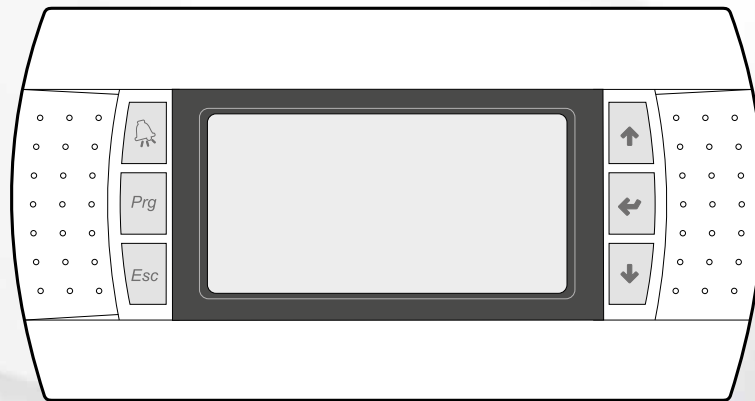# NRG-Small

User manual

CARD PCO5 - PANEL PGD1

AERMEC

Dear Customer,

Thank you for wanting to learn about a product Aermec. This product is the result of many years of experience and in-depth engineering research, and it is built using top quality materials and advanced technologies.

The manual you are about to read is meant to present the product and help you select the unit that best meets the needs of your system.

However, please note that for a more accurate selection, you can also use the Magellano selection program, available on our website.

Aermec Aermec, always attentive to the continuous changes in the market and its regulations, reserves the right to make all the changes deemed necessary for improving the product, including technical data.

Thank you again.

AERMEC S.p.A.

SAFETY CERTIFICATIONS

$C \in$

This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled disposal of Waste Electrical and Electronic Equipment (WEEE), please return the device using appropriate collection systems, or contact the retailer where the product was purchased. Please contact your local authority for further details. Illegal dumping of the product by the user entails the application of administrative sanctions provided by law.
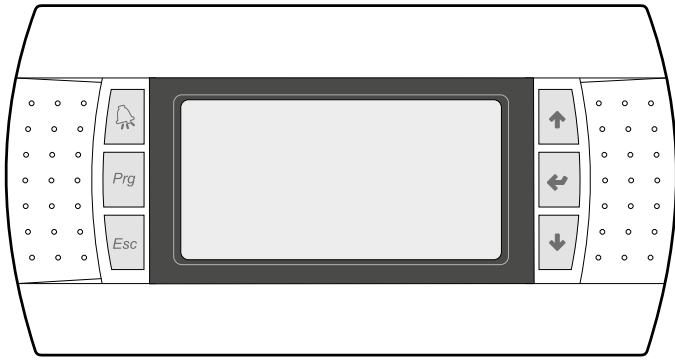
TABLE OF CONTENTS

1   USER INTERFACE (PGD1)

The command panel of the unit allows the rapid setting of the working parameters of the machine, and their visualisation. The card stores all the default settings and any modifications.

The installation of the remote panel PGD1 makes it possible to copy from remote all the functions and settings available on the machine.

After the absence of voltage for any period of time, the unit is able to start up again automatically, maintaining the original settings.

The main user interface is a graphic monitor with six navigation keys; the displays are organised with a menu hierarchy, which is activated by pressing the navigation keys. The default view of these menus is represented by the main menu; you can navigate between the various parameters by using the arrow keys on the right-hand side of the panel; these keys are also used to change the selected parameters.

1.1   START-UP PROCEDURE

After powering the unit, the control card will perform preliminary operations before it is ready to be used; these initial procedures last about 60 seconds before they are complete; two windows are displayed during the initial loading procedures (a start window and one for selecting the system language); these windows are specified below in the table.

NB: the system language can be set in the window shown at start-up, or at any moment by changing the window contained in the installer menu.

Start-up procedure:
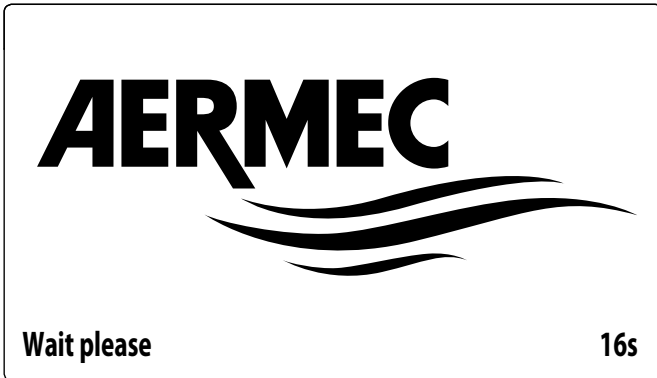
This window indicates the seconds remaining until the software loaded in the unit starts up (switching to the system language selection);
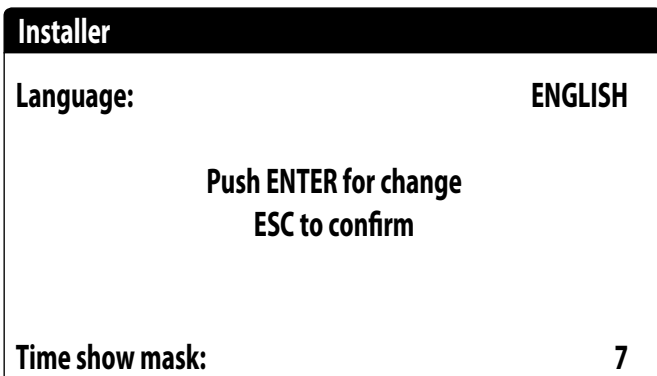
This window makes it possible to select the language with which the system is started;

1.2   FUNCTION OF THE PGD1 CONTROL PANEL KEYS

Function of the PGD1 control panel keys:

🔔 : Displays the list of active alarms and the alarm log

Prg : Pressing this key activates navigation between the menus (orange LED on = winter operating mode active);

Esc : Pressing this key returns to the previous window;

↑ : Pressing this key can have different functions:
— Pressing this key when navigating menus/parameters passes to the next menu/parameter;
— Pressing this key when changing a parameter increases the value of the selected parameter;

↵ : Pressing this key can have different functions:
— Pressing this key when navigating menus enters the selected menu;
— Pressing this key when navigating parameters selects the displayed parameter and enters change mode;
— Pressing this key when changing a parameter confirms the change to the value of the selected parameter;

↓ : Pressing this key can have different functions:
— Pressing this key when navigating menus/parameters passes to the previous menu/parameter;
— Pressing this key when changing a parameter decreases the value of the selected parameter;

1.3   MENU STRUCTURE

All the functions for managing the unit as well as the information about its operation are displayed on the unit control panel; all the functions and information are organised into windows, which are in turn grouped in to menus.

When the unit is operating normally, a main menu is displayed, which is used to select other operating menus.

The menus are displayed via the rotation of the icons that represent them; once the desired icon is selected, the select menu opens, and it is possible to display or change the corresponding parameters. The procedure for navigating the menus, or changing the parameters, is explained in detail in the chapter "Operational utilisation procedures", to which reference is made for more information.

The image shows the relationships between the various menus and the keys used for navigation;

NB: The following pages show all the masks contained in the menus available to the user; Tampering with the parameters in the installer menu could cause the unit to malfunction, therefore it is recommended to have these parameters changed only by personnel assigned to unit installation and configuration;
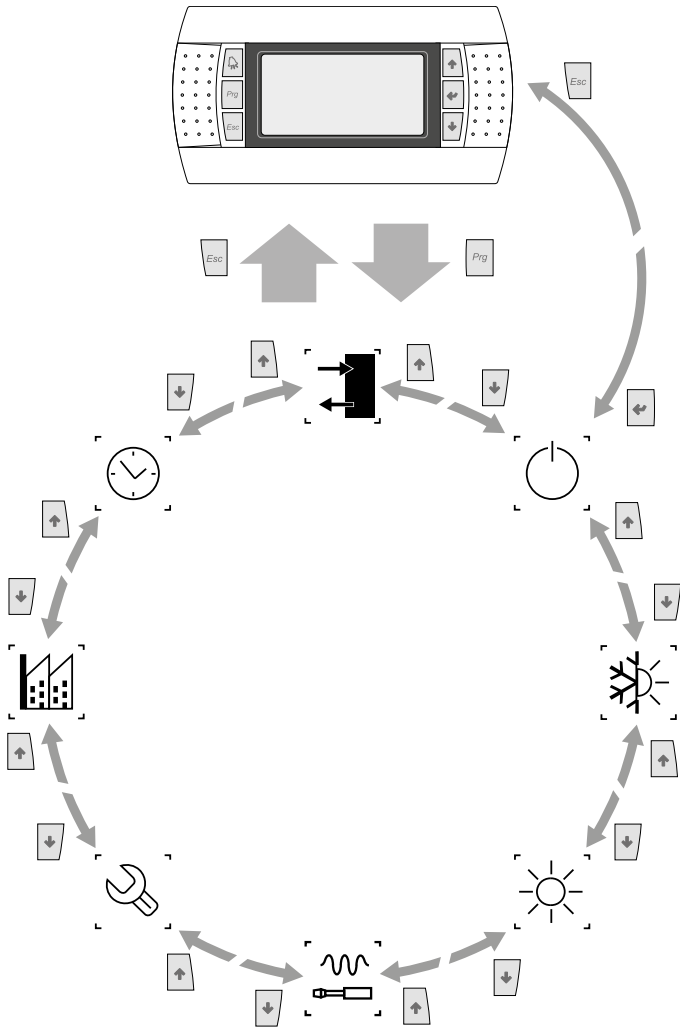
Menu icons:

IN/OUT: This menu contains advanced information about operating the unit;

ON/OFF: This menu is used to activate or deactivate the unit; it also provides state information;

System: This menu is used to set the operating mode, the setpoints for water production and the time bands to be applied to the system;

RECOVERY (if present in the unit):This menu allows to set the parameters related to the recovery management;

INSTALLER: This menu contains settings useful for the installer (Digital input enabling, BMS configuration, adjustments, pumps, etc ...);
NB: this menu is password protected. The value to be set for access is: 0000

ASSISTANCE: This menu is not accessible except by authorized staff;

MANUFACTURER: This menu is not accessible except by authorized staff;

CLOCK: This menu contains the time settings for system management (date and time, calendar);

2 MAIN MENU

2.1 GENERAL MONITOR

This mask is used to display the unit's general status:
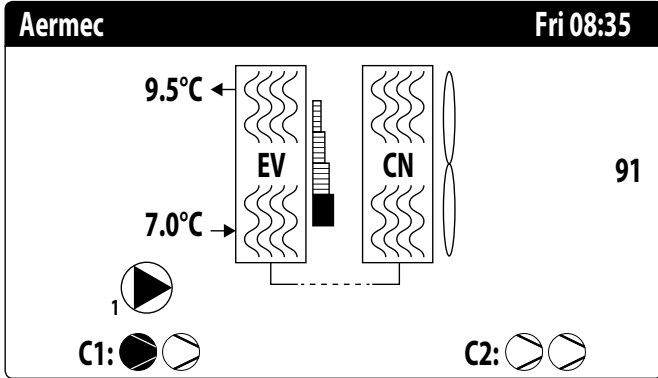
— Current date and time
— Evaporator (EV) output temperature;
— Evaporator (EV) input temperature; when it is just below the value relative to the evaporator input temperature, the icon of the currently active pump will appear (with the relative number);
— Percentage of power (displayed graphically with a bar to the right of the evaporator) requested by the system;
— Fan speed; percentage value displayed to the right of the condenser;
— Status of compressors ON / OFF circuit 1 and circuit 2

NB: some icons can appear at the bottom of this window, indicating certain system states:
— ⋁⋀ : anti-freeze heater activation;
— Ⓛⓣ : Indicates that low output temperature anti-freeze prevention is active (turns off the compressors)
— Ⓛⓒ: indicates that the low charge function is active;
— Ⓕ : Indicates that the flow switch is open. The compressors are turned off and the pumps release the flow switch
— ◗ : indicates that the compressor is on;
— ◒ : indicates that the compressor is off;
— △ : indicates a compressor alarm;
— △ AP : Indicates that high pressure capacity control is active;

2.2 SYSTEM MONITOR

This mask is used to display the system's general status:
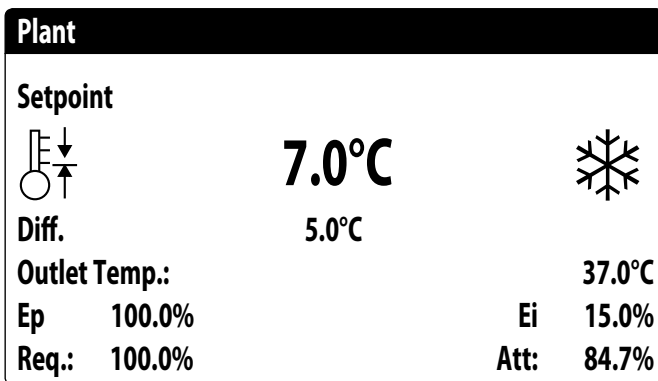
— Current working setpoint;
— Current working differential;
— Temperature probe for machine regulation;
— If a PI function is active, also the proportional factor "Ep" and the integral factor "Ei" will be displayed;
— Requested percentage of power and percentage of power actually active on the system side;

NB: some icons can appear in the window, indicating certain system states:
— ❄ : system chilled water production;
— ❅ : system hot water production;
— 🕒 : time bands active;
— Ⓜ : multifunction input;

2.3 CIRCUIT MONITORS

This mask is used to display the cooling circuit's general status; if the unit has multiple circuits, each will have a dedicated window:
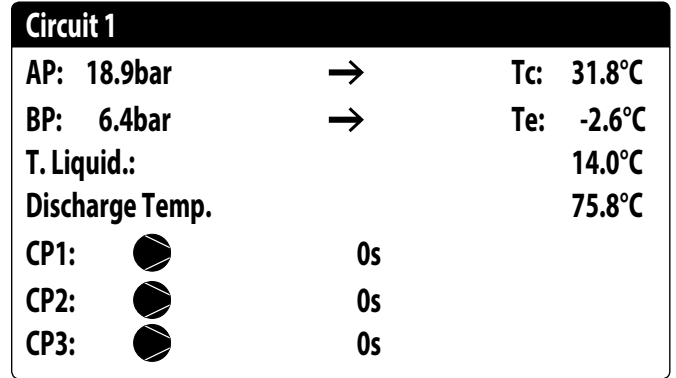
— AP: high pressure
— BP: low pressure
— Tc: condensation temperature
— Te: evaporating temperature
— T.Liquid: liquid temperature
— T.discharge gas: inverter compressor discharge gas temperature
— T.discharge gas 2: ON/OFF compressor discharge gas temperature
The status of the compressors can be:
— ◒ : indicates that the compressor is off, the (remaining) time to satisfy the minimum OFF time is indicated to the side;
— ◗ : indicates that the compressor is on, the (remaining) time to satisfy the minimum ON time is indicated to the side;

NB: if the card is restarted, there will be a 60 second wait to guarantee the minimum shut-off time necessary for the inverter compressor driver.

2.4 POWER DEMAND MONITOR

This mask is used to display the data related to the power demand on the indicated circuit; if the unit has multiple circuits, each will have a dedicated window:
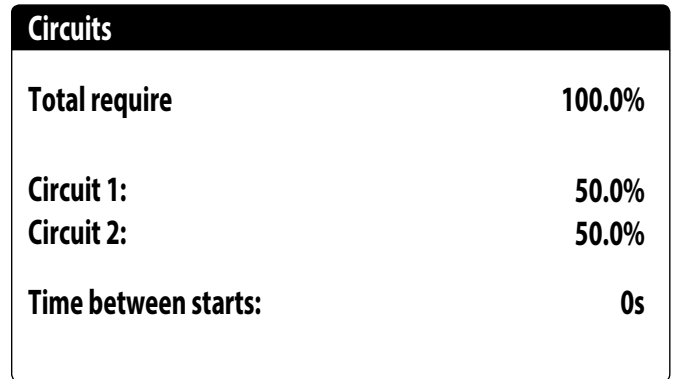
— Total thermostat request;
— Power delivered by circuit 1;
— Time between starts between two compressors.

2.5 MASTER UNIT MONITOR

NB: this mask is only available on the Master unit, if the system has a Master/Slave configuration with multiple units.
This mask is used to display the data related to the system's total power demand and the relative power percentages divided among the units connected to the system:

Master	
Common Outlet:	---°C
Total require	100.0%
Circuit 1:	100.0%
Circuit 2:	100.0%

— Common output (optional): probe water temperature on the common output of the two master and slave unit outputs;
— Demand: power calculated by the Master unit thermostat that will be distributed between the two units;
— Unit 1: percentage power requested of the Master unit;
— Unit 2: percentage power requested of the Slave unit;

2.6 FREE COOLING MONITOR

WARNING: this mask is available on free cooling units.
This mask is used to display the status of the free cooling circuit:

Freecooling	
Power FC:	0/092%
FC	15.0°C
Tot: 38%	
14.2°C	10.0°C
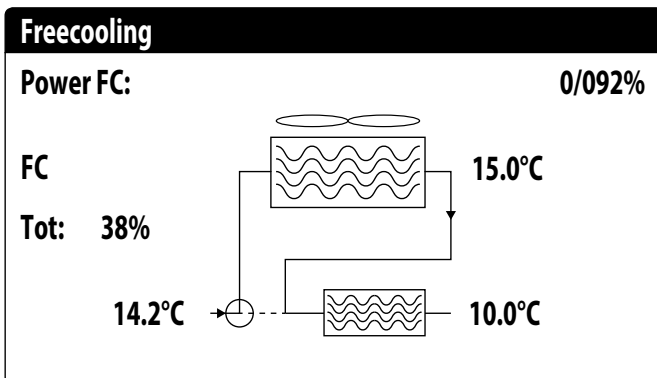
— Activation of the 3-way valve with the display of moving arrows for pump status and water circulation;
— Power delivered by the free cooling based on that available;
— Operating status;
— Tot: total power as a percentage delivered by the unit. If only free cooling, corresponds to the total power delivered by free cooling, if mixed operation the total power is the sum of the power delivered by free cooling and the compressors;
— Display of the values of the free cooling input (lower left), evaporator input (if FC on, upper right) and evaporator output (lower right) probes;
Possible operating status:
— OFF (unit off);
— FC (unit only operating in free cooling);
— FC+CP (unit in mixed operation);
— CP (unit operating with compressors only);

2.7 GLYCOL FREE MONITOR

WARNING: this mask is available on glycolfree units.
This mask is used to display the status of the glycolfree circuit:

Glycol Free	
Power FC:	41/094%
Total:	41%
14.7°C	14.1°C
FC	
14.2°C	15.0°C
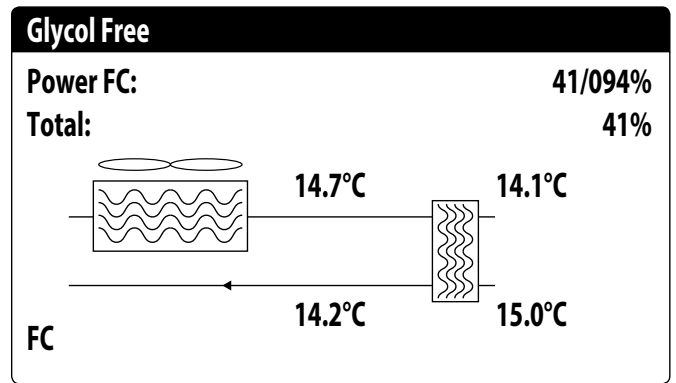
— Activation of the branch containing glycol with the display of moving arrows for pump status and water circulation;
— Power delivered by the free cooling based on that available;
— Tot: total power as a percentage delivered by the unit. If only free cooling, corresponds to the total power delivered by free cooling, if mixed operation the total power is the sum of the power delivered by free cooling and the compressors;
— Display of the values of the free cooling output (upper left), free cooling input (lower left), intermediate evaporator (upper right) and evaporator input (lower right) probes;
— Operating status;
Possible operating status:
— OFF (unit off);
— FC (unit only operating in free cooling);
— FC+CP (unit in mixed operation);
— CP (unit operating with compressors only);

2.8 DK UNIT MONITOR

WARNING: this screen is available on units with two separate circuits on the gas side. (DK)
This screen allows you to view the common temperature of the water leaving the two evaporators:

DK Unit	
Comm.Out.Evap.:	10.0 °C
Evap. Out 1:	6.2 °C
Evap. Out 2:	15.0 °C

— Evap.out 1: Outlet water temperature evaporator 1
— Evap.out 2: Outlet water temperature evaporator 2

2.9 TOTAL RECOVERY MONITOR

WARNING: this mask is available on units with total recovery.
This mask is used to display the status of the total recovery:

Total Recovery	
Inlet water:	15.1°C
Out Total Rec.:	15.1°C
Off unit	
Total require:	0%

— Display of the water temperature value of the total recovery input probe;
— Display of the water temperature value of the total recovery output probe;
Total recovery status:
— 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);
— general off (the whole unit is in stand-by), off from the display (general disabling of the unit from the pGD1 button);

2.10 PEC PRESSURE CONTROL MONITOR

This mask is used to display the result of the control on the machine pressure delta, controlled by the PEC card:

Circuit 1
PEC
Pressure delta control
in progress...

If the result of the pressure delta control is greater than 15 bar (and the 4-way must switch), the valves must be controlled without the activation of the compressors to reduce the pressure delta; Alarms (warnings) are not generated in this situation).
If the control is less than 3 bar (hot/cold operation or a 4-way must switch), the compressors are started without the valve control in order to create the pressure delta; after 300s in this situation an alarm is generated with a machine block.

3   INPUT/OUTPUT MENU

3.1   FAN MONITOR

This window summarises the status of the fans and the utilised setpoints:if the unit has multiple circuits, each will have a dedicated window:

```
Fan                              ⬭⬭
Speed                          ▨▨
        100%

Set:                         0.0bar
Diff:                        0.0bar

1:Max Speed                  0.0bar
```
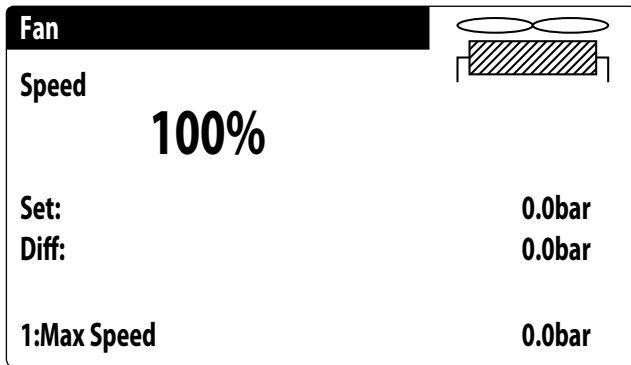
— Speed: this value indicates the current speed (as a percentage) at which the concerned fans are operating (common, circuit 1 or circuit 2);
— Set: Fan setpoint: this value indicates the current ventilation setpoint;
— Diff: Ventilation setpoint differential: this value indicates the current differential applied to the ventilation setpoint;
The state of the fans (displayed on the row at the bottom of the window), can be:
— OFF: fans off;
— PREVENTILATION: fans ON before the compressors;
— high pressure: control based on high pressure;
— POSTVENTILATION: ventilation after compressor OFF;
— ANTI-FREEZE: ventilation phase to prevent the accumulation of snow or the formation of ice;
— DEFROSTING: defrosting phase in progress;
— Equalisation: control based on low temperature;
— MAXIMUM SPEED: fans at maximum speed;
— SILENCED: speed reduced to reduce noise

3.2   OUTSIDE TEMPERATURE MONITOR

This window indicates the value of the outside temperature detected by the unit:

```
Outdoor temp.

          15.0°C

Today      15.0°C     15.0°C
Yester.    15.0°C     15.0°C
```
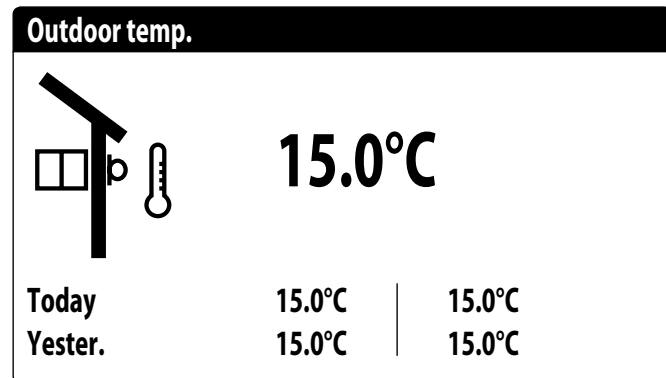
3.3   DEFROSTING MONITOR

This window contains the information concerning the status of defrosting on the unit:if the unit has multiple circuits, each will have a dedicated window:

```
Defrost

Disabled
High ext. temperature

Times:                          0s
Liquid T.:                   25.1°C
Next defrost:                   0m
```
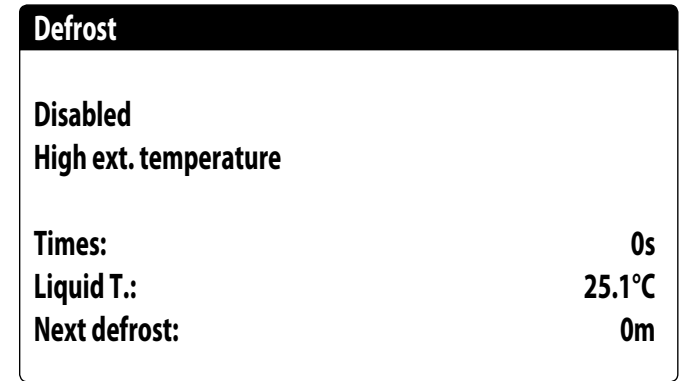
The state of defrosting is divided between two rows, the first can have the following states:
— Disabled: defrosting is disabled;
— Wait for cycle inversion: pause before inversion of the cycle valve;
— Defrosting start: defrosting during the start phase;
— Defrosting in progress: defrosting phase;
— End of defrosting: conclusion of defrosting;
— First defrost: shows the first defrost phase after a power loss;
The second row can have the following states:
— High outside temperature: the air temperature is above the defrosting enabling threshold;
— Circuit off: all the compressors of the circuit are off; defrost is disabled;
— LP above the limit threshold: the low pressure is above the limit threshold to trigger defrosting;
— Min times between defrosting procedures: the defrosting is disabled to respect the minimum time between defrosting procedures;
— Start CP: compressor just started, wait for defrosting bypass time;
— 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 the defrosting due to exceeding the low pressure limit threshold;
— Start for Delta P: start of defrost to overcome the decreasing value of low pressure;
— Liquid Temp OK: the temperature of the liquid exceeded the threshold for determining the end of defrosting;
— Min defrosting times: defrosting continues until exceeding the minimum defrosting time even if the output conditions were already reached;
— Waiting for another circuit: it is the phase in which the circuit that ends the defrost first turns off waiting for the other circuit to end (in the case of a Bicircuit);
— 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:the liquid temperature below the threshold determines the end of the defrost;
— Start for TGP: defrosting was activated due to exceeding the temperature threshold of the discharge gas;
— Forced: defrosting was forced by the user;
The following data is available in the lower part of the window:
— Times: displays the seconds related to the defrosting times;
— T.Liquid: temperature of the liquid to determine the defrosting output;
— Next defrosting: displays the minutes until the next defrosting;

3.4 MULTIFUNCTION INPUT MONITOR

This window contains the information concerning the state of the multifunction input:

```
┌────────────────────────────────────────┐
│ Plant                                   │
│ Input Multifunction                     │
│ (ID18):  ACTIVE                         │
│                                         │
│                                         │
│                                         │
│ Variable SetPoint                       │
│ pCO5 U10=                      45.0°C   │
└────────────────────────────────────────┘
```

Digital Input ID18: this value indicates the state of the digital input connected to multifunction input (U10) enabling, whose states can be:
— OPEN: multifunction input (U10) NOT ENABLED;
— CLOSED: multifunction input (U10) ENABLED;
The functions currently selected for the multifunction input U10 are displayed at the bottom of the window; to set that function, refer to the dedicated paragraph in the installer menu;

3.5 I/O MONITOR

The status of the available inputs and outputs will be shown on the display, divided into successive pages;the following paragraphs will contain the tables with the various analogue and digital inputs and outputs (in the order in which they will be listed on the display of the unit) available on the software;
The order in which the masks will be available will be as follows:
— Analogue inputs;
— Digital inputs;
— Digital outputs;
— Analogue outputs;
— Analogue inputs (PEC);
— Digital output (PEC);
— Analogue Inputs (EVD);
— Analogue Inputs (pCOE - free cooling models)
— Digital Inputs (pCOE - free cooling models)
— Digital outputs (pCOE - free cooling models)
— Analogue Inputs (pCOE - glycolfree models)
— Digital Inputs (pCOE - glycolfree models)
— Digital outputs (pCOE - glycolfree models)
— Analogue Inputs (pCOE - models with total recovery)
— Digital Inputs (pCOE - models with total recovery)
— Digital outputs (pCOE - models with total recovery)
— Analogue Inputs (pCOE - DK);
— Analogue Inputs (pCOE - Variable flow rate / Supplementary heater);
— Digital outputs (pCOE - Variable flow rate / Supplementary heater);
— Digital Inputs (pCOE - Variable flow rate / Supplementary heater);
— Analogue Inputs (pCOE - NRG Large);
— Digital inputs (pCOE - NRG Large);
— Digital outputs (pCOE - NRG Large);

■ *NB: the displays may or may not be present (or change) depending on the model of the unit;*

3.6 ANALOGUE INPUTS

Analogue input	Code	Description	Note
U1	SIW	evaporator water inlet probe	---
U2	SUW	evaporator water outlet probe	---
U3	SAE	External air sensor	Cold Single circuit/Dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Single circuit/Dual circuit
	Fan Series	Fan Alarm Contacts Series	Heat pump Single circuit/Dual circuit
U4	SGP1A	Compressor 1 Circuit 1 discharge gas probe	Cold Single circuit/Dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Single circuit/Dual circuit
	---		Heat pump Single circuit/Dual circuit
U5	TAP1	High pressure, Circuit 1 transducer	Cold Single circuit/Dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Single circuit/Dual circuit
	---		Heat pump Single circuit/Dual circuit
U6	SGP1B	Compressor 2 Circuit 1 discharge gas probe	Cold Single circuit/Dual circuit
			Free cooling/Glycolfree Dual circuit
			Recovery Single circuit/Dual circuit
	---		Free cooling/Glycolfree Single circuit
			Heat pump Single circuit/Dual circuit
U7	SL	Liquid probe	Cold Single circuit,
			Recovery Single circuit
	SGP2A	Compressor 1 Circuit 2 discharge gas probe	Cold dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Dual circuit
	---		Heat pump Single circuit/Dual circuit
U8	TAP2	High pressure, Circuit 2 transducer	Cold dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Dual circuit
	SL1B1	Circuit 1 Coil Liquid Probe	Heat pump single circuit
	---		Cold Single circuit
			Recovery Single circuit
			Heat pump dual circuit
U9	SGP2B	Compressor 2 Circuit 2 discharge gas probe	Cooling only dual circuit
			Free cooling/Glycolfree Dual circuit
			Recovery Dual circuit
	SL1B2	Circuit 2 Coil Liquid Probe	Heat pump single circuit
	---		Cold Single circuit
			Free cooling/Glycolfree Single circuit
			Recovery Single circuit
			Heat pump dual circuit
U10	MULTI IN	Multi-function input	
	Common outlet probe	Common output with Master/Slave	

3.7 DIGITAL INPUTS

Digital Input	Code	Description	Note
ID1	FL	Flow switch	---
ID2	AP1	Circuit 1 high pressure pressure switch / Circ.1 discharge gas thermostat	---
ID3	QMF1	Thermomagnetic fan switch	---
ID4	RCS	Phase monitor	---
ID5	QM11	Compressor 1 circuit 1 thermomagnetic switch	---
ID6	QM21	Compressor 2 circuit 1 thermomagnetic switch	Cooling only Single circuit/Dual circuit
			Free cooling/Glycolfree Dual circuit
			Recovery Single circuit/Dual circuit
			Heat pump Single circuit/Dual circuit
	---	---	Free cooling/Glycolfree Single circuit
ID7	BP1	Circuit 1 low pressure pressure switch	---
ID8	AP2	Circuit 2 high pressure pressure switch / Circ.2 discharge gas thermostat	Cooling only dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Dual circuit
			Heat pump dual circuit
	---	---	Cooling only Single circuit
			Recovery Single circuit
			Heat pump single circuit
ID9	LD1	Leak detector	---
ID10	2° SET	Second setpoint	---
ID11	QM12	Compressor 1 circuit 2 thermomagnetic switch	Cooling only dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Dual circuit
			Heat pump dual circuit
	---	---	Cooling only Single circuit
			Recovery Single circuit
			Heat pump single circuit
ID12	QM22	Compressor 2 circuit 2 thermomagnetic switch	Cooling only dual circuit
			Free cooling/Glycolfree Dual circuit
			Recovery Dual circuit
			Heat pump dual circuit
	---	---	Cooling only Single circuit
			Free cooling/Glycolfree Single circuit
			Recovery Single circuit
			Heat pump single circuit
ID13	BP2	Circuit 2 low pressure pressure switch	Cooling only dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Dual circuit
			Heat pump dual circuit
	---	---	Cooling only Single circuit
			Recovery Single circuit
			Heat pump single circuit
ID14	QMT1	Pump 1 thermomagnetic switch	---
ID15	QMT2	Pump 2 thermomagnetic switch	---
ID16	TV	Fans thermal switch series	In NRG Large it will refer to Circuit 1 (TV1)
ID17	0/1	Remote ON/OFF contact (closed = ON)	---
ID18	EMF	Multifunction input enabling	---

The possible status for each digital input or output can be:
— OPEN: load not active;
— CLOSED: load active;

3.8 DIGITAL OUTPUTS

DIGITAL outputs	Code	Description	Note
NO1	MPE1	Pump 1 evaporator	---
NO2	CP1A	Compressor 1 Circuit 1	Cooling only Single circuit/Dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Single circuit/Dual circuit
	---	---	Heat pump Single circuit/Dual circuit
NO3	CP1B	Compressor 2 Circuit 1	Cooling only Single circuit/Dual circuit
			Free cooling/Glycolfree Dual circuit
			Recovery Single circuit/Dual circuit
	---	---	Free cooling/Glycolfree Single circuit
			HEAT PUMP
NO4	CP1C	Compressor 3 Circuit 1	NRG Large Cool Only / Total Recovery
	---		NRG Small
NO5	VR1C1	Circ.1 Rec. bleed-off	NRG Large Total Recovery
	---		NRG Small and Large
NO6	VB1C1	Circ.1 Cond. bleed-off	NRG Large Total Recovery
	---		NRG Small and Large
NO7	MV1	Ventilation group	(For NRG Large it concerns Circuit 1)
NO8	AE	Alarm summary	---
NO9	CP2A	Compressor 1 Circuit 2	Cooling only dual circuit
			Only Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Dual circuit
	---	---	Cold Single circuit
			Recovery Single circuit
	RS1	Resistance 1 Coil	NRG-Small Heat pump
NO10	CP2B	Compressor 2 Circuit 2	Cooling only dual circuit
			Free cooling/Glycolfree Dual circuit
			Recovery Dual circuit
	---	---	Cold Single circuit
			Free cooling/Glycolfree Single circuit
			Recovery Single circuit
	RS2	Resistance 2 Coil	NRG-Small Heat pump
NO11	CP2C	Compressor 3 Circuit 2	NRG Large Cooling only/Recovery
	CPOR	Recovery external pump	Recovery Single circuit/Dual circuit
	---	---	Cold Single circuit/Dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			HEAT PUMP
NO12	VRT1	Recovery 3-way valve	Recovery Single circuit/Dual circuit
	---	---	Cold Single circuit/Dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			HEAT PUMP
NO13	MVP	Periodic ventilation	NRG Large
	VR1C1	Circ.1 Rec. bleed-off	Recovery Single circuit/Dual circuit
	---	---	Cold Single circuit/Dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			HEAT PUMP
NO14	VB1C1	Circ.1 Cond. bleed-off	Recovery Single circuit/Dual circuit
	CPOR	Recovery external pump	NRG Large Recovery
	---	---	Cold Single circuit/Dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			HEAT PUMP
NO15	VSL1A	Oil bleed-off valve from Circuit 1 Recovery	Recovery Single circuit/Dual circuit
	VRT1	Recovery 3-way valve	NRG Large Recovery
	---	---	Cold Single circuit/Dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			HEAT PUMP
NO16	RRT	Rec. heat exchanger heater	Recovery Single circuit/Dual circuit
	---	---	Cold Single circuit/Dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
	ALF	Flow switch alarm	HEAT PUMP
NO17	RE	Heater exchanger	---
NO18	MPE2	Pump 2 evaporator	---

The possible status for each digital input or output can be:
— OPEN: load not active;
— CLOSED: load active;

3.9 ANALOGUE OUTPUTS

ANALOGUE outputs	Code	Description	Note
Y1	FAN1	Modulating fans unit 1	---
Y2	FAN2	Modulating fans unit 2	NRG Large
Y3	FAN3	Modulating fans unit 3	NRG Large
Y4	---	---	---
Y5	---	---	---
Y6	RB	Tray heater	Cold Single circuit
			Free cooling/Glycolfree Single circuit
			Recovery Single circuit
			Heat pump single circuit

3.10 ANALOGUE INPUTS (PEC)

Analogue Input (PEC)	Code	Description	Note
P1	TBP1	Low pressure transducer (circuit 1)	Sanhua 4÷20mA
			Single circuit/Dual circuit
P2	TAP1	High pressure transducer (circuit 1)	Sanhua 4÷20mA
			Single circuit/Dual circuit
T1	---	---	---
T2	SGA1	Intake temperature probe (circuit 1)	Shibaura NTC 10K L=3m
			Single circuit/Dual circuit
T3	SAE	External air sensor	Shibaura NTC 10K L=3m
			Single circuit/Dual circuit
T4	SL1	Liquid temperature probe (circuit 1)	Shibaura NTC 10K L=3m
			Single circuit/Dual circuit
T5	SGP1A	Compressor 1 Circuit 1 discharge gas probe	Shibaura NTC 10K L=4m
			Single circuit/Dual circuit
T6	SGP1B	Compressor 2 Circuit 1 discharge gas probe	Shibaura NTC 10K L=4m
			DOUBLE CIRCUIT
T7	SGP1C	Compressor 3 Circuit 1 discharge gas probe (NRG Large)	Shibaura NTC 10K L=4m
P3	TBP2	Circuit 2 Low pressure transducer	Sanhua 4÷20mA
			DOUBLE CIRCUIT
P4	TAP2	High pressure, Circuit 2 transducer	Sanhua 4÷20mA
			DOUBLE CIRCUIT
T9	SGA2	Circuit 2 Intake temperature probe	Shibaura NTC 10K L=3m
			DOUBLE CIRCUIT
T10	SL1	Circuit 2 Liquid temperature probe	Shibaura NTC 10K L=3m
			DOUBLE CIRCUIT
T11	SGP2A	Compressor 1 Circuit 2 discharge gas probe	Shibaura NTC 10K L=4m
			DOUBLE CIRCUIT
T12	SGP2B	Compressor 2 Circuit 2 discharge gas probe	Shibaura NTC 10K L=4m
			DOUBLE CIRCUIT
T13	SGP2C	Compressor 3 Circuit 2 discharge gas probe (NRG Large)	Shibaura NTC 10K L=4m

3.11 DIGITAL OUTPUT (PEC)

Digital output (PEC)	Code	Description	Note
N01	VIC1	Circuit 1 reverse cycle valve	Single circuit/Dual circuit
N02	CP1A	Compressor 1 Circuit 1	Single circuit/Dual circuit
N03	CP1B	Compressor 2 Circuit 1	Single circuit/Dual circuit
N04	CP1C	Compressor 3 Circuit 1	NRG Large
N05	VIC2	Circuit 2 reverse cycle valve	DOUBLE CIRCUIT
N06	CP2A	Compressor 1 Circuit 2	DOUBLE CIRCUIT
N07	CP2B	Compressor 2 Circuit 2	DOUBLE CIRCUIT
N08	CP2C	Compressor 3 Circuit 2	NRG Large

The possible status for each digital input or output can be:
— OPEN: load not active;
— CLOSED: load active;

3.12 ANALOGUE INPUTS (EVD)

Analogue Inputs (EVD)	Code	Description	Note
S1	TBP1	Circuit 1 Low pressure transducer	Cold single circuit/dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Single circuit/Dual circuit
S2	SGA1	Circ. 1 intake temperature probe	Cold single circuit/dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Single circuit/Dual circuit
S3	TBP2	Circuit 2 Low pressure transducer	Cold dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Dual circuit
S4	SGA2	Circ. 2 intake temperature probe	Cold dual circuit
			Free cooling/Glycolfree Single circuit/Dual circuit
			Recovery Dual circuit

3.13 ANALOGUE INPUTS (PCOE FREE COOLING MODELS)

Analogue Inputs (pCOE)	Code	Description	Note
B1	SFC	Free cooling inlet probe	Single circuit/Dual circuit
B2	---	---	---
B3	---	---	---
B4	---	---	---

3.14 DIGITAL OUTPUTS (PCOE FREE COOLING MODELS)

Digital outputs (pCOE)	Code	Description	Note
N01	V3V	Free cooling 3-way valve	Single circuit/Dual circuit
N02	---	---	---
N03	---	---	---
N04	---	---	---

The possible status for each digital input or output can be:
— OPEN: load not active;
— CLOSED: load active;

3.15 ANALOGUE INPUTS (PCOE - GLYCOLFREE MODELS)

Analogue Inputs (pCOE)	Code	Description	Note
B1	SFC	Free cooling inlet probe	---
B2	SFC2	Free cooling outlet probe	---
B3	SRU	Intermediate evaporator probe	---
B4	---	---	---

3.16 DIGITAL INPUTS (PCOE - GLYCOLFREE MODELS)

Digital inputs (pCOE)	Code	Description	Note
ID1	RS2	Flow switch Glycol Free side	---
ID2	MTP	Glycol Free pump thermal	---
ID3	---	---	---
ID4	---	---	---

The possible status for each digital input or output can be:
— OPEN: load not active;
— CLOSED: load active;

3.17 DIGITAL OUTPUTS (PCOE - GLYCOLFREE MODELS)

Digital outputs (pCOE)	Code	Description	Note
N01	MPC	Glycol Free Side pump	---
N02	RS2	Glycol Free Side Heater	---
N03	---	---	---
N04	---	---	---

The possible status for each digital input or output can be:
— OPEN: load not active;
— CLOSED: load active;

3.18 ANALOGUE INPUTS (PCOE MODELS WITH TOTAL RECOVERY)

Analogue Inputs (pCOE)	Code	Description	Note
B1	SIR	Recovery inlet probe	---
B2	SUR	Recovery outlet probe	In NRG Large it will refer to Circuit 1
B3	SUR2	Recovery Outlet Probe Circuit 2	NRG Large
B4	---	---	---

3.19 DIGITAL INPUTS (PCOE MODELS WITH TOTAL RECOVERY)

Digital inputs (pCOE)	Code	Description	Note
NO1	FLR	Recovery flow switch	---
NO2	TPR	Recovery external pump thermal switch	---
NO3	---	---	---
NO4	---	---	---

The possible status for each digital input or output can be:
— OPEN: load not active;
— CLOSED: load active;

3.20 DIGITAL OUTPUTS (PCOE MODELS WITH TOTAL RECOVERY)

Digital inputs (pCOE)	Code	Description	Note
NO1	VR1C2	Circ.2 Rec. bleed-off	Recovery Dual circuit
	---		Recovery Single circuit
NO2	VB1C2	Circ.2 Cond. bleed-off	Recovery Dual circuit
	---		Recovery Single circuit
NO3	VRT2	Recovery 3-way valve Circuit 2	Recovery Dual circuit
	---		Recovery Single circuit
NO4	VSL2A	Oil bleed-off valve from Circuit 2 Recovery	Recovery Dual circuit
	---		Recovery Single circuit

The possible status for each digital input or output can be:
— OPEN: load not active;
— CLOSED: load active;

3.21 ANALOGUE INPUTS (PCOE - DK)

Analogue inputs	Code	Description	Note
B1	SUW2	Probe Water outlet temperature according to evap.	Single circuit/Dual circuit
B2	SUC	Probe water outlet common evap.	Single circuit/Dual circuit
B3	---		
B4	---		

3.22 ANALOGUE INPUTS (PCOE - VARIABLE FLOW RATE / SUPPLEMENTARY HEATER)

Analogue inputs	Code	Description	Note
B1	VPF	Differential Transducer	Only for Variable Flow Rate
B2	---	---	
B3	SAC	Storage Tank Probe	Only for Supplementary Heater
B4	---	---	

3.23 DIGITAL OUTPUTS (PCOE - VARIABLE FLOW RATE / SUPPLEMENTARY HEATER);

DIGITAL outputs	Code	Description	Note
NO1	Rest.1	Integral Resistance 1 / Boiler in Replacement	Only for Supplementary Heater
NO2	Rest.2/3	Integr.resist. 2 / Integr.resist. 3	Only for Supplementary Heater
NO3	---		
NO4	---		

The possible status for each digital input or output can be:
— OPEN: load not active;
— CLOSED: load active;

3.24 DIGITAL INPUTS (PCOE - VARIABLE FLOW RATE / SUPPLEMENTARY HEATER);

Digital inputs	Code	Description	Note
Y1	VPF3V	3 Way Valve	Only for Variable Flow Rate

The possible status for each digital input or output can be:
— OPEN: load not active;
— CLOSED: load active;

3.25 ANALOGUE INPUTS (PCOE - NRG LARGE);

Analogue inputs	Code	Description	Note
B1	SL1	Circuit 1 Liquid Probe	NRG Large Cooling only
		----	NRG Large Heat pump
B2	SL2	Circuit 2 Liquid Probe	NRG Large Cooling only
		----	NRG Large Heat pump
B3	SGP1C	Compressor 3 Circuit 1 discharge gas probe	NRG Large Cooling only
		----	NRG Large Heat pump
B4	SGP2C	Compressor 3 Circuit 2 discharge gas probe	NRG Large Cooling only
		----	NRG Large Heat pump

3.26 DIGITAL INPUTS (PCOE - NRG LARGE);

Digital inputs	Code	Description	Note
ID1	QMF2	Circuit 2 Thermomagnetic fan switch	NRG Large
ID2	TV2	Circuit 2 fan thermal series	NRG Large
ID3	QM31	Compressor 3 circuit 1 thermomagnetic switch	NRG Large
ID4	QM32	Compressor 3 circuit 2 thermomagnetic switch	NRG Large

The possible status for each digital input or output can be:
— OPEN: load not active;
— CLOSED: load active;

3.27 DIGITAL OUTPUTS (PCOE - NRG LARGE);

DIGITAL outputs	Code	Description	Note
NO1	VIC1	Cycle Reversing valve Circ. 1	NRG Large Recovery
	----	----	NRG Large Cooling only/Heat pump
NO2	VIC2	Cycle Reversing valve Circ. 2	NRG Large Recovery
	----	----	NRG Large Cooling only/Heat pump
NO3	---	----	
NO4	--	----	

The possible status for each digital input or output can be:
— OPEN: load not active;
— CLOSED: load active;

4   ON/OFF MENU

4.1   GENERAL ON/OFF

This window makes it possible to view the general state of the system as well as to turn the unit on or off:

```
┌─────────────────────────────────────┐
│ On/Off Unit                          │
│                                      │
│ Plant                                │
│                                      │
│ Off General                          │
│                                      │
│ General enable:                      │
│                          NO          │
│                                      │
└─────────────────────────────────────┘
```

Display of the general system state:
— Enabled: the system regulates via the main probe based on the system setpoint;
— Off due to alarm: system off due to serious alarm;
— General off: system turned off by general enabling (see the paragraph described below "General enabling");
— Off by BMS: system turned off by the supervision system;
— Off by clock: system turned off by time bands;
— Off by dig. input: system turned off by digital input (ID17);
— Off by display: system turned off by terminal, control system screen;
— Off by master: system turned off by master in master/slave configuration;
— Out of operating limits: system out of machine operating limits;
— Replacement boiler: replacement boiler active;

It is possible to change the unit state in the last row. If NO is selected, the entire system will be put in stand-by mode, if YES is selected the machine is turned on.

5 SYSTEM MENU

5.1 SELECTING THE SYSTEM OPERATING MODE

This mask is used to display the current unit state, to turn the unit on or off and to select the operating mode:

Plant
Off General ☼
Switch On: YES
Mode Selection: HEATING

Enable: allows to select the mode with which to turn the unit on or off; the available options are:
— OFF: the system does not produce hot/chilled water;
— YES: the system regulates via the main probe based on the system setpoint;
— YES WITH SET2: the system regulates via the main probe based on setpoint 2;
— BY CLOCK: the system regulates only when time bands are active;

Mode selection: allows to select the operating mode used to operate the unit; the available options are:
— COOLING: the system is in cooling mode;
— HEATING: the system is in heating mode;
— FROM OUTSIDE TEMP.: summer or winter mode is selected based on the outside temperature;
— FROM DIG. INPUT: if the digital contact closes, the hot mode is selected;
— BY SUPERVIS.: the BMS system controls remotely;
— BY CALENDAR: hot mode is selected by the calendar;

5.2 SETTING THE VALUES FOR THE PRIMARY SETS

This mask is used to set the values to assign to the primary working setpoints:

Plant
Setpoint 1
❄ 7.0°C
☼ 45.0°C

The primary working setpoints are:
— ❄ : setpoint 1 for cooling mode;
— ☼ : setpoint 1 for heating mode;

5.3 SETTING THE VALUES FOR THE SECONDARY SETPOINTS

This mask is used to set the values to assign to the secondary working setpoints:

Plant
Setpoint 2
❄ 12.0°C
☼ 40.0°C

The secondary working setpoints are:
— ❄ : setpoint 2 for cooling mode;
— ☼ : setpoint 2 for heating mode;

5.4 SETTING THE TIME BANDS (A) AND (B)

NB: this mask is only visible if "BY CLOCK" is selected on the page "Selecting the system operating mode";
This mask is used to set the times and action to assign to the time bands (a) and (b):

Plant			
Timezone			
Day		**MONDAY**	
			SEL
a	08:00	12:00	**ON**
b	16:00	22:00	**ON**

It is possible to assign up to four time bands (a, b, c, d) for each day of the week, during which a specific action can be selected:
— ON: system on with setpoint 1 (nominal);
— SET2: system on with setpoint 2;
— OFF: system off;
NB: the system keeps the system off outside the time bands.

5.5   SET THE TIME BANDS (C) AND (D)

NB: this mask is only visible if "BY CLOCK" is selected on the page "Selecting the system operating mode";
This mask is used to set the times and action to assign to the time bands (c) and (d):

Plant			
Timezone			
Day		**MONDAY**	
			SEL
c	**08:00**	**12:00**	**ON**
d	**16:00**	**22:00**	**ON**

It is possible to assign up to four time bands (a, b, c, d) for each day of the week, during which a specific action can be selected:
— ON: system on with setpoint 1 (nominal);
— SET2: system on with setpoint 2;
— OFF: system off;
NB: the system keeps the system off outside the time bands.

5.6   COPY/PASTE TIME BANDS

NB: this mask is only visible if "BY CLOCK" is selected on the page "Selecting the system operating mode";
This mask is used to copy and paste the time bands set for a day of the week to another (or to all other days):

Plant	
Timezone	
Day	**MONDAY**
Copy to	**---** **NO**

5.7   SETTING THE SEASON CHANGE FROM THE CALENDAR (HEATING)

NB: this mask is only visible if "BY CALENDAR" is selected on the page "Selecting the system operating mode";
This mask is used to set the start and end date for heating mode:

Cooling/Heating	
Select Cool/Heat with	
Calendar	
Start Heating	**0/---**
Finish Heating	**0/---**

5.8   SETTING THE SEASON CHANGE FROM THE CALENDAR (COOLING)

NB: this mask is only visible if "BY CALENDAR" is selected on the page "Selecting the system operating mode";
This mask is used to set the start and end date for cooling mode:

Cooling/Heating	
Select Cool/Heat with	
Outdoor temperature	
Set ON cooling	**27.0°C**
Set ON heating	**13.0°C**

6 RECOVERY MENU

6.1 ENABLING RECOVERY

WARNING: this mask is available on units with total recovery.
This mask is used to display the actual status of the total recovery, and to enable or disable the total recovery:

Off General

Switch On:
YES

The mask displays the total recovery status;the available options are:
— 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);
— general off (whole unit in stand-by);
— off from display (general disabling of the unit from the pGD1 button);
Enable: allows to enable or disable the total recovery;

6.2 SET THE RECOVERY SET VALUE

WARNING: this mask is available on units with total recovery.
This mask allows to view and set the value to be assigned to the recovery work set (default value 45° C, setting range 30~50° C):

Setpoint 1:
45.0°C
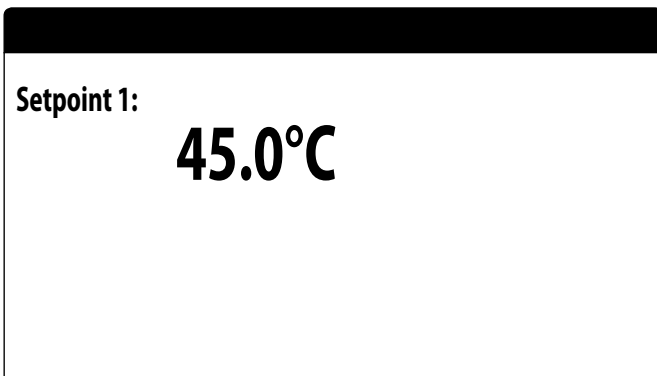
7   CLOCK MENU

7.1   SETTING SYSTEM DATE AND TIME

This mask is used to set the system date and time:

Clock	
Day:	**MONDAY**
Time:	**16 MARZ 2020**
Hour:	**16:29**

7.2   SETTING THE AUTOMATIC SUMMER/WINTER TIME CHANGE

This mask is used to set the automatic change between summer and winter time, it is also possible to define the day the change is made:

Clock

Automatic change
Hour solar/legal: YES
Start:
              LAST   SUNDAY
in   March   alle   02:00
End: LAST   SUNDAY
in   October   alle   03:00

7.3   SETTING THE PUBLIC HOLIDAYS ON THE CALENDAR

This mask is used to set the days (up to 5 intervals) to mark as "holidays" (therefore to activate the relative time programming previously specified for the holiday time band), or set the off mode for the system:

Calendar		
Start	**Finish**	**Action**
25/DIC.	26/DIC.	---
15/LUGL	15/LUGL	---
0/---	0/---	---
0/---	0/---	---
0/---	0/---	---

8 INSTALLER MENU

8.1 PASSWORD TO ACCESS THE INSTALLER MENU (0000)

This mask is used to enter the password necessary for accessing the installer menu (the password is 0000):

```
┌─────────────────────────────────────┐
│ Insert password                     │
├─────────────────────────────────────┤
│                                     │
│                                     │
│      🔑    0000                     │
│                                     │
│                                     │
└─────────────────────────────────────┘
```
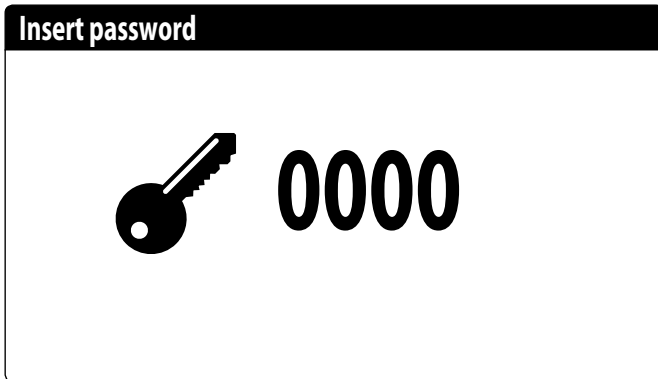
8.2 SETTING THE BMS 1 PARAMETERS

This mask is used to set the parameters related to the serial communication dedicated to BMS1:

```
┌─────────────────────────────────────┐
│ Installer                           │
├─────────────────────────────────────┤
│ Supervisor:              BMS1       │
│ Protocol:           MODBUS EXT      │
│ BaudeRate:          19200 Baud      │
│ StopBits                   2        │
│ Serial address:            1        │
│ Parity Type:            NONE        │
└─────────────────────────────────────┘
```

Protocol: this value indicates which protocol is used to communicate with the BMS supervision system; the support protocols are:
— 0: CAREL: protocol for expansions;
— 1: MODBUS: Modbus/RS485 supervisor;
— 2: pCOWeb: protocol for pCOWeb expansion;
— 3: LON: protocol for LON expansion;
— 4: MODBUS EXT: Modbus in extended version with several addresses available.
Speed: this value indicates which speed is set for serial communication; the possible selections are:
— 0: 1200 baud;
— 1: 2400 baud;
— 2: 4800 baud;
— 3: 9600 baud;
— 4: 19200 baud;
— 5: 38400 baud;
Stopbits: this value indicates the number of bits used to indicate the bitstop in serial communication;
Address: this value indicates the address assigned to the BMS supervision system towards which communication will be made;
Parity: indicates the actual value assigned to the number of parity bits for communication between the unit and the BMS1 supervision system; the values that can be set are:
— None;
— Even;
— Odd.

8.3 ENABLE CHANGE OVER AND ON/OFF BY SUPERVISOR

This mask is used to enable or disable the change over (season change) and unit on/off via BMS:

```
┌─────────────────────────────────────┐
│ Installer                           │
├─────────────────────────────────────┤
│ Supervisor:                         │
│                                     │
│ Enable cooling/heating              │
│ by supervisor              YES      │
│                                     │
│ Enable On-Off unit                  │
│ by supervisor              YES      │
└─────────────────────────────────────┘
```

8.4 SETS THE BMS2 PARAMETERS

This mask is used to set the parameters related to the serial communication dedicated to BMS2:

```
┌─────────────────────────────────────┐
│ Installer                           │
├─────────────────────────────────────┤
│ Supervisor:              BMS2       │
│                                     │
│ BaudeRate:          19200 Baud      │
│ Serial address:            1        │
│ StopBits                   2        │
│ Parity Type:            NONE        │
└─────────────────────────────────────┘
```

Speed: this value indicates which speed is set for serial communication; the possible selections are:
— 0: 1200 baud;
— 1: 2400 baud;
— 2: 4800 baud;
— 3: 9600 baud;
— 4: 19200 baud;
— 5: 38400 baud;
Address: this value indicates the address assigned to the BMS supervision system towards which communication will be made;
Stopbits: this value indicates the number of bits used to indicate the bitstop in serial communication;
Parity: indicates the actual value assigned to the number of parity bits for communication between the unit and the BMS1 supervision system; the values that can be set are:
— None;
— Even;
— Odd.

8.5 ENABLES SYSTEM ON/OFF FROM DIGITAL INPUT (ID17)

This mask is used to enable unit on/off via the digital input (ID17):

```
┌─────────────────────────────────────────┐
│ Input enable                             │
├─────────────────────────────────────────┤
│                                          │
│     ID17: ON/OFF plant                   │
│ NO                                       │
│                                          │
│                                          │
│                                          │
│                                          │
│                                          │
└─────────────────────────────────────────┘
```

8.6 SETTING THERMOSTAT REGULATION

This mask is used to select the parameters for managing the operating thermostat:

```
┌─────────────────────────────────────────┐
│ Installer                                │
├─────────────────────────────────────────┤
│ Regulation temperature                   │
│ sensor with:                             │
│ OUTPUT                                    │
│                                          │
│                                          │
│ Type reg.:        PROP.+INT.             │
│ Integ. Time(Ki)        600s              │
│                                          │
└─────────────────────────────────────────┘
```

Regulation with temperature probe: this value indicates on which probe the system bases its adjustment when producing water; The possible values are:
— OUTPUT (U2): the probe used for adjusting the production of water is the one at the output of the plate heat exchanger;
— INPUT (U1): the probe used for adjusting the production of water is the one at the input of the plate heat exchanger;
— COMMON OUTPUT PROBE (U3 uPC): the probe used for adjusting the production of water is the one at the common output if there are two plate heat exchangers;
NB: if selecting input based adjustment, in order to set a correct work setpoint, keep in mind the addition or the subtraction (based on if hot or cold operation) of the water production differential to or from the work setpoint
Type of reg.: this value indicates which logic is used for managing the adjustment; The possible values are:
— PROP+INT: applies proportional control + integral;
— PROP: applies only proportional control;
Integ. time (Ki): this value indicates the integral time to add to the proportional control (if the regulation type proportional + integral was selected);

8.7 SETS THE LOGIC FOR THE SETPOINT AND DIFFERENTIAL IN COOLING MODE

This mask is used to select the logic to apply to the working setpoint, and the value to assign to the differential for cooling operation:

```
┌─────────────────────────────────────────┐
│ Installer                                │
├─────────────────────────────────────────┤
│ Cooling regulation                       │
│ COMPENS.TEMP.                            │
│                                          │
│                                          │
│ Differential:                    8.0℃    │
│                                          │
│                                          │
│                                          │
└─────────────────────────────────────────┘
```

The type of setpoint indicates which logic is used for managing the working setpoint; the possible states are:
— FIXED SETPOINT: the system uses the values set by the user in the windows of the set menu as the work setpoint (main and secondary setpoints);
— CLIMATIC CURVE: the working setpoint is calculated automatically based on the data entered in the climatic curve;
Differential: this value indicates the differential applied between the water input and output; this value depends on the flow rate value at which the system operates;

8.8 SETS THE LOGIC FOR THE SETPOINT AND DIFFERENTIAL IN HEATING MODE

This mask is used to select the logic to apply to the working setpoint, and the value to assign to the differential for heating operation:

```
┌─────────────────────────────────────────┐
│ Installer                                │
├─────────────────────────────────────────┤
│ Heating regulation                       │
│ COMPENS.TEMP.                            │
│                                          │
│                                          │
│ Differential:                    8.0℃    │
│                                          │
│                                          │
│                                          │
└─────────────────────────────────────────┘
```

The type of setpoint indicates which logic is used for managing the working setpoint; the possible states are:
— FIXED SETPOINT: the system uses the values set by the user in the windows of the set menu as the work setpoint (main and secondary setpoints);
— CLIMATIC CURVE: the working setpoint is calculated automatically based on the data entered in the climatic curve;
Differential: this value indicates the differential applied between the water input and output; this value depends on the flow rate value at which the system operates;

8.9 CLIMATIC CURVE CONFIGURATION IN COOLING MODE

This window is used to set the temperatures (minimum and maximum) and the maximum differential that will be applied to the working setpoint in cooling mode based on the minimum outside air temperature;

```
┌─────────────────────────────────────────┐
│ Installer                                │
├─────────────────────────────────────────┤
│ Setpoint cool                            │
│ Actual:                         12.0℃    │
│                                          │
│                                          │
│ Compens.                                 │
│ max.    5.0℃     SET   25.0℃   35.0℃    │
└─────────────────────────────────────────┘
```
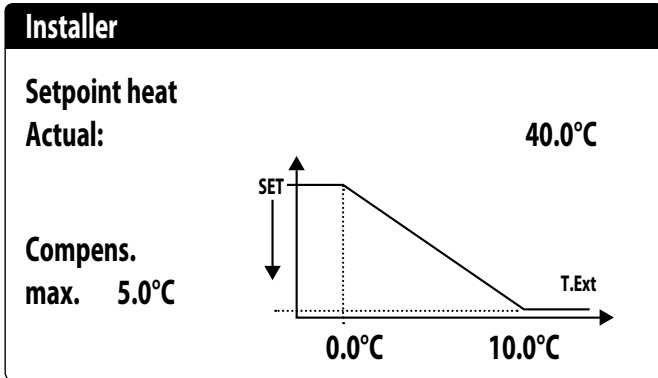
8.10 CLIMATIC CURVE CONFIGURATION IN HEATING MODE

This window is used to set the temperatures (minimum and maximum) and the maximum differential that will be applied to the working setpoint in heating mode based on the minimum outside air temperature;

```
┌────────────────────────────────────┐
│ Installer                          │
│                                     │
│ Setpoint heat                       │
│ Actual:                      40.0°C │
│         SET ┤                       │
│             │╲                      │
│ Compens.    │ ╲            T.Ext    │
│ max.  5.0°C │  ╲_____→      │
│          0.0°C      10.0°C          │
└────────────────────────────────────┘
```

8.11 TOTAL RECOVERY CONFIGURATION

WARNING: this mask is available on units with total recovery.
This window allows to set the temperatures (minimum and maximum and differential) for the recovery management, in addition to the pump management logic:

```
┌────────────────────────────────────┐
│ Installer                          │
│                                     │
│ Total Recovery                      │
│ Differential:                 5.0°C │
│ Max outlet temp:             53.0°C │
│ Pump:                           No  │
└────────────────────────────────────┘
```

Differential: indicates the differential used in the adjustment to calculate the power necessary for recovery;
Max output temp:indicates the recovery water output temperature above which it is forced out from the recovery system, it can re-enter when the water output temperature returns below this threshold minus 3° C;
Pump management:
— No: recovery activates when the flow switch contact closes for water passage. The pump is not managed by the unit;
— Yes: The pump is managed by the unit. It turns off when the recovery inlet temperature setpoint is reached.It turns back on when the temperature of the water at the recovery input drops 3°C below the recovery setpoint. In addition to the flow switch, a possible pump thermal switch is also managed that causes the shutdown;

8.12 ANTI-FREEZE ALARM CONFIGURATION

This window is used to configure the system anti-freeze alarm:

```
┌────────────────────────────────────┐
│ Config.Alarms                      │
│                                     │
│ Antifreeze alarm                    │
│ plant                               │
│                                     │
│ Threshold:                    3.0°C │
│ Differential:                 1.0°C │
│                                     │
│ Force ON pumps:                YES  │
└────────────────────────────────────┘
```

Threshold: this value indicates the temperature of the inlet or outlet water (based on the type of regulation selected), below which the anti-free alarm activates;

Differential: this value indicates the differential to apply to the anti-freeze activation threshold; when the water temperature (inlet or outlet) is higher than the threshold value plus the differential, the anti-freeze alarm is deactivated;
Pump ON power: by changing this value, it is possible to decide whether to automatically activate or deactivate the pumps during the anti-freeze alarm;

8.13 MANAGING THE PUMPS

This mask is used to manage the pumps inside and outside the unit:

```
┌────────────────────────────────────┐
│ Installer                          │
│                                     │
│ Number of Pumps:                 0  │
│                                     │
│ Idle time:                          │
│                               168h  │
│ Delay switch-off:                   │
│                                 5s  │
└────────────────────────────────────┘
```

Number of pumps: this parameter indicates if there are pumps outside the unit;
Off time: this value indicates the off time for a pump, after which the pump is activated (if there are several pumps installed on the unit this prevents limescale build-up in the pump in the case of an extended stop);
Delay off: this value indicates the pump turn off delay after deactivating the compressors;

8.14 CONFIGURE ANTI-FREEZE MANAGEMENT VIA THE PUMP

This mask is used to configure the cyclical activation of the pump for the anti-freeze function:

```
┌────────────────────────────────────┐
│ Installer                          │
│                                     │
│ Cycles pump start                   │
│ Antifreeze Enable:               N  │
│                                     │
│ Cycle time                   30min  │
│ Pulse time                    2min  │
│ Min.Extern.Air Temp.                │
│                               5.0°C │
└────────────────────────────────────┘
```

Enable pump cyclical start-up for anti-freeze: this value indicates whether to enable the pump start-up cycle for the anti-freeze function;
Cycle time: this value indicates the interval time between pump activation periods;
Forced duration: this value indicates the time the pumps will be made to operate for the anti-freeze function;
Outside temp threshold: this value indicates the temperature for the outside air below which the anti-freeze cycle activates (if enabled);

8.15 CONFIGURATION OF THE ANTI-FREEZE ALARM ON THE TOTAL RECOVERY

This mask allows to set the parameters for managing the anti-freeze alarm control on the total recovery:

```
┌─────────────────────────────────────────┐
│ Installer                                │
│                                          │
│ Total recovery                           │
│ Antifreeze alarm                         │
│ Threshold:                        3.0°C  │
│                                          │
│ Differential:                     1.0°C  │
│                                          │
└─────────────────────────────────────────┘
```

Threshold: the anti-freeze alarm is generated below the temperature of the recovery input or recovery output probes;
Differential: once the anti-freeze alarm has been triggered, it can be reset when the temperature of the probe that caused the alarm rises beyond the Threshold value + the value of this parameter;

8.16 CONFIGURE FANS AT LOW TEMPERATURES

This mask is used to configure the cyclical start-up of the fans to eliminate any accumulation of snow:

```
┌─────────────────────────────────────────┐
│ Fans                                     │
│                                          │
│ Fan antifreezer/snow                     │
│ function enable                    YES   │
│                                          │
│ Ext.Air temp.:                    1.0°C  │
│                                          │
│ Pulse time Off:                  120min  │
│ Pulse time On :                    30s   │
└─────────────────────────────────────────┘
```

Enable: this value indicates whether to enable the anti-freeze function on the fans,
Outside Temp: this value indicates the temperature for the outside air below which the anti-freeze cycle activates on the fans (if enabled);
Off period: this value indicates the interval time between fan activation periods during the anti-freeze function;
On period: this value indicates the time for which the fans will be made to operate for the anti-freeze function

8.17 SETS PUMP START-UP FOR ANTI-FREEZE

This mask is used to set pump start-up if the electric heater turns on:

```
┌─────────────────────────────────────────┐
│ Installer                                │
│                                          │
│ Antifreeze Heater                        │
│                                          │
│ Force ON pumps:                          │
│                                          │
│                                    YES   │
│                                          │
│                                          │
└─────────────────────────────────────────┘
```

Pump ON power: this value indicates whether or not to activate the system pumps during operation of the anti-freeze electric heater;

8.18 MULTI-FUNCTION INPUT CONFIGURATION (U10)

NB: to use this function, close the contact on input ID18;
This mask is used to set the function associated with multifunction input U10:

```
┌─────────────────────────────────────────┐
│ Installer                                │
│                                          │
│ Multifunction Input                      │
│                                          │
│ Config. Input (U10):                     │
│ NOT PRESENT                              │
│                                          │
│ Type:              4-20mA                │
│ Min: 4.0mA         Max: 20.0mA           │
└─────────────────────────────────────────┘
```

U10: this value indicates which function to assign to the multifunction input U10; the possible states are:
— NOT PRESENT: the multifunction input is disabled;
— POWER LIMITATION: input U10 is used to limit the unit power proportionally to the signal applied to input U10 (the configuration of the managed power range is available on the next window if this option is active);
— VARIABLE SETPOINT: input U10 is used to vary the unit work setpoint proportionally to the signal applied to input U10 (the configuration of the range for setpoint variation is available on the next window if this option is active);
Type: this value indicates the type of signal applied to the multifunction input; the possible states are:
— 0-10V: input signal 0-10V;
— NTC: input signal NTC;
— 4-20mA: input signal 4-20mA
NB: if option (1) or (2) is selected as "Type", it will be possible to set the minimum and maximum signal value;

8.19 CONFIGURATION OF POWER LIMITATION FOR INPUT (U10)

This mask is used to set the "POWER LIMITATION" function for input U10:

```
┌─────────────────────────────────────────┐
│ Installer                                │
│                                          │
│ Multifunction Input                      │
│                                          │
│ Power limit                              │
│                                          │
│ Minimun Limit :                     0%   │
│                                          │
│ Maximum Limit :                   100%   │
└─────────────────────────────────────────┘
```

Minimum limit: this value indicates the minimum power level that can be reached based on the input signal;
Maximum limit: this value indicates the maximum power level that can be reached based on the input signal;

8.20 CONFIGURATION OF THE NTC SIGNAL FOR INPUT (U10)

This mask is used to set the "NTC" function (for the type) on input U10:

```
┌─────────────────────────────────────────┐
│ Installer                                │
│                                          │
│ Multifunction Input                      │
│                                          │
│ Config. NTC                              │
│                                          │
│ Minimum temp.:                   15.0°C  │
│                                          │
│ Maximum temp.:                   25.0°C  │
└─────────────────────────────────────────┘
```

Minimum temp.: this value indicates the minimum temperature (NTC signal) to assign to the minimum value for the function set on the multifunction input (power limitation or variable setpoint);

Maximum temp: this value indicates the maximum temperature (NTC signal) to assign to the maximum value for the function set on the multifunction input (power limitation or variable setpoint);

8.21 CONFIGURATION OF VARIABLE SETPOINT FOR INPUT (U10)

This mask is used to set the "VARIABLE SETPOINT" function for input U10:

Installer		
Variable SetPoint		
Mode :		
	COOLING	HEATING
Min:	7.0°C	45.0°C
Max:	11.0°C	50.0°C

On this mask it will be possible to set the minimum and maximum setpoint limits (cooling and heating) based on the U10 input signal;

8.22 CONFIGURE NIGHT MODE CONTROL

This mask is used to set the night mode function to lower the noise level of the fans:

Fans	
Condensation mode overnight	**NO**
Controllo On:	**21:00**
Controllo Off:	**8:00**
FC VMax:	**6.0V**
FCV Max 100:	**0.0V**

Night-time silenced control: this value indicates if the night mode function should be activated; this function enables silenced operation during the time band specified in the following parameters;

Control on: if night-time silenced operation is active, this parameter indicates the time after which this operation will be activated;

Control off: if night-time silenced operation is active, this parameter indicates the time after which this operation will be deactivated;

FC VMax: Maximum volts in free cooling operation with night mode control;

FC VMax 100: Fan speed corresponding to 100% of free cooling power;with a set value of 6 V in this parameter, the 100% available and supplied power value will be reached when the fan speed reaches 6 V;

8.23 CONFIGURATION OF THE SUPPLEMENTARY ELECTRIC HEATERS

This mask is used to set the operation of the supplementary heaters in case of low outside temperatures:

Installer	
Suppl.electric heaters	
Number:	**0**
Power:	
	10%

Number of supplementary heaters: this value indicates the number of installed electric heaters (minimum zero, maximum three);

Heater power: this value specifies the percentage power of the individual heater with respect to the unit's total power;

8.24 SETS THE BOILER AS A REPLACEMENT

This mask is used to set the replacement boiler:

Installer	
Boiler in replacement.	
Ÿ	
Enable:	**NO**

Boiler enabled as replacement: this parameter indicates whether to activate the boiler if the outside temperature drops down below the "replacement" value specified in the following window, or if the heat pump has a "total alarm";

8.25 CONFIGURATION OF HEATER INTEGRATION OR REPLACEMENT

This mask is used to set the outside air temperature limits for heater replacement and integration:

Installer	
Integration air temp.:	
	5.0°C
Replacement air temp.:	
	-5.0°C

Integration air temp.: this value indicates the outside temperature above which the heat pump functions without the aid of the electric heaters, whereas if the outside temperature is lower than this value, but still higher than the replacement temperature, the heat pump functions TOGETHER with the heaters;

Replacement air temp. aria: this value indicates the outside temperature below which the heat pump stops and the electric heaters or, if enabled, the boiler, are used for heating;

8.26 COMPRESSOR HOUR COUNTER MONITOR

This window displays the data relative to the operating hours of the compressors on the unit:

```
Hour meter

Circuit 1


Compressor 1:                    0000h
Compressor 2:                    0000h
Compressor 3:                    0000h
```

8.27 COMPRESSOR START-UP MONITOR

This window displays the data relative to the compressor start-ups on the unit:

```
Hour meter

Circuit 1
Number of starts


Compressor 1:                     0000
Compressor 2:                     0000
Compressor 3:                     0000
```

8.28 CONFIGURATION OF THE FAN SPEED

This window is used to configure the inverter fan signals:

```
Fans

Fans

Start time:                        1s

Minimum V:                        1.0
Max V cooling:                   10.0
Max V heating:                   10.0
```

Duration of the initial start: this value indicates the duration of the start of the fans
Min volt: this value indicates the voltage at minimum speed before shutdown;
Max volt cold: this value indicates the voltage at maximum speed during cooling mode;
Max volt hot: this value indicates the voltage at maximum speed during heating mode;

8.29 CONFIGURE MASTER SLAVE

This window is used to configure the parameters for unit Master/Slave management:

```
Installer

Master/Slave


Unit:                            ALONE
Step:                             1.0%


Slave Pump off with
Compressor off:                     NO
```

(Unit: this value indicates the type of setting for the unit; this type can be:
— SINGLE: unit without Master/Slave connection;
— MASTER: identifies the master unit;
— SLAVE: identifies the slave unit;
Power step: the required power calculated by the thermostat is divided between the master and slave units based on this parameter; (E.G.: 1% = the units work in parallel; 100%= the units work in sequential mode (first all the power of one is used and then all the power of the other is used);
Slave pump Off with CP Off: this value indicates management of the pump on the slave unit; this management can be:
— YES: the slave pump turns off if there is no request on the slave;
— NO: the slave pump turns on and shuts down together with the master;

8.30 CONFIGURATION OF THE FAN SPEED IN FREE COOLING

WARNING: this mask is available on free cooling units.
This window is used to configure the inverter fan signals during the free cooling operation:

```
Fans

Frecooling


Delta T:                         15.0°C


Max Volt:                        10.0V


Max Volt 100:                    10.0V
```

Delta T: value generated at the maximum fan speed at a design external air temperature;
Max volts: maximum fan voltage during the free cooling operation.Used in silenced units to reduce noise;
Max volts 100: Fan speed corresponding to 100% of free cooling power.E.g. with a set value of 7 V in free cooling, the 100% available and supplied power value will be reached when the fan speed reaches 7 V;

8.31 FREE COOLING CONFIGURATION (YIELD CONTROL)

WARNING: this mask is available on free cooling units.
This window allows to set the parameters related to the free cooling yield control management;this check constantly verifies that the free cooling coil generates a delta T;
Used as a safety check on the operation of the 3-way valve. The control is active only with ventilation at maximum air flow:

Fans	
Frecooling	
Gain control.	
Delta T:	**1.5°C**
Control time:	**180s**

Delta T: delta T generated at the maximum fan speed;
Control time: yield control bypass time given by the input in free cooling;

8.32 GLYCOL WATER MANAGEMENT

This window is used to enable or disable the use of glycol water:

Installer	
Glycol water	
management.	
Enable: YES	
Freezing temperature of mixed	
with antifreeze:	**0.0°C**

Enable: this value indicates if the unit uses glycol water; the possible states are:
— No: glycol water management is disabled;
— Yes: glycol water management is disabled;

Freezing temperature of mixed with antifreeze: With this parameter, the minimum cold setpoint limit, the antifreeze alarm, the antifreeze resistance threshold and the cold force off threshold are calculated.

8.33 VPF MANAGEMENT (GENERAL PARAMETERS)

This window is used to set the general parameters for the VPF (Variable Primary Flow):

Variable primary flow	
Enable: NO	
Differential pressure.	
Setpoint:	**150mbar**
Diff.:	**100mbar**
Integral:	**180s**

Enable: this value indicates whether to activate or deactivate this mode; the possible states are:
— No: VPF management disabled;
— Yes: VPF management enabled;

Setpoint: indicates the pressure value that the regulation tries to maintain at the ends of the evaporator, by opening and closing the bypass valve;
Diff.: differential used when regulating the bypass valve;
Integral: integral time used when regulating the bypass valve;

8.34 VPF MANAGEMENT (BYPASS 1 PARAMETERS)

This window is used to set the bypass parameters for the VPF (Variable Primary Flow):

Variable primary flow	
Bypass min:	**4.0V**
Bypass max:	**8.0V**
Transd. 4mA:	**0mbar**
Transd. 20mA:	**1000mbar**

Bypass min: this value indicates the minimum Volts corresponding to the minimum water bypass. All the water passes through the system;
Bypass max: this value indicates the maximum Volts corresponding to the maximum water bypass. All the water recirculates through the bypass;
Transd. 4mA; this value indicates the mbar at 4mA read by the differential transducer;
Transd. 20mA: this value indicates the mbar at 20mA read by the differential transducer;

8.35 VPF MANAGEMENT (BYPASS 2 PARAMETERS)

This window is used to set the bypass parameters for the VPF (Variable Primary Flow):

Variable primary flow	
Pressure:	**647mbar**
Valve by-pass.	
Proportional:	**100.0%**
Integral:	**0.0%**
Opening:	**0.0V**
By-pass test:	**0.0V**

Pressure: indicates the current value measured by the differential transducer;
Proportional: indicates the proportional component when calculating the bypass opening;
Integral: indicates the integral component when calculating the bypass opening;
Opening: indicates the current valve opening command;
Test bypass: indicates the forced valve command to use as a test. set to deactivate forcing;

8.36 UNIT INFORMATION EVD

This window shows the EVD Driver firmware version:

```
┌─────────────────────────────────────┐
│ Information                          │
│                                      │
│ EVO  n°      0                       │
│                                      │
│ Firmware version:              ───   │
│                                      │
│                                      │
│                                      │
│                                      │
└─────────────────────────────────────┘
```

8.37 UNIT INFORMATION MONITOR

This window contains information concerning the unit code, the software version and the machine test date:

```
┌─────────────────────────────────────┐
│ Information                          │
│ Aermec S.p.A.                        │
│                                      │
│ Code:     NRG0654°H°°°°°00           │
│                                      │
│ Ver.:     1.0.007  20/01/21          │
│                                      │
│ Testing date:                        │
│           16:26  21/01/21            │
└─────────────────────────────────────┘
```

8.38 SETS THE INTERFACE LANGUAGE

This window is used to select the display language. Press "ENTER" to cycle the available languages:

```
┌─────────────────────────────────────┐
│ Installer                            │
│                                      │
│ Language:   ENGLISH                  │
│                                      │
│           Push ENTER for change      │
│                                      │
│                                      │
│                                      │
│                                      │
└─────────────────────────────────────┘
```

8.39 CONFIGURATION OF THE UNITS OF MEASURE

This window is used to set the units of measure to use in the system:

```
┌─────────────────────────────────────┐
│ Options                              │
│                                      │
│ Type of measurem.unit                │
│ STANDARD [°C/bar]                    │
│                                      │
│ Supervisor BMS                       │
│ STANDARD [°C/bar]                    │
│                                      │
│                                      │
└─────────────────────────────────────┘
```

Type of units of measure: indicates the units of measure shown on the display; the possible states are:
— STANDARD [°C/bar]
— ANGLO-SAXON [°F/psi]
BMS supervisor: indicates the units of measure read by the supervisor; the possible states are:
— STANDARD [°C/bar]
— ANGLO-SAXON [°F/psi]

8.40 CONFIGURES THE INSTALLER MENU PASSWORD

This window is used to change the "Installer" menu access parameter:

```
┌─────────────────────────────────────┐
│ Password                             │
│                                      │
│                                      │
│                  🔑                  │
│                                      │
│                                      │
│ New password                         │
│ Installer:                    0000   │
└─────────────────────────────────────┘
```

9   LIST OF ALARMS

There are three types of alarm resets:
— Auto: automatic, when the event causing the alarm stops, also the alarm disappears.
— Manual: manual, to restart normal operation manual acknowledgement is necessary.
— Semi-auto: semi-automatic, the alarm is automatic but if it is present more than "n" times, it then becomes manual. The interventions are decreased by one unit every hour. Furthermore, there is a "timeout", after which the alarm becomes manual, even if the maximum number of interventions is reached.

Table of contents	Meaning	Reset
AL01	Clock battery flat alarm	Auto
AL02	PCO memory error alarm	Auto
AL03	Phase monitor alarm	Semi-auto
AL04	Display alarm reset	---
AL05	Circ.1 high pressure faulty probe alarm	Manual
AL06	Circ. 2 high pressure faulty probe alarm	Manual
AL07	Circ. 1 low pressure faulty probe alarm	Manual
AL08	Circ. 2 low pressure faulty probe alarm	Manual
AL09	Evaporator 1 input faulty probe alarm	Manual
AL10	Evaporator 1 output faulty probe alarm	Manual
AL11	Evap. common outlet faulty probe alarm	Manual
AL12	Recovery inlet faulty probe alarm	Manual
AL13	Recovery outlet faulty probe alarm	Manual
AL16	Outside temperature faulty probe alarm	Manual
AL17	Circ.1 liquid temperature faulty probe alarm	Manual
AL18	Circ.2 liquid temperature faulty probe alarm	Manual
AL22	Evap pump 1 maintenance request	Auto
AL23	Evap pump 2 maintenance request	Auto
AL24	Evaporator 1 pump thermal alarm	Manual
AL25	Evaporator 2 pump thermal alarm	Manual
AL26	Recovery pump 1 circuit breaker alarm	Manual
AL28	Ventilation unit 1 thermal alarm	Manual
AL29	Fan 2 circuit breaker alarm	Manual
AL30	Circ. 1 low pressure switch alarm	Manual
AL31	Circ. 1 low pressure alarm	Manual
AL32	Circ. 1 high pressure switch alarm	Manual
AL33	Circ. 1 high pressure alarm	Manual
AL34	Circ. 1 serious low pressure alarm	Manual
AL35	Circ. 2 serious low pressure alarm	Manual
AL38	Evaporator flow switch alarm	Manual
AL39	Recovery flow meter alarm	Manual
AL40	Evaporator anti-freeze alarm	Manual
AL41	Common evap. anti-freeze alarm	Manual
AL42	Recovery anti-freeze alarm	Manual
AL46	Alarm offline pCOE expansion (address=2) condenser unit	Manual
AL48	Discharge gas temperature CP1A Circ.1	Manual
AL49	Discharge gas temperature CP1BB Circ.1	Manual
AL51	Maintenance hours alarm CP1A circ.1	Auto
AL52	Maintenance hours alarm CP1B circ.1	Auto
AL54	Maintenance hours alarm CP2B circ.2	Auto
AL55	Maintenance hours alarm CP2B circ.2	Auto
AL58	Circ. 1 compressor 1 technical alarm	Manual
AL59	Circ. 1 compressor 2 technical alarm	Manual
AL61	Circ. 2 compressor 1 technical alarm	Manual
AL62	Circ. 2 compressor 2 technical alarm	Manual
AL64	Circuit 2 low pressure gauge alarm	Manual
AL65	Circ. 2 low pressure alarm	Manual
AL66	Circ. 2 high pressure switch alarm	Manual
AL67	Circ. 2 high pressure alarm	Manual
AL68	Circuit 1 fan thermal series	Semi-auto
AL73	Circ. 1 comp. 1 discharge gas high temp. alarm	Manual
AL74	Circ. 2 comp. 1 discharge gas high temp. alarm	Manual
AL76	Circ. 2 comp. 1 discharge gas high temp. alarm	Manual
AL77	Circ. 2 comp. 2 discharge gas high temp. alarm	Manual
AL79	Free cooling ouput alarm	Manual
AL82	Low water content force off alarm	Manual
AL83	Air-water envelope alarm	Semi-auto
AL85	System high temperature	Manual
AL86	SAC storage tank probe faulty	Auto
AL87	Master offline	Auto
AL88	Slave offline	Auto
AL89	Incorrect master/slave SW version	Auto
AL90	Slave alarm summary	Auto
AL91	Alarm offline pCOE expansion (address=4) free cooling unit	Manual
AL92	Alarm inlet freecooling probe	Manual
AL93	Alarm oulet freecooling probe	Manual
AL97	Free cooling ouput alarm	Manual

Table of contents	Meaning	Reset
AL98	PCOE DK expansion offline alarm (address=3)	Manual
AL99	Evaporator common outlet faulty probe alarm	Manual
AL100	Evaporator 2 output faulty probe alarm	Manual
AL102	Water inlet temp. out of operating limits	Manual
AL103	Suction probe broken or not connected circ. 1	Manual
AL104	Suction probe broken or not connected circ. 2	Manual
AL105	EVD error valve motor circuit 1	Manual
AL106	Evap. Low Temperature EVD (LOP) Circuit 1	Manual
AL107	EVD High evap. temperature (MOP) circuit 1	Manual
AL108	Overheat. low EVD (LowSH) Circuit 1	Manual
AL109	EVD Low suction temperature circuit 1	Manual
AL110	EVD High evap. temperature circuit 1	Manual
AL111	EVD Error Valve Motor Circuit 2	Manual
AL112	Evap. low temperature EVD (LOP) Circuit 2	Manual
AL113	EVD High evap. temperature (MOP) circuit 2	Manual
AL114	Overheat. low EVD (LowSH) Circuit 2	Manual
AL115	EVD Low suction temperature circuit 2	Manual
AL116	EVD S1 probe error	Manual
AL117	EVD S2 probe error	Manual
AL118	EVD S3 probe error	Manual
AL119	EVD S4 probe error	Manual
AL120	EVD EEPROM alarm	Manual
AL121	EVD Driver offline	Manual
AL122	EVD Battery discharged	Manual
AL123	EVD Parameter transmission error	Manual
AL124	EVD Firmware not compatible	Manual
AL126	Leak Detector Alarm	Manual
AL127	Leak detector sensor anomaly	Semi-auto
AL128	Leak Detector Offline	Semi-auto
AL129	Temp.Sensor liquid cond.1 broken or not connect. NRGH Monocirc.	Manual
AL130	Temp.Sensor liquid cond.2 broken or not connect. NRGH Monocirc.	Manual
AL131	High overheating of Circuit 1 (circuit discharged)	Manual
AL132	High overheating of Circuit 2 (circuit discharged)	Manual
AL133	PEC offline	Semi-auto
AL134	PEC Software - alarm set 1	-‑-
AL135	PEC Software - alarm set 2	-‑-
AL136	PEC Hardware - alarm set 1	-‑-
AL137	PEC Hardware - alarm set 2	-‑-
AL140	Expansion pCOE VPF OffLine (address=5)	Manual
AL141	Differential Transducer broken or not connected	Manual

PEC ALARMS

The alarms concerning the PEC each represent a group of alarms.
The tables for each group of alarms are shown below:

Software - alarm set 1

Software - alarm set 1		
Bit	Meaning	Reset
0	Circuit 1 low pressure	Manual
1	Circuit 1 low superheat	Manual
2	Circuit 1 high superheat	Auto
3	NOT USED	-‑-
4	NOT USED	-‑-
5	Circuit 1 refrigerant loss (warning): Valve opening1	-‑-
6	Condensation pressure (high) circuit 1	Manual
7	Circuit 1 Low envelope condensing temperature (warning)	-‑-
8	Circuit 1 High envelope condensing temperature (warning)	-‑-
9	Circuit 1 Low envelope evaporating temperature (warning)	-‑-
10	Circuit 1 High envelope evaporating temperature (warning)	-‑-
11	Circuit 1anti-freeze alarm	-‑-
12	Circuit 1 envelope alarm	Manual
13	End of defrosting for timeout	-‑-
14	Circuit 1 high discharge gas temperature compressor 1	Manual
15	Circuit 2 low superheat	Auto

Hardware - alarm set 1

Hardware - alarm set 1		
Bit	Meaning	Reset
0	P1 sensor	Manual
1	P2 sensor	Manual
2	T1 sensor	-‑-
3	T2 sensor	Manual
4	T3 sensor	Manual

Hardware - alarm set 1		
Bit	**Meaning**	**Reset**
5	T4 sensor	Manual
6	T5 sensor	Manual
7	T6 sensor	Manual
8	T7 sensor	---
9	P3 sensor	Manual
10	P4 sensor	Manual
11	T8 sensor	---
12	T9 sensor	Manual
13	T10 sensor	Manual
14	T11 sensor	Manual
15	T12 sensor	Manual

Software - alarm set 2

| Software - alarm set 2		
Bit	**Meaning**	**Reset**
0	Circuit 2 high superheat	Manual
1	Circuit 2 refrigerant loss (warning): Valve opening 2	---
2	Circuit 1 comp. 2 discharge gas high temp.	Manual
3	Circuit 1 comp. 3 discharge gas high temp.	---
4	Circuit 2 low pressure	Manual
5	Circuit 2 high condensing pressure	Manual
6	Circuit 2 comp. 1 discharge gas high temp.	Manual
7	Circuit 2 comp. 2 discharge gas high temp.	Manual
8	Circuit 2 comp. 3 discharge gas high temp.	---
9	Circuit 2 Low envelope condensing temperature (warning)	---
10	Circuit 2 High envelope condensing temperature (warning)	---
11	Circuit 2 Low envelope evaporating temperature (warning)	---
12	Circuit 2 High envelope evaporating temperature (warning)	---
13	Circuit 2 envelope alarm	Manual
14	Circuit 2 anti-freeze alarm	---
15	Insufficient differential pressure in reverse cycle valve	Manual

Hardware - alarm set 2

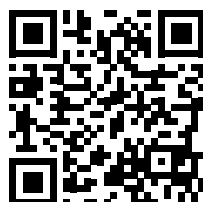| Hardware - alarm set 2		
Bit	**Meaning**	**Reset**
0	T13 sensor	---
1	Drive VS communication	---
2	EEPROM failure	---
3	System controller communication timeout (60s timeout, each new communication resets the timer and cancels the alarm)	Manual
4	Drive VS Alarm	---
5	Drive VS configuration alarm	---
6	Safety feedback circuit 1	Manual
7	Safety feedback circuit 2	Manual
8	System Power Loss	Manual
9	Drive VS locked out	---
10	Valve configuration alarm	Auto
11	Valve 1 alarm	Manual
12	Valve 2 alarm	Manual
13	VS Drive startup alarm	---
14	Pack configuration alarm	Auto
15	NOT USED	---
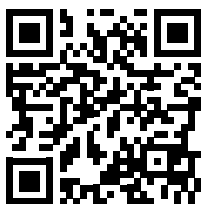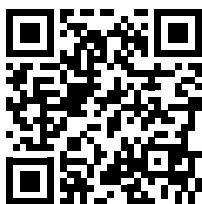
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