



AIR / WATER Heat pump

USER MANUAL

pCO⁵

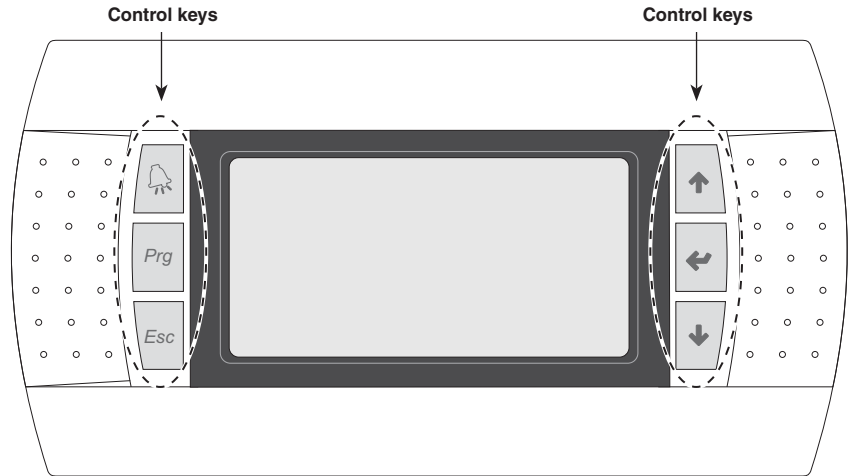








User interface (PGD1)

The unit control panel allow the quick setting and display of the unit's operating parameters. The board memorises all the default settings and any modifications. By installing the remote control panel PGD1 it is possible to remotely replicate all the functions and the settings available on the unit. After a power failure the unit is capable of an automatic restart, retaining the original settings.

The user interface consists of a graphic display with six navigation keys; the display is arranged through a menu hierarchy, activated by pressing the navigation keys. The default display of these menus is the main screen. The navigation between the various parameters is by using the arrow keys located to the right of the display. These keys are also used for the modification of the selected parameter.

INTERFACE CONTROL KEYS:




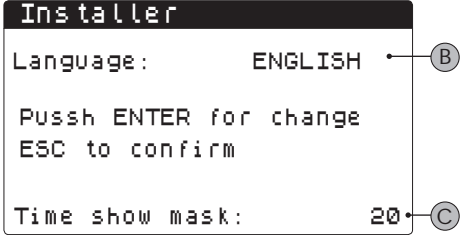
Key	Function
	ALARM key Displays the list of active and historical alarms (red LED on = active alarm)
	MENU ACTIVATION key • Pressing this key activates the navigation between menus (orange LED on = winter operating mode active)
	EXIT MENU key • Pressing this key returns to the previous menu
	NAVIGATION (+) key • Pressing this key when navigating between menu/parameters passes to the next menu/parameter • Pressing this key when modifying a parameter increases the value of the selected parameter
	NAVIGATION (enter) key • Pressing this key when navigating between menus allows entry to the selected menu • Pressing this key when navigating between parameters allows selection of the parameter displayed to modify it • Pressing the key when modifying a parameter confirms the modification of the parameter value selected
	NAVIGATION (-) key • Pressing this key when navigating between menu/parameters passes to the previous menu/parameter • Pressing this key when modifying a parameter decreases the value of the selected parameter

Start-up procedure

After having powered up the unit the control board will carry out preliminary operations before being ready for use. This initial procedure takes around 60 seconds to complete. During the initial loading procedure

two screens are displayed: a start-up screen and a screen to select the system language. These screens are detailed in the table below.

WARNING: The system language can be set on the screen displayed at the start-up or can be modified at any time through the appropriate screen contained in the Installer menu.

Start-up procedure		
Display on the unit	Index	Display/Parameter
	(A)	Remaining time for software loading: this value shows the remaining time to starting the software loaded on the unit, and passing the to system language selection
	(B)	System language: this parameter shows the current language set for the system. To change the language follow the instructions shown on the screen.
	(C)	<p>Remaining time to select the language: this value shows the remaining time to modify the language. When the time elapses the display goes to the main screen (Main screen - General monitoring).</p> <p>WARNING: It is possible to modify the system language at any time using the appropriate screen contained in the Installer menu. (Menu password = 0000).</p>
		

Menu structure and navigation

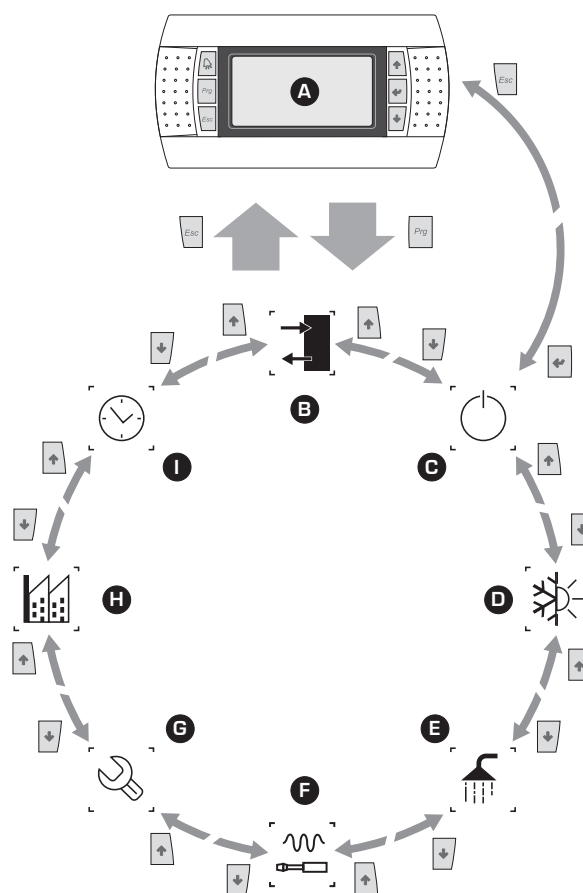
Both the functions to control the unit and the operating information are displayed on the unit mounted control panel. All the functions and information are arranged in screens which in turn are grouped into menus.

During the normal operation of the unit the main screen is displayed, from which it is possible to access the selection of the other operating menus.

The menus are displayed through the rotation of the icons that they represent. Once the desired icon is selected the chosen menu is entered, permitting the display or modification of the parameters that it is made up from. The procedure for navigating the menus, or changing parameters, is explained in detail in the chapter "User operating procedures".

The adjacent drawing shows the relation between the various menus and the navigation keys used.

The operating menus are arranged as in the following drawing:



WARNING: The following pages contain all the masks in the menus available to the user. The values contained in each mask represent the default values set in the system (except the main menu and the IN/OUT menu, which contain data read by the unit rather than operating parameters);

WARNING: Improper selection of the parameters in the Installer menu may cause malfunctions of the unit. It is recommended that these parameters are only modified by personnel qualified in the installation and configuration of the unit.

Index	Icon	Menu	Menu function
A	---	MAIN	The screens in this menu display the current conditions of the unit (unit status, setpoints,circuit data, etc.)
B		IN/OUT	This menu contains advanced information on the unit operation
C		ON/OFF	This menu permits the unit to be enabled or disabled, and provides information on the status
D		SYSTEM	This menu permits the selection of the operating modes, the water setpoints and the time-clock for the system
E		RECOVERY	If the unit includes heat recovery, this menu permits the setting of the parameters associated with the heat recovery
F		INSTALLER	This menu contains the settings useful for the installer (enabling digital inputs, BMS configuration, control, pumps, etc.) WARNING: This menu is password protected. The password is: 0000
G		ASSISTANCE	This menu is only accessible to qualified personnel
H		FACTORY	This menu is only accessible to qualified personnel
I		CLOCK	This menu contains the clock settings for the system control (date, hour, calender)



User operating procedures

To check or modify the operating parameters of the unit it is necessary to use the interface of the control panel on the unit. The basic operations that the user must be capable of, for the correct use of the unit, are:

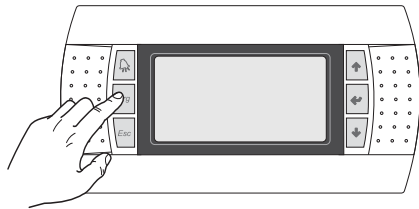
- (1) Moving from one menu to the next.
- (2) Selecting and modifying a parameter.

In this manual the parameters that can be modified by the user are identified by the icon

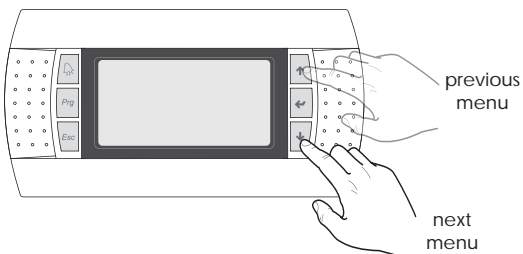
1

Moving between menus

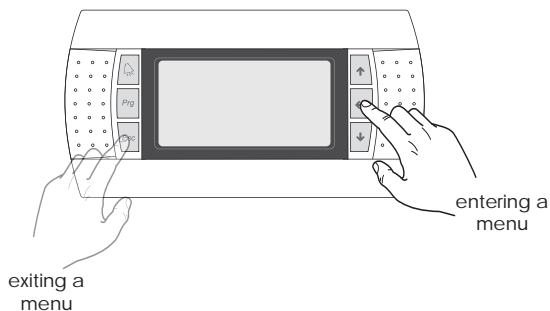
(a) To move between the menus, the order in which they are displayed is shown in the previous page, enter the menu selection mode by pressing the key



(b) Once in the menu selection mode it is possible to move between menus using the arrow keys: the key



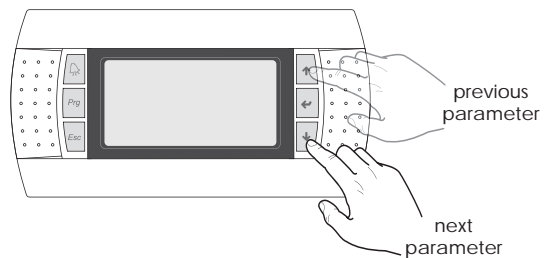
(c) When the desired menu is seen press the key



2

Selecting and modifying a menu

(a) Once in the menu selected, by following the procedure (1), it is possible to move between the screens using the arrow keys: the key



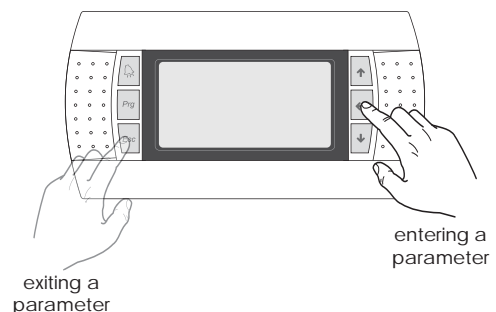
(c) When the desired parameter is seen press the key

WARNING: Once a parameter is selected by pressing the key

(1) Pressing the key

(2) Pressing the key

(3) Pressing the key



Main menu

During normal operation the first screen of the Main menu is displayed on the unit. This menu consists of several screens with different information on the operating status of the system which can be navigated using

the arrow keys. In these screens the information is read only and no parameters can be changed.

WARNING: If no keys are pressed for at least 5 minutes during the use of the control panel the software automatically return to the main screen of this menu.

Main menu - General monitoring		
Display on the unit	Index	Display/Parameter
<p>⚠ WARNING: Several icons can appear in this screen to show specific states of the system, and the icons can be:</p> <p>(LT) low leaving temperature anti-freeze function is active (compressors switched off)</p> <p>(HT) high leaving water temperature prevention is active (compressors switched off)</p> <p>(LC) low load function active</p> <p>(-V-) anti-freeze heater active (set point: 4.0°C - differential: 1.0K)</p> <p>(↘) the return water temperature is dropping so new requests for cooling load are disabled</p> <p>(↗) the return water temperature is rising so new requests for heating load as disabled</p> <p>(-F-) the flow switch is open so compressors will be switched off whilst the pump attempts to enable the flow switch</p>	(A)	System supply water temperature: shows the water temperature leaving the heat exchanger
	(B)	System return water temperature: shows the water temperature entering the heat exchanger
	(C)	Pump active: the icon appears if the unit pump operates, if the unit is supplied with a pump. The number next to the pump indicates which of the pumps is active
	(D)	Compressor status circuit 1: the icon shows the current status of the compressors present in circuit 1, which can be: <ul style="list-style-type: none"> On (●) Off (○) Disabled (⊗) In alarm (△) Part load operation lasting 10 minutes (P)
	(E)	Compressor status circuit 2: the icon shows the current status of the compressors present in circuit 2, which are the same as those available on circuit 1
	(F)	Fan speed circuit 1: the value shows the percentage speed of the fans on circuit 1
	(G)	Common fan speed: the value shows the percentage speed of the common fans between two circuits
	(H)	Fan speed circuit 2: the value shows the percentage speed of the fans on circuit 2
	(I)	System capacity demand: this element presents the system capacity demand as a bar graphic between 0 and 10 WARNING: Based on the operating mode of either heating or cooling the heat exchanger changes role. This is shown on the display of the screen by EV = evaporator, CN = condenser
	(L)	Date and time: shows the current date and time

Main menu - System monitoring		
Display on the unit	Index	Display/Parameter
<p>WARNING: Several icons can appear in this screen to show specific states of the system, and the icons can be:</p> <ul style="list-style-type: none"> (🕒) time-clock is active (M) multi-function input is active (LC) low load function is active 	(A)	Current setpoint: shows the current system setpoint
	(B)	Operating mode: the icon shows the current operating mode of the system (❄ = cooling, ☀ = heating)
	(C)	Differential: shows the current system working differential
	(D)	Control sensor: these values show the sensor on which the control is based (inlet or outlet), and the current value read by the selected sensor
	(E)	Proportional error: if the Proportional + Integral function is active, this shows the proportional value
	(F)	Integral error: if the Proportional + Integral function is active, this shows the integral value
	(G)	Load request: shows the percentage load required by the system
	(H)	Capacity output: shows the percentage output to the system

Main menu - Circuit 1 monitoring		
Display on the unit	Index	Display/Parameter
	(A)	High pressure: shows the discharge pressure of the circuit
	(B)	Low pressure: shows the suction pressure of the circuit
	(C)	Condensing temperature: shows the condensing temperature
	(D)	Evaporating temperature: shows the evaporating temperature
	(E)	Liquid temperature: shows the liquid temperature (displayed only for heat pumps models)
	(F)	Discharge temperature: shows the discharge temperature
	(G)	Compressor status: the icon represents the compressor status of the circuit. Each compressor is numbered with the code CP, and for each the current status is shown, being: <ul style="list-style-type: none"> • On (●) • Off (○)
	(H)	Minimum residual time: the value shows how many seconds remain until minimum required On or Off time elapses for the current status of each compressor

Main menu - Circuit 2 monitoring (visible if present)		
Display on the unit	Index	Display/Parameter
<p>Circuit 2</p> <p>A AP: 23.1bar -> Tc: 39.5°C C</p> <p>B BP: 6.4bar -> Te: -2.6°C D</p> <p>T.Liquid: 14.8°C E</p> <p>Disc.Temp.: 80.8°C F</p> <p>G CP1: ● 0s H</p> <p>CP2: ● 0s</p>	(A)	High pressure: shows the discharge pressure of the circuit
	(B)	Low pressure: shows the suction pressure of the circuit
	(C)	Condensing temperature: shows the condensing temperature
	(D)	Evaporating temperature: shows the evaporating temperature
	(E)	Liquid temperature: shows the liquid temperature
	(F)	Discharge temperature: shows the discharge temperature (displayed only for heat pumps models or unit with total heat recovery)
	(G)	Compressor status: the icon represents the compressor status of the circuit. Each compressor is numbered with the code CP, and for each the current status is shown, being: <ul style="list-style-type: none"> On (●) Off (○)
	(H)	Minimum residual time: the value shows how many seconds remain until minimum required On or Off time elapses for the current status of each compressor

Main menu - General circuits monitoring		
Display on the unit	Index	Display/Parameter
<p>Circuits</p> <p>A Total require 100%</p> <p>B Circuit 1: 46%</p> <p>C Circuit 2: 54%</p> <p>Time between starts: 0s D</p>	(A)	Total capacity request: shows the current value of total capacity request from the system
	(B)	Capacity output of circuit 1: shows the current capacity output of the circuit to satisfy the system request
	(C)	Capacity output of circuit 2: shows the current capacity output of the circuit to satisfy the system request
	(D)	Residual time to next compressor: shows the remaining time before the next compressor is turned on, if required

MAIN Menu - Freecooling monitor (only present on freecooling models)

Display on the unit	Index	Display/Parameter
<p>WARNING: The diagram of this mask will appear different, depending on whether the freecooling mode is activated or not (the moving arrows indicate the operation of the pump and water circulation).</p>	(A)	Freecooling power: this value indicates the actual power supplied by the freecooling system based on what is available
	(B)	Status: this icon indicates the current state of operation; it could be: <ul style="list-style-type: none"> • OFF: unit off; • FreeC: unit only operating in freecooling; • FC+CP: unit operating in mixed freecooling plus compressors; • CP: unit operating only with compressors;
	(C)	Total power: this value indicates the total power in percentage supplied by the unit. If operating only in freecooling, the total power corresponds to the power supplied by freecooling. In the case of mixed operation, the total power is the sum of the power supplied by freecooling and that supplied by the compressors
	(D)	Input temperature: this value indicates the unit input temperature (which becomes the freecooling input temperature if the 3-way valve is open)
	(E)	Freecooling output temperature: visible only with freecooling activated. Corresponds to the temperature read by the evaporator inlet probe
	(F)	Output temperature: this value indicates the temperature exiting the evaporator

MAIN Menu - Glycol free freecooling monitor (only present on glycol free freecooling models)

Display on the unit	Index	Display/Parameter
<p>WARNING: The diagram of this mask will appear different, depending on whether the freecooling mode is activated or not (the moving arrows indicate the operation of the pump and water circulation).</p>	(A)	Freecooling power: this value indicates the actual power supplied by the freecooling system based on what is available
	(B)	Status: this icon indicates the current state of operation; it could be: <ul style="list-style-type: none"> • OFF: unit off; • FreeC: unit only operating in freecooling; • FC+CP: unit operating in mixed freecooling plus compressors; • CP: unit operating only with compressors;
	(C)	Total power: this value indicates the total power in percentage supplied by the unit. If operating only in freecooling, the total power corresponds to the power supplied by freecooling. In the case of mixed operation, the total power is the sum of the power supplied by freecooling and that supplied by the compressors
	(D)	Input temperature: this value indicates the freecooling input temperature
	(E)	Freecooling output temperature: this value indicates the freecooling output temperature
	(F)	Output temperature: this value indicates the intermediate heat exchanger output temperature (which is the temperature read by the evaporator inlet probe)
	(G)	Input temperature: this value indicates the intermediate heat exchanger input temperature

MAIN Menu - General master monitor (only on master units for master/slave configuration)		
Display on the unit	Index	Display/Parameter
	(A)	Common output: this value indicates the current temperature value read by the water probe placed on the common of the two outlets of the master and slave unit
	(B)	Demand: this value indicates the actual power calculated by the thermostat of the Master unit which will be distributed onto the two units
	(C)	Unit 1: this value indicates the actual power requested to the MASTER unit by the system
	(D)	Unit 2: this value indicates the actual power requested to the SLAVE unit by the system

MAIN Menu - Total recovery monitor (only on units with total recovery)		
Display on the unit	Index	Display/Parameter
	(A)	Water input: indicates the current temperature value for incoming water to the total recovery system
	(B)	Water output: this value indicates the current temperature value for outgoing water from the total recovery system
	(C)	Status: this value indicates the current status of the total recovery; this status can be: <ul style="list-style-type: none"> • General off: whole unit in stand-by; • Flow switch open: water is not circulating in the hydraulic circuit of the recovery system and therefore it is disabled; • Enabled: water is circulating in the hydraulic circuit of the recovery system and therefore it is enabled;
	(D)	Demand: this value indicates the actual power requested for total recovery

MAIN Menu - DK monitor (only on units with 2 separate gas-side circuits)		
Display on the unit	Index	Display/Parameter
	(A)	Evaporator common output: indicates the current temperature value read by the probe placed on the common output connection from the two evaporators
	(B)	Evaporator water output 1: indicates the current temperature value for water leaving the evaporator 1
	(C)	Evaporator water output 2: indicates the current temperature value for water leaving the evaporator 2

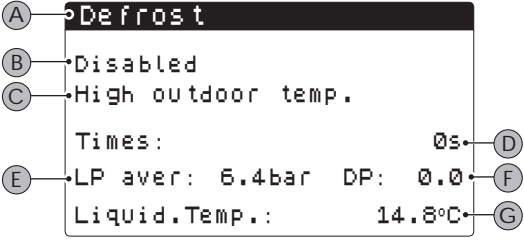


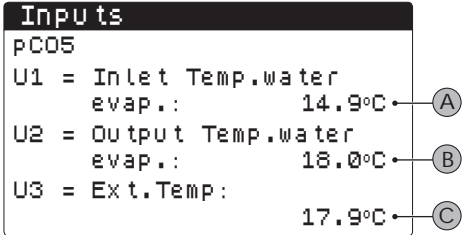
In / Out Menu

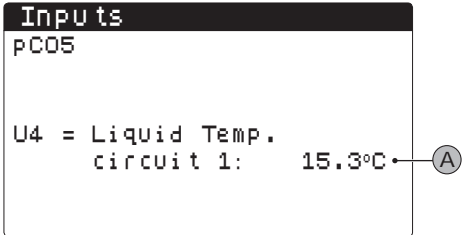
In / Out Menu - External temperature monitoring		
Display on the unit	Index	Display/Parameter
<p>The screenshot shows the 'Outdoor temp.' menu with the following data points labeled A through E:</p> <ul style="list-style-type: none"> A: 8.2°C (Current external air temperature) B: 6.0°C (Minimum external air temperature today) C: 10.2°C (Maximum external air temperature today) D: 8.3°C (Minimum external air temperature yesterday) E: 8.3°C (Maximum external air temperature yesterday) 	(A)	External air temperature: shows the current external air temperature
	(B)	External air temperature (minimum today): shows the minimum external air temperature read today
	(C)	External air temperature (maximum today): shows the maximum external air temperature read today
	(D)	External air temperature (minimum yesterday): shows the minimum external air temperature read yesterday
	(E)	External air temperature (maximum yesterday): shows the maximum external air temperature read yesterday

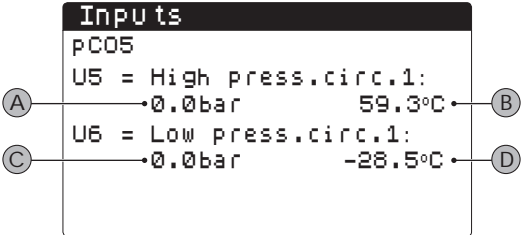
In / Out Menu - Fans monitoring (common or circuit 1)		
Display on the unit	Index	Display/Parameter
<p>The screenshot shows the 'Fan 1 Speed' menu with the following data points labeled A through H:</p> <ul style="list-style-type: none"> A: Fan 1 Speed (100%) B: Fan speed (100%) C: Fan setpoint (0.0bar) D: Differential on fan setpoint (0.0bar) E: Fan status (1: Off, 2: Off) F: Fan pressure circuit 1 (23.1bar) G: Fan status circuit 1 (Off) H: Fan pressure circuit 2 (22.0bar) <p>WARNING: The information contained in this screen can be split into two screens of "Fans circuit 1" and "Fans circuit 2". The control types can be:</p> <ul style="list-style-type: none"> COMMON control: The fans of both circuits are controlled together, in which case there will be only one screen which summarises the data relating to the fans (as seen in the screen above). INDIVIDUAL control: The fans of circuit 1 and circuit 2 are controlled independently, so the system will display two distinctive screens to display the data of the two circuits. In this case the two screens will be successively displayed and will contain the same type of data, except for points (E) and (G) in that (E) is displayed only in the screen "Fans circuit 1", whilst (G) is displayed only in the screen "Fans circuit 2". 	(A)	Circuit fans: shows which circuit the data refers to, with options of: <ul style="list-style-type: none"> Fans: shows that the fans are common to both circuits Fans 1: data refer to the fans of circuit 1 Fans 2: data refers to the fans of circuit 2
	(B)	Fan speed: shows the percentage speed at which the fans are operating (common, circuit 1 or circuit 2)
	(C)	Fan setpoint: shows the current fans setpoint
	(D)	Differential on fan setpoint: shows the current differential applied on the fan setpoint
	(E)	Fan status circuit 1: shows the current status of the fans, which can be: <ul style="list-style-type: none"> OFF: fans off PRE-VENTILATION: fans on in anticipation of compressor HIGH PRESSURE: control based on high pressure POST-VENTILATION: fans on after compressors switch off ANTI-ICING: fans on phase to prevent ice accumulation DEFROST: defrost phase LOW PRESSURE: control based on low pressure MAXIMUM SPEED: fans at maximum speed SILENCED: speed reduction to reduce noise levels
	(F)	Fan pressure circuit 1: shows the current pressure value read
	(G)	Fan status circuit 2: equivalent values to that of item (E) and this value is only displayed if the fans are common to the two circuits. If not, this value is not displayed but is shown in the following screen "Fans circuit 2"
	(H)	Fan pressure circuit 2: shows the current pressure value read and is only displayed if the fans are common to both circuits. If not, this value is not displayed but is shown in the following screen "Fans circuit 2".

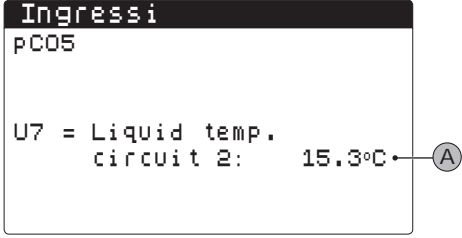
In / Out Menu - Defrost monitoring circuit 1 / circuit 2

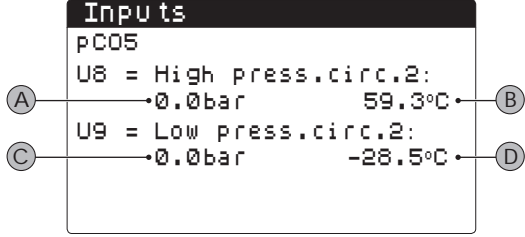
Display on the unit	Index	Display/Parameter
 <p>⚠ WARNING: in the case the unit has two circuits this screen is repeated and the heading of (A) changed to C2, and each screen will provide data for the relevant circuit.</p>	<p>(A)</p> <p>(B)</p> <p>(C)</p> <p>(D)</p> <p>(E)</p> <p>(F)</p> <p>(G)</p>	<p>Defrost circuit: shows which circuit the values refer to, if a second circuit is present, and provides a second screen for the second circuit:</p> <ul style="list-style-type: none"> • Defrost C1: data relating to circuit 1 • Defrost C2: data relating to circuit 2 <p>Defrost information: provides status information on the defrost, which can be:</p> <ul style="list-style-type: none"> • DISABLED: defrost disabled • BYPASS: bypass phase after the compressor start • DECREASING CALCULATION: phase calculating the decrease of pressure • AWAITING CYCLE INVERSION: system in pause before cycle inversion • START DEFROST: defrost in start phase • DEFROSTING: defrost cycle • END DEFROST: end of the defrost cycle • FIRST DEFROST: shows the first defrost phase after a power loss <p>Additional defrost information: provides additional status information on the defrost:</p> <ul style="list-style-type: none"> • HIGH EXTERNAL AIR TEMPERATURE: the external air temperature is above the level for enabling defrost • CIRCUIT OFF: all the compressors of the circuit are off; defrost is disabled • LP ABOVE LIMIT: the low pressure is above the level to enable defrost • MINIMUM TIME BETWEEN DEFROST: defrost is disabled during the period of minimum time between defrosts • START CP: compressor just started; await the bypass time before calculating the pressure decrease • NEW LP REFERENCE: a new low pressure value has been taken as reference for the calculation of decreasing pressure; • START FOR LP LIMIT: start of defrost to overcome the low pressure limit • START FOR DELTA P: start of defrost to overcome the decreasing value of low pressure • TEMP. LIQUID OK: the liquid temperature has overcome the limit to define the end of defrost • MINIMUM DEFROST TIME: defrost continuous until the minimum time is exceeded even if the exit conditions are met • AWAITING OTHER CIRCUIT: occurs if the fans are common to both circuits and the first circuit to finish defrost awaits the second circuit to finish • BYPASS FIRST START: the first defrost after a power loss can only occur after the compressor has run for the determined time • LIQUID TEMP. LOW: liquid temperature below the level that determines the end of defrost • START FOR DGT: defrost is activated due to the level of the discharge gas temperature exceeding the limit • FORCED: in the case the fans are common to both circuits this circuit has been forced into defrost due to defrost of the other circuit, even if not required <p>(D)</p> <p>(E)</p> <p>(F)</p> <p>(G)</p>

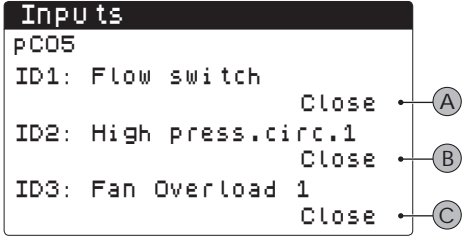
In / Out Menu - Analogue input monitoring (1)		
Display on the unit	Index	Display/Parameter
	(A)	Analogue input U1: shows the heat exchanger inlet water temperature
	(B)	Analogue input U2: shows the heat exchanger outlet temperature
	(C)	Analogue input U3: shows the external air temperature

In / Out Menu - Analogue input monitoring (2)		
Display on the unit	Index	Display/Parameter
	(A)	Analogue input U4: shows the discharge gas temperature of circuit 1

In / Out Menu - Analogue input monitoring (3)		
Display on the unit	Index	Display/Parameter
	(A)	Analogue input U5: shows the high pressure transducer value read for circuit 1
	(B)	Conversion HP temperature: this is the conversion value into temperature from the pressure read by the high pressure transducer of circuit 1
	(C)	Analogue input U6: shows the low pressure transducer value read for circuit 1
	(D)	Conversion LP temperature: this is the conversion value into temperature from the pressure read by the low pressure transducer for circuit 1

In / Out Menu - Analogue input monitoring (4) (only on units with two circuits)		
Display on the unit	Index	Display/Parameter
	<p>(A)</p>	Analogue input U7: shows the discharge gas temperature of circuit 2

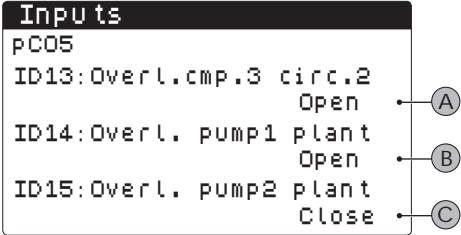
In / Out Menu - Analogue input monitoring (5) (only on units with two circuits)		
Display on the unit	Index	Display/Parameter
	<p>(A)</p>	Analogue input U8: shows the high pressure transducer value read for circuit 2
	<p>(B)</p>	Conversion HP temperature: this is the conversion value into temperature from the pressure read by the high pressure transducer of circuit 2
	<p>(C)</p>	Analogue input U9: shows the low pressure transducer value read for circuit 2
	<p>(D)</p>	Conversion LP temperature: this is the conversion value into temperature from the pressure read by the low pressure transducer for circuit 2

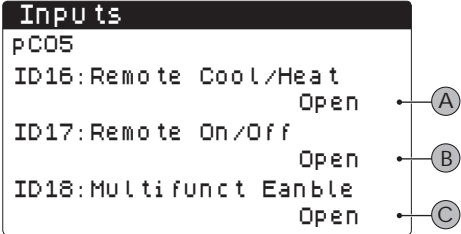
In / Out Menu - Digital input monitoring (1)		
Display on the unit	Index	Display/Parameter
	<p>(A)</p>	Digital input ID1: shows the binary status of the input read from the flow switch of the evaporator, which are: <ul style="list-style-type: none"> • OPEN: flow switch alarm • CLOSED: normal operation
	<p>(B)</p>	Digital input ID2: shows the binary status of the input read from the high pressure pressostat of circuit 1, which are: <ul style="list-style-type: none"> • OPEN: high pressure pressostat alarm • CLOSED: normal operation
	<p>(C)</p>	Digital input ID3: shows the binary status of the input relating to the circuit breaker of the fans on circuit 1, which can be: <ul style="list-style-type: none"> • OPEN: circuit breaker alarm • CLOSED: normal operation

In / Out Menu - Digital input monitoring (2)		
Display on the unit	Index	Display/Parameter
	(A)	Digital input ID4: shows the binary status read from the input of the phase control device, which can be: <ul style="list-style-type: none"> • OPEN: phase control device in alarm • CLOSED: normal operation
	(B)	Digital input ID5: shows the binary status of the input relating to the circuit breaker of compressor 1 on circuit 1, which can be: <ul style="list-style-type: none"> • OPEN: circuit breaker alarm • CLOSED: normal operation
	(C)	Digital input ID6: shows the binary status of the input relating to the circuit breaker of compressor 2 on circuit 1, which can be: <ul style="list-style-type: none"> • OPEN: circuit breaker alarm • CLOSED: normal operation

In / Out Menu - Digital input monitoring (3)		
Display on the unit	Index	Display/Parameter
	(A)	Digital input ID7: shows the binary status of the input relating to the circuit breaker of compressor 3 on circuit 1, which can be: <ul style="list-style-type: none"> • OPEN: circuit breaker alarm • CLOSED: normal operation
	(B)	Digital input ID8: shows the binary status of the input read from the high pressure pressostat of circuit 2 (if provided), which are: <ul style="list-style-type: none"> • OPEN: high pressure pressostat in alarm • CLOSED: normal operation
	(C)	Digital input ID9: shows the binary status of the input relating to the circuit breaker of the fans on circuit 2 (if provided), which can be: <ul style="list-style-type: none"> • OPEN: circuit breaker alarm • CLOSED: normal operation

In / Out Menu - Digital input monitoring (4)		
Display on the unit	Index	Display/Parameter
	(A)	Digital input ID10: shows the binary status of the input relating to the secondary setpoint function, which are: <ul style="list-style-type: none"> • OPEN: secondary setpoint not active • CLOSED: secondary setpoint active NOTE: To control this function the installer must use the digital input ID10 and provide a volt free contact for the activation of the secondary setpoint
	(B)	Digital input ID8: shows the binary status of the input relating to the circuit breaker of compressor 1 on circuit 2, which can be: <ul style="list-style-type: none"> • OPEN: circuit breaker alarm • CLOSED: normal operation
	(C)	Digital input ID9: shows the binary status of the input relating to the circuit breaker of compressor 2 on circuit 2, which can be: <ul style="list-style-type: none"> • OPEN: circuit breaker alarm • CLOSED: normal operation

In / Out Menu - Digital input monitoring (5)		
Display on the unit	Index	Display/Parameter
	(A)	Digital input ID13: shows the binary status of the input relating to the circuit breaker of compressor 3 on circuit 2, which can be: <ul style="list-style-type: none"> • OPEN: circuit breaker alarm • CLOSED: normal operation
	(B)	Digital input ID14: shows the binary status of the input relating to the circuit breaker of pump 1, which can be: <ul style="list-style-type: none"> • OPEN: circuit breaker alarm • CLOSED: normal operation
	(C)	Digital input ID15: shows the binary status of the input relating to the circuit breaker of pump 2 (visible if present), which can be: <ul style="list-style-type: none"> • OPEN: circuit breaker alarm • CLOSED: normal operation

In / Out Menu - Digital input monitoring (6)		
Display on the unit	Index	Display/Parameter
	(A)	Digital input ID16: shows the binary status of the input relating to the change of season function, which can be: <ul style="list-style-type: none"> • OPEN: remote season change not active • CLOSED: remote season change active NOTE: To control this function the installer must use the digital input ID16 and provide a volt free contact for the activation of the remote season changeover
	(B)	Digital input ID17: shows the binary status of the input relating to the remote ON/OFF function, which can be: <ul style="list-style-type: none"> • OPEN: remote ON/OFF remote not active • CLOSED: remote ON/OFF active NOTE: To control this function the installer must use the digital input ID17 and provide a volt free contact for the activation of the remote ON/OFF
	(C)	Digital input ID18: shows the binary status of the input relating to the multi-function U10 (this function is detailed in the Installer menu), which can be: <ul style="list-style-type: none"> • OPEN: multi-function contact not enabled • CLOSED: multi-function contact enabled NOTE: To control this function the installer must use the digital input ID18 and provide a volt free contact for the activation of the multi-function

In / Out Menu - Digital output monitoring (1)		
Display on the unit	Index	Display/Parameter
	(A)	Digital output NO1: shows the binary status of the output relating to pump 1, which can be: <ul style="list-style-type: none"> • OPEN: pump 1 not active • CLOSED: pump 1 active
	(B)	Digital output NO2: shows the binary status of the output relating to compressor 1 of circuit 1, which can be: <ul style="list-style-type: none"> • OPEN: compressor not active • CLOSED: compressor active
	(C)	Digital output NO3: shows the binary status of the output relating to compressor 2 of circuit 1, which can be: <ul style="list-style-type: none"> • OPEN: compressor not active • CLOSED: compressor active

In / Out Menu - Digital output monitoring (2)		
Display on the unit	Index	Display/Parameter
	(A)	Digital output NO4: shows the binary status of the output relating to compressor 3 of circuit 1, which can be: <ul style="list-style-type: none"> • OPEN: compressor not active • CLOSED: compressor active
	(B)	Digital output NO5: shows the binary status of the output to the liquid solenoid valve of circuit 1, which can be: <ul style="list-style-type: none"> • OPEN: valve not active • CLOSED: valve active
	(C)	Digital output NO6: shows the binary status of the output to the reversing valve of circuit 1 (in heat pump models), which can be: <ul style="list-style-type: none"> • OPEN: valve not active • CLOSED: valve active

In / Out Menu - Digital output monitoring (3)		
Display on the unit	Index	Display/Parameter
	(A)	Digital output NO7: shows the binary status of the output to the fans of circuit 1, which can be: <ul style="list-style-type: none"> • OPEN: fans not active; • CLOSED: fans active
	(B)	Digital output NO8: shows the binary status of the output generated by a serious alarm, which can be: <ul style="list-style-type: none"> • OPEN: no alarm present • CLOSED: alarm present
	(C)	Digital output NO9: shows the binary status of the output relating to compressor 1 of circuit 2 (visible if present), which can be: <ul style="list-style-type: none"> • OPEN: compressor not active • CLOSED: compressor active

In / Out Menu - Digital output monitoring (4)		
Display on the unit	Index	Display/Parameter
<pre> Output PC05 NO10: Comp.2 circ.2 Open NO11: Comp.3 circ.3 Open NO12: VSL Circuit 2 Open </pre>	(A)	Digital output NO10: shows the binary status of the output relating to compressor 2 of circuit 2 (visible if present), which can be: <ul style="list-style-type: none"> • OPEN: compressor not active • CLOSED: compressor active
	(B)	Digital output NO11: shows the binary status of the output relating to compressor 3 of circuit 2 (visible if present), which can be: <ul style="list-style-type: none"> • OPEN: compressor not active • CLOSED: compressor active
	(C)	Digital input NO12: shows the binary status of the output to the liquid solenoid valve of circuit 2 (visible if present), which can be: <ul style="list-style-type: none"> • OPEN: valve not active • CLOSED: valve active

In / Out Menu - Digital output monitoring (5)		
Display on the unit	Index	Display/Parameter
<pre> Output PC05 NO13: Fan 2 Open NO14: VIC 2 Open NO15: VSBP1 Open </pre>	(A)	Digital output NO13: shows the binary status of the output to the fans of circuit 2 (visible if present), which can be: <ul style="list-style-type: none"> • OPEN: fans not active • CLOSED: fans active
	(B)	Digital output NO14: shows the binary status of the output to the reversing valve of circuit 2 (visible if second circuit present in heat pump models), which can be: <ul style="list-style-type: none"> • OPEN: valve not active • CLOSED: valve active
	(C)	Digital input NO15: shows the binary status of the output to the bypass solenoid valve of circuit 1 (in heat pump models), which can be: <ul style="list-style-type: none"> • OPEN: valve not active • CLOSED: valve active

In / Out Menu - Digital output monitoring (6)		
Display on the unit	Index	Display/Parameter
<pre> Output PC05 NO16: VSBP2 Open NO17: Antifreeze Heater Open NO18: Pump 2 Open </pre>	(A)	Digital output NO16: shows the binary status of the output to the bypass solenoid valve of circuit 2 (visible if second circuit present in heat pump models), which can be: <ul style="list-style-type: none"> • OPEN: valve not active • CLOSED: valve active
	(B)	Digital output NO17: shows the binary status of the output to the anti-freeze heater, which can be: <ul style="list-style-type: none"> • OPEN: heater not active • CLOSED: heater active
	(C)	Digital input NO18: shows the binary status of the output relating to pump 2 (visible if present), which can be: <ul style="list-style-type: none"> • OPEN: pump 2 not active • CLOSED: pump 2 active



ON / OFF Menu

ON / OFF Menu - Switching unit on or off		
Display on the unit	Index	Display/Parameter
	(A)	Current status: shows the current status of the unit: <ul style="list-style-type: none"> • ENABLED: unit on • OFF GENERAL: unit in standby • OFF FOR ALARM: unit in standby due to an alarm • OFF BY BMS: unit in standby, disabled by the BMS • OFF BY CLOCK: unit in standby, disabled by time-clock settings • OFF BY DIG. IN: unit in standby, disabled by digital input ID8 • OFF BY DISPLAY: unit in standby, disabled from the terminal • ANTI-ICING: unit forced on to avoid icing
	(B)	Switching unit on or off: by modifying this parameter it is possible to switch the unit on or off: <ul style="list-style-type: none"> • YES: unit on • NO: unit off



SYSTEM Menu

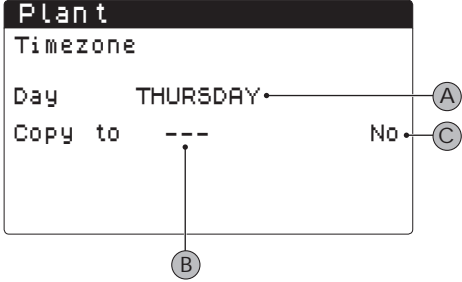




SYSTEM Menu - Selecting the operating mode		
Display on the unit	Index	Display/Parameter
	(A)	Current status: shows the current status of the unit: <ul style="list-style-type: none"> • ENABLED: unit on • OFF GENERAL: unit in standby • OFF FOR ALARM: unit in standby due to an alarm • OFF BY BMS: unit in standby, disabled by the BMS • OFF BY CLOCK: unit in standby, disabled by time-clock settings • OFF BY DIG. IN: unit in standby, disabled by digital input ID8 • OFF BY DISPLAY: unit in standby, disabled from the terminal • ANTI-ICING: unit forced on to avoid icing
	(B)	Active season: the symbol shows the current operating mode: <ul style="list-style-type: none"> • (☀): heating mode • (❄): cooling mode
	(C)	Unit enabled: shows if the unit is enabled for operation, which can be: <ul style="list-style-type: none"> • OFF: system not enabled for operation • ON: system enabled for operation • ON WITH SET2: system enabled for operation with secondary setpoint • TIME-CLOCK: system enabled to operate under time-clock programme
	(D)	Selecting the operating mode: by modifying this parameter it is possible to select the operating mode of the unit: <ul style="list-style-type: none"> • COOLING: unit produces chilled water • HEATING: unit produces hot water • BY EXT. TEMP.: operating mode decided automatically by the external air temperature • BY DIG. IN: operating mode decided by digital input ID16 (input closed = heating) • BY SUPERV.: operating mode decided by BMS • BY CALENDAR: operating mode decided automatically based on the season change-over date in the calendar

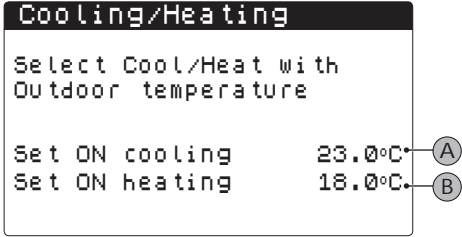



SYSTEM Menu - Setting main setpoints		
Display on the unit	Index	Display/Parameter
	A 	Main cooling setpoint: shows the operating setpoint used for cooling mode
	B 	Main heating setpoint: shows the operating setpoint used for heating mode

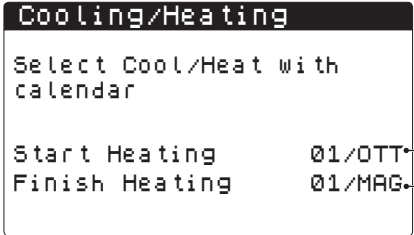




SYSTEM Menu - Setting secondary setpoints		
Display on the unit	Index	Display/Parameter
<p>⚠ WARNING: There are two possibilities for using the secondary setpoint of the system:</p> <ul style="list-style-type: none"> • Enable the system with the secondary setpoint as an option (ON CON SET 2) in the first screen of the System menu. • Use the digital input ID10, which activates the secondary setpoint when closed. 	A 	Secondary cooling setpoint: shows the secondary operating setpoint for cooling mode
	B 	Heating secondary setpoint: shows the secondary operating setpoint for heating mode

SYSTEM Menu - Time-clock settings (A) and (B)		
Display on the unit	Index	Display/Parameter
<p>WARNING: All the screens for time-clock programming are only visible if activated in the main screen of the System menu (Enabling = TIME-CLOCK)</p> <p>WARNING: The values selected for the time-clock (a) and (b) must follow logically: $B < C < E < F$</p> <p>NOTE: Outside of the four possible time-clock programmes the system will remain OFF</p> <p> User modifiable parameters</p>	<p>A </p>	Day to set: this shows the day for which the first two time-clock values (a) and (b) are programmed. This value can be any day of the week or a HOLIDAY day
	<p>B </p>	Time-clock start (a): shows the value of the start of the first time-clock
	<p>C </p>	Time-clock stop (a): shows the value of the stop of the first time-clock
	<p>D </p>	Action associated with time-clock (a): shows the action carried out with the first time-clock, which can be: <ul style="list-style-type: none"> • ON: unit enabled with main setpoint • SET2: unit enabled with secondary setpoint • OFF: unit in standby
	<p>E </p>	Time-clock start (b): shows the value of the start of the second time-clock
	<p>F </p>	Time-clock stop (b): shows the value of the stop of the second time-clock
	<p>G </p>	Action associated with time-clock (b): shows the action carried out with the first time-clock, which can be: <ul style="list-style-type: none"> • ON: unit enabled with main setpoint • SET2: unit enabled with secondary setpoint • OFF: unit in standby

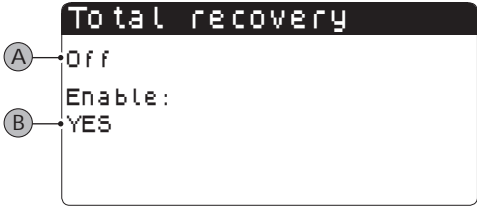


SYSTEM Menu - Time-clock settings (C) and (D)		
Display on the unit	Index	Display/Parameter
<p>WARNING: All the screens for time-clock programming are only visible if activated in the main screen of the System menu (Enabling = TIME-CLOCK)</p> <p>WARNING: The values selected for the time-clock (a) and (b) must follow logically: $B < C < E < F$</p> <p>NOTE: Outside of the four possible time-clock programmes the system will remain OFF</p> <p> User modifiable parameters</p>	<p>A </p>	Day to set: this shows the day for which the last two time-clock values (c) and (d) are programmed. This value can be any day of the week or a HOLIDAY day
	<p>B </p>	Time-clock start (c): shows the value of the start of the third time-clock
	<p>C </p>	Time-clock stop (c): shows the value of the stop of the third time-clock
	<p>D </p>	Action associated with time-clock (c): shows the action carried out with the first time-clock, which can be: <ul style="list-style-type: none"> • ON: unit enabled with main setpoint • SET2: unit enabled with secondary setpoint • OFF: unit in standby
	<p>E </p>	Time-clock start (d): shows the value of the start of the fourth time-clock
	<p>F </p>	Time-clock stop (d): shows the value of the stop of the fourth time-clock
	<p>G </p>	Action associated with time-clock (d): shows the action carried out with the first time-clock, which can be: <ul style="list-style-type: none"> • ON: unit enabled with main setpoint • SET2: unit enabled with secondary setpoint • OFF: unit in standby

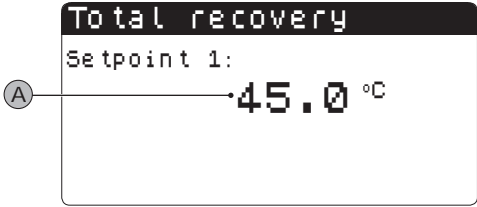


SYSTEM Menu - Copy time-clock settings function		
Display on the unit	Index	Display/Parameter
 <p>Plant Timezone Day THURSDAY Copy to --- No</p> <p>⚠ WARNING: All the screens for time-clock programming are only visible if activated in the main screen of the System menu (Enabling = TIME-CLOCK)</p> <p> User modifiable parameters</p>	<p>(A)  Day to copy from: shows from which day the four time-clock programmes are to be copied</p> <p>(B)  Day to copy to: shows to which day to copy to the selected settings. The time-clock from the reference day can be copied to an individual day of the week, to all remaining days or only for holidays</p> <p>(C)  Make copy: by changing this value to requested copy from the reference day is made for the requested days</p>	

SYSTEM Menu - Setting change-over based on external temperature		
Display on the unit	Index	Display/Parameter
 <p>Cooling/Heating Select Cool/Heat with Outdoor temperature Set ON cooling 23.0°C Set ON heating 18.0°C</p> <p>⚠ WARNING: This screen for automatic control based on external air temperature is only visible if activated in the main screen of the System menu (Selection mode = BY EXT. TEMP.)</p> <p> User modifiable parameters</p>	<p>(A)  Temperature level for cooling: shows the external air temperature value above which cooling mode is automatically activated</p> <p>(B)  Temperature level for heating: shows the external air temperature value below which heating mode is automatically activated</p>	

SYSTEM Menu - Setting change-over based on calendar		
Display on the unit	Index	Display/Parameter
 <p>Cooling/Heating</p> <p>Select Cool/Heat with calendar</p> <p>Start Heating 01/OTT A</p> <p>Finish Heating 01/MAG B</p> <p> WARNING: This screen for automatic control based on calendar is only visible if activated in the main screen of the System menu (Selection mode = BY CALENDAR)</p> <p> User modifiable parameters</p>	<p>A</p> <p></p> <p>B</p> <p></p>	<p>Date to activate heating mode: shows the date after which the change is made from cooling mode to heating mode</p> <p>Date to deactivate heating mode: shows the date after which the change is made from heating mode to cooling mode</p>

RECOVERY Menu *(only for unit with recovery)*

RECOVERY Menu - Activates total recovery		
Display on the unit	Index	Display/Parameter
 <p style="margin-top: 20px;">  User modifiable parameters </p>	<p>(A)</p> <p>(B)</p> 	<p>Status: this value indicates</p> <p>Enabling: this value indicates the password to use to access the installer menu; remember that for access, the default value (0000) must be entered</p>

RECOVERY Menu - Sets the work setpoint for total recovery		
Display on the unit	Index	Display/Parameter
 <p style="margin-top: 20px;">  User modifiable parameters </p>	<p>(A)</p> 	<p>Total recovery setpoint: this value indicates the total recovery work setpoint. The total recovery regulates it with the input probe</p>

Alarm summary table

The unit provides a display of the possible faults, announced by the flashing of the alarm key with the bell symbol located on the left of the display. Pressing the bell key displays the alarm. The reset of the alarm can be automatic, manual or semi-automatic on the basis

of the type and severity of the alarm. To reset the alarm message it is necessary to press the bell key again, but this does not reset the cause of the alarm, but only acknowledges it.

The following table lists the faults that

can be generated by the unit and a brief explanation of the possible cause.

Alarm reset types:



Manual reset:
Unit is reset manually by removing and re-applying power.



















































Automatic reset:
The unit is reset automatically



Semi-automatic reset:
The unit is reset semi-automatically if the alarm is repeated a maximum of three times consecutively, and after a further alarm requires manual reset.

ALARM summary table			
Code	Alarm description	Reset	Note
AL01	Clock battery faulty or not connected		---
AL02	Expansion memory damaged		---
AL03	Phase monitor		---
AL04	---	---	---
AL05	High pressure sensor circuit 1 faulty or not connected		Analogue input U5
AL06	High pressure sensor circuit 2 faulty or not connected		Analogue input U8
AL07	Low pressure sensor circuit 1 faulty or not connected		Analogue input U6
AL08	Low pressure sensor circuit 2 faulty or not connected		Analogue input U9
AL09	Inlet water temp sensor evap.1 faulty or not connected		Analogue input U1
AL10	Outlet water temp sensor evap.1 faulty or not connected		Analogue input U2
AL11	Outlet water temp sensor evap.com. faulty or not connected		---
AL12	Inlet water temp sensor recovery faulty or not connected		---
AL13	Outlet water temp sensor recovery1 faulty or not connected		---
AL14	Outlet water temp sensor recovery2 faulty or not connected		---
AL15	Outlet water temp sensor recovery common faulty or not connected		---
AL16	External temperature sensor faulty or not connected		---




AL17	Liquid temperature sensor circuit 1 faulty or not connected		---
AL18	Liquid temperature sensor circuit 2 faulty or not connected		---
AL23	Circuit breaker compressor 1 circuit 1		---
AL24	Thermal alarm system pump 1		---
AL25	Thermal alarm system pump 2		---
AL26	Thermal alarm heat recovery pump 1		---
AL27	Thermal alarm heat recovery pump 2		---
AL28	Fans circuit breaker circuit 1		---
AL29	Fans circuit breaker circuit 2		---
AL31	Low pressure sensor circuit 1		---
AL32	High pressure pressostat circuit 1		---
AL33	High pressure sensor circuit 1		---
AL34	Circuit 1 low pressure sensor (serious)		---
AL35	Circuit 2 low pressure sensor (serious)		---
AL38	Loss of evaporator water flow		---
AL39	Loss of heat recovery water flow		---
AL40	Anti-freeze alarm system inlet/outlet temperature		---
AL41	Anti-freeze alarm system common outlet temperature		---
AL42	Anti-freeze alarm heat recovery 1 inlet/outlet temperature		---
AL43	Anti-freeze alarm heat recovery 2 outlet temperature		---
AL44	Anti-freeze alarm heat recovery common outlet temperature		---
AL45	Expansion IO (uPC) Off-line		---
AL45	Expansion IO (pCOe) Off-line		---
AL48	Discharge gas temperature sensor circuit 1 faulty or not connected		---
AL49	Discharge gas temperature sensor circuit 2 faulty or not connected		---
AL50	Board re-start from lost power		Not an alarm
AL59	Circuit breaker compressor 2 circuit 1		---
AL60	Circuit breaker compressor 3 circuit 1		---
AL61	Circuit breaker compressor 1 circuit 2		---
AL62	Circuit breaker compressor 2 circuit 2		---
AL63	Circuit breaker compressor 3 circuit 2		---
AL65	Low pressure sensor circuit 2		---


AL66	High pressure pressostat circuit 2		---
AL67	High pressure sensor circuit 2		---
AL75	High discharge gas temperature circuit 1		---
AL76	High discharge gas temperature circuit 2		---
AL84	High heat recovery inlet temperature alarm		---
AL85	High system inlet temperature alarm		---
AL87	Master Offline		---
AL88	Slave Offline		---
AL89	Incorrect Master/Slave software version. (the two cards do not have the same software version)		---
AL90	Freecooling efficiency alarm		---
AL91	Slave alarm summary		---
AL92	Glycol Free flow switch		---
AL93	Glycol Free pump thermal		---
AL94	pCOE expansion offline (address=3) DK Unit		---
AL95	Common evaporator output probe broken or not connected		---
AL96	Evaporator output probe 2 broken or not connected		---
AL97	Freecooling input probe broken or not connected		---
AL98	Freecooling output probe broken or not connected		---
AL99	Glycol intermediate heat exchanger input probe broken or not connected		---

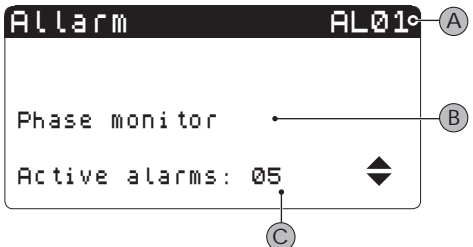
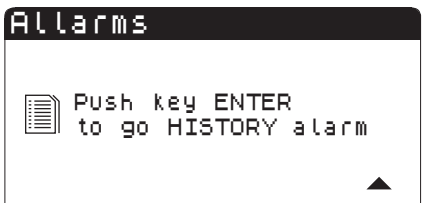
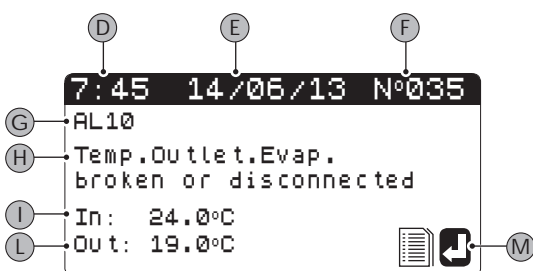
Alarm history

Each time an alarm is generated it is saved in the "alarm history" memory. This memory contains the last 100 alarms recorded. For each alarm saved the inlet and outlet water temperatures are also recorded, so that the service personnel can have a clear picture of the unit at the time the alarm occurred.

To access the alarm history:

- (a) Press the key  and enter the alarm display.
- (b) If any are present, go through the active alarms with the key  and reach the icon that gives access to the alarm history.
- (3) Press the key  to enter the alarm history.

- (4) To exit the alarm history press the key  or the key .

Alarm history and memory			
Display on the unit	Index	Display/Parameter	
  	(A)	Code of active alarm: shows the code for the active alarm currently displayed	
	(B)	Description of active alarm: shows the description of the active alarm currently displayed	
	(C)	Total number of active alarms: shows the total number of active alarms. Active alarms are announced by a red light on the bell labelled key	
	(D)	Alarm history - Alarm time: shows the time of the alarm occurring	
	(E)	Alarm history - Alarm date: shows the date of the alarm occurring	
	(F)	Alarm history - Alarm index: shows the index of alarm (maximum 100) in the alarm history	
	(G)	Alarm history - Alarm code: shows the identifying code of the alarm	
	(H)	Alarm history - Alarm description: shows the description of the alarm	
	(I)	Alarm history - Temperature IN: shows the water inlet temperature at the time the alarm occurred	
	(L)	Alarm history - Temperature OUT: shows the outlet water temperature at the time the alarm occurred	
	(M)	Alarm history - Refrigerant circuit pressure info: pressing the enter key during the display of the alarm history the water temperature data is replaced by the high (HP) and low (LP) pressure values measured on the refrigerant circuit at the time the alarm occurred	
			Note: further pressing of the enter key alternates between the water temperatures and the circuit refrigerant pressures



THE ALARM HISTORY CANNOT BE CANCELLED and having a limit of 100 alarm histories, any additional new alarms after the index value 99 will incrementally start with the index value 00 and overwrite the old data.