectable. The structure of the panel must allow correct passage of cooling air.

2.2.2 How to Perform Cabling

Caution: when performing the cabling "physically" separate the power portion from the command portion. Usually, if these cables are near each other it leads to problems of induced disturbances, or over time, malfunction and/or damage of the components. Ideal conditions are obtained by preparing the location for these to circuits in two separate cabinets. At times this is not possible. It is then necessary to position the power parts in a distinctly separate area inside the same panel than the control parts. For control signals, we recommend using shielded cables with braided wires.
Should control cables need to cross power cables, the intersection must be as close as possible to right angles, avoiding in all cases that control cables be positioned parallel to power cables.
CAREL recommends paying careful attention to the following warnings:

- Use cable ends suitable for the terminals used. Loosen each screw and insert the cable ends. Then tighten the screws. When all steps have been completed, lightly pull on the cables to ensure they have been tightened correctly.
- Separate the cables from the probes, digital inputs, and serial lines as much as possible from cables with inductive loads and power in order to avoid any possible electromagnetic disturbances. Never position power cables and probe cables in the same ducts (including those for electrical cables). Avoid installing the probe cables near power devices (counters, magnetic-thermal devices, or others).
- Minimize probe cable paths and avoid spiral paths that wind around power devices.
- Avoid putting fingers near the electronic components on the boards in order to avoid static electric shocks (extremely dangerous) from the operator to the components.
- Should the power transformer secondary be connected to earth, check that the earth wire corresponds to the wire from the controller that enters the G0 terminal. Make certain that this is true for all of the devices connected to the pCO.
- Do not press on screwdriver too hard when fastening the cables to the terminals to avoid damaging the pCO controller.
- For applications subject to strong vibrations (1.5 mm pk-pk 10/55 Hz) we recommend fastening the cables connected to the pCO with clamps at a distance of about 3 cm from the connectors.
- If the product is installed in an industrial environment (application of EN 61000-6-2) the length of the connections must be less than 30 m.
- All very low voltage connections (analogue and 24 V AD/ V DC digital inputs, analogue outputs, serial bus connections, and power sources) must have reinforced, double insulation compared to the network.
- In residential areas, the cable connecting the pCO controller and the terminal must be shielded.
- There is no limit to the number of cables that can be inserted in a single terminal. The only limitation regards the maximum power in a single terminal: this must not exceed 8 A.
- The maximum cross-section of the cable that can be inserted in a terminal is 2.5 sq. mm (12 AWG).
- The maximum value of the twisting moment (or tightening torque) used to tighten the terminal screw is 0.6 Nm.
- Installation must be performed according to the current laws and norms in the country where the equipment is used.
- For safety reasons, the equipment must be set inside an electric panel so that the only accessible part is the display and the
control keypad.
- Should the equipment malfunction, do not attempt to repair it; send it back to CAREL.

2.2.3 Anchoring the pCO Board

The pCO controller is to be installed on a DIN rail. To fasten it to the DIN rail, position the device on the rail and push on it lightly. The click of the tabs on the back confirm that it is fastened on the rail. To dismount, simply use a screwdriver as a lever on the release holes of the same tabs to lift them up. The tabs are held in place by self-closing springs.

2.2.4 Power Supply

Power supply for the pCO^3 board (controller with terminal connected):
28 - 36 V DC + 10/- 20 % or 24 V AC + 10/- 15 % 50-60 Hz
Maximum absorption P= 15 W (DC power source), P= 40 VA (AC power source).

- Electric power source voltage other than that listed may seriously damage the system.
- When installing, we recommend using a 50 VA Class II transformer, to power a single pCO controller.
- We recommend separating the power supply to the pCO control and the terminal (or more than one pCO and terminals) from the power supply of the other electric devices (counters and other electromechanical components) within the electric panel.
- Should the transformer secondary be earthed, check that the earth wire is connected to the G0 terminal. This must be performed for all devices connected to the pCO.
- If more than one pCO board connected to a pLAN network is powered, make certain that the G and G0 references are respected (the G0 reference must be maintained for all boards).
- A yellow LED indicates the presence of power supply tot he pCO board.

2.2.5 Connection of the analogue inputs

Note: in Smart HP the analogue input configuration is automatically setup based on the type of unit selected.
The analogue inputs on the pCO board can be configured for the various probes available on the market: NTC, PT1000, 0…1 V, 0 - 5 V ratiometric, 0 - 10 V, 0 - 20 mA, or 4 - 20 mA. To select the type of probe used, set the parameter on the user terminal (if equipped with the application program).

Connection of active temperature and humidity probes
All of the active temperature and humidity probes in the DP*2 CAREL series configured as 0 - 1 V or 4 - 20 mA can be connected to the pCO board.
For temperature probes, use the 4 - 20 mA or NTC configuration as the 0/1 V DC signal is understood to be limited to 0 - 1 V and therefore not always compatible with the standard 10 mV/°C signal from the CAREL probes (negative temperatures or temperatures greater than 100 °C may generate an probe alarm).
The inputs must be pre-configured for 0 - 1 V or 4 - 20 mA signals from the application program.

Control	pCO Terminals	Probe Terminals	Description
pCO³	GND	M	Reference
	+V DC	+(G)	Power Supply
	B1, B2, B3, B6, B7, B8	Out H	Active Humidity Output
	B1, B2, B3, B6, B7, B8	Out T	Active Temperature Output

Connection to Universal NTC Temperature Probes
All of the analogue inputs are compatible with NTC probes with 2 wires. The inputs must be pre-configured for NTC type signals from the application program in the flash memory.

Control	pCO Terminals	NTC Probe Cable
pCO³	GND, BC4, BC5, BC9, BC10	1
	B1, B2, B3, B4, B5, B6, B7, B8, B9, B10	2

Connection to the PT1000 Temperature Probes
The pCO controller can be connected to PT1000 probes with 2 wires for all high temperature applications. Their operative range is -50 - 200 °C.
The inputs must be pre-configured for PT1000 type signals from the application program in the flash memory.

Control					PT1000 Probe Cable
pCO³	Probe 1	Probe 2	Probe 3	Probe 4	
	BC4	BC5	BC9	BC10	1
	B4	B5	B9	B10	2

Connection to the Pressure Probes in Current
The pCO can be connected to all active pressure probes in the SPKT****C0 CAREL series or any other pressure probe on the market with 0 - 20 mA or 4 - 20 mA signal. The inputs must be pre-configured for 0 - 20 mA or 4 - 20 mA signals.

Control	pCO Terminals	Probe Cable Colour	Description
pCO³	+V DC	Black	Power supply
	B1, B2, B3 B6, B7, B8	White	Signal
		Green	Not used

Connection to Ratiometric 0/5 V Pressure Probes
The pCO can be connected to all active pressure probes in the SPKT****R0 CAREL series or any other pressure probe on the market with 0/5 V ratiometric signal. The inputs must be pre-configured for 0/5 V ratiometric signals from the application program.

Control	pCO Terminals	Probe Cable Colour	Description
pCO³	+5 V Ref	Black	Power Supply
	GND	Green	Power Supply Reference
	B1, B2, B3 B6, B7, B8	White	Signal

Connection of Active Probes with 0 - 10 V Output
The inputs must be pre-configured for 0 - 10 V signals from the application program.

Control		0 - 10 V Probe Cable
pCO³	GND	Reference
	B1, B2, B3, B6, B7, B8	Signal

Connection of Selected Analogue Inputs, such as ON/OFF
The pCO controller can be configure some clean, not optoisolated, digital inputs. The inputs must be pre-configured as clean digital inputs from the application program.

Control	pCO Terminals				Digital Input Cable
pCO³					
	Digit 1	Digit 2	Digit 3	Digit 4	
	BC4	BC5	BC9	BC10	1
	B4	B5	B9	B10	2

Remoting Analogue Inputs
The cross-section of the cables for remoting the analouge inputs are provided in the following table:

Type of Input	Cross-Section (mm²) per lengths up to 50 m	Cross-Section (mm²) per lengths up to 100 m
NTC	0.5	1.0
PT1000	0.75	1.5
I (in current)	0.25	0.5
V (in voltage)	1.5	Not Recommended

Note: If the product is installed in an industrial environment (application of EN 61000-6-2) the length of the connections must be less than 30 m.
In any case, we recommend not exceeding this length in order to avoid measurement errors.

2.2.6 Connection of the Digital Inputs

The pCO controller has digital inputs for connection to safeties, alarms, device statuses, and remote consensus.
These inputs are all optoisolated compared to the other terminals and can operate at 24 V AC, 24 V DC and a few at 230 V AC.

Note: Separate the cables from the probes and the digital inputs from cables with inductive loads and power in order to avoid any possible electromagnetic disturbances.

Digital Inputs with 24 V AC Power Supply
For pCO³ all inputs can be at 24V AC.
The following figure represents one of the most common wiring diagrams for connecting the 24 V AC digital inputs.

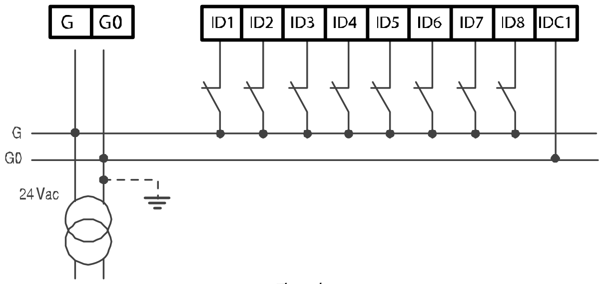


Fig. 2.b

Note: the wiring diagrams provided in these figures, although representing the most common and most simple configurations, do not exclude the possibility of powering the digital inputs separately from the pCO board power supply.
In any case, the inputs have only functional insulation compared to the rest of the control.

Digital Inputs with 24 V DC Power Supply

For pCO³ all inputs can be at 24V DC.

The following figure represents one of the most common wiring diagrams for connecting the 24 V DC digital inputs.

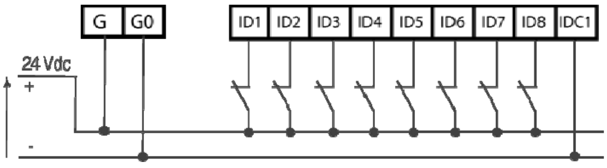


Fig. 2.c

Digital Inputs with 230 V AC Power Supply

Up to two groups of inputs are present that can be powered with 230 V AC; each group has two inputs. The groups are double insulated from each other and can refer to different voltages. Within each group, the digital inputs cannot be independent: for example, due to their common terminal, inputs ID15 and ID16 must have the same voltage supply in order to avoid dangerous short circuits and/or be powered at 230 V AC for lower voltage circuits. In any case, the inputs have double insulation compared to the rest of the control.

	Input
pCO³ Terminals	ID13H, ID14H, ID15H, ID16H

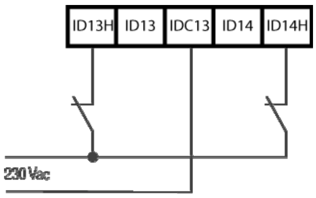


Fig. 2.d

The uncertainty range of the trip threshold ranges from 43 to 90 V AC. We recommend using a 100 mA fuse in series with the digital inputs.

Remoting Digital Inputs

Caution: do not connect other devices to the IDn inputs.

The cross-section of the cables for remoting the digital inputs can be found in the following table.

Cross-Section (mm²) for lengths up to 50 m	Cross-Section (mm²) per lengths up to 100 m
0.25	0.5

Note: If the product is installed in an industrial environment (application of EN 61000-6-2) the length of the connections must be less than 30 m.

In any case, we recommend not exceeding this length in order to avoid reading errors.

2.2.7 Connection of the Analogue Outputs

Connection of the 0 - 10V Analogue Outputs

The pCO controller provides 0 - 10 V optoisolated analogue outputs externally powered by 24 V AC/V DC.

The table below summarizes the distribution of the analogue outputs based on the available versions.

	pCO Terminal	Reference
pCO³ Terminals		
SMALL	Y1, Y2, Y3, Y4	VG0
MEDIUM	Y1, Y2, Y3, Y4	VG0
LARGE	Y1, Y2, Y3, Y4, Y5, Y6	VG0

2.2.8 Connection of the Digital Outputs

The pCO controller has digital outputs with electromechanical relays to facility assembly. The common terminals for some relays have been grouped together.

Electromechanical Relay Digital Outputs

The relays are divided into groups based on the insulation distance. Within each group, the relays have a main insulation between each other and therefore must be exposed to the same voltage (normally 24 V AC or 110 - 230 V AC).

On the other hand, among groups insulation is doubled and therefore the groups can be at different voltages. In any case, there is double insulation towards the rest of the control.

	Version	Reference to equally insulated relays			
		Group 1	Group 2	Group 3	Group 4
Group Composition	SMALL	1 - 7	8		
	MEDIUM	1 - 7	8	9 - 13	
	LARGE	1 - 7	8	9 - 13	14 - 18

Relay ID tag data	SPDT, 2000 VA, 250 V AC, 8A Resistive	
pCO³ Certifications	UL873	2.5 A Resistive, 2A FLA, 12A LRA, 250 V AC, C300 Pilot Duty (30,000 Cycles)
	EN 60730-1	2A Resistive, 2A Inductive, cosφ=0.6, 2(2)A (100,000 Cycles)

Solid State Relay (SSR) Digital Outputs

The pCO controller can also be equipped with solid state relays (SSR) (for example pCO LARGE part no. PCO300*AL0) for the control of devices that require an unlimited number of manoeuvres that may not be supported by the electromechanical versions. These outputs are dedicated to loads powered at 24 V AC/V DC with maximum power Pmax= 10 W.

Summary table of Digital Outputs Based on the Available Versions

pCO³ Terminals	No. SPST	No. SPDT	No. Total Outputs	SSR Reference Relay
SMALL	7	1 (8)	8	1 (7)
MEDIUM	10	3 (8, 12, 13)	13	2 (7, 12)
LARGE	13	5 (8, 12, 13, 14, 15)	18	3 (7, 12, 14) o 4 (7, 12, 14, 15)

Note: the number between parenthesis is the corresponding terminal. For ex.: 8 = N08.

Remoting Digital Outputs

The cross-section of the cables for remoting the digital outputs can be found in the following table.

AWG	Cross-Section (mm²)	Current (A)
20	0.5	2
15	1.5	6
14	2.5	8

If the product is installed in an industrial environment (application of EN 61000-6-2) the length of the connections must be less than 30 m.

Note: For further information and wiring diagrams, please refer to the dedicated manual for the pCO system (+030220335).

2.2.9 Installation of the Serial Field Bus for Connection of Serial Probes or Clima

The serial probes and Clima terminal must be installed according to the following diagram and require the PCO100FD10 field bus be inserted in the dedicated slot ("Field-Bus").
The Clima terminal also requires the IROPZ48500 converter.
Both must be powered with 24 V AC voltage.

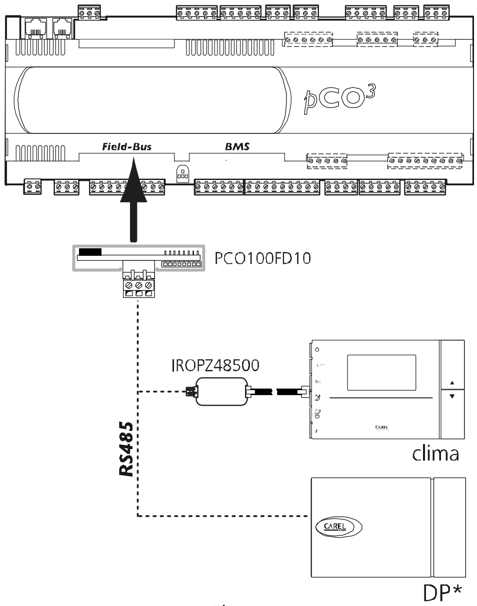


Fig. 2.e

Setup of Parameters and Addresses
The default values (Baud rate = 19200, Stop bit = 2, Time out = 300 ms, Priority = none) are displayed and can be modified if required on the screen Gfc02.
The settings to be made on the Clima terminal are the parameter SEr = 5 and the parameter Adr = 1- 6 (of addressing). For the DP probes, on the other hand, it is necessary to set dip switches 6, 7 and 8 (6 = OFF, 7 = ON, 8 = ON) and the parameter Adr = 128 - 133.

Note: For further information and for the wiring diagrams, please refer to the manual dedicated to the Clima terminal (+030220640) and the manual for the DP serial probes (+030220660).

2.2.10 Installation of EVD400 Valve Driver

For connection in pLAN network of the EVD400 valve with pCO board, please refer to the figure below:

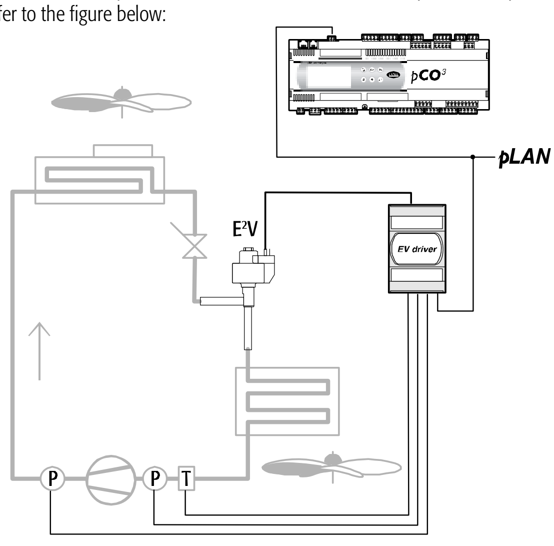


Fig. 2.f

Setting Network Address
The functional parameters of the EVD400, including the network address, are stored in the EEPROM. To modify the values, you must access the serial service port using the EVD4-UI software . Connect the converter (CVSTDUTTL0 or CVSTD0TTL0) to the serial service port and a PC with a USB or serial RS232 port. Then, launch the "EVD4_UI Address" connection as described in the EVD400 valve manual (+030220225) and set the Net address parameter. In the space on the top right of the interface, the new value will appear under "Network address",
after pressing the "READ" key. If not modified by the user, the Net Address parameter will have the following default values:

	Net address
EVD000*40* and EVD000*43*	2
EVD000*41* and EVD000*44*	30
EVD000*42* and EVD000*45*	32
EVD0001460	1

Following is a list describing the connectors supplied with EVD000*4*0 or purchase separately EVDCON0001 for EVD000*4*1.

Note: if the change in address is performed using the pLAN o Modbus®protocol, the "Network address" item is updated when the device is turned off and turned back on.

Note: it is possible to set the network address of the EVD400 valve using the CAREL ComTool software.

Note: for further information and wiring diagrams, please refer to the dedicated manual for the pEVD400 system (+030220225).

2.2.11 Remoting terminal with pLAN Network

If the pCO boards are connected to a pLAN network, the terminal can be remoted up to 50 m away using a telephone wire, whereas, if a shielded pair cable, TCONN6J000, and separate power supply are used, it can be remoted up to 500 m.

Note: if the terminal is used in a residential application, the cable must always be shielded.
The maximum distance between the pCO and the user terminal is shown in the following table:

Cable Type	Distance to Power Supply	Power Supply
Telephone	50 m	Taken from pCO (150 mA)
Shielded AWG24 cable	200 m	Taken from pCO (150 mA)
Shielded AWG20/22 cable	500 m	Separate Power Supply Using TCONN6J000

The maximum distance between two pCO³ with shielded cable is AWG 20/22l, equal to 500

Note: For further information and wiring diagrams, please refer to the dedicated manual for the pCO system (+030220335).

3. START UP

The following systems allow you to update and install the Smart HP application on the pCO board:

- pCO Manager (Winload)
- SmartKey programming key

3.1 pCO Manager (Winload)

It is possible to update the resident software in all CAREL 16-bit controllers on the pCO Sistema board (see the manual dedicated tot he pCO system) using a PC.
For this reason, CAREL supplies the WinLoad32.exe program and a serial converter with RS485 output (part no. CVSTDUTLF0) for connection tot he pCO. It is necessary to install the required driver on the PC, also released by CAREL.
Installation of the WinLoad32.exe program is included in the entire "1Tool" program suite, inside the pCO Manager program, or separately from the Internet site http://ksa.CAREL.com in the "Download → Support → Software Utilities" section.
In addition to the WinLoad32.exe program, installation includes the user manual. The pCO controller can be connected to the PC directly using the RS485 serial port used for "pLAN" connection, or using the BMS serial port with RS485 serial board, optionally used for the "supervisor" connection.
Using the BMS serial port and the optional RS232 serial board, it is possible to connect the pCO controller to an analogue (PSTN) or GSM modem and thus connect to WinLoad32 by remote.
Winload allows communication with all of the programmable controllers in the pCO family.
Using this program, it is generally possible to update and download to a PC the BOOT, BIOS, application, file configuration log, with special cases for the pCO3 controller, using which it is also possible to store files in the new Flash NAND.
Let us underscore that generally CAREL DOES NOT RECOMMEND updating the BOOT. CAREL always loads the correct BOOT required for unit's operation directly in production. Only under very special conditions may CAREL request that a user update the BOOT.
It is only possible to load the BIOS using the serial pLAN connection. The update of the BIOS causes a change in the unit method, which shifts to a low level. In this particular mode it is not possible to download the log data to a PC or load the application in compressed format. To restore the unit to its normal mode of communication with Winload it is necessary to reset the pCO board after successfully loading the BIOS.
Winload will automatically configure for the unit connected. For example, allowing or not the download of a special BIOS version, enabling or not the download of the log configuration, recognising or not if the unit has the possibility to use the greatest possible size of RAM and, therefore, enabling or not the download of an application that takes advantage of the total amount of RAM.
In a few cases, however, it is necessary to set a few options, such as, for example, the operative Baud Rate if the pCO to be used has a 14.7 MHz or 16 MHz quartz, using the command line in a normal windows connection to the executable Winload32.exe.
In-line help and the record file for changes, "CHANGELOG", offer help for the user in any case.
In general, the sequence for operations to begin communications between Winload in the graphic mode and pCO is the following:

- Connect the RS485/USB converter to the PC and to pCO.
- Open the Winload program on the PC by double clicking on the icon only after activating any options using the control line.
- On the main screen, set the serial port of the PC that is connected to the serial converter and the pLAN address of the pCO board to communicate with.
- Power the pCO Controller.
- Wait for "on-line" to be indicated on the lower left on the main screen.
- At this point, select the proper file on the main page to perform the desired operation.

For the "EASYWINLOAD" mode, the automatic loading mode in which the settings are supplied before executing the program, and for remote connection via MODEM, please follow the instructions provided in Winload's on-line Help.
The possibilities for download are listed in the following tables:

LOCAL	pLAN Serial	BMS Serial	FieldBus Serial
Load Boot and BIOS	YES	NO	NO
Loading application and parameters	YES	YES	YES
Loading/downloading logs	YES	YES	YES
Loading/downloading Flash NAND (pCO3)	YES	NO	NO

REMOTE (not via pLAN)	BMS Serial	FieldBus Serial
Load Boot and BIOS	NO	NO
Loading application and parameters	YES	NO
Loading/downloading logs	YES	NO
Loading/downloading Flash NAND (pCO3)	NO	NO

All of the functions of the Winload32 program are also available in the pCO Manager tool, which includes the Commissioning Tool .

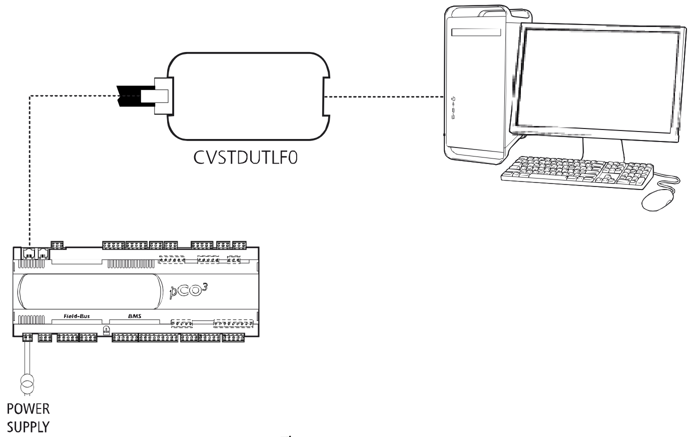


Fig. 3.a

3.1.1 Commissioning Tool

Required setup on pCO to use the Commissioning Tool:

1) the application uses a screen (Ge_01) through which it is possible to setup the Winload protocol on the BMS serial.
2) If you want to have a remote connection, the system variables regarding the PSTN or GSM modem must be setup correctly.
3) To perform the operations available using the Commissioning Tool it is necessary to connect to the already functioning application. This means that the Winload protocol must be set up in some way (using an application screen or by the supervisor) after the pCO controller has been turned on. If the pCO controller is connected directly to start-up via the pLAN serial port, it enters the Winload mode and under these conditions it is not possible to perform the operations of the Commissioning Tool.
4) If firmware and the application are updated, before using the Commissioning Tool you must reset the pCO board.
5) Once the protocol is correctly setup on the desired serial, it is possible to connect the PC. CAUTION: If you use the BMS OR FIELD BUS serial ports, once the pCO controller is disconnected with a PC command (for example when you move from the PCLoad window to the Commissioning Tool window and vice versa), the pCO controller resets the previous protocol setup on the serial in use. If previously an application was updated, the pCO controller is automatically reset. To reconnect the pCO controller, it is therefore necessary to reset the Winload protocol on the pCO.

Memory Limits:
The periodic monitoring of the application variables is limited to a maximum of 250 WORDs that can be defined from among all the available memory the application has available. The periodic monitoring of the application variables is limited to a maximum of 50 WORDs that can be defined from among all the available memory the application has available.
"One-shot" reading and writing the individual variables does not have address limits. All addresses in the memory reserved by the application of all memories present in the pCO are available: memory X, memory T, memory P, memory E.

Note: for further information regarding the installation and update of software on the pCO controller board, please refer to the on-line help of the pCO Manager program.

3.2 SmartKey

The SMARTKEY programming key allows the programming key function to be emulated in parallel in the pCO models for which this function is not available (pCO[XS], pCO[3]) with the exception of the BOOT, which is not loaded by the SMARTKEY. In particular, the key can clone the content of a pCO and download it to another identical pCO on the first use of the telephone connector of the terminals (the pLAN must be disconnected). This function is available for all pCO, even those without a parallel key. In addition to this mode, the key can also be used to remove the log data from more than one pCO and the download them to a PC.
Using the PC, and the "SMARTKEY PROGRAMMER", the key can be configured to perform specific operations: download of logs, application programming, BIOS programming, etc.
For further information, please see the on-line help of the "SMARTKEY PROGRAMMER" program and the SMARTKEY instruction sheet.

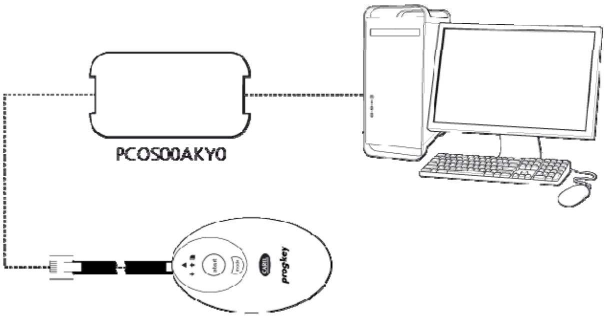


Fig. 3.b

Note: for further information regarding the installation and update of software on the pCO controller board, please refer to the on-line help of the pCO Manager program.

3.3 First Start Up

The first time the pCO[3] board is started up when the Smart HP application is installed, a screen appears from which it is possible to select the program language.
Using standard navigation commands, select the language desired and confirm it in order to access the main menu.

Note: if not selection is made within the time defined by a parameter (in the menu dedicated to the manufacturer), the language selected will be that currently in use.

3.3.1 Addressing the terminal

The address of the terminal can be set in a range from 0 to 32. Addresses 1 and 32 are used for the pLAN protocol. Address 0 identifies the **Local Terminal protocol**, used to perform point-to-point connections without graphics and to configure the pCO controller. The factory-set address is 32. The address of the terminal can be configured only after powering the terminal using the RJ12 connector. To enter the configuration mode, press , and at the same time and hold them for at least 5 seconds. The terminal will show a screen that is similar to the following. The cursor will flash in the upper left corner:

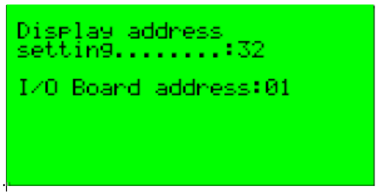


Fig. 3.c

To change the display address ("Display address setting") perform the following operations in sequence.

1. Press once : the cursor will move to the "Display address setting" field.
2. Select the desired value using and , and confirm it by pressing again.
3. If the selected value is different from the value in memory, the following screen will appear and the new value will be saved to the display's permanent memory.

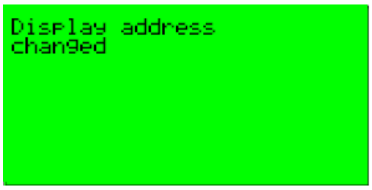


Fig. 3.d

If the value of the address to 0, the terminal will communicate with the pCO board using the Local Terminal protocol and the "I/O Board address" field will disappear as it will no longer have a meaning.
To modify the list of terminals (private and shared) associated with a pCO board, perform the following operations in sequence:

4. Enter the configuration mode (see above) by pressing , and at the same time for at least 5 seconds.
5. Press twice : the cursor will move to the "I/O Board address" field.
6. Select the address of the pCO board to be modified and confirm by pressing .

At this point, the pCO controller will start the configuration procedure by sending a screen similar to that shown in the following figure.

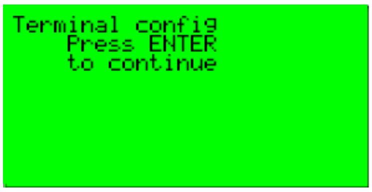


Fig. 3.e

7. Press once again : the configuration screen will appear, similar to the following:

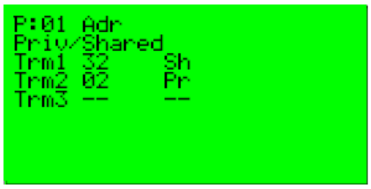


Fig. 3.f

8. Modify the terminal configurations as desired. will move the cursor from one field to the other; whereas, and change the value in the current field. The P:xx field displays the address of the selected pCO board (in the example shown in the figure it is board 1).
9. To exit the configuration procedure and save the data, select the "Ok?" field, select "Yes" and confirm by pressing .

During the configuration procedure, if the terminal remains inactive (no keys pressed) for more than 30 seconds, the pCO board will automatically interrupt the procedure without saving any changes made.

Caution: if during operation the terminal detects an inactive status of the pCO board that is displaying the output, it completely deletes the display and shows a message similar to the following.

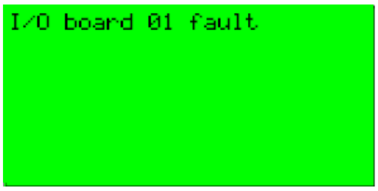


Fig. 3.g

If the terminal detects inactivity on the entire pLAN network, that it does not receive any messages from the network for 10 consecutive seconds, it completely deletes the display and shows the following message:

Fig. 3.h

3.3.2 Addressing the I/O pCO^3 board

To complete the installation procedure, you must set the pLAN address on the pCO. The pCO^3 controllers do not have dip-switches for addressing the pLAN network: the change in the pLAN address is performed using any GD1 terminal.

1. Set the address to 0 on the terminal (please refer to the previous sections for details on how to select this address).
2. Remove the pCO power supply.
3. Remove any pLAN connections to other controllers from the pCO.
4. Connect the terminal to the pCO.
5. Power the pCO controller and at the same time press the UP and ALARM alarm keys on the terminal. After a few seconds, the pCO controller will perform the starting sequence and its display will show a screen similar to the following:

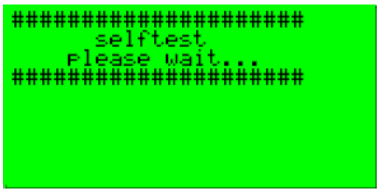


Fig. 3.i

6. Once the screen appears, wait 10 seconds and then release the keys.
7. The pCO controller will interrupt the starting sequence and display a configuration screen similar to the following:

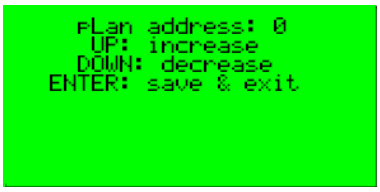


Fig. 3.l

At this point, change the pLAN address suing the ↑ and ↓ keys on the terminal.

8. Confirm the address by pressing ↵: the pCO controller will complete the starting sequence and will use the specified address.

Caution: if the settings have not be configured correctly, the text and the images shown on the display will be incorrect and in the wrong order.

4. USER INTERFACE

4.1 Graphic terminal

Smart HP interfaces with the user via pGD1 terminal, in the wall or panel versions, or eventually via the "built-in" display on the pCO board.

Fig.4.a

This terminal, shown in the figure above, is equipped with six keys with the following meanings:

- Alarm	displays the list of active alarms.
Prg *- Prg*	Allows you to access the main menu tree.
Esc *- Esc*	Return to the previous screen.
- Up	Scroll a list upwards or increase the value shown on the display.
- Down	Scroll a list downwards or reduce the value shown on the display.
- Enter	Enter the selected submenu or confirm the set value.

4.2 Display

It is possible to group the Smart HP screens in three basic types: the main screens (only one if the Smart HP manages only one unit, from two to seven if zone management is used), the navigation menu, and that for modifying parameters.

The lines on the display of the main screen (unit) are organized in the following manner:

Fig.4.b

1- Information about the date, time and units under consideration
2- Main measurements and relative values
3- Main active actuators
4- Status of the unit
The units can be in the following states:

- OFF,
- ON,
- ENERGY S.,
- AUTO-OFF,
- AUTO-ON,
- AUTO-E S.,
- Din-OFF,
- BMS-OFF,
- ALARM-OFF,
- PROTECT.

In the unit status screens following icons may appear:

	identifies the three temperatures indicated and therefore: T.DOMESTIC (temp. relative to the domestic water) T.OUTSIDE (outside temp. measured), T.INSTALLATION (temp. of water returned to the primary installation).
	The request(s) to the compressors are activated at the same time.
	Activated if there is a request to heat the domestic water.
	Activated when one of the installation pumps are turned on, with the exception of the solar panel pumps.
	Activated if one or more solar panels are installed and active.
	Activated if the integration system for the installation (ex. heater or furnace) is operating. If the and icons are both active at the same tine, only the latter is visible.

In the picture below is represented the browser screen og the rooms:

Fig.4.c

1- Information about the date, time and room under consideration
2- Main dimensions and their relative values (temp., humid., zone scheduler active in the room),
3- Main active actuators
4- Room status
The possible states the room may be in are:

- OFF,
- COMFORT,
- ECONOMY,
- AUTO-OFF,
- AUTO-COMF,
- AUTO–ECON,
- KEY-OFF,
- BMS-OFF,
- ALARM-OFF,
- PROTECT.

In the room status screens following icons may appear:

	On and steady in the zone status display screen Presents the status of the zone to heat/cool.
	Presents the user the set mode COOLING (Summer).
	Presents the user the set mode HEATING (Winter).
	Indicates the humidifier is activated.
	Indicates the dehumidifier is activated.
	Indicates the three-way valve of the radiant installation is activated.
	Indicates the zone valve is activated.

Note: If more than one main screen appears (that is unit and zone), two arrows located in on the right of the display (↑ e ↓) allow you to scroll through the screens.

The following figure shows the navigation screen for he main menus.

Fig.4.d

Following are the eight menus:

A.	On-Off/Mode ,
B.	Setpoint,
C.	Time Bands,
D.	Inputs/Outputs,
E.	Alarm Log,
F.	Change Unit,
G.	Service,
H.	Manufacturer,

The parameter modifications screens appear like the example shown below:

Fig.4.e

5- Name of main menu entered
6- Screen index
7- Name of sub-menu where you are editing the parameters
8- Parameter name
9- Editable value

Note: in Smart HP all editable fields are represented by numerical values or capital letters)

5. MENU DESCRIPTION

Main Menu - Function Tree

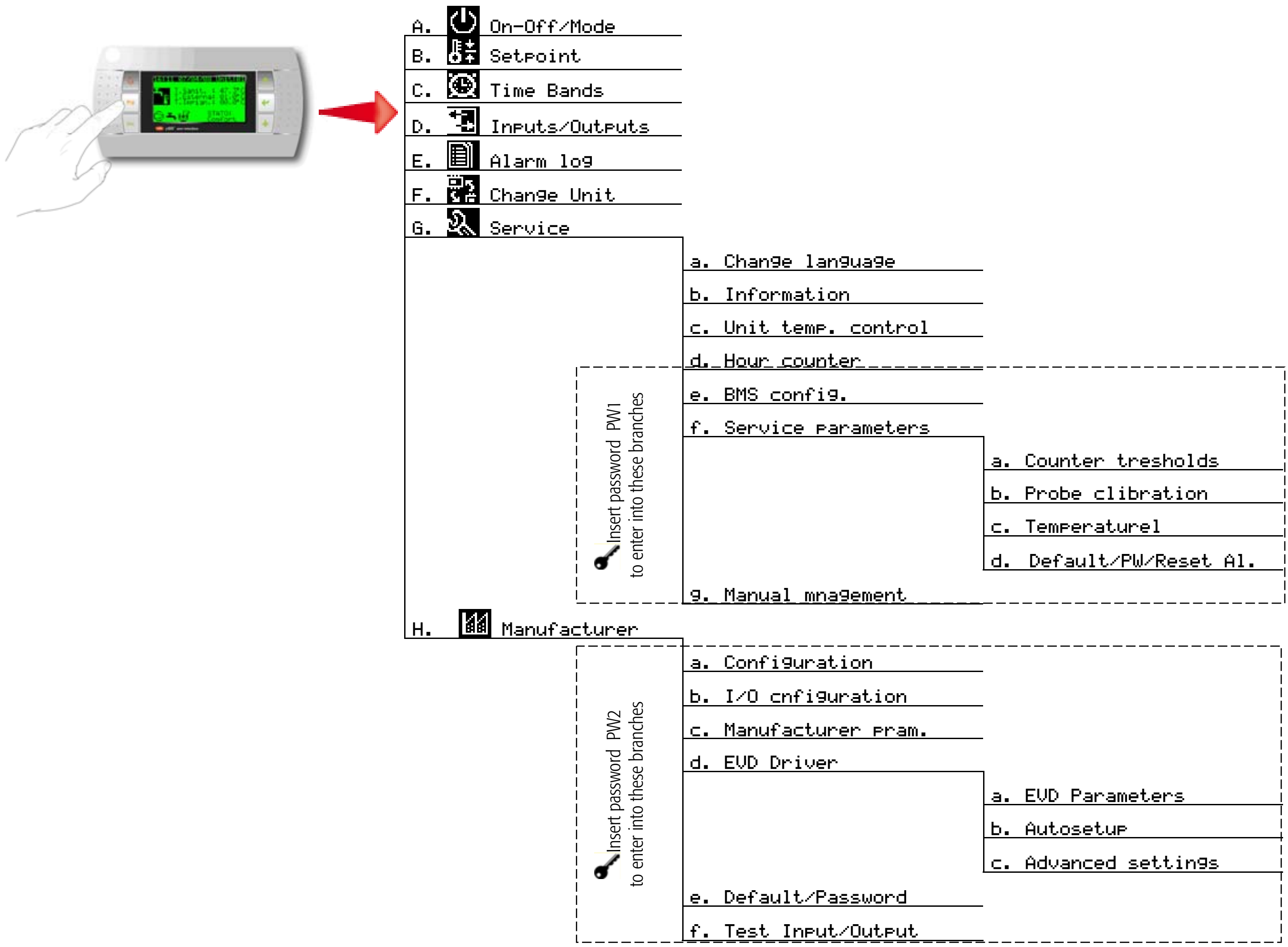


Fig. 5.a

5.1 A. On-Off/Mode

From the main menu (A.) it is possible to set the status of the unit based on the choices made.

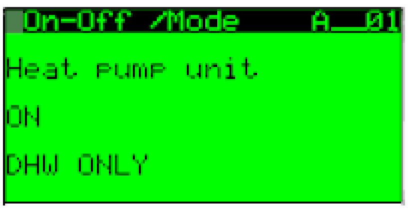


Fig. 5.b

On the first selection line of the screen the following can be chosen:

1. When the Smart HP manages in the "just unit" mode: ON, OFF, ENERGY SAVING, AUTO
2. If the application must manage "unit + installation" the items for selection are: OFF and ON FROM ROOM.

The items in the first case deal with the selection of only the heat pump unit and have the following meanings: ON = standard conditions, OFF = stand by, ENERGY SAVING = use of "reduced" set points for greater energy savings, AUTO = indicates that the scheduler is active.

In the second selection line (editable ONLY if OFF is selected in the first line), you can select the seasonal status of the heat pump (COOLING + DOMESTIC, HEATING + DOMESTIC, ONLY DOMESTIC).
The rooms that can be configured in screens A__03 and A__04, very similar to that shown in Fig. 5.b where only the first row is present. The meanings of the possible choices involve the set points of the rooms are:OFF = stand by, ECONOMY = use a reduced set point for lower energy losses, COMFORT = optimum conditions, AUTO = indicates that the scheduler is active.
The remote ON-OFF digital input allows the entire system to be put in stand by, including the control of the domestic water.

Note: The Smart HP working mode ("just unit" or "unit + installation") must be decided during construction/installation of the installation and cannot be changed by the final user using the display commands.

Note: on the A__02 screen it is possible to put the installation in stand by using the "enable temporary off" function, which allows the unit to restart at a preset time (date and time).

5.2 B. Setpoint

From the main menu (B.) you can set the various "Set point" for only the rooms. The set points that can be set are COMFORT or ECONOMY and depend on the selection made during the unit's configuration.

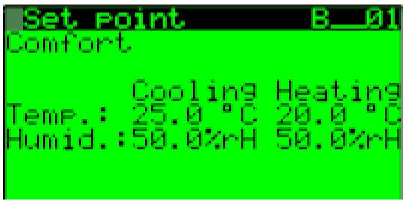


Fig. 5.c

In fact, the range of room set points that can be selected by the user are constrained by the settings made during installation with the respective parameters.

Note: this menu is not active if "just unit" is selected and therefore the room controls have not been activated.

5.3 C. Time bands

Description of Operation:

pCO³ is equipped with an internal clock with a buffer battery that maintains the time and date for all of the functions that require it. The time, date, time slot, closure periods, and holidays are set using the main menu for the Clock/Time Slots (C.). The related screens that appear are the following, in sequence:

- Set time and date
- Set the four time slots
- Closure period up the three max.
- Holidays/special dates up to twelve max.

The screens for setting up "just unit" (unit) are:

Fig. 5.d

Note: If Clima zone or serial probe terminals are present, two sets of screens appear with the following text: "Slot Zone 1" and "Slot Zone 2".

If you want to set fewer time slots than the four pre-set, just select the symbols "--:-- " in the "hh:mm" field of the inactive time slots and for the set point in the same manner.

It is possible to set four different time slots within the same day with respective selectable set points for each time slot.

Thereafter, it is possible to select all of the days of the week, by either copying the previous day, or setting each day independently. To select the set points, please refer tot he relative section and parameters in the overall parameter table.

For this type of unit, the system inertia are very long on average as you are working with radiant systems that often have very large masses. In this case, the working set points (COMFORT and ECONOMY) are very similar.

Consequently, also the number of time slots are also reduced because the consider the large inertia of the system.

If Smart HP must manage only the unit, the "just unit" (UNIT) time slots will be displayed, whereas if it must also manage the installation, only those in the ZONE are displayed, in this case the unit is forced to operate with the most costly request.

If one zone is set to the ECONOMY mode and the other is OFF, the unit will operate with the ENERGY SAVING settings.

	Selectable State			
UNIT	OFF	ON	ENERGY SAVING	AUTO
ZONE	OFF	COMFORT	ECONOMY	AUTO

Note: OFF guarantees antifreeze protection of the unit in all cases.

It is possible to create the time slots for one day and then copy them to the other days if you want to reuse them.

5.4 D. Inputs/Outputs

From the main menu (D.) you can display, in sequence, both the type and the physical status of the inputs and outputs, both digital and analogue. If the inputs or outputs have not be set-up (no devices connected), "----" will be displayed. The figures that follow show the relative screens.

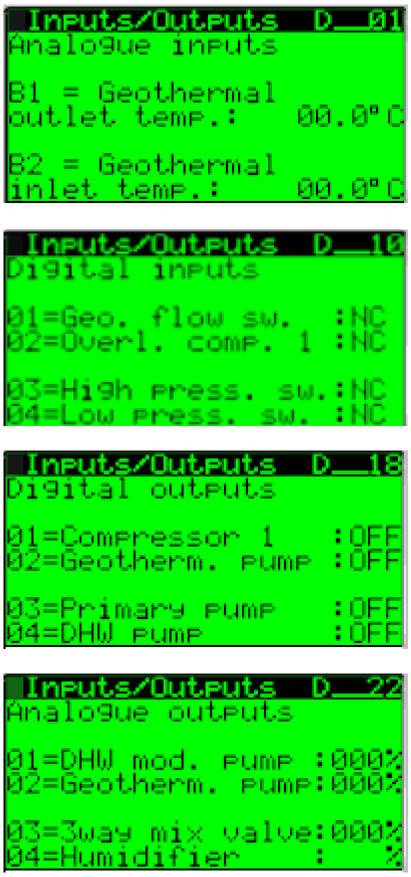


Fig. 5.e

Note: The values relative to the analogue outputs are expressed as percentages.

5.5 E. Alarm Log

From the main menu (E.) it is possible to display in sequence, the alarm log. To reset the alarms, access the Service menu using the password. Using the "Alarm" key, you can silence the acoustical alarm (if present), display the currently active alarms, and reset them (obviously the remain in the log).

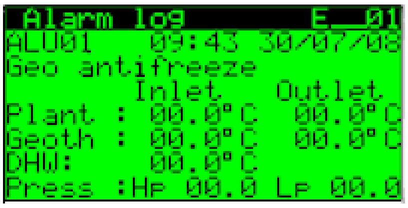


Fig. 5.f

Note: please see the section dedicated to alarms (9.2).

Note: it is possible to access the list of active alarms from the home page by pressing the ***key.***

5.6 F. Change Unit

From the main menu (F.) you can display the set parameters in the other pCO controllers connected in the pLAN network. To to this, enter the sub-menu and enter the unit that you want to access. Once connected, the main screen will display the number of the unit in question.

Note: this function is not active in Smart HP release 1.0.

5.7 G. Service

From the main menu (G.) you can access the service sub-menu, which is divided into two parts. The first part (a,b,c,d) is not password protected and allows you to display the settings of the following data:

G.a. Change language/unit of measure: allows you to select one of the languages loaded in the application (Italian, English).

Note: changing the unit of measure from SI to British units will be available in the next release of Smart HP.

G.b. Info: you can find information regarding the application code (and version) on the first available screen. The second screen contains information regarding the pCO[3] board hardware.

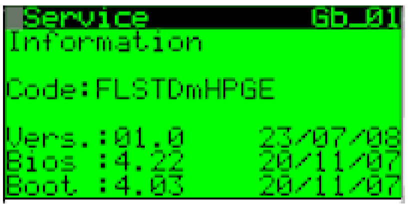
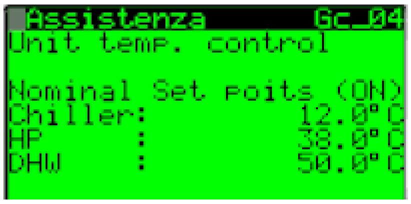


Fig. 5.g

G.c. Temp. Control Unit: allows you to se t the set points for the solar panels (if present), the mixing circuit, the antifreeze function, and the heat pump unit (nominal and energy savings, in both the "heating/cooling" mode and for heating domestic water). The following images only represent the screens relative to the heat pump unit set points.



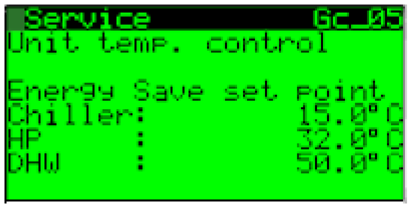


Fig. 5.h

G.d. Hour counter: displays the hours worked for the main moving parts (compressors and pumps depending on the configuration) that may be subject to periodic maintenance.

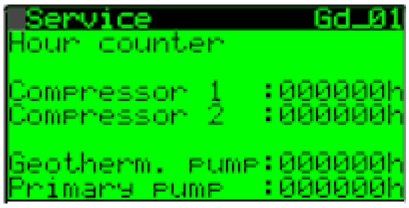


Fig. 5.i

Note: From this point on in this sub-menu, a password must be entered to proceed (PW1 – default 1234).

G.e. BMS Configuration: sets all necessary parameters for connection to a supervisor system. This depends on the type of optional board that is inserted and the type of protocol selected.

By choosing "CAREL" you can connect to a supervisor via a RS485 that supports the CAREL protocol, but you can also connect to boards that convert the CAREL protocol into others, such as a TCP/IP board or a Trend board.

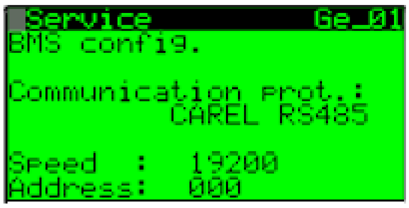


Fig. 5.j

G.a. Config./Threshold: allows you to set the threshold of the working hours for the main moving components or components subject to periodic maintenance in the unit (depending on the configuration).

It is possible to reset the timers for each device on the same screen

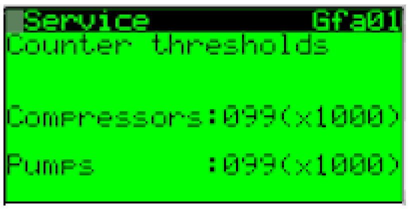


Fig. 5.k

G.f.b. Probe calibration: allows you to set an offset to be added or subtracted from the probe reading involved. Once an offset value (Ofs) is confirmed, press the **key** to automatically update the value of the corresponding probe (shown next to it).

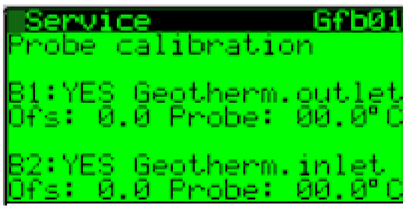


Fig. 5.l

G.f.c. Temperature Control: in this branch, you will find all of the parameters regarding the temperature control that can be changed during installation or assistance on the installation with the exception of those that are the responsibility of the manufacturer, which are located in the H.c. branch.

G.f.d. Default/PW/Reset Al. Allows you to reset the alarm log and change password PW1.

Fig. 5.m

G.g. Manual Management: this allows you to change from the individual actuators on the unit from automatic to manual.
Digital outputs allow only the states ON or OFF, whereas analogue outputs can be selected from 0 - 100%, obviously all defaults are in Auto. If selected, control is by-passed, but not the set alarm thresholds. This protects the unit's safety. Generally, this operation is selected to test the individual actuators during installation.

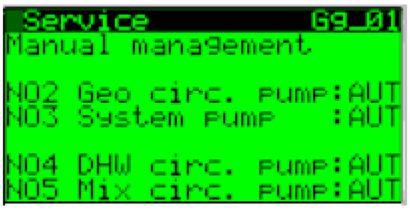


Fig. 5.n

5.8 H. Manufacturer

From the main menu (H.) you can access the manufacturer's sub-menus after entering a password (PW2 – default 1234):

H.a. Unit Configuration: allows you to select the basic characteristics of the unit/installation and the functionality of the individual devices.
The first parameter is the type of unit and installation with circuit reversibility or not. Thereafter, a series of screens are displayed that define the salient characteristics of the individual system components (ex. type and number of compressors, etc.) of the configuration that is allowed by the hardware.

H.b. I/O Configuration
This menu allows you to select the functionality and presence of the individually selectable I/Os.
For each individual I/O there are various possible selections, which essentially depend on the hardware used and by the fact that some I/Os can take on different functions than those set up in the default configuration.
For the digital I/Os, you can select the status of the device, that is NO or NC logic. For the Analogue outputs, the min. and max. output values can be selected (default 0 - 100 %). Furthermore, it is possible to select the type of input for the analogue inputs (ex. 0 - 10 V, 4 - 20 mA, etc.) as well as the working range of the connected probe (ex. for the high pressure probe: 0 - 44.8 Bar). Following is an example of the selection of the digital inputs:

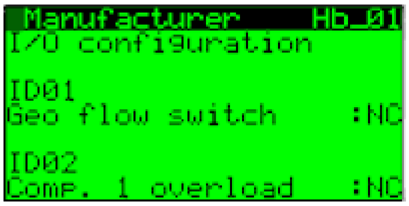


Fig. 5.o

H.c. Manufacturer Parameters: this screen allows you to select the parameters that can be set by the manufacturer.

H.d. EVD Driver: these parameters are those which allow you to set up the electronic valve driver, which in turn is divided into three sub-menus. Please see the relative documentation.

Note: for further information, please refer to the user manual dedicated to the EVD400 driver (+030220225).

H.e. Default/Password: this allows you to select the default CAREL values (when you select CAREL all settings are deleted and the system returns to the default configuration indicated in the following manual).
On the following screen, you can change the manufacturer's password.

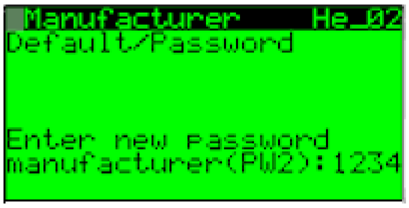


Fig. 5.p

H.f. Input/Output Test

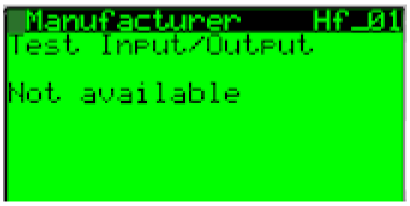


Fig. 5.q

Note: this function is not active in Smart HP release 1.0.

Note: after importing the manufacturer's parameter values, you must turn off and on the pCO controller in order for the new settings to be saved and to become effective.

6. FUNCTIONS

6.1 Compressor Management

Often these units only use scroll type hermetic compressors. Smart HP can manage up to two compressors on a refrigeration circuit. These are used to produce the installation and the domestic water circuit water, both hot and cold, based on the active seasonal mode.
If there are two compressors in the installation, they can be turned on in an alternating manner in a FIFO (First In First Out) rotation that can be set on the Hc_10 screen.
Management times are CAREL standard, that means minimum time on, off between two turn-on's of the same compressor and between different compressors. The same is true for the delays in turning on the unit and the respective installation pumps. These parameters can be displayed in the Manufacturer (H) branch → Manufacturer Params. (c). Please refer to the following figure for their meanings:

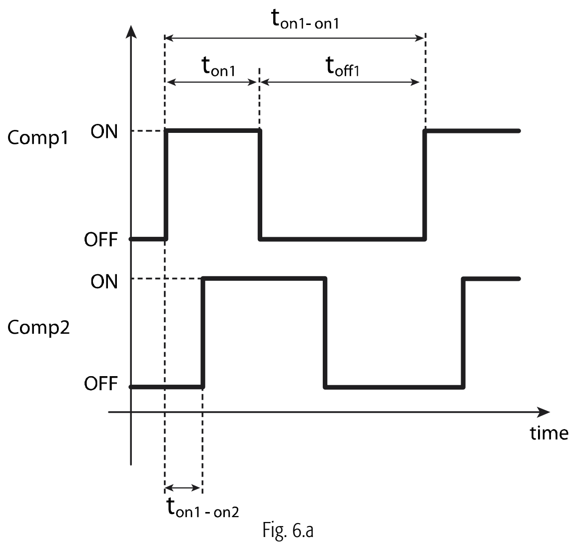


Fig. 6.a

The pCO[3] controller manages the compressor alarms and more specifically, the thermal overload switch for each (without delays and with manual reset), the high pressure switch without delays and with manual reset; and/or the high pressure probe, using a threshold (Hc_01) which allows the operation of one compressor to be stopped (if two are present).
The low pressure alarm may come from either a pressure switch or probe. This alarm has a settable delay and can be reset manually or automatically (in the latter case, five attempts are made before switching to the manual mode). These parameters are found in the Hc_02 - Hc_05 screens.
The circuit may be equipped with an electronic expansion valve controlled by an EVD400 driver. In this case, the low and high pressure probes are those connected to the electronic expansion valves and therefore the ones on the pCO[3] board are not connected.

6.2 EVD400 Electronic Valve Management

To optimize the refrigeration circuit operation, an electronic expansion valve (E2V-E3V, etc.) with its relative EVD400 driver can be used, which is inserted in the pLAN network with an address of No. 5.
Using the EVD400, the high and low pressure probes of the compressors are connected to it and their measurements are transmitted to the pCO[3] controller across the serial pLAN network.
Their parameters are set in the special settings branch for the Manufacturer (H.) → EVD Driver (d) that in turn is divided into three sub-menus (a.EVD Parameters, b,Autosetup, c.Advanced Parameters). The probe readings and status of the E*V valves are found under the Inputs/Outputs branch (D.).
For tests and checks during installation start-up, you will find the screens for manual forcing of the electronic expansion valve under the Service (G.), Manual Management (g) branch.
For further information regarding the individual parameters, please refer to the manual dedicated to the EVD400 (+030220225, Italian and +030220227, English).

Note: also in the units Type 1,2,3,4, it is possible to select the EVD400 driver. In the units 3 and 4 the high and low pressure thresholds refer to the probes connected to the pCO³ board while EVD400 keeps working with the related probes.

6.3 Antifreeze Function

This function allows you to avoid the possibility of reaching temperatures that are potentially dangerous to the installation and geothermal probes. Readings are performed using the relative outlet temperature probes (on the geothermal circuit and primary installation) and by setting a set point and a antifreeze differential for the individual water circuits. These values can be set in the Service branch (Gfc35… Gfc38).
This is a severe alarm that blocks the heat pump. Reset may be either manual or automatic, based on the selection made in the previously listed screens (see the table of alarms).
The operational diagram is provided in the following figure:

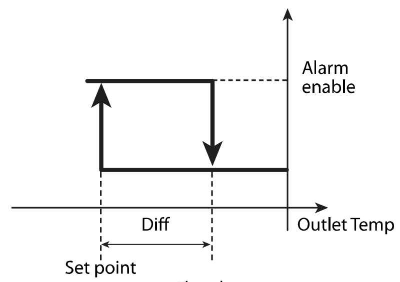


Fig. 6.b

An antifreeze protection set point can be ser for the rooms that reactivates the unit from Stand-by if one of the serial probes/Climas fall below this value. This set point can be set in the Service branch (Gfc46) while its differential is set to 3°C. The same it true for its reset, whish is automatic.

6.4 Control of the installation Water and the Geothermal Circuit

Basic control managed by Smart HP is performed based on the outlet temperature of the mixing circuit, and acts on the three-way modulating valve.
The cooling and heating control set point is set in the Service branch parameters (Gc_02); whereas the DYNAMIC and FIXED POINT control, the control band, the type of control (P = proportional, P+I = proportional + integral), the integration time constant, any possible heating temperature compensation, the offset to avoid condensation when cooling, and the temperature limits can be set using the screens Gfc30 - Gfc34.

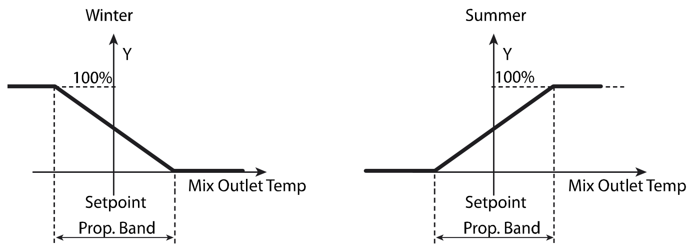


Fig. 6.c

Control of the compressor(s) operation is such that it ensures the return temperature of the primary circuit for both cooling and heating operation, which are set up on screens Gc_04 and Gc_05.
The following figures illustrate the heating thermostat control of the compressors when either 1 or 2 compressors are present. Cooling is obviously mirrored (direct) and refers to the relative working set points (Chiller).

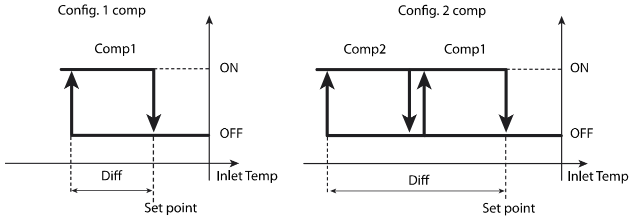


Fig. 6.d

In the primary circuit of the heating function mode, heaters in the heat-exchanger or a furnace (which receive a remote on/off and operates with its own set point settings) can be used to integrate the system (digital output NO6 on the pCO^3 board. In the cooling mode, the outlet probe of the primary circuit guarantees antifreeze protection (please see the section dedicated to the Antifreeze Function) for the unit's heat-exchanger. All of these parameters can be set under Service (G) → Service Parameters (f) → Temperature Control (c).

For reversible units (heating and air conditioning) an inverting valve is used in the refrigeration circuit. In this manner, the flows are also inverted in the heat exchangers (installation and geothermal). Furthermore, four-way valves installed in the water circuits can also be controlled with the same output. This allows the counter flows to be maintained on the heat exchangers. In this configuration, the probes must be installed downstream of the four-way water valves in order to avoid inversion of the reading.

For the geothermal circuit, the control pump can be either an on-off type or modulating. In the latter case if operation is proportional with working set points and relative differentials, these are set in on screen Gfc50.
and the minimum value is set to 35 % of the output.
For antifreeze protection, please see the specific section.
The following diagram illustrates the operation of the modulating pump:

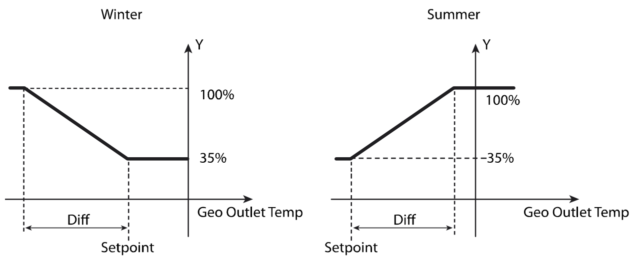


Fig. 6.e

6.5 Humidify and Dehumidify Management

The management of the room humidity control is performed by the primary air treatment system and performed using the readings of the serial probes or Clima present in the rooms.
The humidification system (controlled by a proportional output, Y4) is active under heating; whereas the dehumidification system (controlled by an on-off output, NO11) is active under cooling. For its operation, the dew point of the individual rooms controlled are considered. The presence of these systems is set using screen Gfc39.
The humidification and dehumidification control set points act based on a mathematical average of the readings from the probes/Clima present in the installation and can be set by the end user directly in the Set Point menu (B).
The humidification and dehumidification differentials are set using the screen Gfc40.
The settable limits of the set points by the final user can be set during installation on the screen Gfc44.
The diagrams below illustrate their relative operation:

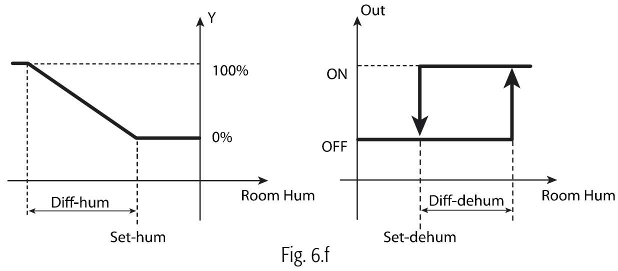


Fig. 6.f

For dehumidification, in addition to the activation of the specific actuator, it is possible to set a safety offset (selectable on Gfc31) for the outlet temperature of the installation in order to avoid reading the dew point of the rooms. This offset raises the installation operating temperature using the modulating valve in the mixing circuit (conditioning it to the highest dew point temperature measured in the individual rooms).
For humidification and dehumidification, there is a single alarm input (except for the unit type 6, which has two separate alarms) which indicates faults in the system active at that time.

6.6 Domestic Water Temperature Control and Anti-Legionnaire Function

This application allows the domestic water temperature to be controlled by activating a 3-way switching valve (see Unit Type 1) and a pump on the relative desuperheater, which can also act as a total recovery unit if the unit is reversible. Control is performed using probe B3 and the relative set points (Nominal and Energy Savings) are set using screens Gc_04 and Gc_05. The working differential is set by the manufacturer in screen Hc_06, which in installations with 2 compressors is equally divided between the two.
Continuous or thermostat operation of the domestic water pump is set using the Manufacturer Hc_23 branch. If the modulating output is used for the domestic water pump, it will be active at 100 % if working below the set point. It will work at 35 % (fixed) if the water temperature is above the set point, regardless of the choice made on screen Hc_23.
Normally, these units are equipped with an accumulator tank that allows the water to stratify. Furthermore, it includes integrating systems that can be either electric heaters or a furnace, in addition to solar panels (as explained in the following section).
The operational diagram is as follows:

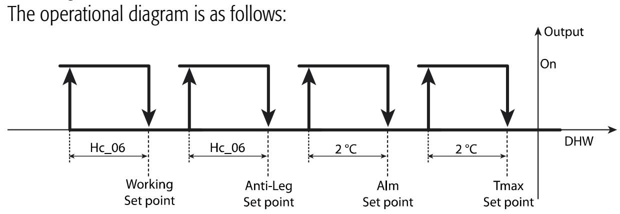


Fig. 6.g

Integral Domestic Water Heaters:
In this case, the relative digital output (NO7 set using the parameter located on the screen Gfc25) is activated in deactivated as a function of the differential values (Gfc28) compared to the working set point, as shown in the following diagram:

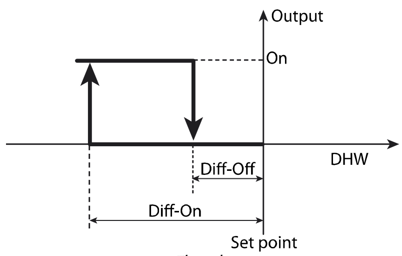


Fig. 6.h

Integral Domestic Water Furnace:
In this case, the relative digital output (NO7 set using the parameter located on screen Gfc25, which allows setting this in place of the heat pump) is activated and deactivated as a function of a set point and a differential set on screen Gfc27.

Anti-Legionnaire Function:
It is possible to activate a weekly algorithm (from screen Gc_03) that using a domestic water integration output, allows avoiding problems related to the proliferation of Legionnaire's Disease, by raising the set point
to a value that can be set for a fixed time of 1 hour.

6.7 Solar Panel Management

From the Service menu (Gfc23) you can select the presence of one or two solar panels (the two panels are used for east-west orientation of the panels).
The probes located on the panels (B9 and B10 on the pCO^3 board) must be PT1000s, which guarantee a maximum operating temperature of up to 200°C.
For each individual panel, to control the pump functions based on the temperature difference between the panel probe and the low portion of the domestic water tank. The relative set point and control ban can be set in the unit's temperature control parameters (screen Gc_01).

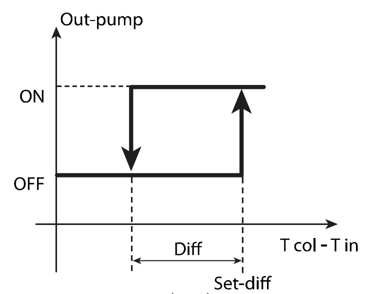


Fig. 6.i

Key

T panel	B9 and/or B10
T low	Temperature of the lower portion of the domestic water tank

If there are two panels (one oriented eastwards and the other westwards) the set point and working differential are the same for both. The entire operation (of the pumps) is independent and the minimum time of activation is set to 30s.
On screen Gfc23 you can also set a warning threshold for the load of the domestic water load. Above this threshold, the solar panel pumps are deactivated, and they will restart operation only if they exceed the max. temperature, again settable on the same screen, and will be definitively stopped once they reach the maximum load threshold of the tank (see the diagram in the section regarding domestic water control).
It is also possible to configure a circuit with a heat exchanger between the solar panel and the tank, by having the two pumps operate in parallel.

Note: this option is only available if Smart HP is installed on a pCO^3 Large control board.

6.8 Temperature Compensation

Under heating operation, the mixing circuit outlet set point (Gc_02) may be positively compensated based on the outside temperature.
This function is activated by selecting Dynamic operation on the Gfc30 screen and by setting an activation set point based on the outside temperature with a relative slope given in percentage (ex. if you select 50 % and a reduction of 1 °C of the outside temperature you obtain an increase of 0.5 °C in the outlet set point).
The maximum limit of the mixing circuit outlet set is set on screen Gfc34.
The diagram below illustrates the its following operation:

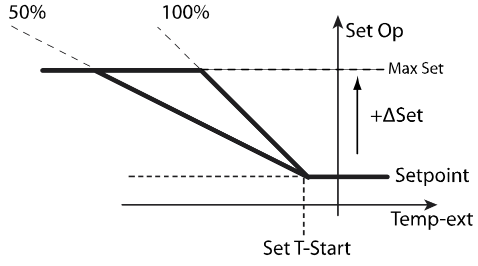


Fig. 6.j

6.9 Management of the zones using the Serial probes or Clima

It is possible to connect rooms to the zone terminal system (Clima) or DPW**14000 model serial probes. Up to six units can be configured using the Service menu (Gfc branch). Both the probes and the Clima terminals communicate the relative temperatures and humilities (based on the models connected) to the pCO^3 board for room control.
In both cases, there are one or two settable scheduler(s)/zone(s) (Gfc branch). Using the main menu, you can choose the operating mode (A. On-off/Mode), Set points (B.) and the relative Time Slots (C.). For further information, please see section 5.
If serial probes are used, the outputs for the two zones/schedulers are available on the pCO^3 board (NO12 and NO13). If Clima is used, the two outputs on the same terminal can be used, and consequently there are six available zone pumps for connection (in any case paired with the two schedulers/zones).
For temperature control:

- If the serial probes are connected, the scheduler/zone working set point uses the average temperature of the activated probes for the respective zone/scheduler.
- For the Clima terminal, the Clima control is used, on which the pCO^3 controller transmits the working set point for the relative zone. In any case, from the individual terminal, it is possible to temporarily modify the local set point using the on-off switch in order to activate the next time slot or to turn it off. In this case, it is reactivated with the same key. If all Clima terminals are turned off, the installation goes into stand-by until it is manually reactivated using at least one terminal.

If the installation also performs cooling, serial probes or Clima with incorporated humidity reading must be used to correctly manage the installation (please see the relative section) and the conditioned mixing valve for temperature control (that is increased by a settable off-set, on Gfc31) of the dew point temperature in the individual rooms, in order to avoid surface condensate phenomena.
The pCO^3 uses the mathematical average of all serial probes or active Clima to control the humidifier and dehumidifier (please refer to the section regarding humidify/dehumidify). Humidity control is only active on heating; dehumidification is active only on cooling operation.
Both the serial probes and Clima transmit the alarms to the pCO^3 board, which are displayed on the system terminal (pGD1) and also, if connected, on a supervisor (BMS).

6.10 Recovery Fans

If a primary air system is present for the rooms, it can be activated and deactivated directly by Smart HP using the relative digital outputs. This function can be set up in the Service branch, on screen Gfc47.
This output is activated by "system on" and is independent of the zone and heat pump status (it remains active even if only Domestic is active). It is deactivated when the system is turned OFF, from the digital input, and/or form the keypad.

7. PARAMETER TABLE

Function Tree

- A. On-Off/Mode
- B. Setpoint
- C. Time bands
- D. Inputs/Outputs
- E. Alarm log
- F. Change Unit
- G. Service
  - a. Change language
  - b. Information
  - c. Unit temp. control
  - d. Hour counter
  - e. BMS config.
  - f. Service parameters
    - a. Counter thresholds
    - b. Probe calibration
    - c. Temperature control
    - d. Default/PW/Reset Al.
  - g. Manual management

  (Insert password PW1 to enter into these branches: e.–g.)
- H. Manufacturer
  - a. Configuration
  - b. I/O configuration
  - c. Manufacturer param.
  - d. EVD driver
    - a. EVD parameters
    - b. Autosetup
    - c. Advanced settings
  - e. Default/Password
  - f. Test Input/Output

  (Insert password PW2 to enter into these branches)

"Mask index": shows univocally the address of each mask and therefore the parameters editable in this mask; e.g., with reference to the "functions tree" above-mentioned). To reach the Mask index parameter Gfc05, make the following steps:

Main menu → G. Service → f. Service parameters (after having inserted the relevant password PW1) → c. Temperature control and browse all the masks up to the fifth (05).

Following is the table of parameters that can displayed on the terminal.

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
A. On-Off/Mode										
A__01	Heat pump unit	On/Off with terminals in room	0	---	0	1	0: OFF 1: ON from room	I	R/W	
		On/Off with only heat pump	0	---	0	3	0: OFF 1: ON 2: ENERGY SAVE 3: AUTO	I	R/W	5
		Select cooling/heating for reversible units	0	---	0	2	0: DHW ONLY 1: HEATING + DHW 2: COOLING + DHW	I	R/W	6
		Select cooling/heating for only heating units	0	---	0	1	0: DHW ONLY 1: HEATING + DHW	I	R/W	
A__02	Enable sleep mode:	Enable "Restart on"	0	---	0	1	0: NO 1: YES	D	R/W	
		Day to restart for "Restart on" function	---	---	1	31		I	R/W	
		Month to restart for "Restart on" function	---	---	1	12		I	R/W	
		Year to restart for "Restart on" function	---	---	0	99		I	R/W	
		Time to restart for "Restart on" function	---	h	0	23		I	R/W	
	Start function:	Start of the "Restart on" function	0	---	0	1	0: NO 1: YES	D	R/W	
A__03	On-Off Zone 01 :	On-Off for Scheduler/Zone 01	0	---	0	3	0: OFF	I	R/W	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
							1: COMFORT 2: ECONOMY 3: AUTO			
A__04	On-Off Zone 02 :	On-Off for Scheduler/Zone 02	0	---	0	3	0: OFF 1: COMFORT 2: ECONOMY 3: AUTO	I	R/W	

B. Setpoint

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
B__01	Comfort Temp. Cooling	Comfort ambient temp. set point (cooling)	25.0	°C	Gfc43	Gfc43		A	R/W	13
	Comfort Temp. Heating	Comfort ambient temp. set point (heating)	20.0	°C	Gfc43	Gfc43		A	R/W	14
	Comfort Umid. Cooling	Comfort ambient humidity set point (cooling)	50.0	%rH	Gfc44	Gfc44		A	R/W	24
	Comfort Umid. Heating	Comfort ambient humidity set point (heating)	50.0	%rH	Gfc44	Gfc44		A	R/W	23
B__02	Economy Temp. Cooling	Economy ambient temp. set point (cooling)	26.0	°C	Gfc43	Gfc43		A	R/W	15
	Economy Temp. Heating	Economy ambient temp. set point (heating)	19.0	°C	Gfc43	Gfc43		A	R/W	16
	Economy Umid. Cooling	Economy ambient humidity set point (cooling)	50.0	%rH	Gfc44	Gfc44		A	R/W	22
	Economy Umid. Heating	Economy ambient humidity set point (heating)	50.0	%rH	Gfc44	Gfc44		A	R/W	21

C. Time bands

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
C__01	Clock Time:	Set hour	---	h	0	23		I	R/W	15
		Set minutes	---	---	0	59		I	R/W	16
		Set day	---	---	1	31		I	R/W	14
		Set month	---	---	1	12		I	R/W	17
		Set year	---	---	0	99		I	R/W	18
	Day:	Day of the week calculated based on the current date	---	---	1	7	1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday 7: Sunday	I	R	11
C__02	Day ---	Set day Unit time slots	0	---	0	6	0: MONDAY 1: TUESDAY 2: WEDNESDAY 3: THURSDAY 4: FRIDAY 5: SATURDAY 6: SUNDAY	I	R/W	
	Day to copy from scheduler	Allows copying the time slots of individual days	---	---	0	1	0: No 1: Yes	D	R/W	
	F1	Set start hour time slot 1	8	---	0	23	0 - 23	I	R/W	
		Set start minute time slot 1	30	---	0	59	0 - 59	I	R/W	
		Set set point type time slot 1	1	---	0	2	0: OFF 1: ON 2: ENERGY SAVE	I	R/W	
	F2	Set start hour time slot 2	12	---	0	23	0 - 23	I	R/W	
		Set start minute time slot 2	30	---	0	59	0 - 59	I	R/W	
		Set set point type time slot 2	2	---	0	2	0: OFF 1: ON 2: ENERGY SAVE	I	R/W	
	F3	Set start hour time slot 3	13	---	0	23	0 - 23	I	R/W	
		Set start minute time slot 3	30	---	0	59	0 - 59	I	R/W	
		Set set point type time slot 3	1	---	0	2	0: OFF 1: ON 2: ENERGY SAVE	I	R/W	
	F4	Set start hour time slot 4	17	---	0	23	0 - 23	I	R/W	
		Set start minute time slot 4	30	---	0	59	0 - 59	I	R/W	
		Set set point type time slot 4	0	---	0	2	0: OFF 1: ON 2: ENERGY SAVE	I	R/W	
C__03	Enable holidays	Enable unit holidays	0	---	0	1	0: NO 1: YES	D	R/W	
	Start1	Set start day holiday 1	---	---	0	31	0 – 31	I	R/W	
		Set start month holiday 1	---	---	0	12	0 - 12	I	R/W	
		Set set point type holiday 1	0	---	0	2	0: OFF 1: ON 2: ENERGY SAVE	I	R/W	
	Stop1	Set end day holiday 1	---	---	0	31	0 – 31	I	R/W	
		Set end month holiday 1	---	---	0	12	0 - 12	I	R/W	
	Start2	Set start day holiday 2	---	---	0	31	0 – 31	I	R/W	
		Set start month holiday 2	---	---	0	12	0 - 12	I	R/W	
		Set set point type holiday 2	0	---	0	2	0: OFF 1: ON 2: ENERGY SAVE	I	R/W	
	Stop2	Set end day holiday 2	---	---	0	31	0 – 31	I	R/W	
		Set end month holiday 2	---	---	0	12	0 - 12	I	R/W	
	Start3	Set start day holiday 3	---	---	0	31	0 – 31	I	R/W	
		Set start month holiday 3	---	---	0	12	0 - 12	I	R/W	
		Set set point type holiday 3	0	---	0	2	0: OFF 1: ON 2: ENERGY SAVE	I	R/W	
	Stop3	Set end day holiday 3	---	---	0	31	0 – 31	I	R/W	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
		Set end month holiday 3	---	---	0	12	0 - 12	I	R/W	
C__04	Enable special days	Enable unit yearly special days	0	---	0	1	0: NO 1: YES	D	R/W	
	SD1…SD6	Set special day 1…6	---	---	0	31	0 – 31	I	R/W	
		Set special day month 1…6	---	---	0	12	0 - 12	I	R/W	
		Set set point type special day 1…6	0	---	0	2	0: OFF 1: ON 2: ENERGY SAVE	I	R/W	
C__05	Zone 01 bands Day:	Set day Time slots Zone 01	0	---	0	6	0: MONDAY 1: TUESDAY 2: WEDNESDAY 3: TUESDAY 4: FRIDAY 5: SATURDAY 6: SUNDAY	I	R/W	
	Zone 01 bands Copy in:	Allows copying the time slots of individual days	0	---	0	1	0: No 1: Yes	D	R/W	
	F1	Set start hour time slot 1	8	---	0	23	0 - 23	I	R/W	
		Set start minute time slot 1	30	---	0	59	0 - 59	I	R/W	
		Set set point type time slot 1	1	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
	F2	Set start hour time slot 2	12	---	0	23	0 - 23	I	R/W	
		Set start minute time slot 2	30	---	0	59	0 - 59	I	R/W	
		Set set point type time slot 2	2	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
	F3	Set start hour time slot 3	13	---	0	23	0 - 23	I	R/W	
		Set start minute time slot 3	30	---	0	59	0 - 59	I	R/W	
		Set set point type time slot 3	1	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
	F4	Set start hour time slot 4	17	---	0	23	0 - 23	I	R/W	
		Set start minute time slot 4	30	---	0	59	0 - 59	I	R/W	
		Set set point type time slot 4	0	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
C__06	Enable holidays	Enable unit holidays zone 01	0	---	0	1	0: NO 1: YES	D	R/W	
	Start1	Set start day holiday 1	---	---	0	31	0 – 31	I	R/W	
		Set start month holiday 1	---	---	0	12	0 - 12	I	R/W	
		Set set point type holiday 1	0	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
	Stop1	Set end day holiday 1	---	---	0	31	0 – 31	I	R/W	
		Set end month holiday 1	---	---	0	12	0 - 12	I	R/W	
	Start2	Set start day holiday 2	---	---	0	31	0 – 31	I	R/W	
		Set start month holiday 2	---	---	0	12	0 - 12	I	R/W	
		Set set point type holiday 2	0	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
	Stop2	Set end day holiday 2	---	---	0	31	0 – 31	I	R/W	
		Set end month holiday 2	---	---	0	12	0 - 12	I	R/W	
	Start3	Set start day holiday 3	---	---	0	31	0 – 31	I	R/W	
		Set start month holiday 3	---	---	0	12	0 - 12	I	R/W	
		Set set point type holiday 3	0	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
	Stop3	Set end day holiday 3	---	---	0	31	0 – 31	I	R/W	
		Set end month holiday 3	---	---	0	12	0 - 12	I	R/W	
C__07	Enable special days	Enable unit yearly special days zone 01	0	---	0	1	0: NO 1: YES	D	R/W	
	SD1…SD6	Set special day 1…6	---	---	0	31	0 – 31	I	R/W	
		Set special day month 1…6	---	---	0	12	0 - 12	I	R/W	
		Set set point type special day 1…6	0	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
C__08	Zone 02 bands Day:	Set day Time slots Zone 02	0	---	0	6	0: MONDAY 1: TUESDAY 2: WEDNESDAY 3: TUESDAY 4: FRIDAY 5: SATURDAY 6: SUNDAY	I	R/W	
	Zone 02 bands Copy in:	Allows copying the time slots of individual days	0	---	0	1	0: No 1: Yes	D	R/W	
	F1	Set start hour time slot 1	8	---	0	23	0 - 23	I	R/W	
		Set start minute time slot 1	30	---	0	59	0 - 59	I	R/W	
		Set set point type time slot 1	1	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
	F2	Set start hour time slot 2	12	---	0	23	0 - 23	I	R/W	
		Set start minute time slot 2	30	---	0	59	0 - 59	I	R/W	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
		Set set point type time slot 2	2	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
	F3	Set start hour time slot 3	13	---	0	23	0 - 23	I	R/W	
		Set start minute time slot 3	30	---	0	59	0 - 59	I	R/W	
		Set set point type time slot 3	1	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
	F4	Set start hour time slot 4	17	---	0	23	0 - 23	I	R/W	
		Set start minute time slot 4	30	---	0	59	0 - 59	I	R/W	
		Set set point type time slot 4	0	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
C__09	Enable holidays	Enable unit holidays zone 02	0	---	0	1	0: NO 1: YES	D	R/W	
	Start1	Set start day holiday 1	---	---	0	31	0 – 31	I	R/W	
		Set start month holiday 1	---	---	0	12	0 - 12	I	R/W	
		Set set point type holiday 1	0	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
	Stop1	Set end day holiday 1	---	---	0	31	0 – 31	I	R/W	
		Set end month holiday 1	---	---	0	12	0 - 12	I	R/W	
	Start2	Set start day holiday 2	---	---	0	31	0 – 31	I	R/W	
		Set start month holiday 2	---	---	0	12	0 - 12	I	R/W	
		Set set point type holiday 2	0	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
	Stop2	Set end day holiday 2	---	---	0	31	0 – 31	I	R/W	
		Set end month holiday 2	---	---	0	12	0 - 12	I	R/W	
	Start3	Set start day holiday 3	---	---	0	31	0 – 31	I	R/W	
		Set start month holiday 3	---	---	0	12	0 - 12	I	R/W	
		Set set point type holiday 3	0	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
	Stop3	Set end day holiday 3	---	---	0	31	0 – 31	I	R/W	
		Set end month holiday 3	---	---	0	12	0 - 12	I	R/W	
C__10	Enable special days	Enable Zone 02 yearly special days	0	---	0	1	0: NO 1: YES	D	R/W	
	SD1…SD6	Set special day 1…6	---	---	0	31	0 – 31	I	R/W	
		Set special day month 1…6	---	---	0	12	0 - 12	I	R/W	
		Set set point type special day 1…6	0	---	0	2	0: OFF 1: COMFORT 2: ECONOMY	I	R/W	
D. Inputs/Outputs										
D__01	B1 = Geothermal outlet temp.:	B1= Geothermal Outlet Water Temperature	---	°C	-99.9	99.9		A	R	1
	B2 = Geothermal inlet temp:	B2= Geothermal Inlet Water Temperature	---	°C	-99.9	99.9		A	R	2
D__02	B3 = DHW control temperature:	B3= Domestic Hot Water Temperature	---	°C	-99.9	99.9		A	R	3
D__03	B4 = Mix outlet temperature:	B4= Mixing Circuit Outlet Water Temperature	---	°C	-99.9	99.9		A	R	4
	B5 = Sys. return temperature:	B5= Primary Circuit Inlet Water Temperature	---	°C	-99.9	99.9		A	R	5
D__04	B4 = Discharge comp. 1:	B4= Compressor Exhaust Gas Temperature	---	°C	-100	200		A	R	
	B5 = Sys. return temperature:	B5= Primary Circuit Inlet Water Temperature	---	°C	-99.9	99.9		A	R	5
D__05	B6 = Outside temperature:	B6= Outside Air Temperature	---	°C	-99.9	99.9		A	R	35
D__06	B6 = System outlet temperature:	B6= Primary Installation Circuit Water Outlet Temperature (for unit type 4)	---	°C	-99.9	99.9		A	R	12
D__07	B7 =Condensation:	B7= High Pressure Transducer (on unit type 3 or 4)	---	°C	-01.0	99.9		A	R	7
	B8 =Evaporation :	B8= Low Pressure Transducer (on unit type 3 or 4)	---	°C	-01.0	99.9		A	R	6
D__08	B7 = System outlet temperature:	B7= Primary Installation Circuit Water Outlet Temperature (for unit type 5 or 6)	---	°C	-99.9	99.9		A	R	12
	B8 = Mix circ. outlet:	B8= Mixing Circuit Outlet Water Temperature (for unit type 5)	---	°C	-99.9	99.9		A	R	4
	B8 = Solar circuit return:	B8= Solar Circuit Boiler Inlet Temperature (for unit type 6)	---	°C	-99.9	99.9		A	R	9
D__09	B9 = Solar colletor 1 temperature:	B9= Solar Panel 1 Temperature	---	°C	-100	200		A	R	10
	B10= Solar colletor 2 temperature:	B10= Solar Panel 2 Temperature	---	°C	-100	200		A	R	11
D__10	01= Geo. flow sw. :	ID01= Geothermal Field Side Flow Switch	---	---	0	1	0: NC 1: NO	D	R	
	02= Overl. comp. 1:	ID02= Compressor 1 Thermal Overload Switch	---	---	0	1	0: NC 1: NO	D	R	
	03= High press. sw. :	ID03= Compressor 1 High Pressure Switch	---	---	0	1	0: NC 1: NO	D	R	
	04= Olw press. sw. :	ID04= Compressor 1 Low Pressure Switch	---	---	0	1	0: NC 1: NO	D	R	
D__11	05= Overload Pumps :	ID05= Unit/Installation Pump Thermal Overload Switch (on unit type 1 or 2)	---	---	0	1	0: NC 1: NO	D	R	
	06= Overl. DHW heat.:	ID06= Domestic Hot Water Storage Heater Thermal Overload Switch (on unit type 1 or 2)	---	---	0	1	0: NC 1: NO	D	R	
	07= Add heat. alarm:	ID07= Installation Integrated Furnace/Heater Thermal	---	---	0	1	0: NC	D	R	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
		Overload Switch					1: NO			
	08= Remote On/Off :	ID08= Remote On-Off	---	---	0	1	0: NC 1: NO	D	R	
D__12	05= Overl. geo. Pump:	ID05= Geothermal Pump Thermal Overload Switch (on unit type 3, 4, 5 or 6)	---	---	0	1	0: NC 1: NO	D	R	
	06= Overl. sys. Pump:	ID06= Primary Circuit Pump Thermal Overload Switch (on unit type 3, 4, 5 or 6)	---	---	0	1	0: NC 1: NO	D	R	
	07= Add heat. alarm:	ID07= Installation Integrated Furnace/Heater Thermal Overload Switch	---	---	0	1	0: NC 1: NO	D	R	
	08= Remote On/Off :	ID08= Remote On-Off	---	---	0	1	0: NC 1: NO	D	R	
D__13	09= Overload comp. 2:	ID09= Compressor 2 Thermal Overload Switch	---	---	0	1	0: NC 1: NO	D	R	
	10= H.Press. comp. 2:	ID10= Compressor 2 High Pressure Switch	---	---	0	1	0: NC 1: NO	D	R	
	11= Overl. DHW pump:	ID11= Domestic Pump Thermal Overload Switch	---	---	0	1	0: NC 1: NO	D	R	
	12= Overl. mix pump:	ID12= Mixing Circuit Pump Thermal Overload Switch (on unit type 3)	---	---	0	1	0: NC 1: NO	D	R	
D__14	09= Overload comp. 2:	ID09= Compressor 2 Thermal Overload Switch	---	---	0	1	0: NC 1: NO	D	R	
	10= H.Press. comp. 2:	ID10= Compressor 2 High Pressure Switch	---	---	0	1	0: NC 1: NO	D	R	
	11= Overl. DHW pump:	ID11= Domestic Pump Thermal Overload Switch	---	---	0	1	0: NC 1: NO	D	R	
	12= Sys. Flow switch:	ID12= Installation Circuit Flow Switch (on unit type 4, 5 or 6)	---	---	0	1	0: NC 1: NO	D	R	
D__15	13= Humidifier al. :	ID13= Humidifier Alarm	---	---	0	1	0: NC 1: NO	D	R	
	14= Overl. DHW heat.:	ID14= ACS Storage Heater Thermal Overload Switch	---	---	0	1	0: NC 1: NO	D	R	
D__16	15= Overl. mix pump:	ID15= Mixing Circuit Pump Thermal Overload Switch	---	---	0	1	0: NC 1: NO	D	R	
	16= Deumidif. al. :	ID16= Dehumidifier Alarm	---	---	0	1	0: NC 1: NO	D	R	
	17= Overload Solar 1 :	ID17= Solar Circuit Pump 1 Thermal Overload Switch	---	---	0	1	0: NC 1: NO	D	R	
	18= Overload Solar 2 :	ID18= Solar Circuit Pump 2 Thermal Overload Switch	---	---	0	1	0: NC 1: NO	D	R	
D__17	01= Compressor 1 :	NO1= Compressor 1	---	---	0	1	0: OFF 1: ON	D	R	11
	02= Geotherm. pump :	NO2= Geothermal Pump	---	---	0	1	0: OFF 1: ON	D	R	12
	03= System pump :	NO3= Installation Pump	---	---	0	1	0: OFF 1: ON	D	R	13
	04= DHW 3way valve :	NO4= Domestic Water Circuit 3-way Valve (on unit type 1)	---	---	0	1	0: OFF 1: ON	D	R	14
D__18	01= Compressor 1 :	NO1= Compressor 1	---	---	0	1	0: OFF 1: ON	D	R	11
	02= Geotherm. pump :	NO2= Geothermal Pump	---	---	0	1	0: OFF 1: ON	D	R	12
	03= Primary pump :	NO3= Installation Pump	---	---	0	1	0: OFF 1: ON	D	R	13
	04= DHW pump:	NO4= Domestic Pump	---	---	0	1	0: OFF 1: ON	D	R	14
D__19	05= Mixing pump :	NO5= Mixing Pump	---	---	0	1	0: OFF 1: ON	D	R	15
	06= Boiler/Heater :	NO6= Furnace/Heater	---	---	0	1	0: OFF 1: ON	D	R	16
	07= DHW heaters :	NO7= ACS Heater	---	---	0	1	0: OFF 1: ON	D	R	17
	08= Alarm/Fan :	NO8= Alarm/Recovery Fan	---	---	0	1	0: OFF 1: ON	D	R	18
D__20	09= Compressor 2 :	NO9= Compressor 2	---	---	0	1	0: OFF 1: ON	D	R	19
	10= 4-way valve :	NO10= 4-way Valve	---	---	0	1	0: OFF 1: ON	D	R	20
	11= Dehumidifier :	NO11= Dehumidifier	---	---	0	1	0: OFF 1: ON	D	R	21
	12= Valve Zone 1 :	NO12= Zone 1 Valve	---	---	0	1	0: OFF 1: ON	D	R	22
	13= Valve Zone 2 :	NO13= Zone 2 Valve	---	---	0	1	0: OFF 1: ON	D	R	23
D__21	14= Recov. fan :	NO14= Recovery Fan	---	---	0	1	0: OFF 1: ON	D	R	24
	15= Solar pump 1:	NO15= Solar Pump 1	---	---	0	1	0: OFF 1: ON	D	R	25
	16= Solar pump 2 :	NO15= Solar Pump 2	---	---	0	1	0: OFF 1: ON	D	R	26
D__22	01= DHW mod. pump :	Y1= ACS Modulating Pump	---	%	0	100		I	R	3
	02= Geotherm. Pump :	Y2= Geothermal Modulating Pump	---	%	0	100		I	R	4
	03= 3way mix valve :	Y3= Mixing Circuit 3-way Valve	---	%	0	100		I	R	2
	04= Humidifier :	Y4= Modulating Humidifier	---	%	0	100		I	R	1
D__23	Temperature :	Temperature, Humidity of Serial Probe No. 01	---	°C	-99.9	99.9		A	R	50
	Humidity :		---	%	0	99.9		A	R	51
	Dew Point :		---	°C	-99.9	99.9		A	R	
D__24	Temperature :	Temperature, Humidity of	---	°C	-99.9	99.9		A	R	52

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
	Humidity :	Serial Probe No. 02	---	%	0	99.9		A	R	53
	Dew Point :		---	°C	-99.9	99.9		A	R	
	Temperature :	Temperature, Humidity of	---	°C	-99.9	99.9		A	R	54
D__25	Humidity :	Serial Probe No. 03	---	%	0	99.9		A	R	55
	Dew Point :		---	°C	-99.9	99.9		A	R	
	Temperature :	Temperature, Humidity of	---	°C	-99.9	99.9		A	R	56
D__26	Humidity :	Serial Probe No. 04	---	%	0	99.9		A	R	57
	Dew Point :		---	°C	-99.9	99.9		A	R	
	Temperature :	Temperature, Humidity of	---	°C	-99.9	99.9		A	R	58
D__27	Humidity :	Serial Probe No. 05	---	%	0	99.9		A	R	59
	Dew Point :		---	°C	-99.9	99.9		A	R	
	Temperature :	Temperature, Humidity of	---	°C	-99.9	99.9		A	R	60
D__28	Humidity :	Serial Probe No. 06	---	%	0	99.9		A	R	61
	Dew Point :		---	°C	-99.9	99.9		A	R	
	Temperature :		---	°C	-99.9	99.9		A	R	62
	Humidity :		---	%	0	99.9		A	R	63
	Dew Point :	Temperature, humidity, output status	---	°C	-99.9	99.9		A	R	
D__29	Relay 1:	of Clima No. 1	---	---	0	1	0: Open 1: Closed	D	R	
	Relay 2:		---	---	0	1	0: Open 1: Closed	D	R	
	Analog output:		---	%	0	100		A	R	64
	Temperature :		---	°C	-99.9	99.9		A	R	65
	Humidity :		---	%	0	99.9		A	R	
	Dew Point :	Temperature, humidity, output status	---	°C	-99.9	99.9		A	R	
D__30	Relay 1:	of Clima No. 2	---	---	0	1	0: Open 1: Closed	D	R	
	Relay 2:		---	---	0	1	0: Open 1: Closed	D	R	
	Analog output:		---	%	0	100		A	R	66
	Temperature :		---	°C	-99.9	99.9		A	R	67
	Humidity :		---	%	0	99.9		A	R	
	Dew Point :	Temperature, humidity, output status	---	°C	-99.9	99.9		A	R	
D__31	Relay 1:	of Clima No. 3	---	---	0	1	0: Open 1: Closed	D	R	
	Relay 2:		---	---	0	1	0: Open 1: Closed	D	R	
	Analog output:		---	%	0	100		A	R	
	Temperature :		---	°C	-99.9	99.9		A	R	68
	Humidity :		---	%	0	99.9		A	R	69
	Dew Point :	Temperature, humidity, output status	---	°C	-99.9	99.9		A	R	
D__32	Relay 1:	of Clima No. 4	---	---	0	1	0: Open 1: Closed	D	R	
	Relay 2:		---	---	0	1	0: Open 1: Closed	D	R	
	Analog output:		---	%	0	100		A	R	
	Temperature :		---	°C	-99.9	99.9		A	R	70
	Humidity :		---	%	0	99.9		A	R	71
	Dew Point :	Temperature, humidity, output status	---	°C	-99.9	99.9		A	R	
D__33	Relay 1:	of Clima No. 5	---	---	0	1	0: Open 1: Closed	D	R	
	Relay 2:		---	---	0	1	0: Open 1: Closed	D	R	
	Analog output:		---	%	0	100		A	R	
	Temperature :		---	°C	-99.9	99.9		A	R	72
	Humidity :		---	%	0	99.9		A	R	73
	Dew Point :	Temperature, humidity, output status	---	°C	-99.9	99.9		A	R	
D__34	Relay 1:	of Clima No. 6	---	---	0	1	0: Open 1: Closed	D	R	
	Relay 2:		---	---	0	1	0: Open 1: Closed	D	R	
	Analog output:		---	%	0	100		A	R	
	Mode	Operating status of EVD400 driver	---	---	0	2	0: Cool 1: Heat 2: Defrost	I	R	
D__35	EEV	Operating modes of EVD400 driver	---	---	0	1	0: AUTO 1: MAN.	D	R	
	EEV position	No. Steps By Valve	---	---	0	9999		I	R	
	Power request	Percentage Power Required	---	%	0	100		I	R	
D__36		Type of Refrigerant Used	---	---	0	13	0: --- 1: R22 2: R134a 3: R404a 4: R407c 5: R410a 6: R507c 7: R290 8: R600 9: R600a 10: R717 11: R744 12: R728 13: R1270	I	R	
	SuperHeat	Superheat Temperature	---	°C	-999.9	999.9		I	R	
	Actual SH Set	Superheat Set Point	---	°C	-99.9	99.9		I	R	
	Satured Temp	Evaporation Temperature	---	°C	-999.9	999.9		I	R	
	Suction Temp	Suction Temperature	---	°C	-999.9	999.9		I	R	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
D__37	Evap.pressure	Evaporation Pressure	---	barg	-99.9	99.9		I	R	
	Evap.temp.	Evaporation Temperature	---	°C	-99.9	99.9		I	R	
	Aux.probe	Condensing Pressure	---	barg	-99.9	99.9		I	R	
D__38	Low Superheat	View Status of Low Superheating	---	---	0	1	0: No 1: Yes	D	R	
	Hight t.cond	View Status of High Condensing Temperature	---	---	0	1	0: No 1: Yes	D	R	
	LOP	View Status of LOP	---	---	0	1	0: No 1: Yes	D	R	
	MOP	View Status of MOP	---	---	0	1	0: No 1: Yes	D	R	
D__39	EVD version HW SW Driver	EVD400 Driver Hardware Version	---	---	0	999		I	R	
		EVD400 Driver Software Version	---	---	0	999		I	R	
D__40	Temperature:	Temperature, Humidity of Outside Serial Probe	---	°C	-99.9	99.9		A	R	
	Humidity:		---	%	0	99.9		A	R	74

E. Alarm log

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
E__	Alarm log E__	Progressive Alarm Number	0	---	0	50		I	R	
		Alarm Code followed by Time, Date and Description of Event	0	---	0	24	0: --- 1: ALP01 - Geothermal Flow Switch 2: ALP05 - Installation Flow Switch 3: ALP04 - ACS Pres. Thermal Overload Switch 4: ALP02 - Geo. Pres. Thermal Overload Switch 5: ALP03 - Inst. Pres. Thermal Overload Switch 6: ALC01 - Comp. 1 Thermal Overload Switch 7: ALC02 - Comp. 2 Thermal Overload Switch 8: ALB01 - High Pressure 1 9: ALB03 - High Pressure 2 10: ALB02 - Low Pressure 11: ALU01 - Geotherm. Antifreeze 12: ALU02 - Inst. Antifreeze 13: ALA01 - Probe B1 Fault 14: ALA02 - Probe B2 Fault 15: ALA03 - Probe B3 Fault 16: ALA04 - Probe B4 Fault 17: ALA05 - Probe B5 Fault 18: ALA06 - Probe B6 Fault 19: ALA07 - Probe B7 Fault 20: ALA08 - Probe B8 Fault 21: ALA09 - Probe B9 Fault 22: ALA10 - Probe B10 Fault 23: ALB04 - High Pres. Trans. 24: ALB05 - Low Pres.Trans.	I	R	
	Inlet Outlet Plant :	Primary Installation Inlet/Outlet Temp.	---	°C	-99.9	99.9		A	R	
	Geoth :	Geothermal Probe Inlet/Outlet Temp.	---	°C	-99.9	99.9		A	R	
	DHW :	Domestic Water Control Temp.	---	°C	-99.9	99.9		A	R	
	Press :Hp Lp	High and Low Pressure Refrigeration Circuit	---	bar	-1.0	99.9		A	R	

G. Service

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
Ga_01	Language	Change language from Italian to English	---	---	0	1	0: Italian 1: English	I	R/W	
Ga_02	Disable language screen when start:	Deactivate the language change screen when turn on	---	---	0	1	0: NO 1: YES	D	R/W	
	Countdown:	Display time of language change screen on start-up	60	s				I	R/W	
Gb_01	Code:FLSTDmHPGE	Information on application code, BIOS and BOOT version with issue date	---	---				---	R	
Gb_02	Information Type of pCO:	Type of pCO3 (small, medium, large) installed with relative Flash Memory and RAM	---	---				---	R	
Gc_01	Temperature control water solar temperature :	Solar Panel Recovery Temperature Set Point	6.0	°C	0.0	50.0		A	R/W	29
		Solar Panel Recovery Temperature Differential	2.0	°C	1.0	20.0		A	R/W	
Gc_02	Circ. outlet set point mixed cooling:	Mixing Circuit Water Outlet Set Point in Cooling	17.5	°C	Gfc34	Gfc34		A	R/W	30
		Mixing Circuit Water Outlet Set Point in Heating	35.0	°C	Gfc34	Gfc34		A	R/W	31
Gc_03	Antilegionella cyc::	Enable Antifreeze Cycle	0	---	0	1	0: OFF 1: ON	D	R/W	
	Set Point:	Antifreeze Cycle Water Set Point	70.0	°C	0.0	99.9		A	R/W	
	Start cycle Day:	Antifreeze Cycle Start Day	0	---	0	7	0: --- 1: MONDAY 2: TUESDAY 3: WEDNESDAY 4: THURSDAY 5: FRIDAY 6: SATURDAY 7: SUNDAY	I	R/W	
	Start cycle Time:	Antifreeze Cycle Start Time	0	h	0	23		I	R/W	
Gc_04	Nominal Setpoints (ON) Chiller :	Nominal Set Point (ON) in Chiller Operation	12.0	°C	Hc_21	Hc_21		A	R/W	36
	HP :	Nominal Set Point (ON) in Heat Pump Operation	38.0	°C	Hc_21	Hc_21		A	R/W	37
	DHW :	Nominal Set Point (ON) of Domestic Water	50.0	°C	Hc_22	Hc_22		A	R/W	40

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
Gc_05	Energy Save Setpoint Chiller :	Energy Saving Set Point in Chiller Operation	15.0	°C	Hc_21	Hc_21		A	R/W	38
	HP :	Energy Saving Set Point in Heat Pump Operation	32.0	°C	Hc_21	Hc_21		A	R/W	39
	DHW :	Energy Saving Set Point for Domestic Water	50.0	°C	Hc_22	Hc_22		A	R/W	41
Gd_01	Compressor 1 :	Compressor 1 Hour Counter	0	kh	0	999		I	R	
	Compressor 2 :	Compressor 2 Hour Counter	0	kh	0	999		I	R	
	Geotherm. pump:	Geothermal Pump Hour Counter	0	kh	0	999		I	R	
	Primary pump :	Primary Circuit Pump Hour Counter	0	kh	0	999		I	R	
Gd_02	DHW pump :	Domestic Circuit Pump Hour Counter	0	kh	0	999		I	R	
	Mix. pump :	Mixing Circuit Pump Hour Counter	0	kh	0	999		I	R	
	Solar pump 1 :	Solar Panel Pump 1 Hour Counter	0	kh	0	999		I	R	
	Solar pump 2 :	Solar Panel Pump 2 Hour Counter	0	kh	0	999		I	R	
Ge_01	Communication prot. :	BMS Protocol Settings	1	---	0	3	0: --- 1: CAREL RS485 2: ModBus RS485 3: pCOload local	I	R/W	
	Speed :	BMS Speed Settings	4	---	0	4	0: 1200 1: 2400 2: 4800 3: 9600 4: 19200	I	R/W	
	Address :	Select Address No. for BMS	1	---	0	207		I	R/W	
Gfa01	Compressors:	Compressor Hour Counter Threshold	99	kh	0	999		I	R/W	
	Pumps :	Pump Hour Counter Threshold	99	kh	0	999		I	R/W	
Gfa02	Reset hour counter Compressor 1 :	Reset Compressor 1 Hour Counter	0	---	0	1	0: NO 1: YES	D	R/W	
	Compressor 2 :	Reset Compressor 2 Hour Counter	0	---	0	1	0: NO 1: YES	D	R/W	
	Geotherm. pump :	Reset Geothermal Pump Hour Counter	0	---	0	1	0: NO 1: YES	D	R/W	
	Primary pump :	Reset Primary Circuit Pump Hour Counter	0	---	0	1	0: NO 1: YES	D	R/W	
Gfa03	Reset hour counter DHW pump:	Reset Domestic Pump Hour Counter	0	---	0	1	0: NO 1: YES	D	R/W	
	Mix. pump :	Reset Mixing Circuit Pump Hour Counter	0	---	0	1	0: NO 1: YES	D	R/W	
	Solar pump 1 :	Reset Solar Panel Pump 1 Hour Counter	0	---	0	1	0: NO 1: YES	D	R/W	
	Solar pump 2 :	Reset Solar Panel Pump 2 Hour Counter	0	---	0	1	0: NO 1: YES	D	R/W	
Gfb01	Probe calibration B1:	Enable/disable Analogue Input B1	1	---	0	1	0: NO 1: YES Geotherm.outlet	D	R/W	
	Ofs:	Probe B1 Calibration Value	0.0	°C	-9.9	9.9		A	R/W	
	Probe:	B1= Geothermal Outlet Water Temperature	---	°C	-99.9	99.9		A	R	1
	B2:	Enable/disable Analogue Input B2	1	---	0	1	0: NO 1: YES Geotherm.inlet	D	R/W	
	Ofs:	Probe B2 Calibration Value	0.0	°C	-9.9	9.9		A	R/W	
	Probe:	B2= Geothermal Return Circuit Inlet Water Temperature	---	°C	-99.9	99.9		A	R	2
Gfb02	Probe calibration B3:	Enable/disable Analogue Input B3	1	---	0	1	0: NO 1: YES Domest.water	D	R/W	
	Ofs:	Probe B3 Calibration Value	0.0	°C	-9.9	9.9		A	R/W	
	Probe:	B3= Domestic Hot Water Temperature	---	°C	-99.9	99.9		A	R	3
Gfb03	Probe calibration B4:	Enable/disable Analogue Input B4	1	---	0	1	0: NO 1: YES Mix circ.outlet	D	R/W	
	Ofs:	Probe B4 Calibration Value	0.0	°C	-9.9	9.9		A	R/W	
	Probe:	B4= Mixing Circuit Outlet Water Temperature	---	°C	-99.9	99.9		A	R	4
	B5:	Enable/disable Analogue Input B5	1	---	0	1	0: NO 1: YES System return	D	R/W	
	Ofs:	Probe B5 Calibration Value	0.0	°C	-9.9	9.9		A	R/W	
	Probe:	B5= Primary Circuit Inlet Water Temperature	---	°C	-99.9	99.9		A	R	5
Gfb04	Probe calibration B4:	Enable/disable Analogue Input B4	1	---	0	1	0: NO 1: YES Compress.disch.	D	R/W	
	Ofs:	Probe B4 Calibration Value	0.0	°C	-9.9	9.9		A	R/W	
	Probe:	B4= Compressor Exhaust Gas Temperature	---	°C	-100	200		A	R	
	B5:	Enable/disable Analogue Input B5	1	---	0	1	0: NO 1: YES System return	D	R/W	
	Ofs:	Probe B5 Calibration Value	0.0	°C	-9.9	9.9		A	R/W	
	Probe:	B5= Primary Circuit Inlet Water Temperature	---	°C	-99.9	99.9		A	R	5
Gfb05	Probe calibration B6:	Enable/disable Analogue Input B6	1	---	0	1	0: NO 1: YES Ext.air temp.	D	R/W	
	Ofs:	Probe B6 Calibration Value	0.0	°C	-9.9	9.9		A	R/W	
	Probe:	B6= Outside Air Temperature (on unit type 3, 5 or 6)	---	°C	-99.9	99.9		A	R	35
Gfb06	Probe calibration B6:	Enable/disable Analogue Input B6	1	---	0	1	0: NO 1: YES System outlet	D	R/W	
	Ofs:	Probe B6 Calibration Value	0.0	°C	-9.9	9.9		A	R/W	
	Probe:	B6= Primary Circuit Water Outlet Temperature (for unit type 4)	---	°C	-99.9	99.9		A	R	12
Gfb07	Probe calibration B7:	Enable/disable Analogue Input B7	1	---	0	1	0: NO 1: YES Cond. press.	D	R/W	
	Ofs:	Probe B7 Calibration Value	0.0	Bar	-9.9	9.9		A	R/W	
	Probe:	B7= High Pres. Transd. (unit type 3, 4)	---	Bar	-1.0	99.9		A	R	7
	B8:	Enable/disable Analogue Input B8	1	---	0	1	0: NO 1: YES Evapor. press.	D	R/W	
	Ofs:	Probe B8 Calibration Value	0.0	Bar	-9.9	9.9		A	R/W	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
	Probe:	B8= Low Pres. Transd. (unit type 3, 4)	---	Bar	-1.0	99.9		A	R	6
Gfb08	Probe calibration B7:	Enable/disable Analogue Input B7	1	---	0	1	0: NO 1: YES System outlet	D	R/W	
	Ofs:	Probe B7 Calibration Value	0.0	---	-9.9	9.9		A	R/W	
	Probe:	B7= Primary Circuit Outlet Water Temperature	---	°C	-99.9	99.9		A	R	12
	B8:	Enable/disable Analogue Input B8	1	---	0	1	0: NO 1: YES In mix circuit	D	R/W	
			1	---	0	1	0: NO 1: YES Return solar	D	R/W	
	Ofs:	Probe B8 Calibration Value	0.0	---	-9.9	9.9		A	R/W	
	Probe:	B8= Solar Circuit Boiler Inlet Temperature (for unit type 6)	---	°C	-99.9	99.9		A	R	9
		B8= Mixing Circuit Outlet Water Temperature (for unit type 5)	---	°C	-99.9	99.9		A	R	4
Gfb09	Probe calibration B9:	Enable/disable Analogue Input B9	1	---	0	1	0: NO 1: YES Solar coll.1	D	R/W	
	Ofs:	Probe B9 Calibration Value	0.0	°C	-9.9	9.9		A	R/W	
	Probe:	B9= Solar Panel 1 Temperature	---	°C	-100	200		A	R	10
	B10:	Enable/disable Analogue Input B10	1	---	0	1	0: NO 1: YES Solar coll.2	D	R/W	
	Ofs:	Probe B10 Calibration Value	0.0	°C	-9.9	9.9		A	R/W	
	Probe:	B10= Solar Panel 2 Temperature	---	°C	-100	200		A	R	11
Gfb10	Probe Calibration Serial probe n° 01 Temperature Ofs:	Temperature Calibration Value Serial Probe No. 01	0.0	°C	-10.0	10.0		A	R/W	
	Temperature Probe:	Serial Probe No. 01 Temperature	---	°C	-30.0	70.0		A	R	
	Humidity Ofs:	Humidity Calibration Value Serial Probe No. 01	0.0	%	-10.0	10.0		A	R/W	
	Humidity Probe:	Serial Probe No. 01 Humidity	---	%	0.0	99.9		A	R	
Gfb11	Probe Calibration Serial probe n° 02 Temperature Ofs:	Temperature Calibration Value Serial Probe No. 02	0.0	°C	-10.0	10.0		A	R/W	
	Temperature Probe:	Serial Probe No. 02 Temperature	---	°C	-30.0	70.0		A	R	
	Humidity Ofs:	Humidity Calibration Value Serial Probe No. 02	0.0	%	-10.0	10.0		A	R/W	
	Humidity Probe:	Serial Probe No. 02 Humidity	---	%	0.0	99.9		A	R	
Gfb12	Probe Calibration Serial probe n° 03 Temperature Ofs:	Temperature Calibration Value Serial Probe No. 03	0.0	°C	-10.0	10.0		A	R/W	
	Temperature Probe:	Serial Probe No. 03 Temperature	---	°C	-30.0	70.0		A	R	
	Humidity Ofs:	Humidity Calibration Value Serial Probe No. 03	0.0	%	-10.0	10.0		A	R/W	
	Humidity Probe:	Serial Probe No. 03 Humidity	---	%	0.0	99.9		A	R	
Gfb13	Probe Calibration Serial probe n° 04 Temperature Ofs:	Temperature Calibration Value Serial Probe No. 04	0.0	°C	-10.0	10.0		A	R/W	
	Temperature Probe:	Serial Probe No. 04 Temperature	---	°C	-30.0	70.0		A	R	
	Humidity Ofs:	Humidity Calibration Value Serial Probe No. 04	0.0	%	-10.0	10.0		A	R/W	
	Humidity Probe:	Serial Probe No. 04 Humidity	---	%	0.0	99.9		A	R	
Gfb14	Probe Calibration Serial probe n° 05 Temperature Ofs:	Temperature Calibration Value Serial Probe No. 05	0.0	°C	-10.0	10.0		A	R/W	
	Temperature Probe:	Serial Probe No. 05 Temperature	---	°C	-30.0	70.0		A	R	
	Humidity Ofs:	Humidity Calibration Value Serial Probe No. 05	0.0	%	-10.0	10.0		A	R/W	
	Humidity Probe:	Serial Probe No. 05 Humidity	---	%	0.0	99.9		A	R	
Gfb15	Probe Calibration Serial probe n° 06 Temperature Ofs:	Temperature Calibration Value Serial Probe No. 06	0.0	°C	-10.0	10.0		A	R/W	
	Temperature Probe:	Serial Probe No. 06 Temperature	---	°C	-30.0	70.0		A	R	
	Humidity Ofs:	Humidity Calibration Value Serial Probe No. 06	0.0	%	-10.0	10.0		A	R/W	
	Humidity Probe:	Serial Probe No. 06 Humidity	---	%	0.0	99.9		A	R	
Gfb16	Probe Calibration Ext. serial probe Temperature Ofs:	Temperature Calibration Value Outside Serial Probe	0.0	°C	-10.0	10.0		A	R/W	
	Temperature Probe:	Outside Serial Probe Temperature	---	°C	-30.0	70.0		A	R	
	Humidity Ofs:	Humidity Calibration Value Outside Serial Probe	0.0	%	-10.0	10.0		A	R/W	
	Humidity Probe:	Outside Serial Probe Humidity	---	%	0.0	99.9		A	R	
Gfc01	Enable control room zones:	On-screen selection of Ambient Control System	0	---	0	2	0: NONE 1: PROBES 2: CLIMA	I	R/W	
	Number probes/Clima required:	Indicates the number of devices in a room to be activated	0	---	0	6		I	R/W	
Gfc02	Modbus setting Baudrate	ModBus Protocol Speed Setting for Serial Probes and Clima	4	---	0	4	0: 1200 1: 2400 2: 4800 3: 9600 4: 19200	I	R/W	
	Stop bit	ModBus Protocol Stop Bit Setting for Serial Probes and Clima	1	---	0	1	0: 1 1: 2	I	R/W	
	Parity mode	ModBus Protocol Parity Bit Setting for Serial Probes and Clima	0	---	0	1	0: NONE 1: EVEN	I	R/W	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
	Timeout	ModBus Protocol Response Time Delay Setting for Serial Probes and Clima	300	ms	100	5000		I	R/W	
Gfc03	Serial probe n° 01 Enabled:	Enable Serial Probe No. 01	0	---	0	1	0: NO 1: YES	D	R/W	
	Address:	Dipswitch address of Serial Probe No. 01	128	---	128	159		I	R/W	
	No. of zones:	Assign Scheduler/Zone for Serial Probe No. 01	0	---	0	1	0: 2 1: 1	D	R/W	
	Type:	Installed Probe Type Setting	0	---	0	1	0: TEMPERATURE 1: TEMP.+HUMID.	D	R/W	
Gfc04	Serial probe n° 02 Enabled:	Enable Serial Probe No. 02	0	---	0	1	0: NO 1: YES	D	R/W	
	Address:	Dipswitch address of Serial Probe No. 02	128	---	128	159		I	R/W	
	No. of zones:	Assign Scheduler/Zone for Serial Probe No. 02	0	---	0	1	0: 2 1: 1	D	R/W	
	Type:	Installed Probe Type Setting	0	---	0	1	0: TEMPERATURE 1: TEMP.+HUMID.	D	R/W	
Gfc05	Serial probe n° 03 Enabled:	Enable Serial Probe No. 03	0	---	0	1	0: NO 1: YES	D	R/W	
	Address:	Dipswitch address of Serial Probe No. 03	128	---	128	159		I	R/W	
	No. of zones:	Assign Scheduler/Zone for Serial Probe No. 03	0	---	0	1	0: 2 1: 1	D	R/W	
	Type:	Installed Probe Type Setting	0	---	0	1	0: TEMPERATURE 1: TEMP.+HUMID.	D	R/W	
Gfc06	Serial probe n° 04 Enabled:	Enable Serial Probe No. 04	0	---	0	1	0: NO 1: YES	D	R/W	
	Address:	Dipswitch address of Serial Probe No. 04	128	---	128	159		I	R/W	
	No. of zones:	Assign Scheduler/Zone for Serial Probe No. 04	0	---	0	1	0: 2 1: 1	D	R/W	
	Type:	Installed Probe Type Setting	0	---	0	1	0: TEMPERATURE 1: TEMP.+HUMID.	D	R/W	
Gfc07	Serial probe n° 05 Enabled:	Enable Serial Probe No. 05	0	---	0	1	0: NO 1: YES	D	R/W	
	Address:	Dipswitch address of Serial Probe No. 05	128	---	128	159		I	R/W	
	No. of zones:	Assign Scheduler/Zone for Serial Probe No. 05	0	---	0	1	0: 2 1: 1	D	R/W	
	Type:	Installed Probe Type Setting	0	---	0	1	0: TEMPERATURE 1: TEMP.+HUMID.	D	R/W	
Gfc08	Serial probe n° 06 Enabled:	Enable Serial Probe No. 06	0	---	0	1	0: NO 1: YES	D	R/W	
	Address:	Dipswitch address of Serial Probe No. 06	128	---	128	159		I	R/W	
	No. of zones:	Assign Scheduler/Zone for Serial Probe No. 06	0	---	0	1	0: 2 1: 1	D	R/W	
	Type:	Installed Probe Type Setting	0	---	0	1	0: TEMPERATURE 1: TEMP.+HUMID.	D	R/W	
Gfc09	Clima n° 01 Status:	Operating status of CLIMA No. 01	0	---	0	1	0: Off 1: On	D	R	
	Address:	Clima No. 1 Parameter Address	0	---	0	999		I	R/W	
	No. of zones:	Assign Scheduler/Zone for Clima No. 01	0	---	0	1	0: 2 1: 1	D	R/W	
	Model:	Reading of control type for CLIMA No. 01	0	---	0	7	0: T+Hrd 1: H 2: T 3: T+H 4: T2 5: T2+H 6: T2A 7: T2A+H	I	R	
Gfc10	Clima n° 01 Lock:	Block Clima No. 1 Keypad	0	---	0	2	0: NOT LOCKED 1: UP-DOWN-PRG 2: ONLY PRG	I	R/W	
	Menu password:	Access Password for Clima No. 01	0	---	0	999		I	R/W	
Gfc11	Clima n° 02 Status:	Operating status of CLIMA No. 02	0	---	0	1	0: Off 1: On	D	R	
	Address:	Clima No. 02 Parameter Address	0	---	0	999		I	R/W	
	No. of zones:	Assign Scheduler/Zone for Clima No. 02	0	---	0	1	0: 2 1: 1	D	R/W	
	Model:	Reading of control type for CLIMA No. 02	0	---	0	7	0: T+Hrd 1: H 2: T 3: T+H 4: T2 5: T2+H 6: T2A 7: T2A+H	I	R	
Gfc12	Clima n° 02 Lock:	Block Clima No. 02 Keypad	0	---	0	2	0: NOT LOCKED 1: UP-DOWN-PRG 2: ONLY PRG	I	R/W	
	Menu password:	Access Password for Clima No. 02	0	---	0	999		I	R/W	
Gfc13	Clima n° 03 Status:	Operating status of CLIMA No. 03	0	---	0	1	0: Off 1: On	D	R	
	Address:	Clima No. 03 Parameter Address	0	---	0	999		I	R/W	
	No. of zones:	Assign Scheduler/Zone for Clima No. 03	0	---	0	1	0: 2 1: 1	D	R/W	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
	Model:	Reading of control type for CLIMA No. 03	0	---	0	7	0: T+Hrd 1: H 2: T 3: T+H 4: T2 5: T2+H 6: T2A 7: T2A+H	I	R	
Gfc14	Clima n° 03 Lock:	Block Clima No. 03 Keypad	0	---	0	2	0: NOT LOCKED 1: UP-DOWN-PRG 2: ONLY PRG	I	R/W	
	Menu password:	Access Password for Clima No. 03	0	---	0	999		I	R/W	
Gfc15	Clima n° 04 Status:	Operating status of CLIMA No. 04	0	---	0	1	0: Off 1: On	D	R	
	Address:	Clima No. 04 Parameter Address	0	---	0	999		I	R/W	
	No. of zones:	Assign Scheduler/Zone for Clima No. 04	0	---	0	1	0: 2 1: 1	D	R/W	
	Model:	Reading of control type for CLIMA No. 04	0	---	0	7	0: T+Hrd 1: H 2: T 3: T+H 4: T2 5: T2+H 6: T2A 7: T2A+H	I	R	
Gfc16	Clima n° 04 Lock:	Block Clima No. 04 Keypad	0	---	0	2	0: NOT LOCKED 1: UP-DOWN-PRG 2: ONLY PRG	I	R/W	
	Menu password:	Access Password for Clima No. 04	0	---	0	999		I	R/W	
Gfc17	Clima n° 05 Status:	Operating status of CLIMA No. 05	0	---	0	1	0: Off 1: On	D	R	
	Address:	Clima No. 05 Parameter Address	0	---	0	999		I	R/W	
	No. of zones:	Assign Scheduler/Zone for Clima No. 05	0	---	0	1	0: 2 1: 1	D	R/W	
	Model:	Reading of control type for CLIMA No. 05	0	---	0	7	0: T+Hrd 1: H 2: T 3: T+H 4: T2 5: T2+H 6: T2A 7: T2A+H	I	R	
Gfc18	Clima n° 05 Lock:	Block Clima No. 05 Keypad	0	---	0	2	0: NOT LOCKED 1: UP-DOWN-PRG 2: ONLY PRG	I	R/W	
	Menu password:	Access Password for Clima No. 05	0	---	0	999		I	R/W	
Gfc19	Clima n° 06 Status:	Operating status of CLIMA No. 06	0	---	0	1	0: Off 1: On	D	R	
	Address:	Clima No. 06 Parameter Address	0	---	0	999		I	R/W	
	No. of zones:	Assign Scheduler/Zone for Clima No. 06	0	---	0	1	0: 2 1: 1	D	R/W	
	Model:	Reading of control type for CLIMA No. 06	0	---	0	7	0: T+Hrd 1: H 2: T 3: T+H 4: T2 5: T2+H 6: T2A 7: T2A+H	I	R	
Gfc20	Clima n° 06 Lock:	Block Clima No. 06 Keypad	0	---	0	2	0: NOT LOCKED 1: UP-DOWN-PRG 2: ONLY PRG	I	R/W	
	Menu password:	Access Password for Clima No. 06	0	---	0	999		I	R/W	
Gfc21	External serial probe:	Enable/disable Outside Serial Probe	0	---	0	1	0: NOT PRESENT 1: PRESENT	D	R/W	
Gfc22	Ext. serial probe n° 07 Enabled:	Enable Serial Probe No. 07	0	---	0	1	0: NO 1: YES	D	R/W	
	Address:	Dipswitch address of Serial Probe No. 07	128	---	128	159		I	R/W	
	Type:	Installed Probe Type Setting	0	---	0	1	0: TEMPERATURE 1: TEMP.+HUMID.	D	R/W	
Gfc23	N. solar collectors:	Set No. Solar Panels	0	---	0	2	0: NOT PRESENT 1: 1 COLLECTOR ACTIVE 2: 2 COLLECTORS ACTIVE	I	R/W	
	Alm T. D.H.W.:	ACS Max. Temp Limit	75.0	°C	20.0	99.9		A	R/W	
	Max T. D.H.W.:	ACS Maximum Attainable Temperature	85.0	°C	0.0	99.9		A	R/W	
	Max T.Solar:	Solar Panels Maximum Attainable Temperature	140.0	°C	0.0	200.0		A	R/W	
Gfc24	System integration	Select Installation Integration (NONE, FURNACE, ELEC. HEATER)	0	---	0	2	0: NONE 1: BOILER 2: EL. HEATERS	I	R/W	
	Request as:	Type of installation integration operation (CP integration, CP replacement)	0	---	0	1	0: INTEGRATE HP 1: REPLACE HP	D	R/W	
Gfc25	DHW integration	Select ACS integration (NONE, FURNACE, ELEC. HEATER)	0	---	0	2	0: NONE 1: BOILER 2: EL. HEATERS	I	R/W	
	Request as:	Type of domestic integration operation (CP integration, CP replacement)	0	---	0	1	0: INTEGRATE HP 1: REPLACE HP	D	R/W	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
Gfc26	Enable boiler based on the:	Activation of furnace as a function of: OUTSIDE AIR TEMP. or GEOTHERMAL RETURN TEMP.)	0	---	0	1	0: OUTSIDE AIR T. 1: GEOTHERMAL RETURN T.	D	R/W	
	Boiler activation delay:	Furnace Activation Delay Time	5	min	0	999		I	R/W	
Gfc27	Boiler setting: Setpoint sys.:	Activation set point (for installation) of furnace on outside air or geo. return	5.0	°C	-50.0	50.0		A	R/W	
	Diff.System:	Furnace Activation Differential	3.0	°C	0.0	20.0		A	R/W	
	Setpoint DHW:	Furnace Activation Set Point for Domestic Water	35.0	°C	0.0	70.0		A	R/W	
	Diff. DHW:	Furnace Activation Differential for Domestic Water	5.0	°C	0.0	20.0		A	R/W	
Gfc28	Heaters setting: Diff. On sys..:	Differential, with respect to operational set point, for activation of integrating heaters of the installation	8.0	°C	0.0	30.0		A	R/W	
	Diff. Off sys.:	Differential, with respect to operational set point, for deactivation of integrating heaters of the installation	5.0	°C	0.0	30.0		A	R/W	
	Delay On:	Installation heater activation delay time	60	s	0	999		I	R/W	
	Diff. On DHW:	Differential, with respect to operational set point, for activation of integrating heaters of the domestic water	10.0	°C	0.0	30.0		A	R/W	
	Diff. Off DHW:	Differential, with respect to operational set point, for deactivation of integrating heaters of the domestic water	5.0	°C	0.0	30.0		A	R/W	
Gfc30	Temperature control mix circ.:	Mixing Circuit Outlet Temperature Control	1	---	0	1	0: FIXED POINT 1: DYNAMIC	D	R/W	
	External T set:	Temperature Set Point for Compensation Start	7.0	---	-99.9	99.9		A	R/W	
	% compensation:	Compensation Ramp Slope	80	%	0	100		A	R/W	
Gfc31	Anti-sweat function Mix circ. temp. offset in auto mode::	Mixing Circuit Temperature Offset (cooling)	3.0	°C	0.0	9.9		A	R/W	
Gfc32	Type of valve control 3 way system:	Installation 3-way Valve Temperature Control	1	---	0	1	0: P 1: P+I	D	R/W	
	Prop. band:	Proportional band for mixing valve	4.0	°C	2.0	99.9		A	R/W	
	Integr. time:	Mixing Valve Control Integration Time	30	s	1	999		I	R/W	
Gfc33	Reverse logic system 3way mix valve:	Mixing Circuit 3-way Valve Logic Inversion	0	---	0	1	0: DIRECT 1: INVERSE	D	R/W	
Gfc34	Outlet temp. limits Mix circuit water: Min cooling:	Mixing Circuit Water Outlet Temperature Minimum Limit	12.0	°C	5.0	99.9		A	R/W	32
	Max heating:	Mixing Circuit Water Outlet Temperature Maximum Limit	45.0	°C	20.0	99.9		A	R/W	33
Gfc35	Antifreeze alarm setp. Geotherm circ.:	Geothermal Circuit Antifreeze Alarm Set Point	4.0	°C	-99.9	99.9		A	R/W	
	Geothermal antifreeze alarm setpoint:	Geothermal Circuit Antifreeze Alarm Differential	3.0	°C	0.5	99.9		A	R/W	
Gfc36	Reset antifreeze alarm Geotherm circ.:	Geothermal Circuit Antifreeze Alarm Reset Type	1	---	0	1	0: AUTO 1: MANUAL	D	R/W	
Gfc37	System antifreeze alarm setpoint:	Installation Side Antifreeze Alarm Set Point	4.0	°C	-99.9	99.9		A	R/W	
	System antifreeze alarm diff. :	Installation Antifreeze Alarm Activation Differential	3.0	°C	0.5	99.9		A	R/W	
Gfc38	Reset antifreeze alarm system side:	Installation Side Antifreeze Alarm Reset Type	1	---	0	1	0: AUTO 1: MANUAL	D	R/W	
Gfc39	Type of humidifier:	Enable Modulating Humidifier	0	---	0	1	0: NOT PRESENT 1: MODULATING	D	R/W	
	Type of dehumidifier:	Enable Dehumidifier On/Off	0	---	0	1	0: NOT PRESENT 1: ON/OFF	D	R/W	
Gfc40	Dehumidification diff:	Dehumidifier working differential	5.0	---	0.0	99.9		A	R/W	
	Humidification band:	Humidifier Working Band	5.0	---	0.0	99.9		A	R/W	
Gfc41	Min humidity limit measured:	Measured Humidity Minimum Limit Set Point	10.0	%	0.0	50.0		A	R/W	
	Max humidity limit measured:	Measured Humidity Maximum Limit Set Point	90.0	%	50.0	99.9		A	R/W	
Gfc42	Activate pump in system circuit:	Primary Circuit Pump Active	1	---	0	1	0: UNIT ON 1: ON REQUEST	D	R/W	
Gfc43	Set temperature limits Min cooling:	Cooling Ambient Temperature Set Point Minimum Limit	18.0	°C	0.0	99.9		A	R/W	18
	Max cooling:	Cooling Ambient Temperature Set Point Max. Limit	30.0	°C	Gfc43	99.9		A	R/W	17
	Min heating:	Heating Ambient Temperature Set Point Min. Limit	15.0	°C	0.0	99.9		A	R/W	20
	Max heating:	Heating Ambient Temperature Set Point Max. Limit	25.0	°C	Gfc43	99.9		A	R/W	19
Gfc44	Set humidity limits Min cooling:	Cooling Ambient Humidity Set Point Minimum Limit	30.0	%	0.0	99.9		A	R/W	25
	Max cooling:	Cooling Ambient Humidity Set Point Maximum Limit	70.0	%	0.0	99.9		A	R/W	26
	Min heating:	Heating Ambient Humidity Set Point Minimum Limit	30.0	%	0.0	99.9		A	R/W	27
	Max heating:	Heating Ambient Humidity Set Point Maximum Limit	70.0	%	0.0	99.9		A	R/W	28
Gfc45	Cooling/Heating Select season from:	Cooling/Heating Selection	0	---	0	1	0: KEYBOARD 1: B.M.S.	I	R/W	
Gfc46	Enable protection	Protection Function Active for Rooms	0	---	0	1	0: NO 1: YES	D	R/W	
	Set protection	Protection Function Intervention Set Point	---	°C	0.0	99.9		A	R/W	
Gfc47	Recovery fan:	Recovery Fans Enabled	0	---	0	1	0: DISABLE 1: ENABLE	D	R/W	
Gfc48	Diff. valve zone Summer:	Cooling valve activation temperature differential (Zone 1=Zone 2)	1.5	°C	0.0	9.9		A	R/W	
Gfc48	Winter:	Heating valve activation temperature differential (Zone 1=Zone 2)	2.0	°C	0.0	9.9		A	R/W	
Gfc49	Enable lighting digital output NO8 with minor alarms:	Enable GENERAL ALARM relay activation even with minor alarms	0	---	0	1	0: NO 1: YES	D	R/W	
Gfc50	Setpoint geo pump Summer:	Cooling Set Point for Control of Modulating Geothermal Pump	35.0	°C	-99.9	99.9		A	R/W	
	Winter:	Heating Set Point for Control of Modulating Geothermal	6.5	°C	-99.9	99.9		A	R/W	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
		Pump								
Gfc51	Band geo pump Summer:	Cooling Working Band for Modulating Geothermal Pump	3.0	°C	0.0	9.9		A	R/W	
	Winter:	Heating Working Band for Modulating Geothermal Pump	3.0	°C	0.0	9.9		A	R/W	
Gfd01	Delete alarm log:	Allow deletion of Alarm Log	0	---	0	1	0: NO 1: YES	D	R/W	
	Enter new service password (PW1):	Select New Service Password	1234	---	0	9999		I	R/W	
Gg_01	NO2 Geo circ. pump:	Geothermal Installation Pump Manual Start	0	---	0	1	0: AUT 1: MAN	D	R/W	
	NO3 System pump:	Installation Pump Manual Start	0	---	0	1	0: AUT 1: MAN	D	R/W	
	NO4 DHW circ. pump:	ACS Pump Manual Start	0	---	0	1	0: AUT 1: MAN	D	R/W	
	NO5 Mix circ. pump:	Mixing Installation Pump Manual Start	0	---	0	1	0: AUT 1: MAN	D	R/W	
Gg_02	NO15 Solar pump 1:	Solar Circuit Pump 1 Manual Start	0	---	0	1	0: AUT 1: MAN	D	R/W	
	NO16 Solar pump 2:	Solar Circuit Pump 2 Manual Start	0	---	0	1	0: AUT 1: MAN	D	R/W	
Gg_03	EEV mode	Electronic Expansion Valve Manual Positioning	0	---	0	1	0: AUTO 1: MAN.	D	R/W	
	Requested step	Number of steps requested	0	---	0	9999		I	R/W	
	EEV position	Letter of current number of steps	0	---	0	9999		I	R	
Gg_04		Unit waiting for:	0	---	0	1	0: 1: System waiting for	D	R	
		Message for any faults of EVD400 Driver	0	---	0	3	0: NO WARNINGS 1: VALVE OPEN RESTART 2: BATT CHARGED RESTART 3: EEPROM ERROR RESTART	I	R	
	Go ahead?	Select to Bypass Error	0	---	0	1	0: NO 1: YES	D	R/W	
Gg_05	S1	EVD400 Driver Probe S1 Offset	0.0	°C/bar	-9.9	9.9		I	R/W	
	S2	EVD400 Driver Probe S2 Offset	0.0	°C/bar	-9.9	9.9		I	R/W	
	S3	EVD400 Driver Probe S3 Offset	0.0	°C/bar	-9.9	9.9		I	R/W	
	PT1000	EVD400 Driver Probe S2 (PT1000) Offset	0.0	°C	-01.0	10.0		I	R/W	
H. Manufacturer										
Ha_01	Type of unit:	Unit with selection of up to 2 compressors	1	---	0	1	0: One compressor 1: Two Compressors	D	R	
		Set unit configuration type	5	---	1	6	1: Basic heating 2: Heating + DHW 3: Heating + DHW 4: Reversing + DHW 5: Reversing + Driver + DHW 6: Rev. + Driver + DHW + Solar	I	R/W	
Ha_02	Electronic Valve driver present EVD400:	Enable EVD400 Valve Driver	0	---	0	1	0: NOT PRESENT 1: PRESENT	D	R/W	
Ha_03	Total no. Of comps.:	Total number of compressors	2	---	1	2	1: 1 compressor 2: 2 compressors	I	R/W	
	Comp. 1:	Compressor No. 1 Enabled	1	---	0	1	0: DISABLE 1: ENABLE	D	R/W	
	Comp. 2:	Compressor No. 2 Enabled	1	---	0	1	0: DISABLE 1: ENABLE	D	R/W	
Hb_01	ID01 Geo flow switch:	Invert Geothermal Side Flow Switch Logic	0	---	0	1	0: NC 1: NO	D	R/W	
	ID02 Comp. 1 overload:	Invert Compressor 1 Thermal Overload Switch Logic	0	---	0	1	0: NC 1: NO	D	R/W	
Hb_02	ID03 High press. comp. 1:	Invert Compressor 1 High Pressure Switch Logic	0	---	0	1	0: NC 1: NO	D	R/W	
	ID04 Low press. switch :	Invert Low Pressure Switch Logic	0	---	0	1	0: NC 1: NO	D	R/W	
Hb_03	ID05 Geo pump overload :	Invert pump thermal overload switch logic (on unit type 1 or 2), geothermal pump thermal overload switch (on unit type 3, 4, 5 or 6)	0	---	0	1	0: NC 1: NO	D	R/W	
	ID06 Sys. pump overload :	Invert ACS heater thermal overload switch (on unit type 1 or 2); installation pump thermal overload switch (on units type 3, 4, 5 or 6)	0	---	0	1	0: NC 1: NO	D	R/W	
Hb_04	ID07 Boiler alarm :	Invert Furnace Alarm Logic	0	---	0	1	0: NC 1: NO	D	R/W	
	ID08 Remote On/Off :	Invert On/Off Remote Logic	0	---	0	1	0: NC 1: NO	D	R/W	
Hb_05	ID09 Comp. 2 overload:	Invert Compressor 2 Thermal Overload Switch Logic	0	---	0	1	0: NC 1: NO	D	R/W	
	ID10 High press. comp. 2 :	Invert Compressor 2 High Pressure Switch Logic	0	---	0	1	0: NC 1: NO	D	R/W	
Hb_06	ID11 DHW pump overload :	Invert ACS Pump Thermal Overload Switch Logic	0	---	0	1	0: NC 1: NO	D	R/W	
	ID12 Sys. Circ. flow sw. :	Invert installation circuit flow switch logic (on unit type 4, 5 or 6); mixing installation pump thermal overload switch (on unit type 3)	0	---	0	1	0: NC 1: NO	D	R/W	
Hb_07	ID13 Humidifier alarm :	Invert Humidifier Alarm Logic	0	---	0	1	0: NC 1: NO	D	R/W	
	ID14 DHW heater overload :	Invert ACS Heater Thermal Overload Switch Logic	0	---	0	1	0: NC 1: NO	D	R/W	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
Hb_08	ID15 Mix pump overload :	Invert Mixing Pump Thermal Overload Switch Logic	0	---	0	1	0: NC 1: NO	D	R/W	
	ID16 Dehumidifier alarm :	Invert Dehumidifier Alarm Logic	0	---	0	1	0: NC 1: NO	D	R/W	
Hb_09	ID17 Solar pump 1 overl. :	Invert Solar Pump 1 Thermal Overload Switch Logic	0	---	0	1	0: NC 1: NO	D	R/W	
	ID18 Solar pump 2 overl. :	Invert Solar Pump 2 Thermal Overload Switch Logic	0	---	0	1	0: NC 1: NO	D	R/W	
Hb_10	Reverse logic 4-way valve:	Invert Heat Pump Cycle Inversion 4-way Valve Logic	0	---	0	1	0: NC 1: NO	D	R/W	
Hb_11	B7 = High pressure Type:	Select High Pressure Transducer Type (unit 3 or 4)	2	---	0	3	0: --- 1: 0..10Vdc 2: 0..5Vdc 3: 4..20mA	I	R/W	
	min:	High Pressure Transducer Minimum Limit	0.0	bar	-01.0	99.9		A	R/W	
	max:	High Pressure Transducer Maximum Limit	34.5	bar	-01.0	99.9		A	R/W	
Hb_12	B8 = Low pressure Type:	Select Low Pressure Transducer Type (unit 3 or 4)	2	---	0	3	0: --- 1: 0..10Vdc 2: 0..5Vdc 3: 4..20mA	I	R/W	
	min:	Low Pressure Transducer Minimum Limit	-1.0	bar	-01.0	99.9		A	R/W	
	max:	Low Pressure Transducer Maximum Limit	9.3	bar	-01.0	99.9		A	R/W	
Hc_01	Set high pressure compressor/s:	Set High Pressure Compressor(s)	25.0	bar	0.0	50.0		A	R/W	
	High press. hyst.:	High Pressure Compressor(s) Hysteresis	2.0	bar	0.0	9.9		A	R/W	
Hc_02	Set low pressure compressor/s:	Set Low Pressure Compressor(s)	1.5	bar	0.0	50.0		A	R/W	
	Low press. hyst.:	Low Pressure Compressor(s) Hysteresis	0.5	bar	0.5	99.9		A	R/W	
Hc_03	Low pressure alarm delay time at start compressor/s:	Low Pressure Alarm Delay Time for Compressor(s) Start	40	s	0	999		I	R/W	
Hc_04	Low pres. alarm delay time in steady operat. compressor/s:	Low Pressure Alarm Delay Time while compressor(s) in steady operating conditions	10	s	0	999		I	R/W	
Hc_05	Reset low pressure alarm:	Low Pressure Compressor(s) Alarm Reset Type	0	---	0	1	0: AUTO 1: MANUAL	D	R/W	
Hc_06	Type of comp.Cont.:	Type of proportional or integral control of compressor operation	0	---	0	1	0: P 1: P+I	D	R/W	
	Sys. prop. band:	Differential compressor start from installation request	3.0	°C	0.5	15.0		A	R/W	
	Integral time:	Compressor Control Integration Time	60	s	1	999		I	R/W	
	DHW prop. band:	Domestic Hot Water Differential	4.0	°C	0.5	15.0		A	R/W	
Hc_07	Minimum compressor ON time:	Minimum ON Time for Compressor	60	s	0	900		I	R/W	
	Minimum compressor OFF time:	Minimum OFF Time for Compressor	60	s	0	900		I	R/W	
Hc_08	Min. time between two starts of same compressor:	Minimum time between starts of the same compressor	300	s	0	900		I	R/W	
Hc_09	Min. time between starts of different compressors:	Minimum time between starts of different compressors	10	s	0	900		I	R/W	
Hc_10	Compressor rot.:	Enable Compressor Rotation	1	---	0	1	0: NO 1: YES	D	R/W	
Hc_11	Delay between On compressor from On system pump:	Delay time between compressor ON and installation pump ON	30	s	0	9999		I	R/W	
Hc_12	System pump Off delay time from compres. Off:	Delay time between installation pump OFF and compressor OFF	120	s	0	9999		I	R/W	
Hc_13	Delay between On compressors from On geo. pump:	Delay time between compressor ON and geothermal pump ON	30	s	0	9999		I	R/W	
Hc_14	Geotherm. pump Off delay time from compres. Off:	Delay time between geothermal pump OFF and compressor OFF	30	s	0	9999		I	R/W	
Hc_15	System flow switch alarm delay time at pump start:	Delay time between installation flow switch alarm and start of pump	15	s	0	999		I	R/W	
Hc_16	Alarm delay time System flow switch in steady op.:	Delay time for installation in steady operating conditions flow switch alarm	5	s	0	999		I	R/W	
Hc_17	Reset sys.Flow switch:	Reset Installation Flow Switch	0	---	0	1	0: AUTO 1: MANUAL	D	R/W	
Hc_18	Geothermal flow switch alarm delay time at pump start:	Delay time between geothermal flow switch alarm and start of pump	15	s	0	999		I	R/W	
Hc_19	Alarm delay time Geotherm. flow switch in steady op.:	Delay time for geothermal flow switch alarm in steady operating conditions	5	s	0	999		I	R/W	
Hc_20	Reset geo flow switch:	Reset Geothermal Flow Switch	0	---	0	1	0: AUTO 1: MANUAL	D	R/W	
	Verif.Stato iniziale flussostati:	Enable check of flow switches (geothermal and installation) when pump started	0	---	0	1	0: NO 1: YES	D	R/W	
Hc_21	Limiti temp. Water temp. Limits Chiller Min:	Chiller minimum set point limit can be set per unit	7.0	°C	0.0	99.9		A	R/W	
	Chiller Max:	Chiller maximum set point limit can be set per unit	17.0	°C	0.0	99.9		A	R/W	
	PdC Min:	Heat pump minimum set point limit can be set per unit	20.0	°C	0.0	99.9		A	R/W	
	PdC Max:	Heat pump maximum set point limit can be set per unit	50.0	°C	0.0	99.9		A	R/W	
Hc_22	Temperature limits DHW Min :	Domestic water minimum set point limit can be set per unit	20.0	°C	0.0	99.9		A	R/W	
	DHW Max :	Domestic water maximum set point limit can be set per unit	70.0	°C	0.0	99.9		A	R/W	
Hc_23	Sel.Sanitary pump:	Select heat pump operation in heating	1	---	0	1	0: ALWAYS ENABLE 1: BY THERMOSTAT	D	R/W	
Hda01	EVD parameters EVD type	Type of serial used by EVD400	1	---	1	2	1: EVD400 pLAN 2: EVD400 tLAN	I	R/W	
	EVD probes type	Type of probe connected to EVD400	0	---	0	5	0: NOT SELECTED 1: SHeat NTC-P(4-20)mA 2: SHeat NTC-P(raz) 3: SHeat NTC-NTC	I	R/W	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
							4: SHeat Pt1000-P 5: SHeat NTCht-P(raz)			
		Assigned position for probes	0	---	0	5	0: 1: 2: NTC>S3 P(raz)>S1 3: NTCsuct>S3 NTCsat>S1 4: Pt1000>S2 P(raz)>S1 5: NTCht>S2 P(raz)>S1	I	R	
Hda02	Valve type	Type of valve connected	0	---	0	14	0: NOT SELECTED 1: ALCO EX5 2: ALCO EX6 3: ALCO EX7 4: ALCO EX8 330 step/s 5: SPORLAN 0.5-20tons 6: SPORLAN 25-30tons 7: SPORLAN 50-250tons 8: CAREL E2V**P 9: CAREL E2V 10: DANFOSS ETS-25/50 11: DANFOSS ETS-100 12: DANFOSS ETS-250/400 13: CUSTOM 14: ALCO EX8 500 step/s	I	R/W	
	Refrigerant	Type of refrigerant used	0	---	0	13	0: --- 1: R22 2: R134a 3: R404a 4: R407c 5: R410a 6: R507c 7: R290 8: R600 9: R600a 10: R717 11: R744 12: R728 13: R1270	I	R/W	
	Battery enable:	Coil Module Present	0	---	0	1	0: N 1: Y	D	R/W	
Hda03	Custom valve config. Minimum steps	Minimum steps for custom valve	0	---	0	8100		I	R/W	
	Maximum steps	Maximum steps for custom valve	0	---	0	8100		I	R/W	
	Closing/Opening steps	Closure/Aperture Steps for Custom Valve	0	---	0	8100		I	R/W	
	Opening EXTRAs	Enable Extra Aperture Steps	0	---	0	1	0: N 1: Y	D	R/W	
	Closing EXTRAs	Enable Extra Closure Steps	0	---	0	1	0: N 1: Y	D	R/W	
Hda04	Custom valve config. Phase current	Current of Moving Valve	0	mA	0	1000		I	R/W	
	Still current	Current of Dwell Valve	0	mA	0	1000		I	R/W	
	Step rate	Control Frequency	32	Hz	32	501		I	R/W	
	Duty cycle	Duty cycle used	0	%	0	100		I	R/W	
Hda05	EEV position with 0% power demand standby steps	Number of steps of the valve in standby	0	---	0	8100		I	R/W	
Hda06	S1 probe limits Pressure limits Min value	Set the minimum value of the low pressure probe connected	-1.0	barg	-9.9	99.9		I	R/W	
	Max value	Set the maximum value of the low pressure probe connected	9.3	barg	0.0	99.9		I	R/W	
Hda07	Aux.probe conf.	Type of Auxiliary Probe Connected	1	---	0	4	0: NOT SELECTED 1: PRESSURE 2: NTC 3: NTC HT 4: PT 1000	I	R/W	
	Aux.probe limits Min value	Set the minimum value of the auxiliary probe (high pressure) connected	-1.0	°C/barg	-99.9	99.9		I	R/W	
	Max value	Set the maximum value of the auxiliary probe (high pressure) connected	9.3	°C/barg	-99.9	99.9		I	R/W	
Hda08	Alarms delay Low SuperHeat	Alarm Delay for Low Superheating	120	s	0	600		I	R/W	
	High SuperHeat	Alarm Delay for High Superheating	20	min	0	600		I	R/W	
	LOP	Alarm Delay for Low Evaporation Pressure	120	s	0	600		I	R/W	
	MOP	Alarm Delay for High Evaporation Pressure	0	s	0	600		I	R/W	
	Probe error	Alarm Delay for Probe Error	10	s	0	999		I	R/W	
Hda09	Stand alone	Enable Stand Alone	0	---	0	1	0: NO 1: YES	D	R/W	
Hdb01	EVD Autosetup Circuit/EEV ratio for startup opening	Percent Aperture on Start	60	%	0	100		I	R/W	
Hdb02	Compressore or unit	Type of Compressor Used	0	---	0	5	0: NOT SELECTED 1: RECIPROCATING 2: SCREW 3: SCROLL	I	R/W	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
							4: CABINET FLOADED 5: CABINET			
	Capacity control	Type of Compressor Capacity-control	0	---	0	3	0: NOT SELECTED 1: NONE or STAGES 2: CONTINUOS SLOW 3: CONTINUOS FAST	I	R/W	
Hdb02	Evaporator type Cool	Type of Evaporator / Condenser	0	---	0	4	0: NOT SELECTED 1: PLATES 2: SHELL&TUBES 3: FINNED FAST 4: FINNED SLOW	I	R/W	
	Heat	Type of Evaporator / Condenser	0	---	0	4	0: NOT SELECTED 1: PLATES 2: SHELL&TUBES 3: FINNED FAST 4: FINNED SLOW	I	R/W	
Hdb03	Min saturation temp. Cooling mode	Temperature at LOP Operating Pressure Minimum in Chiller	-2.0	°C	-70.0	50.0		I	R/W	
	Heating mode	Temperature at LOP Operating Pressure Minimum in Heat Pump	-18.0	°C	-70.0	50.0		I	R/W	
	Defrost mode	Temperature at LOP Operating Pressure Minimum in Defrost	-3.0	°C	-70.0	50.0		I	R/W	
Hdb04	Max saturation temp. Cooling mode	Temperature at MOP Operating Pressure Maximum in Chiller	12.0	°C	-05.0	90.0		I	R/W	
	Heating mode	Temperature at MOP Operating Pressure Maximum in Heat Pump	12.0	°C	-05.0	90.0		I	R/W	
	Defrost mode	Temperature at MOP Operating Pressure Maximum in Defrost	15.0	°C	-05.0	90.0		I	R/W	
Hdb05	High SuperHeat alarm threshold Auto	Upper SuperHeat Alarm Threshold in Auto	20.0	°C	0.0	99.9		I	R	
	SuperHeat Man	Upper SuperHeat Alarm Threshold in Manual	0.0	°C	0.0	99.9		I	R/W	
Hdc01	param. CH-Circuit/EEV Ratio Auto	Percentage of maximum power managed by the valve in the circuit where it is installed (Chiller) (Auto)	0	%	0	999		I	R	
		Percentage of maximum power managed by the valve in the circuit where it is installed (Chiller) (Manual)	0	%	0	100		I	R/W	
	CH-Proportional gain Auto	Proportional Factor of PID in Chiller (Auto)	0.0	---	0.0	99.9		I	R	
		Proportional Factor of PID in Chiller (Manual)	0.0	---	0.0	99.9		I	R/W	
	CH-Integral time Auto	Integration Time for Superheating Control in Chiller (Auto)	0	s	0	999		I	R	
		Integration Time for Superheating Control in Chiller (Manual)	0	s	0	999		I	R/W	
Hdc02	HP-Circuit/EEV Ratio Auto	Percentage of maximum power managed by the valve in the circuit where it is installed (CP) (Auto)	0	%	0	999		I	R	
		Percentage of maximum power managed by the valve in the circuit where it is installed (CP) (Manual)	0	%	0	100		I	R/W	
	HP-Proportional gain Auto	Proportional Factor of PID in CP (Auto)	0.0	---	0.0	99.9		I	R	
		Proportional Factor of PID in CP (Manual)	0.0	---	0.0	99.9		I	R/W	
	HP-Integral time Auto	Integration Time for Superheating Control in CP (Auto)	0	s	0	999		I	R	
		Integration Time for Superheating Control in CP (Manual)	0	s	0	999		I	R/W	
Hdc03	DF-Circuit/EEV Ratio Auto	Percentage of maximum power managed by the valve in the circuit where it is installed (DF) (Auto)	0	---	0	999		I	R	
		Percentage of maximum power managed by the valve in the circuit where it is installed (DF) (Manual)	0	---	0	100		I	R/W	
	DF-Proportional gain Auto	Proportional Factor of PID in DF (Auto)	0.0	---	0.0	99.9		I	R	
		Proportional Factor of PID in DF (Manual)	0.0	---	0.0	99.9		I	R/W	
	DF-Integral time Auto	Integration Time for Superheating Control in DF (Auto)	0	---	0	999		I	R	
		Integration Time for Superheating Control in DF (Manual)	0	---	0	999		I	R/W	
Hdc04	SuperHeat deadzone +/- Auto	Dead Zone for PID Control (Auto)	0.0	°C	0.0	9.9		I	R	
		Dead Zone for PID Control (Manual)	0.0	°C	0.0	9.9		I	R/W	
	Derivative time Auto	Derivative Time for PID (Auto)	0.0	s	0.0	99.9		I	R	
		Derivative Time for PID (Manual)	0.0	s	0.0	99.9		I	R/W	
Hdc05	Low SuperHeat int.time Auto	Integration Time for Low Superheating Control (Auto)	0.0	s	0.0	99.9		I	R	
		Integration Time for Low Superheating Control (Manual)	0.0	s	0.0	30.0		I	R/W	
	LOP integral time Auto	Integration Time for Low Evaporation Pressure Control (Auto)	1.5	s	0.0	99.9		I	R	
		Integration Time for Low Evaporation Pressure Control (Manual)	0.0	s	0.0	25.5		I	R/W	
Hdc06	MOP integral time Auto	Integration Time for High Evaporation Pressure Control (Auto)	2.5	s	0.0	99.9		I	R	
		Integration Time for High Evaporation Pressure Control (Manual)	0.0	s	0.0	25.5		I	R/W	
	MOP startup delay Auto	Duration of MOP Suspension (Auto)	60	s	0	999		I	R	
		Duration of MOP Suspension (Manual)	0	s	0	999		I	R/W	
Hdc07	Dynamic proportional gain?	Attenuation Coefficient on Capacity Changes	0	---	0	1	0: NO 1: YES	D	R/W	
	Blocked valve check Auto	Time beyond which, under specific conditions, the valve is blocked (Auto)	60	s	0	999		I	R	
		Time beyond which, under specific conditions, the valve is blocked (Manual)	0	s	0	999		I	R/W	
Hdc08	High Tcond.protection Auto	Maximum Condensation Temperature Value (Auto)	85.0	°C	0.0	99.9		I	R	
		Maximum Condensation Temperature Value (Manual)	0.0	°C	0.0	99.9		I	R/W	

Mask Index	Descr. display	Descr.	Def	UOM	Min	Max	Value description	Type	R/W	BMS addr.
	High Tcond.int.time Auto	Integration Time for Condensation Control (Auto)	0.0	s	0.0	99.9		I	R	
		Integration Time for Condensation Control (Manual)	0.0	s	0.0	25.5		I	R/W	
Hdc09	CH-SuperHeat set Auto	Superheat Set Point in Chiller (Auto)	0.0	°C	-99.9	99.9		I	R	
		Superheat Set Point in Chiller (Manual)	0.0	°C	-99.9	99.9		I	R/W	
	CH-Low SuperHeat Auto	Low Superheat Set Point in Chiller (Auto)	0.0	°C	-99.9	99.9		I	R	
		Low Superheat Set Point in Chiller (Manual)	0.0	°C	-04.0	21.0		I	R/W	
Hdc10	HP-SuperHeat set Auto	Superheat Set Point in Heat Pump (Auto)	0.0	°C	-99.9	99.9		I	R	
		Superheat Set Point in Heat Pump (Manual)	0.0	°C	-99.9	99.9		I	R/W	
	HP-Low SuperHeat Auto	Low Superheat Set Point in Heat Pump (Auto)	0.0	°C	-99.9	99.9		I	R	
		Low Superheat Set Point in Heat Pump (Manual)	0.0	°C	-04.0	21.0		I	R/W	
Hdc11	DF-SuperHeat set Auto	Superheat Set Point in Defrost (Auto)	0.0	°C	-99.9	99.9		I	R	
		Superheat Set Point in Defrost (Manual)	0.0	°C	0.0	99.0		I	R/W	
	DF-Low SuperHeat Auto	Low Superheat Set Point in Defrost (Auto)	0.0	°C	-99.9	99.9		I	R	
		Low Superheat Set Point in Defrost (Manual)	0.0	°C	-04.0	21.0		I	R/W	
He_01	Default/Password INSTALL DEFAULT Delete user settings and enter global default values:	Reset the CAREL Default Values (see list of Parameters)	0	---	0	1	0: NO 1: YES	D	R/W	
He_02	Default/Password Enter new password manufacturer(PW2):	Select New Manufacturer Password	1234	---	0	9999		I	R/W	

8. VARIABLES SENT TO THE SUPERVISOR

Smart HP can be connected to a number of supervision systems, especially those using the Carel and Modbus BMS communication protocols.
The connection uses a BMS serial port.
The different connection protocols are managed by the following optional boards:

- Carel RS485: part no. PCOS004850 (see Fig. 8.a)
- Modbus RS485: part no. PCOS004850 (see Fig. 8.a)
- Lon Works FTT10: part no. PCO10000F0 (*)
- Bacnet RS485:part no. PCO1000BA0 (*)
- Bacnet Ethernet:part no. PCO1000WB0 (*)
- Trend: part no. PCO100CLP0 (*)

Note: (*) these communications protocols are not currently manageably with the Configuration Tools (LONset and BACset) available on the internet site http://ksa.carel.com/; however, the Smart HP software is setup to use them.

The following figure represents the connection diagram for the serial BMS board with the pCO³.

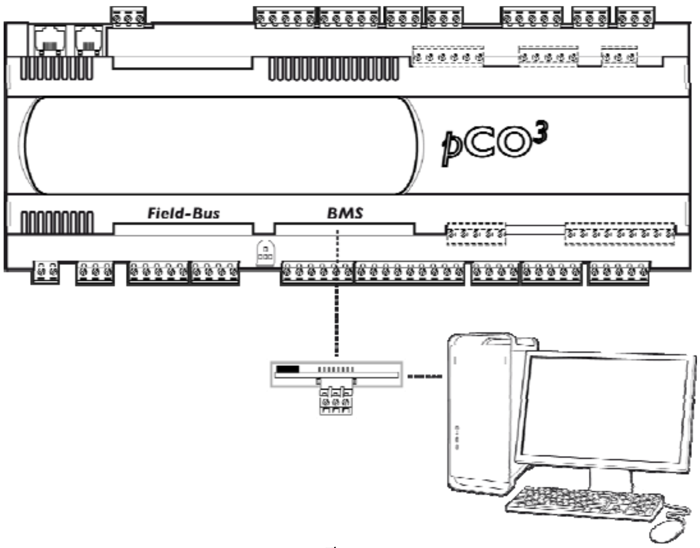


Fig. 8.a

The following table shows the variables sent to the supervisor.

CAREL Address	ModBus Address	Mask index	Descr.	Def.	UOM	Min	Max	R/W	Name (*)
Analog									
1	1	D__01	Geothermal Heat Exchanger Outlet Water Temperature (geothermal outlet B1)	0.00	°C	-99.9	-99.9	R	Out_Geo
2	2	D__01	Geothermal Heat Exchanger Inlet Water Temperature (geothermal return circuit B2)	0.00	°C	-99.9	-99.9	R	In_Geo
3	3	D__02	Domestic Hot Water Temperature (B3)	0.00	°C	-99.9	-99.9	R	Sanitary_Temp
4	4	D__03	Mixing Circuit Outlet Water Temperature (b4)	0.00	°C	-99.9	-99.9	R	Mix_Circ_Temp
5	5	D__03	Primary Circuit Heat Exchanger Inlet Water Temperature (B5)	0.00	°C	-99.9	-99.9	R	In_Plant
6	6	D__37 (EVD 400), D__07 (unit 3 or 4)	Low Pressure Compressor(s)	0.00	---	-1	99.9	R	Lp_Pressure
7	7	D__37 (EVD 400), D__07 (unit 3 or 4)	High Pressure Compressor(s)	0.00	---	-1	99.9	R	Hp_Pressure
9	9	D__08	Solar Circuit Inlet Boiler Temperature	0.00	°C	-99.9	99.9	R	In_Solar_Boiler
10	10	D__09	Solar Panel 1 Temperature	0.00	°C	-100	200	R	Solar_Circ1
11	11	D__09	Solar Panel 2 Temperature	0.00	°C	-100	200	R	Solar_Circ2
12	12	D__06 / D__08	Installation Circuit Heat Exchanger Water Outlet Temperature	0.00	°C	-99.9	99.9	R	Out_Plant
13	13	B__01	Comfort Room Temperature Set Point (Cooling)	23	°C	-99.9	99.9	R/W	Set_Temp_Comf_S
14	14	B__01	Comfort Room Temperature Set Point (Heating)	23	°C	-99.9	99.9	R/W	Set_Temp_Comf_W
15	15	B__02	Economy Room Temperature Set Point (Cooling)	27	°C	-99.9	99.9	R/W	Set_Temp_Econ_S
16	16	B__02	Economy Room Temperature Set Point (Heating)	19	°C	-99.9	99.9	R/W	Set_Temp_Econ_W
17	17	Gfc43	Maximum Room Temperature Limit (Cooling)	35	°C	-99.9	99.9	R/W	Set_T_Lim_Hi_S
18	18	Gfc43	Minimum Room Temperature Limit (Cooling)	15	°C	-99.9	99.9	R/W	Set_T_Lim_Low_S
19	19	Gfc43	Maximum Room Temperature Limit	35	°C	-99.9	99.9	R/W	Set_T_Lim_Hi_W

CAREL Address	ModBus Address	Mask index	Descr.	Def.	UOM	Min	Max	R/W	Name (*)
			(Heating)						
20	20	Gfc43	Minimum Room Temperature Limit (Heating)	15	°C	-99.9	99.9	R/W	Set_T_Lim_Low_W
21	21	B__02	Economy Room Humidity Set Point (Heating)	50	%rH	0	-100	R/W	Set_Humid_Econ_W
22	22	B__02	Economy Room Humidity Set Point (Cooling)	50	%rH	0	-100	R/W	Set_Humid_Econ_S
23	23	B__01	Comfort Room Humidity Set Point (Heating)	50	%rH	0	100	R/W	Set_Humid_Comf_W
24	24	B__01	Comfort Room Humidity Set Point (Cooling)	50	%rH	0	100	R/W	Set_Humid_Comf_S
25	25	Gfc44	Room Humidity Minimum Limit (Cooling)	30	%rH	0	100	R/W	Set_H_Lim_Low_S
26	26	Gfc44	Room Humidity Maximum Limit (Cooling)	90	%rH	0	100	R/W	Set_H_Lim_Hi_S
27	27	Gfc44	Room Humidity Minimum Limit (Heating)	30	%rH	0	100	R/W	Set_H_Lim_Low_W
28	28	Gfc44	Room Humidity Maximum Limit (Heating)	90	%rH	0	100	R/W	Set_H_Lim_Hi_W
29	29	Gc_01	Storage recovery temperature set point	0.00	°C	0	30	R/W	Setp_Temperature_Coll
30	30	Gc_02	Mixing Circuit Water Outlet Set Point (Cooling)	0.00	°C	-99.9	99.9	R/W	Set_Man_Floor_Summer
31	31	Gc_02	Mixing Circuit Water Outlet Set Point (Heating)	0.00	°C	-99.9	99.9	R/W	Set_Man_Floor_Winter
32	32	Gfc34	Mixing Circuit Water Outlet Temperature Minimum Limit	0.00	°C	0	99.9	R/W	Lim_Min_Outlet_Floor
33	33	Gfc34	Mixing Circuit Water Outlet Temperature Maximum Limit	0.00	°C	0	99.9	R/W	Lim_Max_Outlet_Floor
35	35	D__05, Main page	Outside Air Temperature	0.00	°C	-99.9	99.9	R	External_Temp
36	36	Gc_04	Standard Condition Temperature Set (Chiller)	23	°C	0	99.9	R/W	Set_Temp_StdC_Ch
37	37	Gc_04	Standard Condition Temperature Set (Heat Pump)	23	°C	0	99.9	R/W	Set_Temp_StdC_Hp
38	38	Gc_05	Energy Savings Condition Temperature Set (Chiller)	27	°C	0	99.9	R/W	Set_Temp_ES_Ch
39	39	Gc_05	Energy Savings Condition Temperature Set (Heat Pump)	19	°C	0	99.9	R/W	Set_Temp_ES_Hp
40	40	Gc_04	Standard Condition ACS Temperature Set	23	°C	20	80	R/W	Set_HotWater_Std
41	41	Gc_05	Energy Savings ACS Temperature Set	23	°C	20	80	R/W	Set_HotWater_E_S
50	50	Room:01	Temperature Measured by SERIAL PROBE NO. 1	0.00	°C	-99.9	99.9	R	a_Temperature1
51	51	Room:01	Humidity Measured by SERIAL PROBE NO. 1	0.00	%rH	0	100	R	a_Humidity1
52	52	Room:02	Temperature Measured by SERIAL PROBE NO. 2	0.00	°C	-99.9	99.9	R	a_Temperature2
53	53	Room:02	Humidity Measured by SERIAL PROBE NO. 2	0.00	%rH	0	100	R	a_Humidity2
54	54	Room:03	Temperature Measured by SERIAL PROBE NO. 3	0.00	°C	-99.9	99.9	R	a_Temperature3
55	55	Room:03	Humidity Measured by SERIAL PROBE NO. 3	0.00	%rH	0	100	R	a_Humidity3
56	56	Room:04	Temperature Measured by SERIAL PROBE NO. 4	0.00	°C	-99.9	99.9	R	a_Temperature4
57	57	Room:04	Humidity Measured by SERIAL PROBE NO. 4	0.00	%rH	0	100	R	a_Humidity4
58	58	Room:05	Temperature Measured by SERIAL PROBE NO. 5	0.00	°C	-99.9	99.9	R	a_Temperature5
59	59	Room:05	Humidity Measured by SERIAL PROBE NO. 5	0.00	%rH	0	100	R	a_Humidity5
60	60	Room:06	Temperature Measured by SERIAL PROBE NO. 6	0.00	°C	-99.9	99.9	R	a_Temperature6
61	61	Room:06	Humidity Measured by SERIAL PROBE NO. 6	0.00	%rH	0	100	R	a_Humidity6
62	62	Room:01	Temperature Measured by CLIMA NO. 1	0.00	°C	-99.9	99.9	R	a_Temp_Cli1
63	63	Room:01	Humidity Measured by CLIMA NO. 1	0.00	%rH	0	100	R	a_Hum_Cli1
64	64	Room:02	Temperature Measured by CLIMA NO. 2	0.00	°C	-99.9	99.9	R	a_Temp_Cli2
65	65	Room:02	Humidity Measured by CLIMA NO. 2	0.00	%rH	0	100	R	a_Hum_Cli2
66	66	Room:03	Temperature Measured by CLIMA NO. 3	0.00	°C	-99.9	99.9	R	a_Temp_Cli3
67	67	Room:03	Humidity Measured by CLIMA NO. 3	0.00	%rH	0	100	R	a_Hum_Cli3
68	68	Room:04	Temperature Measured by CLIMA NO. 4	0.00	°C	-99.9	99.9	R	a_Temp_Cli4
69	69	Room:04	Humidity Measured by CLIMA NO. 4	0.00	%rH	0	100	R	a_Hum_Cli4
70	70	Room:05	Temperature Measured by CLIMA NO. 5	0.00	°C	-99.9	99.9	R	a_Temp_Cli5
71	71	Room:05	Humidity Measured by CLIMA NO. 5	0.00	%rH	0	100	R	a_Hum_Cli5
72	72	Room:06	Temperature Measured by CLIMA NO. 6	0.00	°C	-99.9	99.9	R	a_Temp_Cli6
73	73	Room:06	Humidity Measured by CLIMA NO. 6	0.00	%rH	0	100	R	a_Hum_Cli6
74	74	D__40	Humidity Measured by OUTSIDE SERIAL PROBE NO. 7	0.00	%rH	0	100	R	a_HumidityExt
Integer									
1	209	On_Humi_Mod_Device	Humidifier Analogue Output	0	---	0	9999	R	On_Humi_Mod_Device
2	210	Out_EVMix_Mod	3-way Installation Valve Analogue Output	0	---	0	1000	R	Out_EVMix_Mod
3	211	Out_Pump_Mix_Mod	Modulating Domestic Pump Analogue Output	0	---	0	9999	R	Out_Pump_Mix_Mod
4	212	Ctrl_Mod_Geo_P	Modulating Geothermal Pump Analogue Output	0	---	-9999	9999	R	Ctrl_Mod_Geo_P
5	213	A__01	Unit On-Off (0=Off; 1=On from room) (0=Off; 1=On; 2=Energy Savings; 3=Auto)	0	---	0	3	R/W	OnOff_Status
6	214	A__01	(0=Domestic; 1=Heating + Domestic; 2=Cooling + Domestic)	0	---	0	2	R/W	S_W_Change_Type
7	215	C__01	Current Date	0	---	1	31	R	Current_Day

CAREL Address	ModBus Address	Mask index	Descr.	Def.	UOM	Min	Max	R/W	Name (*)
8	216	C__01	Current Hour	0	---	0	23	R	Current_Hour
9	217	C__01	Current Minutes	0	---	0	59	R	Current_Minute
10	218	C__01	Month	0	---	1	12	R	Current_Month
11	219	C__01	Day of the Week	1	---	1	7	R	Current_Weekday
12	220	C__01	Year	0	---	0	99	R	Current_Year
Digital									
1	1		Request to Delete Alarm Memory	0	---	0	1	R/W	Reset_Alarm
2	2	Ha_01	Unit Type 1 Configuration	0	---	0	1	R	config_1
3	3	Ha_02	Unit Type 2 Configuration	0	---	0	1	R	config_2
4	4	Ha_03	Unit Type 3 Configuration	0	---	0	1	R	config_3
5	5	Ha_04	Unit Type 4 Configuration	0	---	0	1	R	config_4
6	6	Ha_05	Unit Type 5 Configuration	0	---	0	1	R	config_5
7	7	Ha_06	Unit Type 6 Configuration	0	---	0	1	R	config_6
8	8		Operating Mode (Chiller - Cooling/ Heat Pump - Heating)	0	---	0	1	R	CH_HP_Mode
9	9		Domestic Activated	0	---	0	1	R	Sanitary
11	11	D__17 / D__18	Digital output 1	0	---	0	1	R	OUT1
12	12	D__17 / D__18	Digital output 2	0	---	0	1	R	Out2
13	13	D__17 / D__18	Digital output 3	0	---	0	1	R	OUT3
14	14	D__17 / D__18	Digital output 4	0	---	0	1	R	OUT4
15	15	D__19	Digital output 5	0	---	0	1	R	OUT5
16	16	D__19	Digital output 6	0	---	0	1	R	OUT6
17	17	D__19	Digital output 7	0	---	0	1	R	OUT7
18	18	D__19	Digital output 8	0	---	0	1	R	OUT8
19	19	D__20	Digital output 9	0	---	0	1	R	OUT9
20	20	D__20	Digital output 10	0	---	0	1	R	OUT10
21	21	D__20	Digital output 11	0	---	0	1	R	OUT11
22	22	D__20	Digital output 12	0	---	0	1	R	OUT12
23	23	D__20	Digital output 13	0	---	0	1	R	OUT13
24	24	D__21	Digital output 14	0	---	0	1	R	OUT14
25	25	D__21	Digital output 15	0	---	0	1	R	OUT15
26	26	D__21	Digital output 16	0	---	0	1	R	OUT16
27	27		Digital output 17	0	---	0	1	R	OUT17
28	28		Digital output 18	0	---	0	1	R	OUT18
31	31		Geothermal Flow Switch Alarm (manual reset)	0	---	0	1	R	Geo_Flow_Alarm
32	32		Evaporator Flow Switch Alarm (manual reset)	0	---	0	1	R	Evap_Flow_Alarm
33	33		Compressor 1 Thermal Overload Switch Alarm	0	---	0	1	R	Comp1_Ovl_Alarm
34	34		Geothermal Circuit Pump Thermal Overload Switch Alarm	0	---	0	1	R	Geo_Pump_Ovl_Al
35	35		Installation Pump Thermal Overload Switch Alarm	0	---	0	1	R	User_Pump_Ovl_Al
36	36		Compressor 2 Thermal Overload Switch Alarm	0	---	0	1	R	Comp2_Ovl_Alarm
37	37		Domestic Pump Thermal Overload Switch Alarm	0	---	0	1	R	Sanitary_Pump_Ovl_Al
38	38		Domestic Hot Water Storage Heater Thermal Overload Switch Alarm	0	---	0	1	R	Heat_Boiler_Alarm
39	39		Mixing Circuit Pump Thermal Overload Switch Alarm	0	---	0	1	R	Mix_Pump_Alarm
40	40		Solar Circuit Pump 1 Thermal Overload Switch Alarm	0	---	0	1	R	SolarPump1_Ov
41	41		Solar Circuit Pump 2 Thermal Overload Switch Alarm	0	---	0	1	R	SolarPump2_Ov
42	42		Compressor 1 High Pressure Alarm Status from Digital Input	0	---	0	1	R	Al_HP1_Din
43	43		Compressor(s) High Pressure Alarm Status from Transducer	0	---	0	1	R	Al_HP1_Tran
44	44		Compressor 2 High Pressure Alarm Status from Digital Input	0	---	0	1	R	Al_HP2_Din
45	45		Compressor(s) Low Pressure Alarm from Digital Input	0	---	0	1	R	Al_LP_Din
46	46		Compressor(s) Low Pressure Alarm from Transducer	0	---	0	1	R	Al_LP_Tran
47	47		Geothermal Antifreeze Alarm	0	---	0	1	R	Al_Antif_Geo
48	48		Primary Circuit Antifreeze Alarm	0	---	0	1	R	Al_Antif_Plant
49	49		Installation Integrated Furnace/Heater Thermal Overload Switch Alarm	0	---	0	1	R	Boiler_Ov
50	50		Humidifier Alarm	0	---	0	1	R	Humidifier_Alarm
51	51		Dehumidifier Alarm	0	---	0	1	R	Dehumidifier_Alarm
52	52		Installation Temperature Maximum Threshold Limit Reached Alarm	0	---	0	1	R	Aut_Man_Al_Limit_MaxT_Floor
53	53		Installation Temperature Minimum Threshold Limit Reached Alarm	0	---	0	1	R	Aut_Man_Al_Limit_MinT_Floor
54	54		ACS Temperature Maximum Threshold Limit Reached Alarm	0	---	0	1	R	Aut_Man_Al_Overtemp_Boiler
55	55		ACS Temperature Maximum Threshold Limit Reached from Solar Circuit Alarm	0	---	0	1	R	Aut_Man_Al_Solar_Temp
56	56		Humidity Minimum Threshold Limit Reached Alarm	0	---	0	1	R	Aut_Man_Al_Limit_Low_Humidity
57	57		Humidity Maximum Threshold Limit Reached Alarm	0	---	0	1	R	Aut_Man_Al_Limit_High_Humidity

Note: the addressed provided in the table are according to the CAREL standard. The second column provides the ModBus (packet) address. If using a ModBus communication protocol in "register" mode, the addresses listed in the table (ModBus column) must be increased by one, both for the digital variables (coil) and for the analogue variables (register).

Note: (*) “Name” indicates the name of the variable used internally by the commissioning program.

9. ALARMS

9.1 Alarm Management

When alarm is activated, the Smart HP performs a few actions on the installation or unit, a message appears on the display, the respective LEDs turn on, and the alarm relay is activated.
Alarms can be divided into three categories: severe unit alarms (the unit or fundamental components of the unit are stopped), alarms that stop only one or more system operations, other alarms (only messages or warnings) that do not stop any operations rather they advise the user, for example, that thresholds have been exceeded. There are also alarms that do not originate from the pCO control board rather from the components connected to it, such as the DP probes, Clima or EVD400 (these may be due to communication problems between these components and the controller or real malfunctions between these accessories)..
At the bottom of the Alarm Table (section 9.3) is the key for the alarm messages-codes. They allow you to identify where the alarm indicated by the Smart HP was generated.

To monitor the active alarm, you only need to push the key and the name (or names if there are more than one active alarms) will appear on the display. To scroll through the list, use the and keys.

To reset the active alarms, you must first view them and then press then again. If the alarm condition no longer exists, the alarm will be reset; if not it will reappear.

The following figure illustrates the screen that appears when the key is pressed. You can see: 1) the origin of the alarm and 2) the part of the installation/unit involved.

Fig. 9.a

Note: if the alarm is reset automatically, the system will return to normal operation, but the alarm LED and relative message string will remain active until the key is pressed at least twice.

9.2 Alarm Log

From the main menu, you can enter the dedicated branch (E.), from which you can access the alarm log display screen.

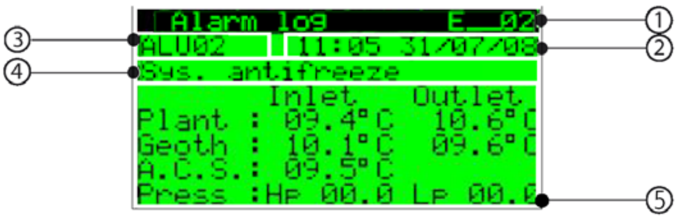


Fig. 9.b

The information provided in these screens involve:

1. The chronological number of the even (which indicates the exact moment that the alarm was triggered, or its "age"; E__01 indicates the oldest alarm)
2. The time and date of the alarm
3. The alarm code (please see sec. 9.3)
4. A short description of the logged alarms
5. The values relative to inlet and outlet temperature and pressure

Note: The maximum number of alarms logged is 50. When this limit is exceeded, the new events overwrite the old ones, which are thereby deleted.
The logged alarms are those shown in the table (sec. 9.3) that have an asterisk (*) next to the code. These are alarms that regard the correct operation of the unit, which are thus the most important ones. The alarms relative to the installation system are not recorded.

Historic Log
It is possible to record the events on the expanded 2 MB memory connected permanently to the board.
To download the data recorded in the historic log, you must use the Winload tool. In any case, please refer to the manual dedicated to the pCO system (+030220335).

9.3 Alarm Table

Code	Descr. display	Reset	Delay	Alarm Relay	Notes
ALA01 *	Position: B1 Probe B1 faulty or disconnected alarm	Automatic	60 sec	YES	Stop the unit
ALA02 *	Position: B2 Probe B2 faulty or disconnected alarm	Automatic	60 sec	YES	If the modulating geothermal pump is regulated to maximum speed.
ALA03 *	Position: B3 Probe B3 faulty or disconnected alarm	Automatic	60 sec	YES	Stop control of the domestic water circuit
ALA04 *	Position: B4 Probe B4 faulty or disconnected alarm	Automatic	60 sec	YES	Stop control of the mixing circuit (except type 5)

Code	Descr. display	Reset	Delay	Alarm Relay	Notes
ALA05 *	Position: B5 Probe B5 faulty or disconnected alarm	Automatic	60 sec	YES	Stop the unit
ALA06 *	Position: B6 Probe B6 faulty or disconnected alarm	Automatic	60 sec	YES	Block the probe's enabled functions (except type 4)
ALA07 *	Position: B7 Probe B7 faulty or disconnected alarm	Automatic	60 sec	YES	If the pressure probe stops the unit
ALA08 *	Position: B8 Probe B8 faulty or disconnected alarm	Automatic	60 sec	YES	If the pressure probe stops the unit, if the mixing circuit outlet probe stops control, of if the probe in the lower portion of the domestic water tank stops control of the solar panel circuits.
ALA09 *	Position: B9 Probe B9 faulty or disconnected alarm	Automatic	60 sec	YES	Stop solar pump 1 operation
ALA10 *	Position: B10 Probe B10 faulty or disconnected alarm	Automatic	60 sec	YES	Stop solar pump 2 operation
ALB01 *	Position: ID3 High pressure compressor 1	Manual	Immediately	YES	Stop the compressor(s), the geothermal pump, the primary circuit, and the domestic water circuit. The mixing circuit pump remains on.
ALB02 *	Position: ID4 Low pressure compressor/compressors	From parameter (Hc_05)	From parameter (Hc_03; Hc_04)	YES	Stop the compressor(s), the geothermal pump, the primary circuit, and the domestic water circuit. The mixing circuit pump remains on.
ALB03 *	Position: ID10 High pressure compressor 2	manual	immediately	YES	Stop the compressor(s), the geothermal pump, the primary circuit, and the domestic water circuit. The mixing circuit pump remains on.
ALB04 *	Position: B7/S2 High pressure compressor 1 by transducer	Manual	Immediately	YES	Stop the compressor(s), the geothermal pump, the primary circuit, and the domestic water circuit. The mixing circuit pump remains on.
ALB05 *	Position: B8/S1 Low pressure compressor/compressors by transducer	From parameter (Hc_05)	From parameter (Hc_03; Hc_04)	YES	Stop the compressor(s), the geothermal pump, the primary circuit, and the domestic water circuit. The mixing circuit pump remains on.
ALC01 *	Position: ID2 Compressor 1 overload	Manual	Immediately	YES	Stop the relative compressor. The unit is blocked if it is the only active compressor.
ALC02 *	Position: ID9 Compressor 2 overload	Manual	Immediately	YES	Stop the relative compressor. The unit is blocked if it is the only active compressor.
ALD01	Driver Eeprom error	Manual	Immediately	YES	
ALD03	Driver MOP timeout (check timeout)	Manual	Immediately	YES	
ALD04	Driver Timeout LOP (check timeout)	Manual	Immediately	YES	
ALD05	Driver Low SuperHeat (check timeout)	Manual	Immediately	YES	
ALD06	Driver High SuperHeat (check timeout)	Manual	Immediately	YES	
ALD07	Driver EEV not closed during power OFF	Manual	Immediately	YES	
ALD08	Driver Probe S1 error	Manual	Immediately	YES	
ALD09	Driver Probe S2 error	Manual	Immediately	YES	
ALD10	Driver Probe S3 error	Manual	Immediately	YES	
ALD11	Driver EVD GoAhead request (maintenance menu)	Manual	Immediately	YES	
ALD12	Driver Lan disconnected	Manual	30 sec	YES	
ALD13	Driver Auto Setup Procedure not completed	Manual	Immediately	YES	
ALP01 *	Position: ID1 Water flow switch geothermal side	From parameter (Hc_20)	From parameter (Hc_18; Hc_19)	YES	Stop the compressor(s), the geothermal pump, the primary circuit, and the domestic water circuit. The mixing circuit pump remains on.
ALP02 *	Position: ID5 Pumps overload unit/plant (unit 1; 2)	manual	immediately	YES	Stop the compressor(s), the geothermal pump, the primary circuit, and the domestic water circuit. The mixing circuit pump remains on.
ALP02 *	Position: ID5 Goethermal system pump overload (unit 3; 4; 5; 6)	manual	immediately	YES	Stop the compressor(s), the geothermal pump, the primary circuit, and the domestic water circuit. The mixing circuit pump remains on.
ALP03 *	Position: ID6 System pump overload (or mix pump overload)	manual	immediately	YES	Stop the compressor(s), the geothermal pump, the primary circuit, and the domestic water circuit. The mixing circuit pump remains on only on the Type 6 unit.
ALP04 *	Position: ID11 DHW pump overload	Manual	Immediately	YES	Stop the domestic water circuit and the recovery logic.
ALP05 *	Position: ID12 Water flow switch system side	From parameter (Hc_17)	From parameter (Hc_15; Hc_16)	YES	Stop the compressor(s), the geothermal pump, the primary circuit, the mixing circuit, and the domestic water circuit. The mixing circuit pump remains on.
ALP06	Position: ID15 Pump mix circuit overload	Manual	Immediately	YES	Stop the mixing circuit pump and shut the 3-way valve
ALP07	Position: ID17 Pump solar circuit 1 overload	Manual	Immediately	Can Be Enabled (Gfc49)	Stop solar pump 1 operation
ALP08	Position: ID18 Pump solar circuit 2 overload	Manual	Immediately	Can Be Enabled (Gfc49)	Stop solar pump 2 operation
ALR01	Position: ID7 Alarm boiler/heater integr. plant	Automatic	Immediately	Can Be Enabled (Gfc49)	Block the relative integration system
ALR02	Position: ID13 Humidifier alarm from digital input	Automatic	Immediately	Can Be Enabled (Gfc49)	Stop operation of the modulating humidifier
ALR03	Position: ID6 Boiler heater DHW overload from digital input (unit 1; 2)	Manual	Immediately	Can Be Enabled (Gfc49)	Block the relative integration system
ALR03	Position: ID14 Boiler heater DHW overload from digital input (unit 3; 4; 5;6)	Manual	Immediately	Can Be Enabled (Gfc49)	Block the relative integration system
ALR04	Position: ID16 Dehumidifier alarm from digital input	Automatic	Immediately	Can Be Enabled (Gfc49)	Stop operation of the dehumidifier
ALS01	Serial probe n° 01 Humidity probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	The last zone probe to go in alarm turns off the pump and shuts the valve. Alarm signal on the dedicated screen.
ALS02	Serial probe n° 01 Probe Offline	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS03	Serial probe n° 01 Temperature probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS04	Serial probe n° 02 Humidity probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS05	Serial probe n° 02 Probe Offline	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS06	Serial probe n° 02 Temperature probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS07	Serial probe n° 03 Humidity probe broken	Automatic	60 sec	Can Be	

Code	Descr. display	Reset	Delay	Alarm Relay	Notes
				Enabled (Gfc49)	
ALS08	Serial probe n° 03 Probe Offline	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS09	Serial probe n° 03 Temperature probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS10	Serial probe n° 04 Humidity probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS11	Serial probe n° 04 Probe Offline	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS12	Serial probe n° 04 Temperature probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS13	Serial probe n° 05 Humidity probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS14	Serial probe n° 05 Probe Offline	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS15	Serial probe n° 05 Temperature probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS16	Serial probe n° 06 Humidity probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS17	Serial probe n° 06 Probe Offline	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS18	Serial probe n° 06 Temperature probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS19	External serial probe Humidity probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	Block the probe's enabled functions
ALS20	External serial probe Probe Offline	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALS21	External serial probe Temperature probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALT01	threshold reached comp. 1 op. hour	Manual	Immediately	Can Be Enabled (Gfc49)	Warning signal
ALT02	threshold reached comp. 2 op. hour	Manual	Immediately	Can Be Enabled (Gfc49)	Warning signal
ALT03	Operating hour threshold reached geothermal pump	Manual	Immediately	Can Be Enabled (Gfc49)	Warning signal
ALT04	Operating hour threshold reached primary pump	Manual	Immediately	Can Be Enabled (Gfc49)	Warning signal
ALT05	Operating hour threshold reached DHW pump	Manual	Immediately	Can Be Enabled (Gfc49)	Warning signal
ALT06	Operating hour threshold reached mix pump	Manual	Immediately	Can Be Enabled (Gfc49)	Warning signal
ALT07	Operating hour threshold reached solar pump 1	Manual	Immediately	Can Be Enabled (Gfc49)	Warning signal
ALT08	Operating hour threshold reached solar pump 2	Manual	Immediately	Can Be Enabled (Gfc49)	Warning signal
ALU01 *	Geothermal exchanger antifreeze	From parameter (Gfc36)	Immediately	YES	Stop the compressor(s), the geothermal pump, the primary circuit, and the domestic water circuit. The mixing circuit pump remains on.
ALU02 *	System exchanger antifreeze	From parameter (Gfc38)	Immediately	YES	Stop the compressor(s), the geothermal pump, the primary circuit, and the domestic water circuit. The mixing circuit pump remains on.
ALW01	Parameter config. Error Request enable time bands	Automatic	Immediately		Warning signal
ALW02	Reach threshold temp. max mix circuit	Automatic	60 sec	Can Be Enabled (Gfc49)	Warning signal
ALW03	Reach threshold temp. min mix circuit	Automatic	60 sec	Can Be Enabled (Gfc49)	Warning signal
ALW04	Reach threshold high temperature sanitary	Automatic	60 sec	Can Be Enabled (Gfc49)	Warning signal (Gfc23)
ALW05	Reach threshold max temperature sanitary to solar collector	Automatic	60 sec	Can Be Enabled (Gfc49)	Warning signal (Gfc23; Gfc01))
ALW06	Reach threshold max humidity raised	Automatic	90 sec	Can Be Enabled (Gfc49)	Warning signal

Code	Descr. display	Reset	Delay	Alarm Relay	Notes
ALW07	Reach threshold min humidity raised	Automatic	90 sec	Can Be Enabled (Gfc49)	Warning signal
ALY01	Clima Room: 01 Address: xxx Inside probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	The last zone CLIMA to go in alarm turns off the pump and shuts the valve. Alarm signal on the dedicated screen.
ALY02	Clima Room: 01 Address: xxx Comunication error	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALY03	Clima Room: 02 Address: xxx Inside probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALY04	Clima Room: 02 Address: xxx Comunication error	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALY05	Clima Room: 03 Address: xxx Inside probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALY06	Clima Room: 03 Address: xxx Comunication error	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALY07	Clima Room: 04 Address: xxx Inside probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALY08	Clima Room: 04 Address: xxx Comunication error	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALY09	Clima Room: 05 Address: xxx Inside probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALY10	Clima Room: 05 Address: xxx Comunication error	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALY11	Clima Room: 06 Address: xxx Inside probe broken	Automatic	60 sec	Can Be Enabled (Gfc49)	
ALY12	Clima Room: 06 Address: xxx Comunication error	Automatic	60 sec	Can Be Enabled (Gfc49)	

Note: the last letter of the alarm code-label (the one before the numbers) has the following meaning:

A.	"AIN" pCO physical probe fault
B.	"Boh" Alarms that block the Circuit, High-Low pressure
C.	"Compressor" Thermal overload switches, covering
D.	"Driver" Electronic valve
E.	"Expansion" pCOe Alarms
F.	"Fan"
G.	"Generic" general alarms, faulty clock, HW, or Memory
H.	"Humidifier"
I	"Fan Coil" alarms from a hydronic network
M	"MP-BUS" / Belimo
O	"Offline" Offline supervisor, offline pLAN
P	"Pumps" Pump flow switches, pump thermal overload switches
Q	"Quality" HACCP, Consumption
R	"Remote" Various alarms from digital inputs
S	Serial probe"
T	"Timing" Maintenance warning
U	"unit" Alarms that block the unit
V	"VFD" Inverter alarms from field
W	"Warning" generic
X	Defrost
Y	Clima

Note: Alarm reset can be either manual, automatic or selectable by parameter. In the first case, the user must manually reset the alarm. In the second case, the alarm is automatically reset by the Smart HP, which logs the event in any case (these are alarms that are not grave and not potentially dangerous). In the last case the alarm is reset by a parameter. If this option is activated, the system will try to reset the alarm five times (at constant 10 second intervals, recorded in the alarm log). If after these five attempts the alarm continues to exist, Smart HP shifts to the manual reset mode, and the alarm relay is activated. If within the five consecutive attempts, the alarm/fault situation is resolved, the alarm relay is reset and logged.

Note: the delays for the various alarms can be set, reset using the relative parameter (indicated between parenthesis) or not present (the message "immediate" indicates that there is no delay between when the fault/problem is detected by the Smart HP and the signal to the connected alarm).

Note: the column for the "alarm relays" may contain the message "Yes" if the relay is activated, or "enabled" if it is can be activated or not using the relative parameter (in the screen Gfc49).
The eventual enabling of a parameter by the alarm relay implies the contemporary activation in a single block of all alarms that are distinguished with the message "Can Be Enabled" in the above listed parameter table.

NOTES

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