EN

25/05 - 5805851_02
Translation of Original instructions

NGW

User manual

ELECTRONIC CONTROLLER

AERMEC

www.aermec.com

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, 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

CE

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

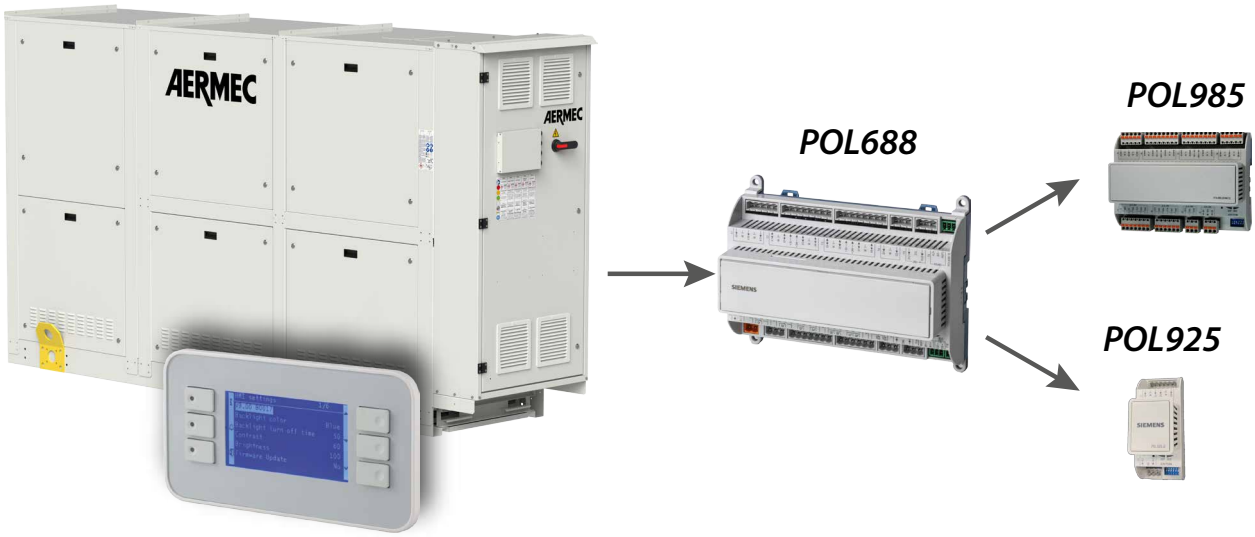
1 INTRODUCTION

Adjusting the units NGW includes:
— POL688 board, with control panel, is a controller for the entire functioning of the unit;
— POL985 expansion (additional inputs and outputs);
— POL925 expansion (additional digital inputs);
— Evd EVO electronic valve drivers

NOTICE

For the complete list of inputs and outputs, please refer to paragraph "3 Input/output menu *on page 11***".**

For information about the board SI485 please refer to paragraph "6 Accessory SI485 *on page 27***".**



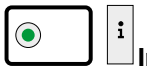
2 USER INTERFACE

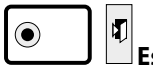
2.1 CONTROL PANEL

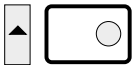
The command panel of the unit allows the rapid setting of the working parameters of the machine, and their visualisation. The card stores all the default settings and any modifications.
The user interface is represented by a semi-graphical display with six keys for navigation. The displays are organised via a menu hierarchy, which can be activated by pressing the navigation keys. The display default of these menus is represented by the main menu; navigation through the various parameters takes place using the arrow keys positioned on the right of the panel. These keys are also used to modify the parameters selected.

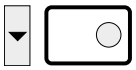
Function of the control panel keys:

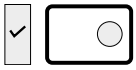

Alarm Key: Pressing this key displays the list of active alarms and alarm log. A lit red alarm LED means that at least one alarm is active.


Info Key: Pressing this key activates navigation among the menus. The lit green LED means that summer mode is active, while the lit orange LED means that winter mode is active.


Esc Key: Pressing this key leads to the display of the main window.


Up Key: Pressing this key can have several functions:
— Pressing this key when navigating menus/parameters passes to the previous menu/parameter;
— Pressing this key when changing a parameter increases the value of the selected parameter;


Down Key: Pressing this key can have several functions:
— Pressing this key when navigating menus/parameters passes to the next menu/parameter;
— Pressing this key when changing a parameter decreases the value of the selected parameter;


Enter Key: Pressing this key can have several 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;
— A long press on this key allows you to enter the "Log In" screen to enter the password required to enter the various menus and change parameters.

NOTICE

The colours of the keys on the control panel have different meanings to the colours of the indicator lights on the unit.

2.2 AUTHENTICATION LEVELS

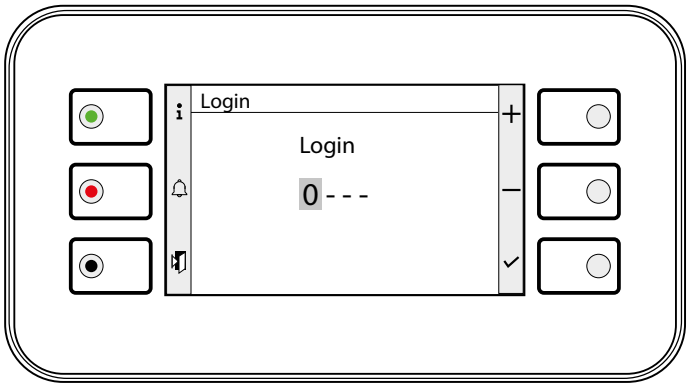
There are different levels of authentication that allow the user access to different menus.
The levels are listed below and are ordered by increasing authentication level:
— Standard user
— Installer
— Assistance
— Manufacturer

When a user logs in with a certain level of authentication, he/she will have access to the authenticated and lower levels, but not to the higher levels.
Example: if a user logs in with the Assistance level, he/she will have access to all menus except the Manufacturer's menu.

NOTICE

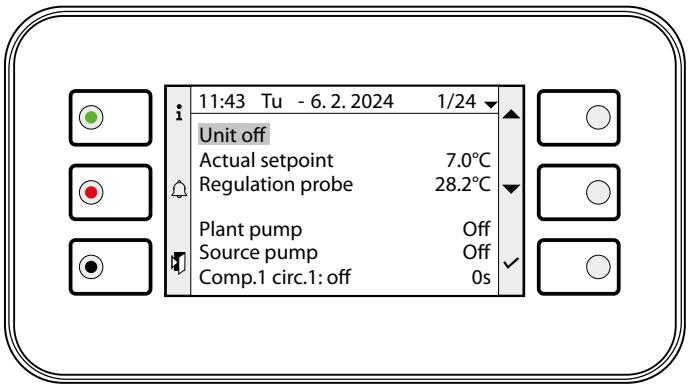
The "Assistance" and "Manufacturer" menus contain confidential settings, the modification of which is not available to the user or installer; the parameters contained in these menus are only available to the authorised technical after-sales service/assistance.

To log in, press and hold the "Enter" key on any screen and enter the installer-level password (0000).



2.3 MAIN MASKS

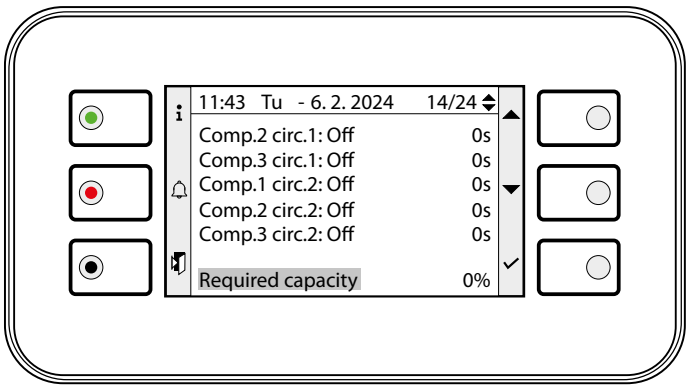
The main page, which is scrolled with the keys ▲ and ▼, provides the user with various information through the presence of readout parameters.



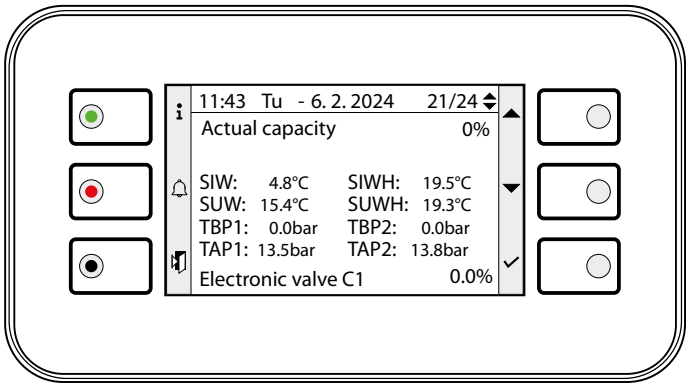
— Summary state of the unit/machine, states can be as follows:

State	Value	Meaning
Unit Off	0	The unit is stationary and is not enabled to start
Unit ON	1	The unit is in operation and is in stationary condition
Unit start-up	2	The unit is switched on and is performing the start-up procedure
Unit switch-off	3	The unit is in operation but is performing the switch-off procedure
Power increase	4	The unit is in operation on a compressor as a result of increased thermostat demand
Power decrease	5	The unit is switching off a compressor due to a drop in thermostat demand
Season changeover	6	The unit is in operation and is performing the cycle reverse procedure during functioning
Off by alarm	9	The unit performed an emergency switch-off due to the presence of a serious alarm

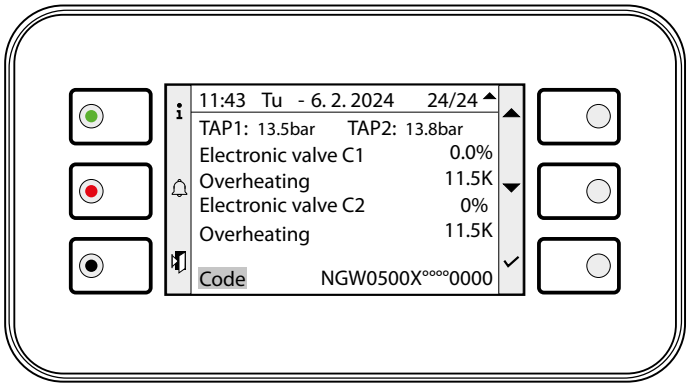
— Current adjustment setpoint
— Adjustment probe: depending on the parameterisation and mode of operation, this can be the temperature of the water flow to the evaporator, flow to the condenser, return to the evaporator or return to the condenser
— System side pump status
— Source side pump status
— Status of compressor 1 of circuit 1 and counting of minimum times



— Status of compressor 2 of circuit 1 and counting of minimum times
— Status of compressor 3 of circuit 1 and counting of minimum times
— Status of compressor 1 of circuit 2 and counting of minimum times
— Status of compressor 2 of circuit 2 and counting of minimum times
— Status of compressor 3 of circuit 2 and counting of minimum times
— Cooling capacity required by the unit/machine thermostat



— Compressor cooling capacity
— Evaporator inlet water temperature probe
— Condenser inlet water temperature probe
— Evaporator outlet water temperature probe
— Condenser outlet temperature probe
— Low pressure transducers of circuits 1 and 2
— High pressure transducers of circuits 1 and 2
— Position of electronic expansion valve of circuit 1



— Calculated overheating on circuit 1
— Position of electronic expansion valve of circuit 2
— Calculated overheating on circuit 2
— Unit/machine identification code

2.4 MAIN MENU

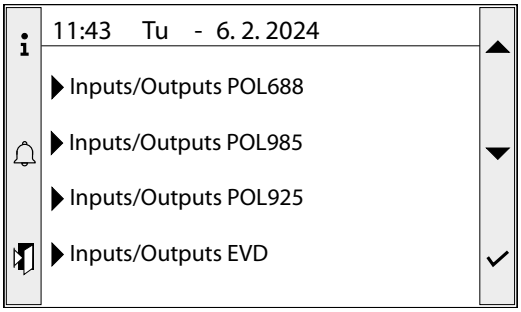
By pressing the key  the main menu is accessed:

Menu	Description
Inputs/outputs	Unit status information masks
On/Off	Unit On/Off
Plant	System parameters (chiller, heat pump) in the unit/machine: enabling, nominal and second setpoint, time periods
Installer	Installer level parameter menu
Configurator	Configurator Mask (password-protected)
Assistance	Assistance level parameter menu (password-protected)
Manufacturer	Manufacturer level parameter menu (password-protected)
Inspection	Parameter menu and Test level information (password-protected)
System	Information and system functions page

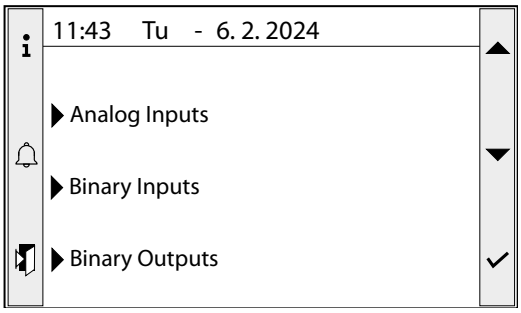
To select the desired menu, scroll through the list using the keys ▲ and ▼; after it has been identified, confirm by pressing the Enter key.

3 INPUT/OUTPUT MENU

In this menu you can get a summary of how the unit/machine is working. Inside are all the analogue and digital quantities that are read or generated by the control boards.



3.1 INPUTS/OUTPUTS POL688 BOARD



The inputs and outputs of the POL688 board are divided into analogue inputs, digital inputs and digital outputs.

Analogue inputs - POL688

Analogue inputs	Code	Description	Note
X1	SIW	Evaporator inlet probe	
X2	SIWH	Condenser inlet probe	
X3	SUW	Evaporator outlet probe	
X4	SUWH	Condenser outlet probe	
X5	TAP1	High pressure transducer circuit 1	
X6	TAP2	High pressure circuit 2 transducer	
X8	MULTI IN	Multi-function input	Configurable

Digital inputs - POL688

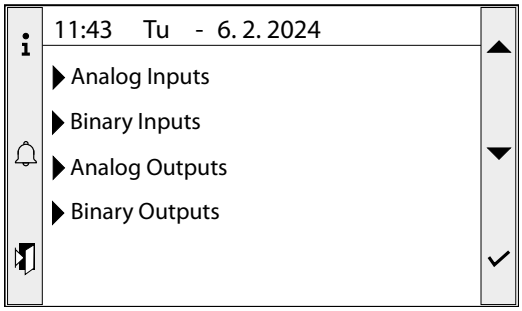
Digital inputs	Code	Description	Note
DI1	MTPE1	Evaporator pump 1 circuit breaker	230Vac
DI2	MTPE2	Evaporator pump 2 circuit breaker	230Vac
DU1	BP1	Circuit 1 low pressure pressure switch	24Vac
DU2	BP2	Circuit 2 low pressure pressure switch	24Vac
D1	ON/OFF	Remote ON/OFF contact (closed=ON)	
D2p	C/F	Remote season contact (closed = summer mode)	
X7	AMF	Multifunction input enabling	
X9	MVA	Atex fan monitoring	
X10	FANR	Remote switch-off (<adjacent unit/machine>)	
X11	LD	Leak detector	

Digital outputs - POL688

Digital outputs	Code	Description	Note
Q1	AL	Serious alarm	NO/NC exchange relay
Q2	RRE	Anti-freeze resistance	NO/NC exchange relay
Q3	CC1A	Compressor 1 Circuit 1	NO Relay
Q4	CC2A	Compressor 1 Circuit 2	NO Relay

Digital outputs	Code	Description	Note
Q5	CC1B	Compressor 2 Circuit 1	NO Relay
Q6	CC1C	Compressor 3 Circuit 1	NO Relay
Q7	CC2B	Compressor 2 Circuit 1	NO Relay
Q8	CC2C	Compressor 3 Circuit 2	NO Relay

3.2 POL985 BOARD INPUTS/OUTPUTS



The inputs and outputs of the POL985 expansion are divided into analogue inputs, digital inputs, analogue outputs and digital outputs.
Electronic valve outputs are also present.

Analogue inputs - POL985

Analogue inputs	Code	Description	Note
B1	SAE	External air sensor	
B2	SL1	Circuit 1 Liquid Probe	
B3	SL2	Circuit 2 Liquid Probe	
X7	SGP1	Pressing line gas probe circuit 1	
X8	SGP2	Pressing line gas probe circuit 2	

Digital inputs - POL985

Digital inputs	Code	Description	Note
DL1	MTPC1/TV1	Fan 1 / Condenser pump 1 circuit breaker	230Vac
DL2	MTPC2/TV2	Fan 2 / Condenser pump 2 circuit breaker	230Vac
D1	AP1	Circuit 1 high pressure switch	
D2	AP2	Circuit 2 high pressure switch	
D3	RCS	Phase monitor	
X4	FL/PD	Evaporator flow switch/flow meter / Differential pressure switch	
X5	FLH	Flowswitch condenser	
X6	SPE	Series of electrical protections	

Analogue outputs - POL985

Analogue outputs	Code	Description	Note
X1	V2VC1/ DCP1	Modulating pump condenser 1 / Modulating fan 1	
X2	V2VE	Evaporator modulating pump	
X3	V2VC2/ DCP2	Modulating pump condenser 2 / Modulating fan 2	

Digital outputs - POL985

Digital outputs	Code	Description	Note
Q1	VIC1	Circuit 1 reverse cycle valve	
Q2	VIC2	Circuit 2 reverse cycle valve	
Q3	RRC	Condenser anti-freeze resistance	
Q5	CPE1	Pump 1 evaporator	
Q6	CPE2	Pump 2 evaporator	
Q7	CPC1/MV1	Pump 1 condenser	
Q8	CPC2/MV2	Pump 2 condenser	

3.3 INPUTS/OUTPUTS POL925 BOARD

Digital inputs - POL925

Digital inputs	Code	Description	Note
D1	MTC1A	Overload compressor 1 circuit 1	
D2	MTC1B	Overload compressor 2 circuit 1	
D3	MTC1C	Overload compressor 3 circuit 1	
D4	MTC2A	Overload compressor 1 circuit 2	
DI1	MTC2B	Overload compressor 2 circuit 2	230Vac
DI2	MTC2C	Overload compressor 3 circuit 2	230Vac

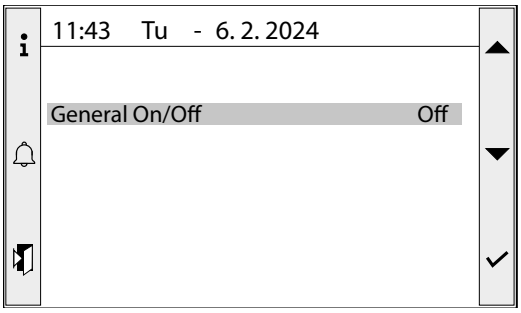
3.4 EVD EVO BOARD INPUTS/OUTPUTS

Inputs/outputs	Code	Description	Note
S1	BP1	Low pressure circuit 1	
S2	SGA1	Intake gas temperature circuit 1	
S3	BP2	Low pressure circuit 2	
S4	SGA2	Intake gas temperature circuit 2	

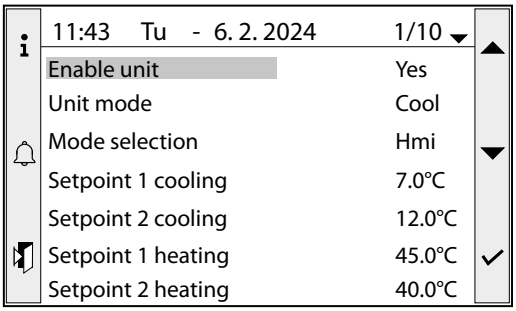
4 OPERATING MENUS

4.1 ON/OFF MENU

This menu allows you to change the status of the unit. If Off is selected, the whole system will be placed in stand-by mode, whereas if On is selected, the unit/machine will be switched on.



4.2 SYSTEM MENU



— System mode setting:
- **YES**: the system regulates via the main probe based on the system setpoint
- **With set 2**: the system regulates on the main probe according to setpoint 2
- **By time periods**: the system only regulates when the time periods are active

— Selection of operating mode:
- **Heat**: the system produces heat
- **Cold**: the system produces cold

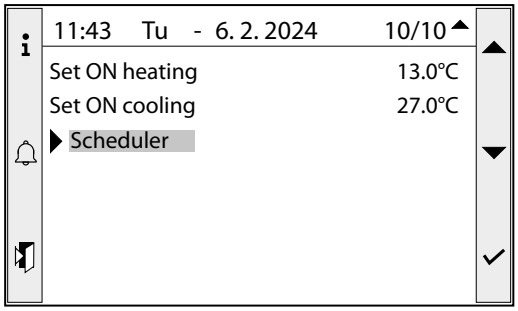
— Setpoint 1 setting cold water
— Setpoint 2 setting cold water

NOTICE

In the case of glycol water, the limit of the minimum cold setpoint is automatically lowered in relation to the indicated freezing point of the mixture.

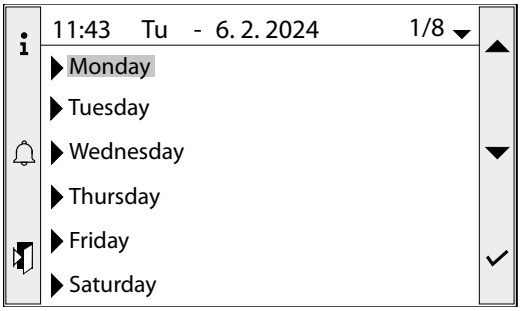
— Setpoint 1 setting hot water
— Setpoint 2 setting hot water

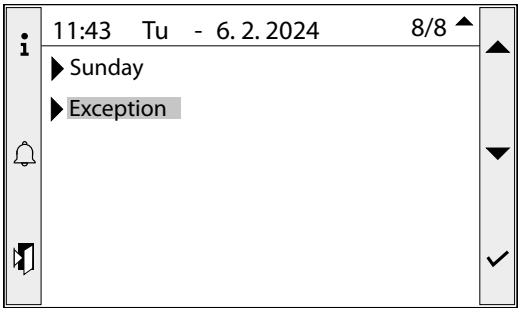
4.2.1 Time periods page



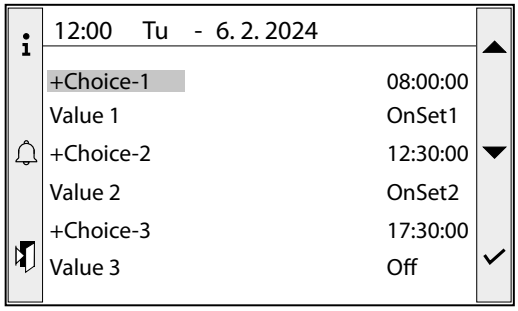
— Outdoor air temperature setpoint for automatic changeover in heating mode
— Outdoor air temperature setpoint for automatic changeover in cooling mode

The time periods sub-menu allows you to define the unit's functioning time periods, based on the day of the week or exception periods (e.g. holidays):





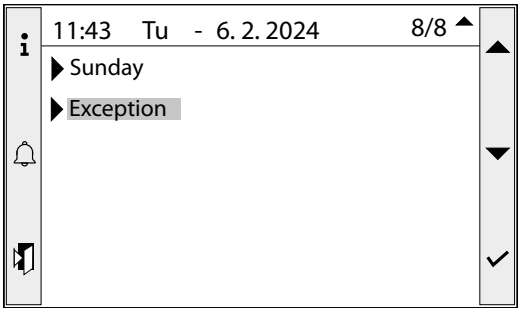
By selecting the desired day, time periods can be set for the day of the week.



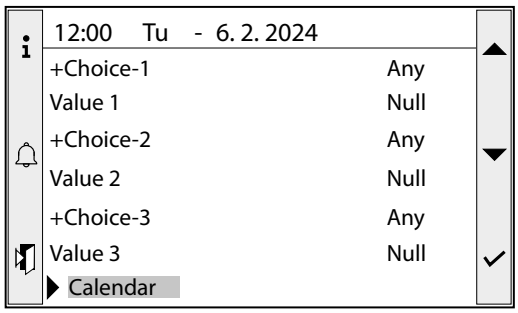
— Start time of the set period

— Time period functioning mode:
- **OFF**: system off
- **OnSet1**: system on with setpoint 1
- **OnSet2**: system on with setpoint 2

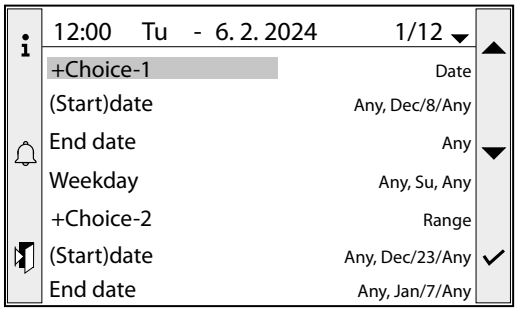
4.2.2 Exception period page

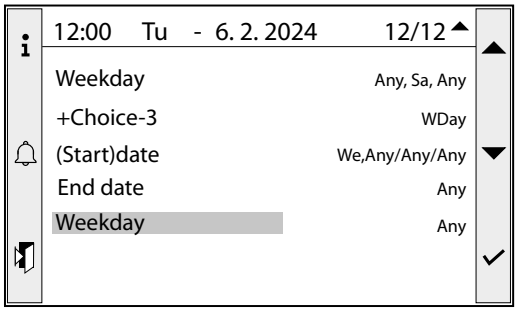


Selecting the "Exception" item takes you to the sub-menu, where you can set the functioning of the unit during the chosen exception day:



Selecting the "Calendar" items takes you to the sub-menu, where you can set the calendar days to be considered as exceptions:





— Type of period:
- **Date**: exception period linked to a specific date
- **Range**: exception period defined as a group of days
- **WDay**: weekly exception period

— Date (start)

— End of period date

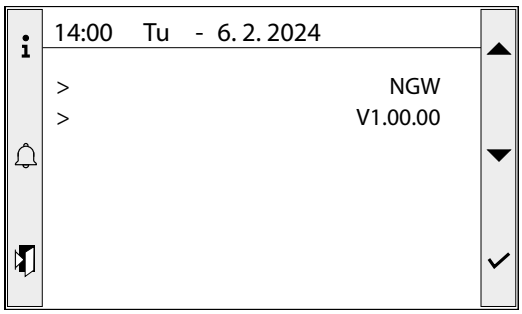
— Week day: the defined exception period will refer to the selected day of the week

NOTICE

Using "Any" means that the parameter is not relevant and will not be taken into account.

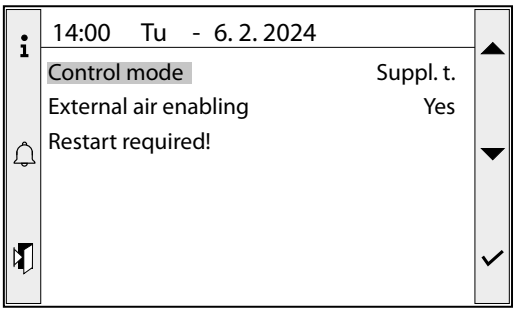
4.3 INSTALLER MENU

The password (0000) must be entered to access the installer menu.
Please refer to paragraph "2.2 Authentication levels *on page 8*" for the correct procedure.



— Unit range name
— Software version

4.3.1 General parameters page



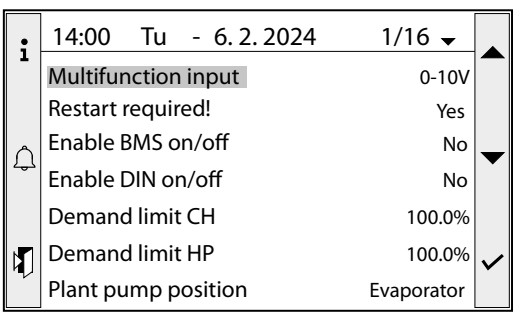
— Control probe selection:
0. Flow temperature
1. Return temperature

— Enabling of the outdoor air temperature probe:
0. No
1. Yes

NOTICE

Changing these parameters requires the board to be reset. Press on the reset command, located immediately below the parameter, for the selection to become active.

4.3.2 System parameters page



— Multi-function input signal type:
0. 0-10V
1. NTC
2. 4-20mA

NOTICE

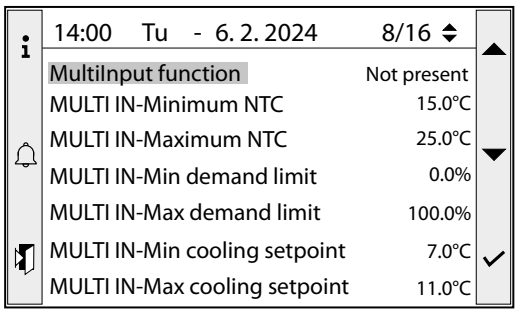
Changing these parameters requires the board to be reset. Press on the reset command, located immediately below the parameter, for the selection to become active.

— Enabling on/off of the unit from BMS via serial:
0. No
1. Yes

— Enabling on/off of the unit via digital input:
0. No
1. Yes

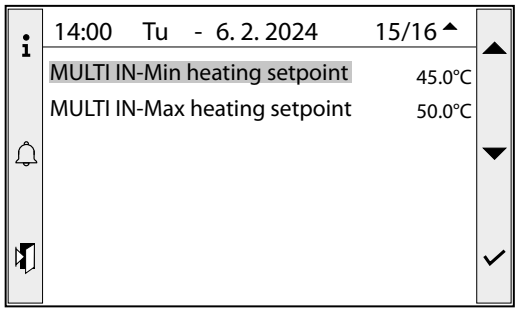
— Setting the cooling demand limit in cold functioning
— Setting the cooling demand limit in hot functioning

— Installation position of the system side pump:
0. **Evaporator**: the pump is located, from the unit/machine's point of view, upstream of the water reversing valves
1. **System**: the pump is located, from the unit/machine's point of view, downstream of the water reversing valves



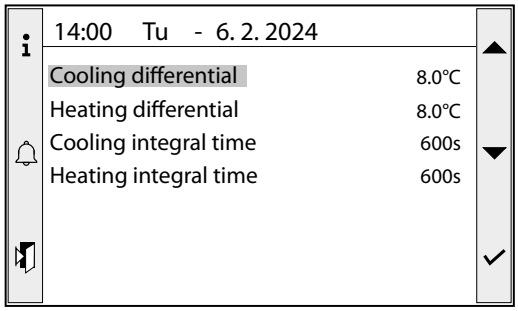
— Selection of the function associated with the multifunction input:
0. **Not present**: multifunction input not used
1. **Demand limit**: variation of the cooling demand limit in proportion to the variation of the multifunction input
2. **Variable setpoint**: variation of the adjustment setpoint in proportion to the variation of the multifunctional input

— Minimum value of multifunction input when configured as NTC
— Maximum value of multifunction input when configured as NTC
— Limit value of the cooling demand corresponding to the minimum of the multifunction input
— Limit value of the cooling demand corresponding to the maximum of the multifunction input
— Cold setpoint value corresponding to the minimum of the multifunction input
— Cold setpoint value corresponding to the maximum of the multifunction input



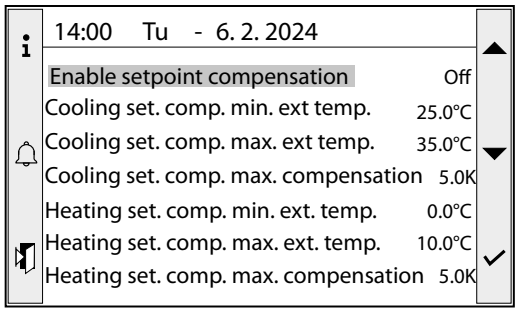
— Hot setpoint value corresponding to the minimum of the multifunction input
— Hot setpoint value corresponding to the maximum of the multifunction input

4.3.3 Adjustment parameters page



— Setting the adjustment differential in cold functioning
— Setting the adjustment differential in hot functioning
— Integral time value of the PI regulator in cold functioning
— Integral time value of the PI regulator in hot functioning

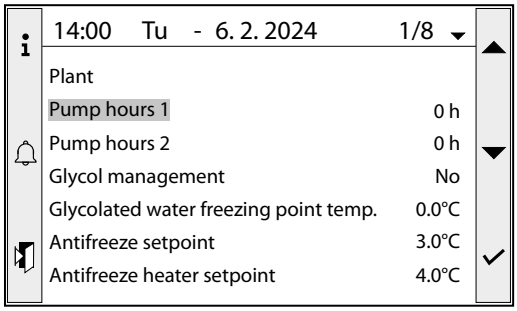
4.3.4 Setpoint compensation parameters page



— Setpoint compensation enabling:
0. No
1. Yes

— Minimum outdoor temperature for cold setpoint compensation
— Maximum outdoor temperature for cold setpoint compensation
— Maximum compensation of the cold setpoint allowed
— Minimum outdoor temperature for hot setpoint compensation
— Maximum outdoor temperature for hot setpoint compensation
— Maximum compensation of the hot setpoint allowed

4.3.5 System side parameters page



— Number of functioning hours of the system pump 1

NOTICE

This parameter is read-only (can only be set with user level Assistance or higher)

— Number of functioning hours of the system pump 2

NOTICE

This parameter is read-only (can only be set with user level Assistance or higher)

— Enables glycol water management:
0. No
1. Yes

— Freezing point value of the mixture of water and glycol contained in the system
— Anti-freeze protection alarm threshold

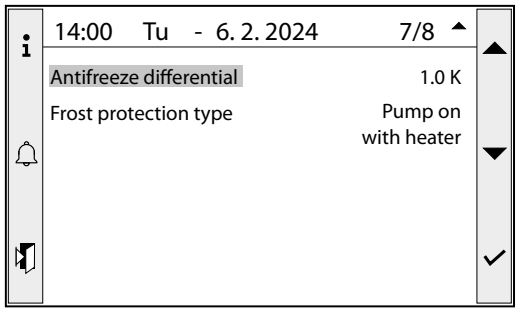
NOTICE

If glycol water management is enabled, the threshold will not be modifiable and will be calculated automatically by the system.

— Anti-freeze resistance intervention threshold

NOTICE

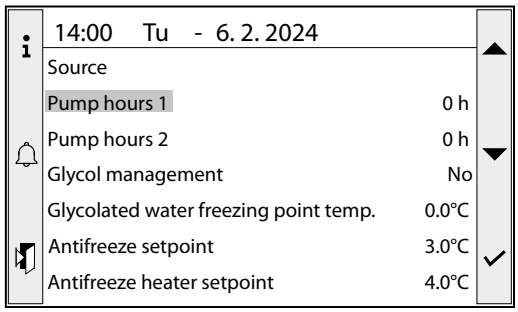
If glycol water management is enabled, the threshold will not be modifiable and will be calculated automatically by the system.



— Anti-freeze alarm and anti-freeze resistance intervention differential
— Type of system pump intervention in the event of anti-freeze protection:

0. **Pump off**: the system pump does not run under any circumstances
1. **Pump on with resistance**: the system pump starts up together with the anti-freeze resistance
2. **Pump on with alarm**: the system pump starts when the alarm is triggered

4.3.6 Source side parameters page



— Number of functioning hours of the source pump 1

NOTICE

This parameter is read-only (can only be set with user level Assistance or higher)

— Number of functioning hours of the source pump 2

NOTICE

This parameter is read-only (can only be set with user level Assistance or higher)

— Enables glycol water management:

0. No
1. Yes

— Freezing point value of the mixture of water and glycol contained in the system
— Anti-freeze protection alarm threshold
— Anti-freeze alarm intervention differential

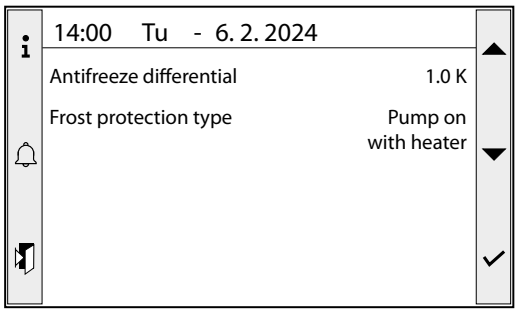
NOTICE

If glycol water management is enabled, the threshold will not be modifiable and will be calculated automatically by the system.

— Anti-freeze resistance intervention threshold

NOTICE

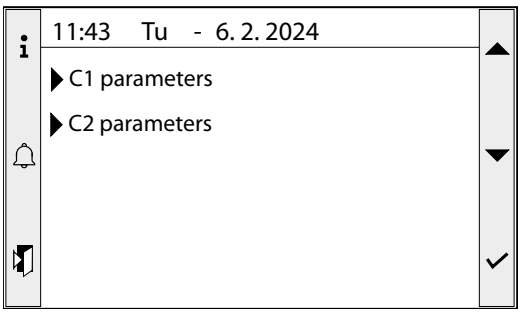
If glycol water management is enabled, the threshold will not be modifiable and will be calculated automatically by the system.



— Anti-freeze alarm and anti-freeze resistance intervention differential
— Type of intervention of the source pump in the event of anti-freeze protection:

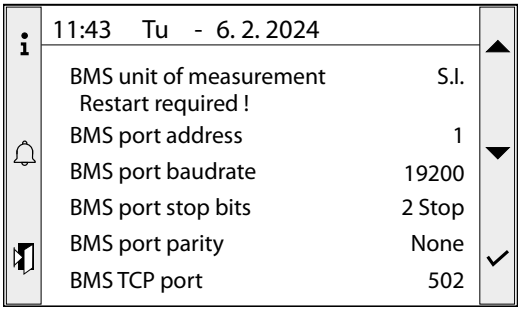
0. **Pump off**: the source pump does not run under any circumstances
1. **Pump on with resistance**: the source pump starts up together with the anti-freeze resistance
2. **Pump on with alarm**: the source pump starts when the alarm is triggered

4.3.7 Cooling circuits menu



Menus dedicated to cooling circuits.

4.3.8 BMS communication parameters page



— Unit of measurement selection for BMS communication:
0. S.I.
1. Imperial

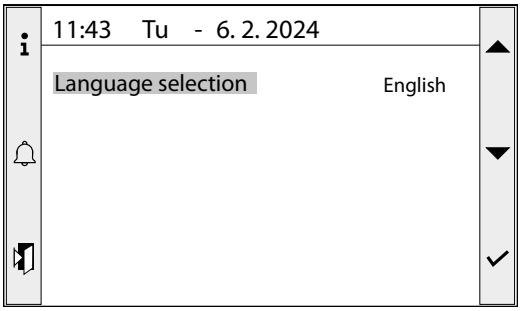
— Slave address in Modbus communication protocol
— Speed (baud rate) of the Modbus communication protocol:
0. 9600
1. 19200

— Number of stop bits of the Modbus communication protocol:
0. 1 stop bit
1. 2 stop bits

— Number of parity bits of the Modbus communication protocol:
0. Even
1. Odd
2. None

— Communication port number for Modbus TCP

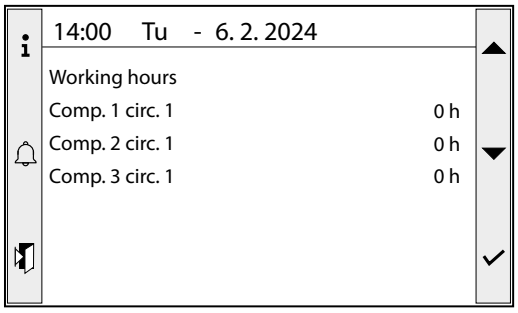
4.3.9 Language selection page



Display language selection.

4.3.10 Circuit parameters page

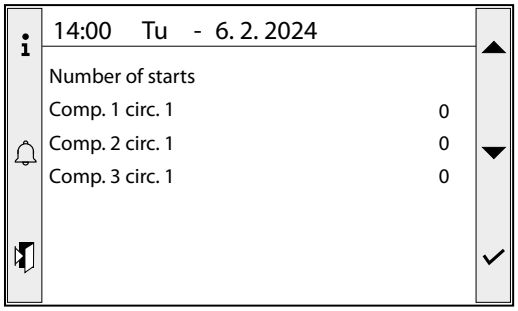
Selecting one of the two parameters opens the submenu as in the following screen:



— Number of functioning hours of compressor 1
— Number of functioning hours of compressor 2
— Number of functioning hours of compressor 3

NOTICE

These parameters are read-only (can only be set with user level Assistance or higher)

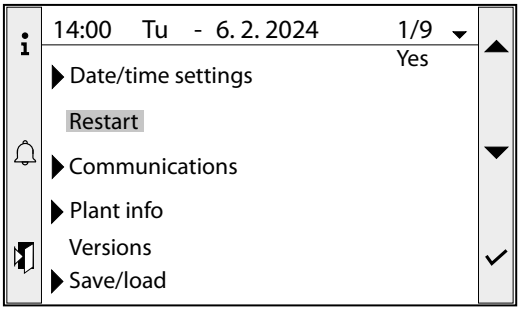


— Number of peaks of compressor 1
— Number of peaks of compressor 2
— Number of peaks of compressor 3

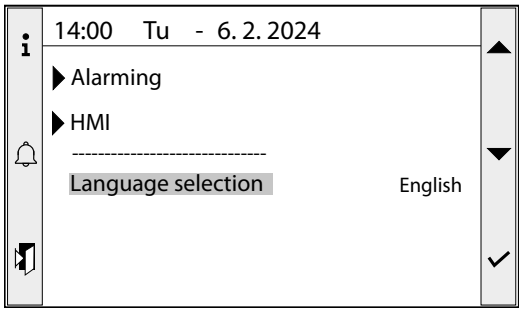
NOTICE

These parameters are read-only (can only be set with user level Assistance or higher)

4.4 SYSTEM MENU

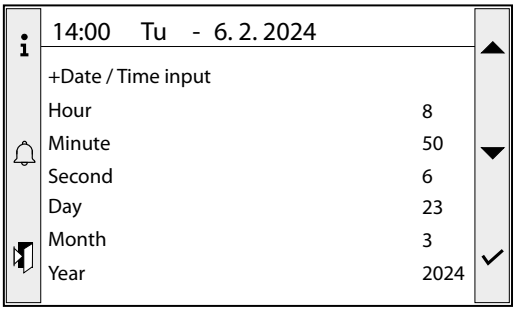


— Date/Time Setting Menu
— Restarting the boards: Executed
— Communication Menu
— System Information Page
— Software version menu and BSP
— Save/Load Page



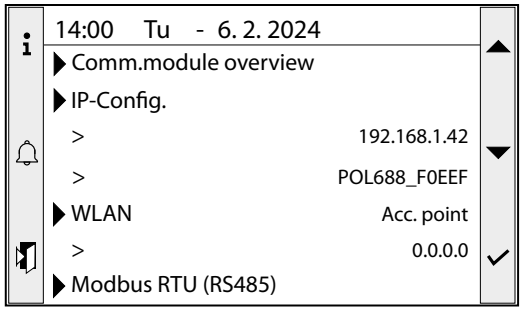
— Alarm Menu
— User interface menu (HMI)
— Display language selection

4.4.1 Date/Time settings menu

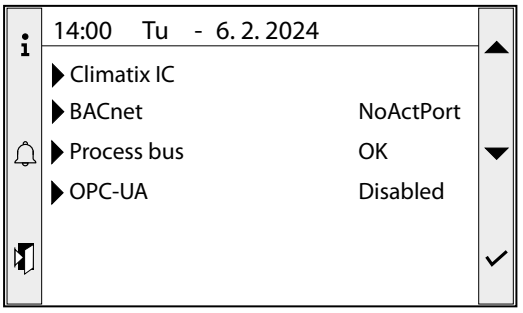


1. Current hours value
2. Current minutes value
3. Current seconds value
4. Current day value
5. Current month value
6. Current year value

4.4.2 Communication menu

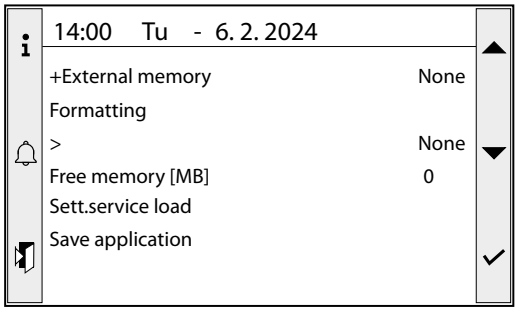


— Communication module summary page
— IP address configuration menu
— Current IP address
— Board identification code
— WLAN configuration menu
— Current WLAN address
— Modbus RTU configuration menu



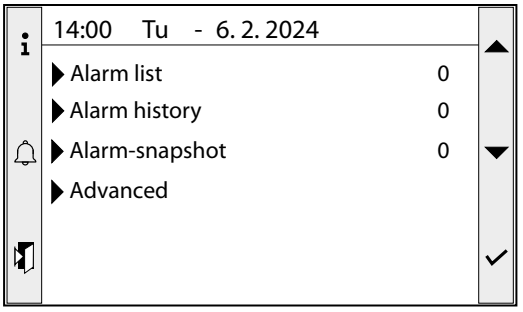
— Climatix settings menu (not available)
— Bacnet configuration menu
— Card bus information menu
— OPC-UA configuration menu (not available)

4.4.3 Save/Load Page



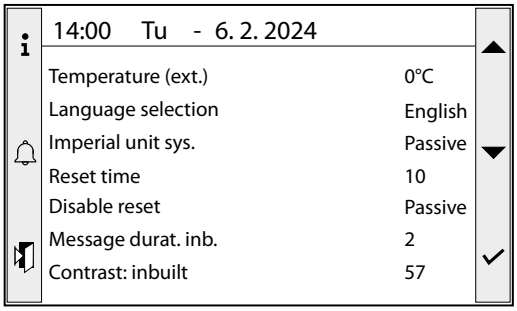
— External memory (SD) installed
— Performs formatting of external memory
— Free memory in MBytes
— Loads settings from external memory
— Saves the application in the external memory

4.4.4 Alarm Menu



— Alarm list page
— Alarm log page
— Alarm snapshot page (not available)
— Advanced page

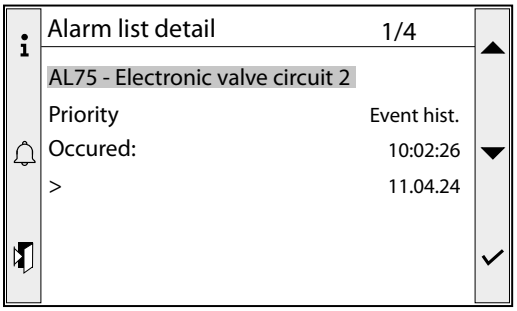
4.4.5 User interface menu



— External temperature probe (not connected)
— Display language selection
— Selected unit of measurement system
— Display reset time
— Disabling the display reset:
  ◦ Passive
  ◦ Active
— System message duration
— Display contrast intensity

5 ALARM

Pressing the "Alarm" key accesses the alarms menu; if alarms are present, the most recent is displayed.
Each alarm is uniquely identified by a code, which can also be found in the alarm summary table on the following pages.



5.1 ALARM RESET (GREEN LIGHT OR YELLOW LIGHT)

WARNING

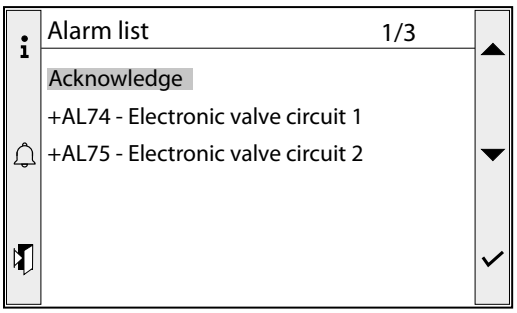
The alarm reset procedure is reserved only for authorised technical personnel. If an alarm occurs, it is necessary to contact the AUTHORISED TECHNICAL SUPPORT SERVICE.

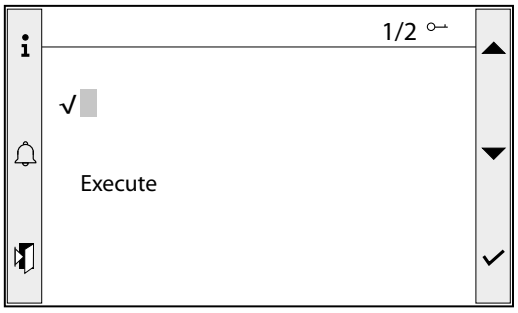
MANDATORY

Before resetting an alarm, it is necessary to contact the AUTHORISED TECHNICAL SUPPORT SERVICE. In the event of alarms with "manual reset from the control panel", it is necessary to request the AUTHORISED TECHNICAL SUPPORT SERVICE to intervene in order to resolve the unit malfunction and perform the reset procedure using a password.

To reset alarms, except for severe alarms (with red light), this procedure must be performed:

1. Log in with an Installer level password or higher;
2. Press the "Alarm" key to access the alarms menu;
3. Press the "Alarm" key again to display the complete list of alarms;
4. At the beginning of the list is the entry "Acknowledge". Press the Enter key;
5. Use the arrow keys to select "Executed";
6. Press the "Enter" key.





5.2 SEVERE GAS LEAKAGE ALARM RESET (RED LIGHT)

To reset severe alarms (with red light), it is necessary to enter the Assistance menu.

WARNING

The alarm reset procedure is reserved only for authorised technical personnel. If an alarm occurs, it is necessary to contact the AUTHORISED TECHNICAL SUPPORT SERVICE.

MANDATORY

Before resetting an alarm, it is necessary to contact the AUTHORISED TECHNICAL SUPPORT SERVICE. In the event of alarms with "manual reset from the control panel", it is necessary to request the AUTHORISED TECHNICAL SUPPORT SERVICE to intervene in order to resolve the unit malfunction and perform the reset procedure using a password.

5.3 ALARM HISTORY

At any time, it is possible to view the history of the last 150 alarms that have occurred in the system (intervention and alarm reset), by pressing the "Alarm" key until the alarm history page is displayed.

Entries	2
-AL41 - Thermal pump 1 evaporator	Val OffNormal: Passive
+AL41 - Thermal pump 1 evaporator	Val OffNormal: Active

For each event, you can go to the time and date of the event:

-AL41 - Thermal pump 1 evaporator	Val OffNormal: Passive
Priority	NA
Occured:	08:19:46
>	Mo,Mar/25/2024

5.4 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 triggered more than "n" times in an hour then it becomes manual. Interventions are decreased by one unit every hour.

Example: taking the Phase monitor alarm, the maximum number of times the alarm can intervene is 3. This is the maximum number the alarm can do in one hour, but considering that every hour the count is decreased by one unit it follows that: the phase monitor alarm can intervene, without assuming the level of manual reset, a maximum of 3 times in one hour or 4 times in 2 hours or 5 times in 3 hours and so on.

5.4.1 Alarm type

There are three types of alarms:

— **Unit alarms**: these are a category of alarms in which no particular light is switched on, so the green light indicating the active unit will remain on.
— **Non-functioning component alarms**: these are a category of alarms in which the yellow light comes on. In this case it is necessary to press the RESET key on the unit and contact the AUTHORISED TECHNICAL AFTER-SALES SERVICE/ ASSISTANCE so that they can intervene to resolve the malfunctioning of the unit.
— **Serious gas leak alarms**: they are a category of alarms that causes the right light to turn on. In this case it is necessary to press the RESET button on the unit and request the AUTHORISED TECHNICAL SUPPORT SERVICE to intervene to resolve the unit malfunction and perform the reset procedure using a password.

Code	Description	Alarm light	Reset	N.int.
AL01	BSP version (POL688 board firmware) incorrect	Green	Auto	-
AL02	High number of pwd log attempts	Green	Manual on the control panel	-
AL10	External air probe broken or not connected	Green	Manual on the control panel	-
AL11	Evaporator outlet water probe broken or not connected	Green	Manual on the control panel	-
AL12	Evaporator inlet water probe broken or not connected	Green	Manual on the control panel	-
AL13	Condenser outlet water probe broken or not connected	Green	Manual on the control panel	-
AL14	Condenser inlet water probe broken or not connected	Green	Manual on the control panel	-
AL20	Circuit 1 discharge gas probe broken or not connected	Green	Manual on the control panel	-
AL21	Circuit 1 suction probe broken or not connected	Green	Manual on the control panel	-
AL22	Circuit 1 liquid probe broken or not connected	Green	Manual on the control panel	-
AL23	High pressure sensor circuit 1 faulty or not connected	Green	Manual on the control panel	-
AL24	Low pressure sensor circuit 1 faulty or not connected	Green	Manual on the control panel	-
AL25	Low pressure from circuit 1 probe	Green	Manual on the control panel	-
AL26	Low pressure from circuit 1 probe (not delayed)	Green	Manual on the control panel	-
AL27	High pressure from circuit 1 probe	Green	Manual on the control panel	-
AL28	High discharge temperature circuit 1	Green	Manual on the control panel	-
AL30	Circuit 2 discharge gas probe broken or not connected	Green	Manual on the control panel	-
AL31	Circuit 2 suction probe broken or not connected	Green	Manual on the control panel	-

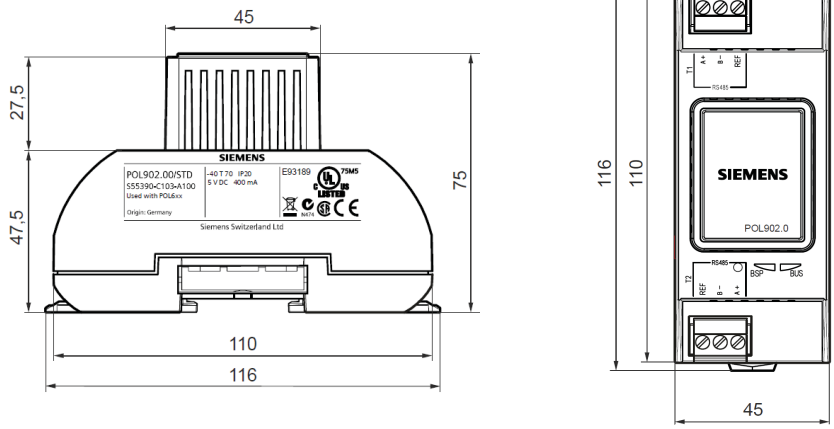
Code	Description	Alarm light	Reset		N.int.
AL32	Circuit 2 liquid probe broken or not connected	Green	Manual on the control panel	-	
AL33	High pressure sensor circuit 2 faulty or not connected	Green	Manual on the control panel	-	
AL34	Low pressure sensor circuit 2 faulty or not connected	Green	Manual on the control panel	-	
AL35	Low pressure from circuit 2 probe	Green	Manual on the control panel	-	
AL36	Low pressure from circuit 2 probe (not delayed)	Green	Manual on the control panel	-	
AL37	High pressure sensor circuit 2	Green	Manual on the control panel	-	
AL38	High discharge temperature circuit 2	Green	Manual on the control panel	-	
AL40	Evaporator antifreeze alarm	Green	Manual on the control panel	-	
AL41	Evaporator pump 1 circuit breaker	Green	Manual on the control panel	-	
AL42	Evaporator pump 2 circuit breaker	Green	Manual on the control panel	-	
AL43	Evaporator pump thermal switches	Green	Manual on the control panel	-	
AL44	Loss of evaporator water flow	Green	Manual on the control panel	-	
AL45	Maintenance request for evaporator pump 1	Green	Manual on the control panel	-	
AL46	Maintenance request for evaporator pump 2	Green	Manual on the control panel	-	
AL47	High evaporator water inlet temperature	Green	Manual on the control panel	-	
AL50	Leak detector	Red	Manual on the control panel	Manual with the RESET button	
AL51	High pressure from pressostat circuit 1	Red	Manual on the control panel	Manual with the RESET button	
AL52	Low pressure from pressostat circuit 1	Red	Manual on the control panel	Manual with the RESET button	
AL53	High pressure from pressostat circuit 2	Red	Manual on the control panel	Manual with the RESET button	
AL54	Low pressure from pressostat circuit 2	Red	Manual on the control panel	Manual with the RESET button	
AL60	Off from adjacent machine	Yellow	Auto	Manual with the RESET button	
AL61	Atex fan monitoring	Yellow	Manual on the control panel	Manual with the RESET button	
AL62	Phase monitor	Green	Semi-auto	-	3
AL63	Series of electrical protections	Yellow	Manual on the control panel	Manual with the RESET button	
AL70	Circuit 1 envelope alarm	Green	Semi-auto	-	5
AL71	Envelope alarm circuit 2	Green	Semi-auto	-	5
AL72	Circuit 1 delta pressure	Green	Manual on the control panel	-	
AL73	Circuit 2 delta pressure	Green	Manual on the control panel	-	
AL74	Electronic valve 1 circuit 1	Green	Manual on the control panel	-	
AL75	Electronic valve 1 circuit 2	Green	Manual on the control panel	-	
AL76	High overheating of circuit 1	Green	Manual on the control panel	-	
AL77	High overheating of circuit 2	Green	Manual on the control panel	-	

Code	Description	Alarm light	Reset	N.int.
AL80	Overload compressor 1 circuit 1	Green	Manual on the control panel	-
AL81	Overload compressor 2 circuit 1	Green	Manual on the control panel	-
AL82	Overload compressor 3 circuit 1	Green	Manual on the control panel	-
AL83	Overload compressor 1 circuit 2	Green	Manual on the control panel	-
AL84	Overload compressor 2 circuit 2	Green	Manual on the control panel	-
AL85	Overload compressor 3 circuit 2	Green	Manual on the control panel	-
AL86	Maintenance of compressor 1 circuit 1	Green	Manual on the control panel	-
AL87	Maintenance of compressor 2 circuit 1	Green	Manual on the control panel	-
AL88	Maintenance of compressor 3 circuit 1	Green	Manual on the control panel	-
AL89	Maintenance of compressor 1 circuit 2	Green	Manual on the control panel	-
AL90	Maintenance of compressor 2 circuit 2	Green	Manual on the control panel	-
AL91	Maintenance of compressor 3 circuit 2	Green	Manual on the control panel	-
AL100	Fan thermal switch 1	Green	Manual on the control panel	-
AL101	Fan thermal switch 2	Green	Manual on the control panel	-
AL102	Thermal pump 1 condenser	Green	Manual on the control panel	-
AL103	Thermal pump 2 condenser	Green	Manual on the control panel	-
AL104	Condenser pump thermal switches	Green	Manual on the control panel	-
AL105	No condenser water flow	Green	Manual on the control panel	-
AL106	High condenser water inlet temperature	Green	Manual on the control panel	-
AL107	Condenser anti-freeze alarm	Green	Manual on the control panel	-
AL108	Maintenance request for condenser pump 1	Green	Manual on the control panel	-
AL109	Maintenance request for condenser pump 2	Green	Manual on the control panel	-
AL120	POL985 offline	Green	Auto	-
AL121	POL925 offline	Green	Auto	-
AL122	Offline EVD drivers	Green	Auto	-

6 ACCESSORY SI485

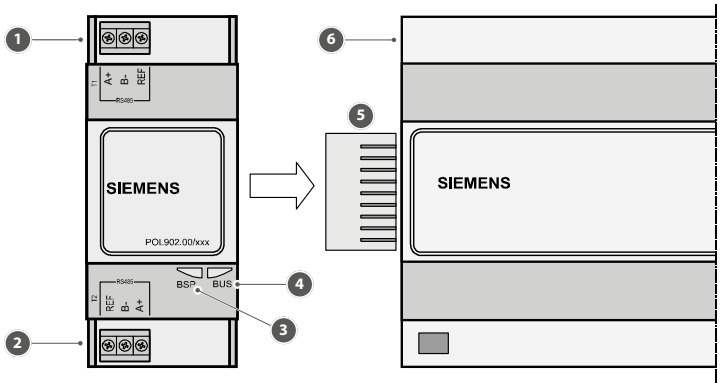
The board SI485 is an accessory that allows the direct interfacing of an RS485 network and is mounted to the left of the unit board (POL688).
The card provides the optical isolation of the controller in relation to the RS485 serial network. The maximum achievable baud rate is 19200 baud (settable via software).

6.1 DIMENSIONS



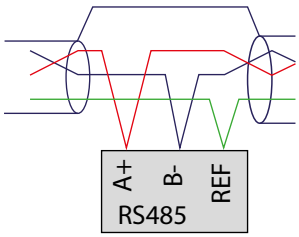
Units of measure: mm

6.2 MOUNTING

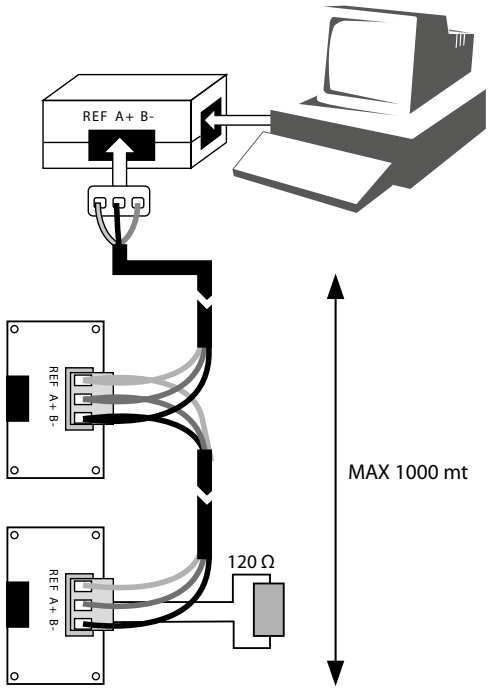


1 Modbus RS485 Interface (slave, channel 1)
2 Modbus RS485 Interface (slave, channel 2)
3 "BSP" (Board Support Package) status display
4 "BUS" status display (Bus connections)
5 Connection to the board (communication extension)
6 Unit board (POL688)

Connection to the RS485 network is via the removable terminal connectors on the board. The meanings of the pins on the connectors are highlighted by the silkscreen printing on the board and listed below:



If the board occupies the last position in the supervision serial line, a line terminating resistor with a value of 120 Ω - 1/4 W must be connected to the ends of pins A+ and B- as shown in the diagram below:



6.3 TECHNICAL FEATURES

Cable section:	use twisted and shielded two-wire AWG22 cable with cross-sections at terminals of mm2: min. 0.2 - max. 2.5.
Functioning conditions:	-40 / 70°C; < 90% RH
Storage conditions:	-40 / 70°C; < 95% RH

6.4 CARE IN HANDLING THE CARD

Electrical damage may occur on electronic components is almost always due to electrostatic discharge caused by the operator. It is therefore necessary take suitable steps for these type of components, in particular:

— before handling any electronic component or card, touch a grounded object (trying to avoid touching a component is not sufficient as a discharge of 10,000 V, which is quite easily achieved by static electricity, produces an arc of about 1 cm);
— the materials must remain in their original packaging as far as possible. If necessary, remove the card from its package and place it in an antistatic bag, without touching the back of the card with the hands;
— the use of plastic, polystyrene or non antistatic bags should be strictly avoided;
— avoid at all cost the direct handling of the card from one operator to another (to avoid electrostatic induction and discharges).

6.5 REFERENCE GUIDE FOR MODAER PROTOCOL

The Modaer communication protocol is the communication standard made available by Aermec for the connection between chillers and centralised supervision or control systems (see the Aermec products guide to see on which machine this protocol is available).
The protocol allows both the point to point connection (machine * supervisor), as well as several machines (max 255) on the same bus link to a supervisor, because it manages one address for each machine.
The system uses a master-slave communication mode, therefore the supervision system is master and the machine slave. This means that the machine only responds to the enquiry made by the supervisor.

6.6 DATA CONFIGURATION

Each 8 bit word (1 byte) in the message is comprised of two coded hex characters with 4 bits each (0-9, A-F).

6.7 MESSAGE FORMAT

The fields that comprise the message are shown in Table 1.
The message begins with a dead interval of at least 3.5 characters long (indicated in Table 1 as a dead period). The duration of this interval depends on the baud rate.
The first data to be transmitted is the address of the machine; then the type of request (read or write type), data relating to the request, the checksum and then a dead interval with the same length as that at the beginning.

Tab. 1

START	Dead time
ADDRESS	1 byte
COMMAND	1 byte
DATA	n x byte
CHECKSUM	2 byte
SHigh	Dead time
Address:	this is the machine address and can be comprised between 1 and 255.
Command:	this is the operation you want to perform.
Checksum:	this is a safety check to verify the correctness of the data being transmitted and is calculated from time to time by the sender of the message; the receiver has to recalculate and compare it with the one received in order to be sure that all information received is correct.

The checksum is calculated by considering all areas except the checksum field and considering only the 8 bits of data for each byte (excluding start and shigh bits).
The checksum is a 16-bit data and is obtained as as follows:

1. set the 16 bit checksum data with all 1 (0xffff in hex);
2. run the Exor with the next byte of the message (starting from the first, i.e. the address);
3. run the shift of a bit (toward the least significant bit) by inserting a 0 on the more significant bit;
4. control on the least significant bit extracted after the shift (carry bit);
5. if the bit is 1 perform the exor with the fixed data hex 0xA001;
6. repeat the operations from point 3 until 8 shifts have been made;
7. repeat the operations from point 2 for each byte that comprises the message.

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