FINAL USER'S INSTRUCTION MANUAL

pCO^5/pGD DIGITAL CONTROLLER

HEAT PUMPS
AirMaster, AquaMaster, EasyMaster, BoxAir

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TABLE OF CONTENTS:

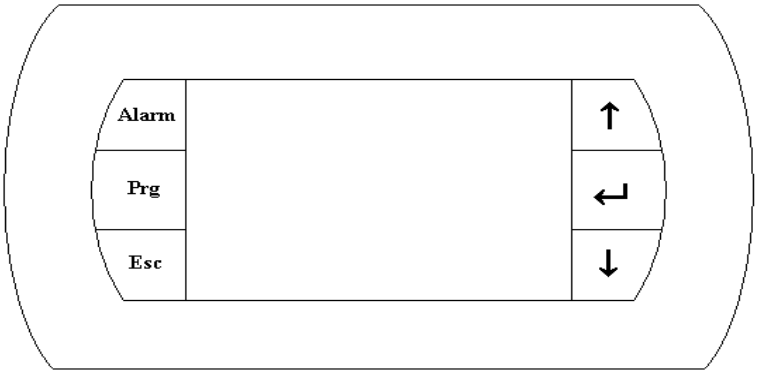
1 Introduction

The pCO^5 electronic controller with the PGD visual display unit is a programmable controller, enabling to control heat pumps.
The product range of heat pumps delivered by Master Therm CZ includes the controllers integrated in AIRMASTER, EASYMASTER, BOXAIR air/water heat pumps and AQUAMASTER water/water heat pumps.

2 Visual display unit

The communication with the regulator is made possible by the visual display unit with graphic display, keyboard, and indicators. It is possible to use the keyboard to take basic control of the heat pump such as:

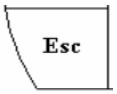
- Setting the mode of operation
- Solving emergency states
- Checking the state of the heat pump (indication of operation, operating temperature)



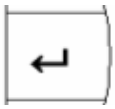
2.1 Display unit

It is the graphic display unit with the resolution of 132x64 pixels. The unit displays operating and configuration parameters.

2.2 Denotation and functions of keyboard keys and backlighting

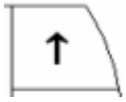


ESC key
- Is used for escaping from a menu or for jumping one level higher in the menu
- Backlighting indicates that the device is under voltage.

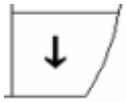


ENT key
- Is used for saving entered parameters and for jumping to another variable indicated on the screen
- Backlighting indicates that the device is under voltage.

ALARM key
- A short press is designed for entering the alarm displayed
- If backlighting flashes on and off, an alarm is active
- If backlighting is lit steadily, the manual alarm reset is necessary (the same error 3x per hour).



UP key
Moves the cursor up, lists in the menu, increments the parameter value
- It starts the manual defrosting along with the DOWN key.



DOWN key
- Moves the cursor down, lists in the menu, decrements the parameter value
- It starts the manual defrosting along with the UP key.

PRG key
- Is used for entering the detailed menu of the controller from the initial display
- Is used for entering the menu to set up heating circuits (optional)
- calls in Help in some screens.

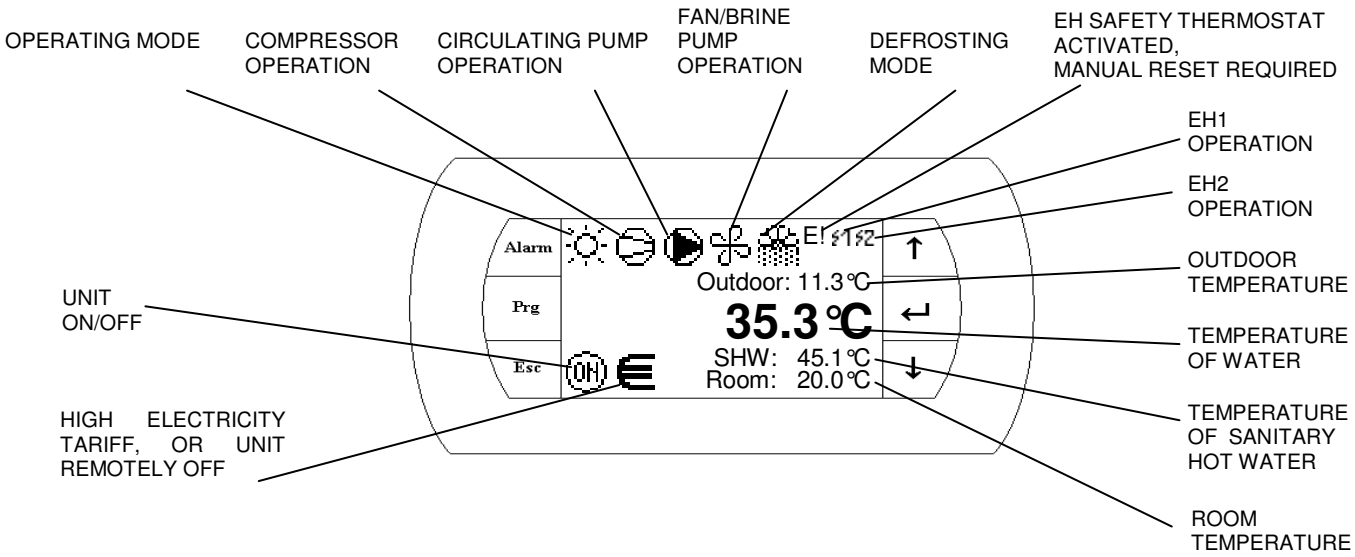
2.3 Language Change

Pressing keys ESC and ENTER simultaneously will change to the next available language.

3 Structure of the menu

3.1 Main screen

This screen is automatically activated after turning the main switch on. The main screen is also automatically activated after escaping from the detail menu of the control unit (ESC key).
The main screen indicates the operating condition of the unit. The following icons are displayed in the main screen:



3.1.1 Operating Mode

Following operating modes are possible:

 Heating

 Heating – low outdoor temperature (aux. heaters only, compressor OFF)

 Cooling, or Passive Cooling (GSHP only)

 Cooling with Dew Point protection (no humidity condensation possible)

Sanitary Hot Water preparation active

Swimming Pool heating active

When icon is FLASHING, unit is in the SUMMER MODE.

3.1.2 Compressor Operation

Following compressor indicators are possible:

Compressor no. 1 in operation

Compressor no. 2 in operation (2 compressor units only)

Compressors 1 and 2 in operation (2 compressor units only)

Recommended Unit Service Inspection
This situation is NOT ALARM and unit continues in normal operation.
After typical compressor time in operation, it is recommended refrigerant circuit service inspection. Typical time is 3000 operating hours, therefore we recommend service inspection in 6 months from service icon appearing.

3.1.3 Pump Operation

Following circulating pump indicators are possible:

Heating Circulating Pump in operation

When icon is flashing more than 10s after the circulating pump start, the flow did not start and pump was switched off to protect it from damaging. This situation is called “Pump Alarm”. System tries to restart the pump each compressor off time. This situation is ussually connected to “Flow Alarm”, please see the “Alarms” chapter.

3.1.4 Fan/Brine Pump Operation

Following Fan (Air to Water), or Brine Pump (GSHP) indicators are possible

Fan/Brine Pump in operation

3.1.5 Defrost Mode

Defrost status indication for Air/Water heat pumps.

Flashing Icon indicates Temperature Condition for Defrost Mode, but minimum time from last defrost cycle has not elapsed
Pernament Icon indicates Active Defrost Mode.

During Defrost Mode “Steam/Fog” can appear in the area of outdoor unit.
This is standard behaviour.

3.1.6 Electric Heater Operation and Safety Thermostat Activated

When the Electric (Auxiliary) Heater Safety Thermostat is activated the icon "**E!**" will appear on the main screen.
This situation could happen by the overheating of the electric heater, caused by insufficient water pressure in the heating system, or by heating circulation pump malfunction. This problem is also related "FLOW" Alarm.
When this situation occurs, it is necessary to manually reset the Safety Thermostat. Please see the "Throubleshooting" chapter for Safety Thermostat location and reset procedure.

 Heater no 1 in operation

 Heater no 2 in operation

When Icons are **FLASHING**, the system is requesting heater operation, but due to Safety Thermostat activation or "Pump Alarm" heater could not be started. Please reset the Safety Thermostat or fill the water to the heating system.

3.1.7 Outdoor Temperature

The real outdoor temperature is shown on the display in °C.

3.1.8 Temperature of Water

Actual heating water temperature is shown on the display in °C.

3.1.9 Sanitary Hot Water Temperature

When the Heat Pump is configured for preparing of Sanitary Hot Water, the display is showing actual Sanitary Hot Water temperature.

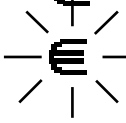
3.1.10 Room Temperature

When the Room Temperature Probe is used, it is shown on the main display.
When Room Terminal (pAD) is used, the temperature is not shown on the main display. In case pAD Room Terminal or, more pADs are used, plese see the pAD menu (list using arrow down).

3.1.11 Electricity Tearifi / Remote Off

Following situations are possible:

 High Electricity Tariff is active (where applicable), or unit is Remotely OFF

 Flashing symbol indicates High Electricity Tariff or Remote OFF, but Compressor operation is configured to ignore the command.

3.1.12 Unit On/Off

Following operators are possible:

 Unit is ON

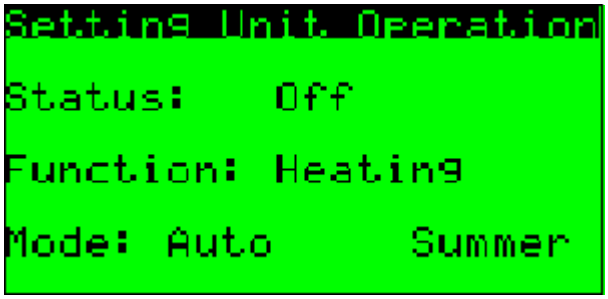
 Unit is OFF

3.2 Auxiliary screens

Auxiliary screens can be displayed by pressing the UP or DOWN keys. After the last screen has been displayed, the main screen with icons will be automatically reached when the UP or DOWN keys are pressed.
By pressing the ESC key in any of the auxiliary screens, the main screen with icons will be automatically reached.
Pressing PRG key will cause entering “deeper” menu, enabling more detailed setting.

3.2.1 Setting Unit Operation

This screen indicates the ON/OFF state, HEATING/COOLING function and AUTO/SUMMER/WINTER mode. This screen enables to change the operating mode of the heat pump.



By pressing the ENT key, the cursor moves to a variable that can then be edited with UP and DOWN keys – to change its value. After you have entered a desirable value, it is necessary to confirm it by pressing the ENT key, making the cursor move to another variable. After the last variable on the screen has been edited, the cursor returns to the top left corner of the screen. After that you can use the UP or DOWN keys to move to previous or next screens.

In this case, the unit can be switched from ON to OFF and vice versa, it is possible to change the function of the heat pump into HEATING or COOLING and change the operating mode to AUTO, WINTER, OR SUMMER. The function HEATING/COOLING can only be changed if the state ”Status = OFF”.

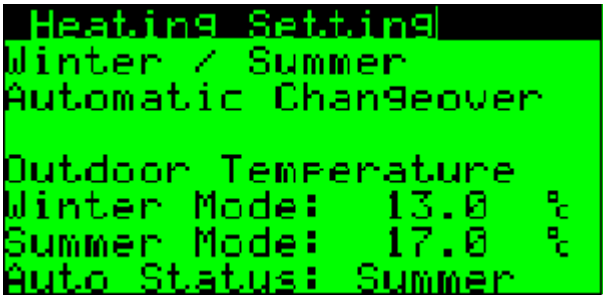
Parameters Setting:

Parameter:	Range:	Unit	Description
Status	On Off	-	On: unit is ON. Off: unit is OFF.
Function	Auto Heating Cooling*	-	Auto: Function is automatically selected according to the Mode setting. Heating: All heating circuits are in operation. Cooling: All cooling circuits are in operation. Heating is disabled with exception of the Sanitary Hot Water and Swimming Pool. Mode is forced to Summer.
Mode	Auto Winter Summer	-	Auto: Mode is automatically selected according to the outdoor temperature. Winter: All heating circuits are in operation. Cooling is disabled. Summer: Heating is disabled with exception of the Sanitary Hot Water and Swimming Pool.

* Cooling is available only for Reversible Heat Pump or GSHP with Passive Cooling Module.

3.2.1.1 Setting Automatic Changeover

Pressing PRG key from previous screen displays mask with automatic changeover.



Parameters Setting:

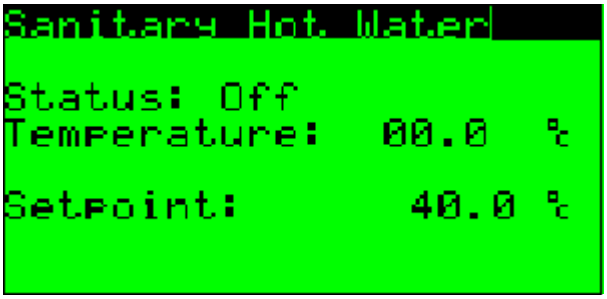
Parameter:	Range/F.:	Unit	Description
Winter Mode	-20.0 40.0 F:+13.0	°C	Outdoor temperature for activation of Winter Mode. Below this temperature, Winter Mode is activated.
Summer Mode	-20.0 40.0 F:+17.0	°C	Outdoor temperature for activation of Summer Mode. Above this temperature, Summer Mode is activated.
Auto Status	Winter Summer	-	Result of the Automatic Changeover according to the setting above.

Note: The mode is not changed according to actual outdoor temperature, but rather the “average” outdoor temperature, created inside the controller.

Pressing ESC key, the previous “Setting Unit Operation” screen is displayed.

3.2.2 Sanitary Hot Water

The next auxiliary screen is the Sanitary Hot Water (SHW) main display. This screen is available, when heat pump is configured to prepare SHW.



Parameter:	Range/F.:	Unit	Description
Status	On Off	-	On: SHW function is activated. Off: SHW function is not activated.
Temperature	-	°C	Actual SHW temperature..
Setpoint	0 45(60*)	°C	Requested SHW temperature set by user.

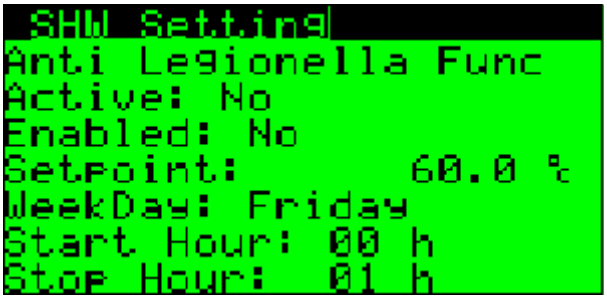
* When setpoint is higher than 45°C, it is possible, the electric heater will be activated to reach the requested temperature.

3.2.2.1 Antibacteria (Legionella) Function

Using PRG from previous screen, the Antilegionella setting screen is shown. Legionella is bacteria, generally present in tap cold water in small quantity. Small quantity is not dangerous for humans. When tap water temperature is in range between 25°C to 35°C, the Legionella bacteria is reproducting exponentially. When this temperature range is maintained for long period of time, the quantity of bacteria in some cases could reach level dangerous for humans in case of inhalation. This could happen an example during showering. Legionella could cause disease similar to pneumonia. Although the risk for healthy human is very low, it is dangerous for humans with decreased immunity.

From reasons listed above, we recommend to keep the SHW setpoint around 45°C (not lower than 40°C), when bacterial growth is 0 or very low.

Anyway it is possible to enable "Antilegionella" function. When function is enabled, the SHW setpoint is weekly automatically increased and maintained for programmed period of time. Sufficient is the temperature 60°C, that kills all Legionella bacteria present in the water in a few minutes.



Parameter:	Range/F.:	Unit	Description
Active	No Yes	-	Showing the antibacterial function is actually in operation.
Enabled	No Yes F: No	-	Enabling the function. No: Function is not enabled. Yes: Function is enabled.
Setpoint	0 65*	°C	Requested SHW temperature set for Antilegionella function by user.
WeekDay	Mo-Su F: Friday	-	Day of the week for function activation.
Start Hour	0-23 F: 0	h	Start hour of the increased SHW setpoint.
Stop Hour	0-23 F: 2	h	Stop hour of the increased SHW setpoint. We recommend 1 hour of time for each 100 l of the SHW tank volume. Example: SHW tank volume is up to 200 l . We recommend 2 hour period. SHW tank volume is 300 l . We recommend 3 hour period.

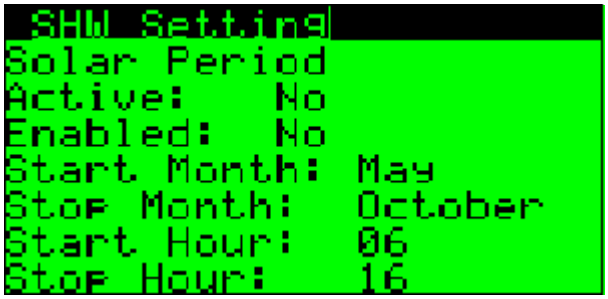
* Cause the setpoint is higher than 45°C, it is possible, the electric heater will be activated to reach the requested temperature.

Note: For correct function, the heat pump must be equipped with internal or external electric heater or gas boiler.

Using ESC key returns to the Main SHW display. Using UP/DOWN keys lists in SHW menu.

3.2.2.2 Solar Period function

Function to block SHW preparation by the heat pump according to simple timer setting.



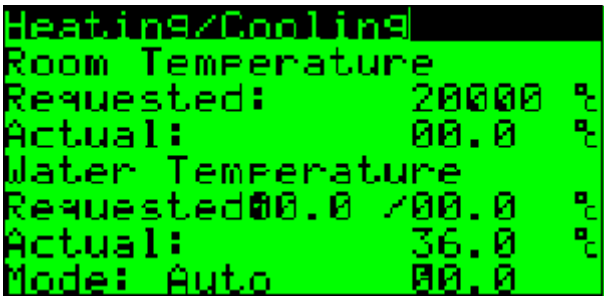
Parameter:	Range/F.:	Unit	Description
Active	Yes No	-	Yes: unit is in Solar Period No: unit is in normal mode
Enabled	Yes No	-	Yes: function is enabled No: function os disabled
Start Month	Jan-Dec	-	Month to start function
Stop Month	Jan-Dec	-	Month to stop function
Start Hour	00-23	h	Hour of the day to start function
Stop Hour	00-23	h	Hour of the day to stop function

Simply set the timer to block SHW preparation to allow solar thermal energy heat up the SHW.

Using ESC key returns to the Main SHW display. Using UP/DOWN keys lists in SHW menu.

3.2.3 Heating/Cooling

This display informs about the main heat pump heating/cooling circuit status and enables the Automatic or Manual circuit operation.

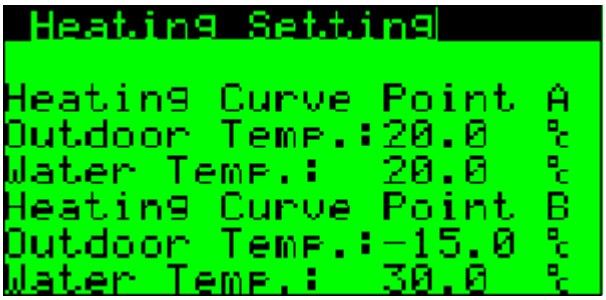


Parameter:	Range/F.:	Unit	Description
Room Temperature Requested	6.0 32.0 F: 20.0	°C	Requested Room temperature set by user. When Room probe is not used, this value is considered to adjust the water temperature. When pAD room terminal is used, entered value is automatically transferred to the pAD and vice versa.
Room Temperature Actual	-99.9 99.9	°C	If room temperature probe is used or pAD room terminal is used, this value is showing the real room temperature (Main Zone)
Water Temperature Requested	-99.9 99.9	°C	xx.x: The first value is the requested temperature according to the weather compensation setting of the main heating/cooling circuit. /xx.x: The second value is the result of all requests from the other heating/cooling circuits and exactly the real requested setpoint for Heat Pump.
Water Temperature Actual	-99.9 99.9	°C	Actual heating/cooling water temperature.
Mode	Auto Manual F: Auto	-	Auto: Automatic operation according to the setting of the main weather compensation curve. Manual: Manual operation according to entered value.
Manual Requested Temperature	*-99.9 99.9	°C	Requested heating/cooling water temperature set by user.

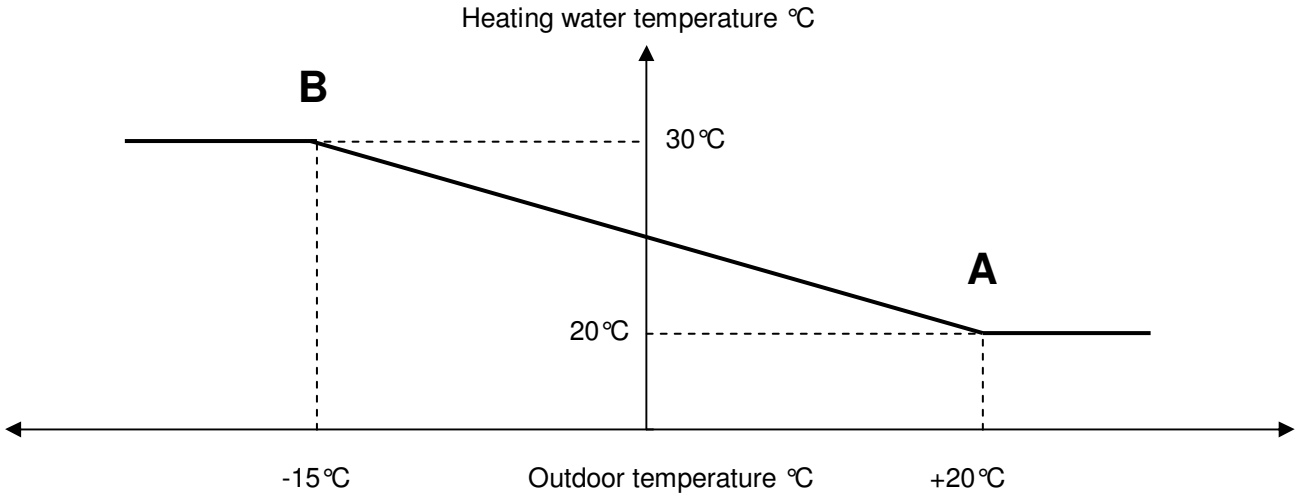
* The real temperature range is limited according to the setting during commisioning.

3.2.3.1 Heating Setting

Pressing PRG from previous screen will show Main Heating Weather Compensation Setting display.



Weather compensation parameters could be shown on following picture:



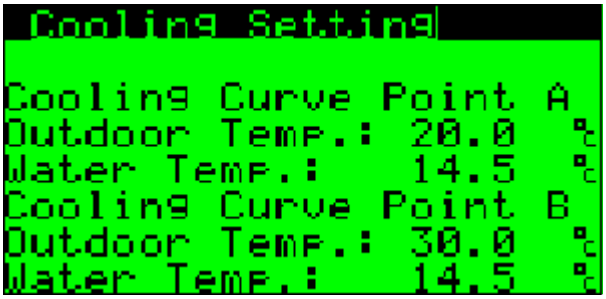
Parameter:	Range/F.:	Unit	Description
Point A Outdoor Temperature	-20.0 30.0 F: 20.0	°C	Point A, outdoor temperature definition.
Point A Water Temperature	*20.0 47.5 F: 20.0	°C	Point A, water temperature definition. Requested heating water temperature for defined Point A outdoor temperature. 20.0°C is typical setting for Under Floor Heating (UFH) and Radiators.
Point B Outdoor Temperature	-20.0 30.0 F: -15.0	°C	Point B, outdoor temperature definition.
Point B Water Temperature	*20.0 47.5 F: 30.0	°C	Point B, water temperature definition. Requested heating water temperature for defined Point B outdoor temperature. 30.0°C is typical setting for UFH. 40.0°C is typical setting for Radiators.

* The real temperature range is limited according to the setting during commisioning.

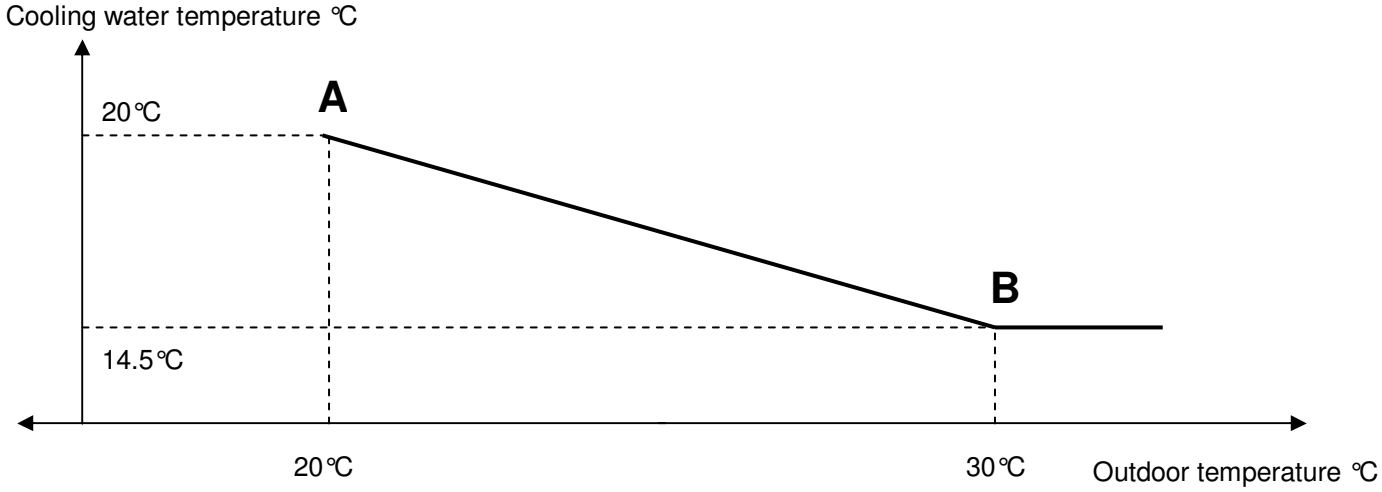
Use ESC key for return to previous display.
Use UP or DOWN key to reach the “Cooling Setting”, for units with Cooling, or Passive Cooling only.

3.2.3.2 Cooling Setting

This display is available only for units with Cooling, or Passive Cooling (Optional Equipment). Display enables setting of the Main Cooling Weather Compensation.



Weather compensation parameters could be shown on following picture:



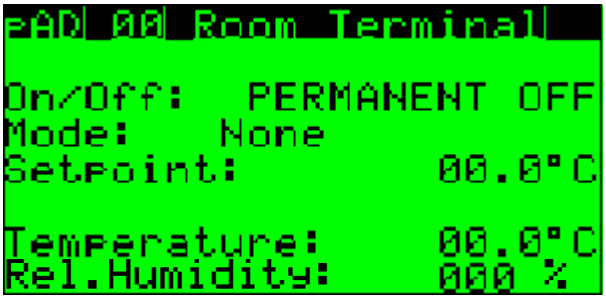
Parameter:	Range/F.:	Unit	Description
Point A Outdoor Temperature	10.0 40.0 F: 20.0	°C	Point A, outdoor temperature definition.
Point A Water Temperature	*14.5 30.0 F: 14.5	°C	Point A, water temperature definition. Requested cooling water temperature for defined Point A outdoor temperature. 20.0°C is typical setting for Under Floor Heating (UFH) and FanCoils.
Point B Outdoor Temperature	10.0 40.0 F: 30.0	°C	Point B, outdoor temperature definition.
Point B Water Temperature	*14.5 30.0 F: 14.5	°C	Point B, water temperature definition. Requested cooling water temperature for defined Point B outdoor temperature. 18.0°C is typical setting for UFH. 14.5°C is typical setting for FanCoils.

* The real temperature range is limited according to the setting during commisioning. Additional limitation is possible due to the Dew Point protection if it is activated.

Use ESC key for return to the display Heating/Cooling.

3.2.4 Room Terminal pADxx

When pAD room terminal is installed, following display automatically appears in the menu.



Parameter could be adjusted directly on pAD room terminal or remotely on pGD display using this mask.

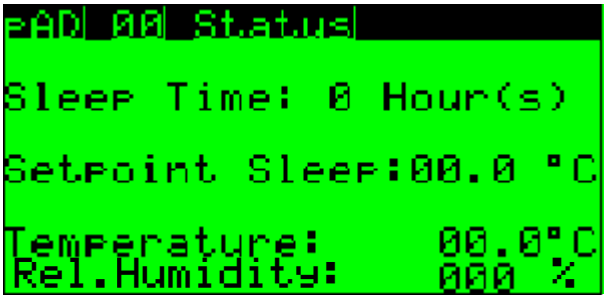
Parameter:	Range/F.:	Unit	Description
pAD	01, 11-16	-	pAD Identification Number. This Parameter is not adjustable. It is given by pAD Hardware Address. 01: Main Zone Room Terminal 11: Heating Circuit 1 Room Terminal 12: Heating Circuit 2 Room Terminal 13: Heating Circuit 3 Room Terminal 14: Heating Circuit 4 Room Terminal 15: Heating Circuit 5 Room Terminal 16: Heating Circuit 6 Room Terminal
On/Off	Pernament OFF OFF ON	-	Pernament OFF: Terminal is pernamently OFF and heating/cooling of the zone is disabled. OFF: Terminal is OFF by the scheduler and heating/cooling of the zone is temporarily disabled. ON: Terminal is ON and heating/cooling of the zone is enabled.
Mode	Winter Summer	-	For pAD 01 it has the same meaning like the main Mode of the Heat Pump. When unit is equipped with cooling or passive cooling, with Mode change also Function is changed. For pAD11 to 16, the Mode setting has no effect and Mode is forced according to the Heat Pump Mode. Heat Pump has priority to pAD11 to 16.
Setpoint	6.0 to 32.0	°C	Requested Room Temperature set by user.
Temperature	-99.9 to 99.9	°C	Real Room Temperature
Rel. Humidity	0-100	%	Real Room Relative Humidity

Note: Terminal **pAD 01** – Main Room Terminal has absolute priority if it is installed.

Using PRG key enters detailed pAD setting menu.

3.2.4.1 pADxx Status

This mask is accessible pressing PRG key from the pADxx display.

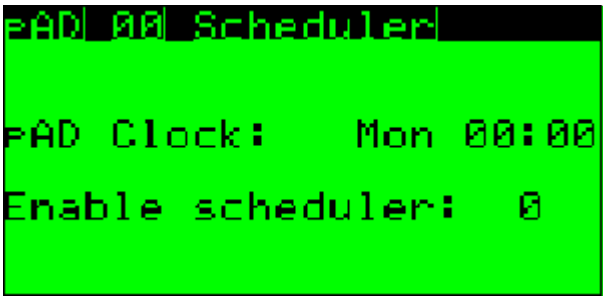


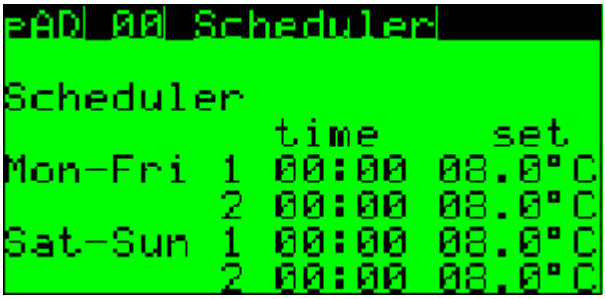
Parameter:	Range/F.:	Unit	Description
pAD	01, 11-16	-	pAD Identification Number. This Parameter is not adjustable. It is given by pAD Hardware Address. 01: Main Zone Room Terminal 11: Heating Circuit 1 Room Terminal 12: Heating Circuit 2 Room Terminal 13: Heating Circuit 3 Room Terminal 14: Heating Circuit 4 Room Terminal 15: Heating Circuit 5 Room Terminal 16: Heating Circuit 6 Room Terminal
Sleep Time	0-9	h	Remaining time of the pAD Sleep Function.
Setpoint Sleep	6.0 – 32.0	°C	Room Temperature Setpoint for pAD Sleep Function. Temporary Room Setpoint for the Sleep Time set. When Sleep Time elapses, Setpoint is returned to standart value set on the pAD.
Temperature	-99.9 to 99.9	°C	Real Room Temperature
Rel. Humidity	0-100	%	Real Room Relative Humidity

ESC key returns to pADxx Room Terminal display.
Using UP/DOWN keys lists in the pAD menu.

3.2.4.2 pADxx Scheduler

Scheduler setting consists of 2 displays.



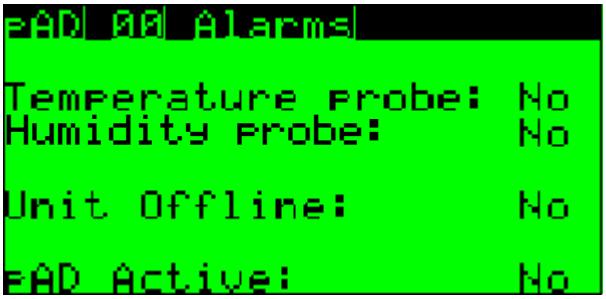


Parameter:	Range/F.:	Unit	Description
pAD	01, 11-16	-	pAD Identification Number. This Parameter is not adjustable. It is given by pAD Hardware Address. 01: Main Zone Room Terminal 11: Heating Circuit 1 Room Terminal 12: Heating Circuit 2 Room Terminal 13: Heating Circuit 3 Room Terminal 14: Heating Circuit 4 Room Terminal 15: Heating Circuit 5 Room Terminal 16: Heating Circuit 6 Room Terminal
pAD Clock	Mo-Su 00:00-23:59	d h:m	pAD actual time. Time is automatically synchronized with the main controller.
Enable Scheduler	0 1	-	0: Scheduler is not enabled. 1: Scheduler is enabled.
Mon-Fri time 1 2	 00:00-23:59 00:00-23:59	 h:m h:m	 Start time of the first time zone for Monday to Friday. Start time of the second time zone for Mo to Fr.
Mon-Fri set 1 2	 Off/6.0-32.0/On Off/6.0-32.0/On	 °C/- °C/-	 Room Setpoint, or simple On/Off request for TZ 1. Room Setpoint, or simple On/Off request for TZ 2.
Sat-Sun time 1 2	 00:00-23:59 00:00-23:59	 h:m h:m	 Start time of the first time zone for Sat - Sun. Start time of the second time zone for Sat - Sun.
Sat-Sun set 1 2	 Off/6.0-32.0/On Off/6.0-32.0/On	 °C/- °C/-	 Room Setpoint, or simple On/Off request for TZ 1. Room Setpoint, or simple On/Off request for TZ 2.

ESC key returns to pADxx Room Terminal display.
Using UP/DOWN keys lists in the pAD menu.

3.2.4.3 pADxx Alarms

If pAD is in Alarm Status it is possible to see it on this display.

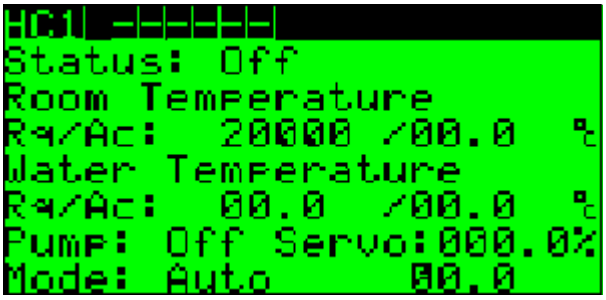


Parameter:	Range/F.:	Unit	Description
pAD	01, 11-16	-	pAD Identification Number. This Parameter is not adjustable. It is given by pAD Hardware Address. 01: Main Zone Room Terminal 11: Heating Circuit 1 Room Terminal 12: Heating Circuit 2 Room Terminal 13: Heating Circuit 3 Room Terminal 14: Heating Circuit 4 Room Terminal 15: Heating Circuit 5 Room Terminal 16: Heating Circuit 6 Room Terminal
Temperature Probe	No Yes	-	No: Temperature probe is not in alarm. Yes:Temperature probe has active alarm. Contact Your installation company, pAD must be replaced.
Humidity Probe	No Yes	-	No: Humidity probe is not in alarm. Yes:Humidity probe has active alarm. Contact Your installation company, pAD must be replaced.
Unit Offline	No Yes	-	No: Unit is Online, no alarm. Yes: Unit is Offline = alarm Please check proper pAD location in the plastic frame on the wall. If the position is correct, please contact installation company.

ESC key returns to pADxx Room Terminal display.
Using UP/DOWN keys lists in the pAD menu.

3.2.5 Heating Circuits

When additional Heating/Cooling Circuit or more Heating/Cooling Circuits are enabled during commisioning, following display(s) appears in the menu.



This display informs about the additional heating/cooling circuit status and enables the Automatic or Manual circuit operation.

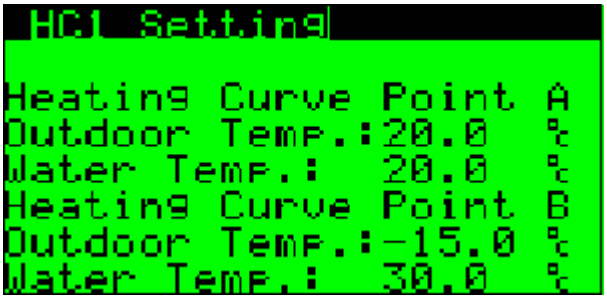
Parameter:	Range/F.:	Unit	Description
HCx	1-6	-	Heating Circuit (HC) Identification
------	alphanumerical	-	Up to 6 characters for customized HC name
Room Temperature Rq	6.0 32.0 F: 20.0	°C	Requested Room temperature set by user. When Room probe is not used, this value is considered to adjust the water temperature. When pAD room terminal is used, entered value is automatically transferred to the pAD and vice versa.
Room Temperature Ac	-99.9 99.9	°C	If room temperature probe is used or pAD room terminal is used, this value is showing the actual room temperature of the HCx Zone
Water Temperature Rq	-99.9 99.9	°C	xx.x: The first value is the requested temperature according to the weather compensation setting of the main heating/cooling circuit. /xx.x: The second value is the result of all requests from the other heating/cooling circuits and exactly the real requested setpoint for Heat Pump.
Water Temperature Ac	-99.9 99.9	°C	Actual HCx heating/cooling water temperature.
Pump	Off On	-	Off: HCx relay (pump) is not running. On: HCx relay (pump) is running.
Servo	0-100.0	%	Mixing valve position.
Mode	Auto Manual F: Auto	-	Auto: Automatic operation according to the setting of the main weather compensation curve. Manual: Manual operation according to entered value.
Manual Requested Temperature	*-99.9 99.9	°C	Requested heating/cooling water temperature set by user.

* The real temperature range is limited according to the setting during commisioning.

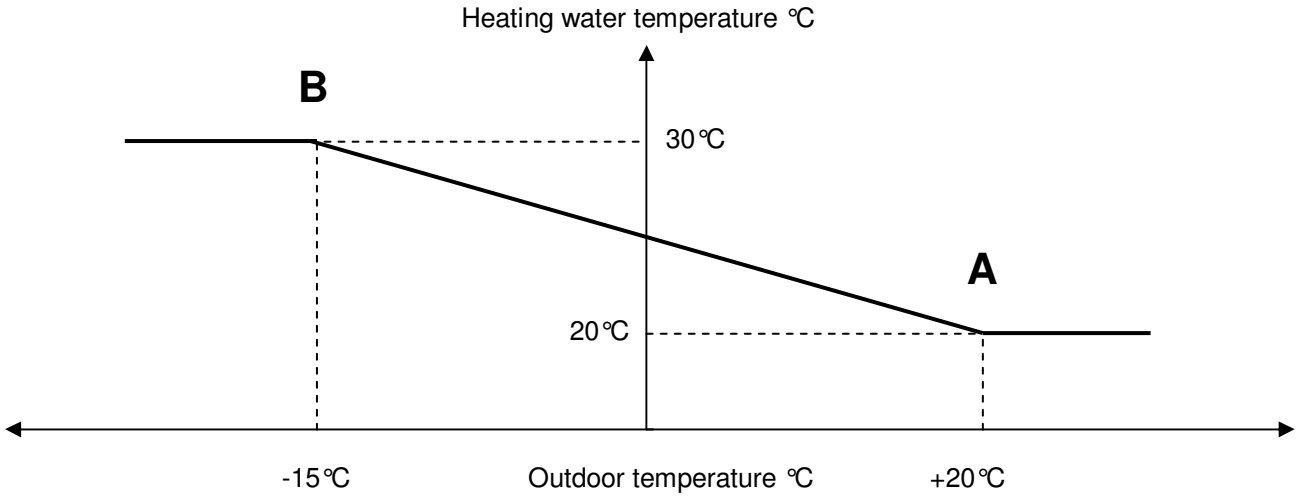
Key PRG opens Weather Compensation Curve setting for HCx.

3.2.5.1 HCx Heating Curve Setting

Pressing PRG from previous screen will show Main Heating Weather Compensation Setting display for Heating Circuit (HCx).



Weather compensation parameters could be shown on following picture:



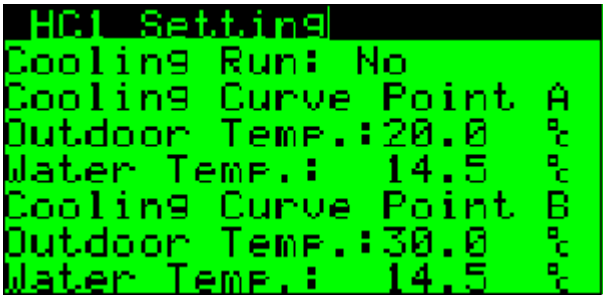
Parameter:	Range/F.:	Unit	Description
Point A Outdoor Temperature	-20.0 30.0 F: 20.0	°C	Point A, outdoor temperature definition.
Point A Water Temperature	*20.0 47.5 F: 20.0	°C	Point A, water temperature definition. Requested heating water temperature for defined Point A outdoor temperature. 20.0°C is typical setting for Under Floor Heating (UFH) and Radiators.
Point B Outdoor Temperature	-20.0 30.0 F: -15.0	°C	Point B, outdoor temperature definition.
Point B Water Temperature	*20.0 47.5 F: 30.0	°C	Point B, water temperature definition. Requested heating water temperature for defined Point B outdoor temperature. 30.0°C is typical setting for UFH. 40.0°C is typical setting for Radiators.

* The real temperature range is limited according to the setting during commisioning.

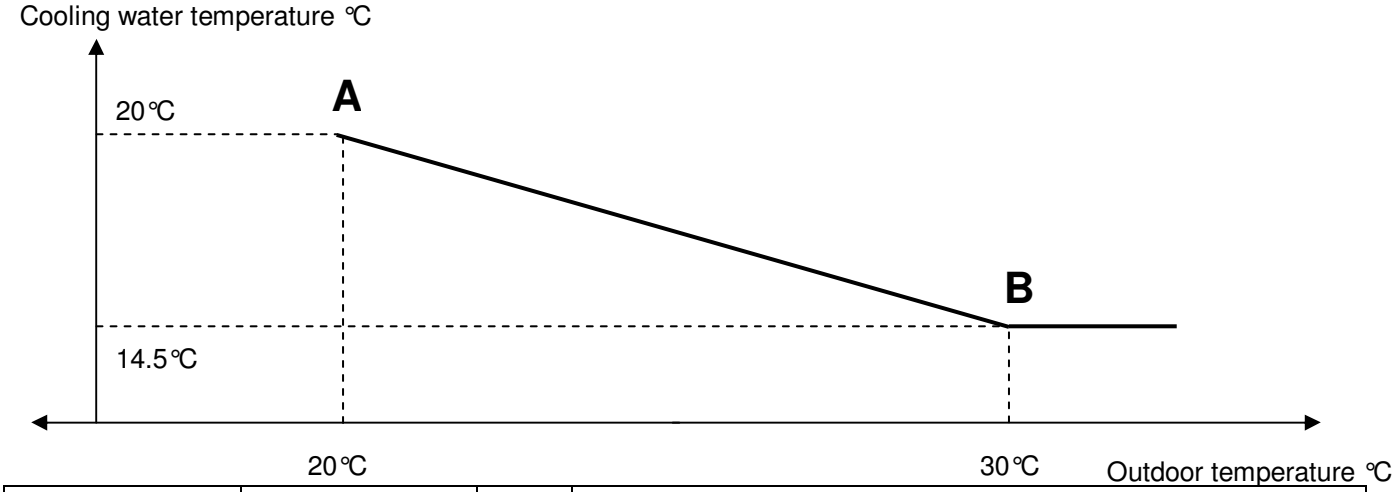
Use ESC key for return to previous display, HCx.
Use UP or DOWN key to reach the “HC1 Cooling Curve Setting”, for units with Cooling, or Passive Cooling only.

3.2.5.2 HCx Cooling Curve Setting

This display is available only for units with Cooling, or Passive Cooling (Optional Equipment). Display enables setting of the HCx Cooling Weather Compensation.



Weather compensation parameters could be shown on following picture:



Parameter:	Range/F.:	Unit	Description
Cooling Run:	No Yes	-	No: HCx is not operating in Cooling Function. Yes: HCx is operating in Cooling Function
Point A Outdoor Temperature	10.0 40.0 F: 20.0	°C	Point A, outdoor temperature definition.
Point A Water Temperature	*14.5 30.0 F: 14.5	°C	Point A, water temperature definition. Requested cooling water temperature for defined Point A outdoor temperature. 20.0°C is typical setting for Under Floor Heating (UFH) and FanCoils.
Point B Outdoor Temperature	10.0 40.0 F: 30.0	°C	Point B, outdoor temperature definition.
Point B Water Temperature	*14.5 30.0 F: 14.5	°C	Point B, water temperature definition. Requested cooling water temperature for defined Point B outdoor temperature. 18.0°C is typical setting for UFH. 14.5°C is typical setting for FanCoils.

* The real temperature range is limited according to the setting during commisioning. Additional limitation is possible due to the Dew Point protection if it is activated.

Use ESC key for return to previous display, HCx.

3.2.5.3 HCx Custom Name

Following display enables setting of the Custom Name for Heating Circuit.

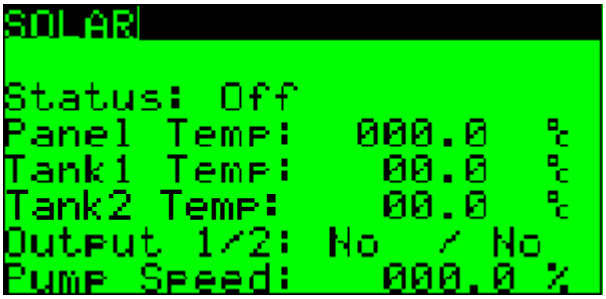
Each dash could be substituted by alphanumerical character.
Example: “1FLOOR”
This HCx “Name” appears on the main HCx mask.

3.2.5.4 Heating/Cooling Circuits (HCx) General Principle

- It is possible to enable up to 6 heating/cooling circuits
- As the heating/cooling circuits are configured during commisioning, requested setpoints with corresponding offsets are automatically transferred to the Main Heating/Cooling Circuit (Heat Pump)
- Heat Pump is always supplying highest temperature requested in the Heating Function and the lowest temperature requested in the Cooling Function, up to it’s absolute limits.
- Each circuit could be equipped with pAD Room Terminal, which enables Scheduler and automatic water temperature adjusting to reach requested Room (Zone) temperature.

3.2.6 Solar

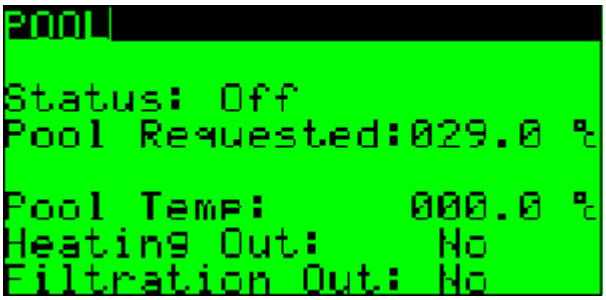
When Solar Thermal control is enabled, following display appears in the menu.



Parameter:	Range/F.:	Unit	Description
Status	Off On	-	Off: Control is disabled by the user. On: Control is enabled by the user.
Panel Temperature	-50.0 150.0	°C	Real Solar Panel temperature
Tank 1 Temperature	-50.0 99.9	°C	Real Storage Tank water temperature charged by Solar Thermal system.
Tank 2 Temperature	-50.0 99.9	°C	Real Storage Tank no.2, or additional demand side water temperature charged by Solar Thermal system. This value is shown only, when Storage Tank no.2 or additional demand side is configured (an example Swimming Pool)
Output 1/2	No, Yes	-	Relay Output no.1, or 2 status. No=Off, Yes=On
Pump Speed	0-100.0	%	Pump Speed, when Pump with variable speed is used.

3.2.7 Swimming Pool

When Swimming Pool control is enabled, following screen appears in the menu.

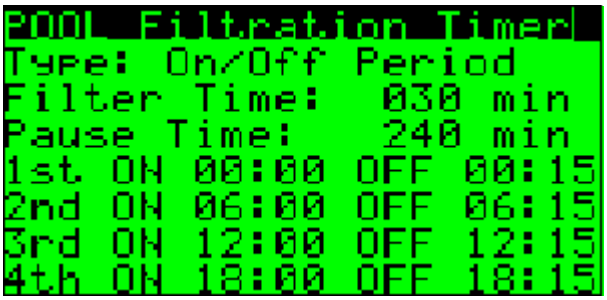


Parameter:	Range/F.:	Unit	Description
Status	Off On	-	Off: Control is disabled by the user. On: Control is enabled by the user.
Pool Requested Temperature	0.0 99.9	°C	Requested Swimming Pool water temperature set by user.
Pool Temperature	-50.0 99.9	°C	Real Swimming Pool water temperature.
Heating Out	No Yes	-	Yes: Swimming Pool heating is in operation
Filtration Out	No Yes	-	Yes: Filtration Pump in operation.

Press PRG for additional Swimming Pool setting.

3.2.7.1 Pool Filtration Timer Setting

This display enables swimming pool filtration configuration.

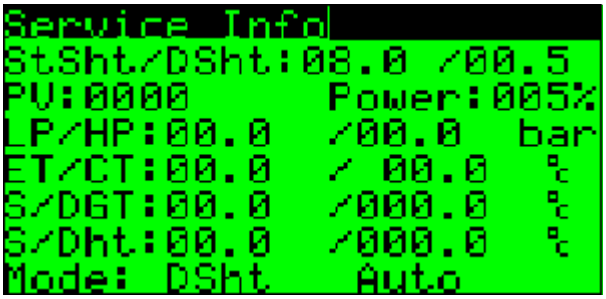


Parameter:	Range/F.:	Unit	Description
Type	On/Off Period Scheduler	-	On/Off Period: Filtration pump is activated according to the Filter/Pause Time principle. Scheduler: Filtration pumps is activated according to the Scheduler.
Filter Time	0 999	min	Filtration pump run period.
Pause Time	0 999	min	Filtration pump stop period.
1st, 2nd, 3rd, 4th ON/OFF	00:00 23:59	h:m	1st, 2nd, 3rd and 4th On/Off time scheduler definition.

Key ESC returns to the POOL mask.

3.2.8 Service Info

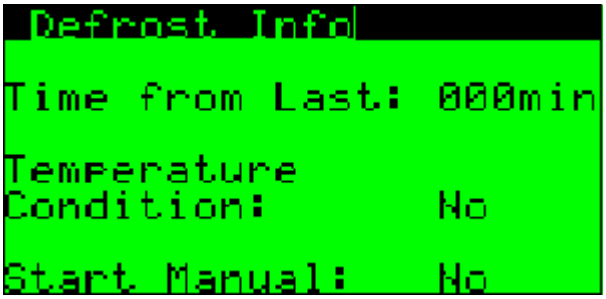
This is information display with refrigerant circuit operating parameters.



Parameter:	Range/F.:	Unit	Description
StSht	-99.9 99.9	°C	Suction Superheat Setpoint.
StDSht	-99.9 99.9	°C	Discharge Superheat Setpoint.
PV	0 9999	-	Electronic Expansion Valve Position.
Power	0 100	%	Electronic Expansion Valve capacity request.
LP/HP	-1.0 45.0	bar	Actual Compressor Suction / Discharge Pressure.
ET/CT	-50.0 99.9	°C	Actual Evaporating/Condensing Temperature.
S/DGT	-50.0 150.0	°C	Actual Suction / Discharge Gas Temperature.
S/Dht	-50.0 99.9	°C	Actual Suction / Discharge Superheat.
Mode	SSht DSht	°C	Actual Control type. SSht: Suction Superheat Control DSht: Discharge Superheat Control

3.2.8.1 Defrost Info (Air/Water units only)

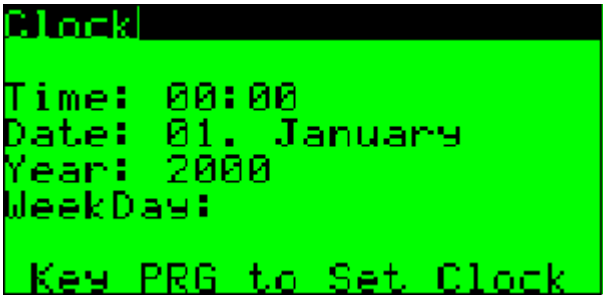
Pressing PRG key on previous screen opens Defrost Info mask.



Parameter:	Range/F.:	Unit	Description
Time from Last Cycle	000 200	Min	Shows time from last defrost cycle. When period is longer than 200 minutes, the value is not increasing.
Temperature Condition	No Yes	-	Informs, if temperature condition starting the defrost cycle is met.
Start Manual	No Yes	-	When Temperature Condition is met, it is possible to manually activate the defrost cycle and bypass the minimum time between 2 defrost cycles, usually set to 45 minutes.

3.2.9 Clock

Clock screen is the Last screen of the Auxiliary Menu.

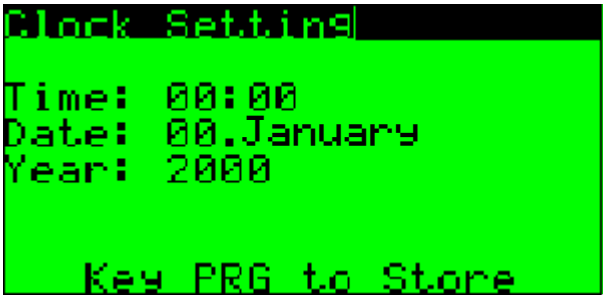


Parameter:	Range/F.:	Unit	Description
Time	00:00 23:59	h:m	Shows actual hours and minutes of the day.
Date	01. January 31. December	-	Day of the month and month.
Year	2000 2099	-	Shows actual year.
WeekDay	Monday Sunday	-	Shows day of the week.

Press PRG to set the Clock.

3.2.9.1 Setting the Clock

This displayappears after pressing PRG key on previous screen.



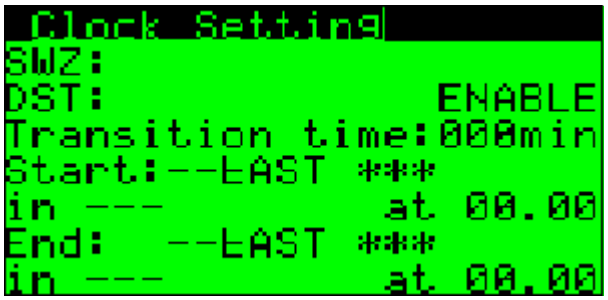
Parameter:	Range/F.:	Unit	Description
Time	00:00 23:59	h:m	Setting of the new time.
Date	01. January 31. December	-	Setting of the new day and month.
Year	2000 2099	-	Setting of the new year.

Important: After setting the new values press **PRG** key to **STORE** them, otherwise the new setting is lost.

Note: New clock setting is automatically distributed into pAD terminals.

3.2.9.2 Setting the Daylight Saving Time

This mask enables setting the automatic Daylight Saving Time (DST) changeover.
Mask could be reached using UP/DOWN keys from previous screen.

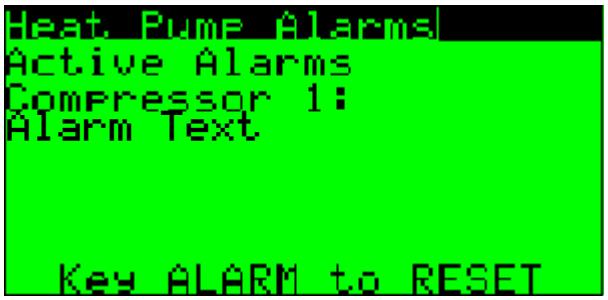


Parameter:	Range/F.:	Unit	Description
DST	Enable Disable	-	Enables or Disables automatic DST changeover.
Transition time	0 999	min	Time for changeover, when unit was not powered.
Start	First Second Third Forth Last Mon-Sun	-	Day of the Month to start the DST
At	00:00 23:59	h:m	Time to start DST

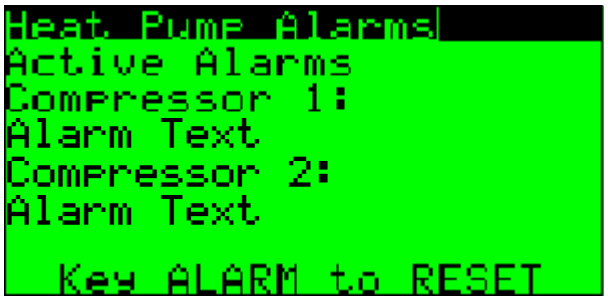
Parameter:	Range/F.:	Unit	Description
End	First Second Third Forth Last Mon-Sun	-	Day of the Month to stop DST
At	00:00 23:59	h:m	Time to stop DST

4 Alarms

Alarms may occur while the unit is in operation. The control is drawn up in such a manner that the operation can be restarted automatically. If a problem is more serious, it is necessary to reset the unit manually.
If an alarm state occurred during the operation of the unit, the backlighting of ALR key flashes on and off. If the backlighting of the key is lit steadily, the unit has been blocked and it is necessary to reset it manually.
By pressing ALARM button, the screen with active alarms, or last active alarm will be displayed.



If the unit is equipped with 2 compressors, alarms are showing separately for each compressor.



4.1 Types of alarm

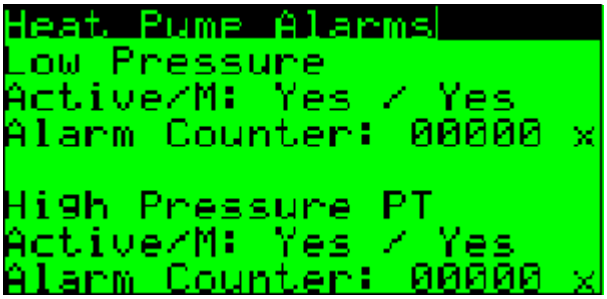
Displayed Alarm Text	Alarm Code	Alarm description	Reset
Low Pressure	AL01	compressor low suction pressure	aut.<3/hrs
High Pressure PT	AL02	compressor high discharge pressure from pressure transducer	aut.<3/hrs
High Discharge Temp.	AL03	high compressor discharge gas temperature	aut.<3/hrs
High Condensing Temp.	AL04	too high refrigerant condensing temperature	aut.<3/hrs
Low Evaporating Temp.	AL05	too low evaporating temperature	aut.<3/hrs
Antifreeze	AL06	low water temperature with risk of freezing	aut.<3/hrs
Fan Thermal	AL07	fan overheating, or circuit breaker activation brine pump overheating or circuit breaker activation	aut.<3/hrs
Compressor Thermal	AL08	compressor overheating, or circuit breaker activation	aut.<3/hrs
Flow	AL09	inufficient or no flow of water thru heat pump	aut.<3/hrs
Probes	AL10	one of the important temperature sensor malfunction	automatic
High Pressure Switch	AL11	compressor high discharge pressure from pressure high pressure switch	aut.<3/hrs
Low Pressure HP side	AL12	too low pressure on high pressure side of the refrigerant circuit	aut.<3/hrs
DC Drive Alarm	AL13	alarm of the compressor drive for inverter units	automatic
EVD Evo	AL14	alarm of the Electronic Expansion Valve driver	aut.<3/hrs

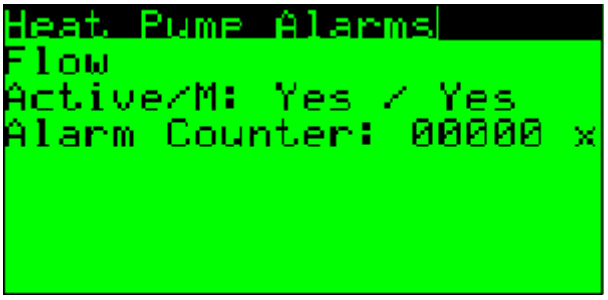
4.2 General Alarm Explanation

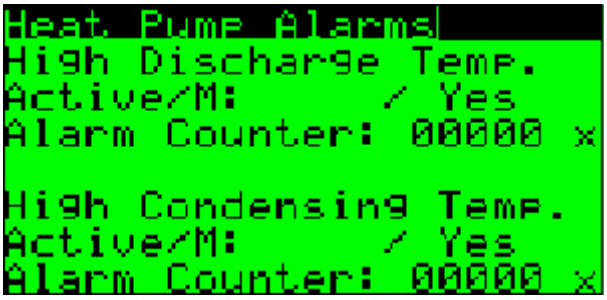
Heat Pump is complex device consisting of sensitive components. Therefore control system switchs the operation off in case the operating conditions are not suitable for unit safe and long durability operation. Operating conditions are given externally, by the actual status of power supply, actual load and operating mode request. Alarms could occur during unit standard unit operation. Until unit in not in pernament alarm, or it does not require manual reset, there is no reason to concern.

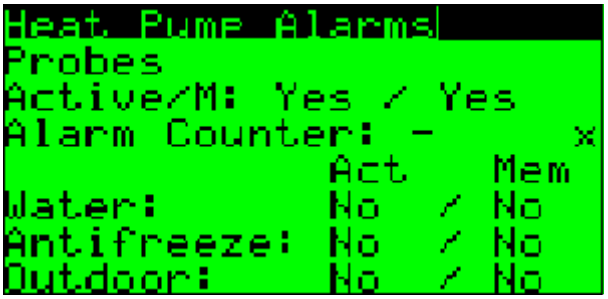
4.3 Detailed Alarm Displays

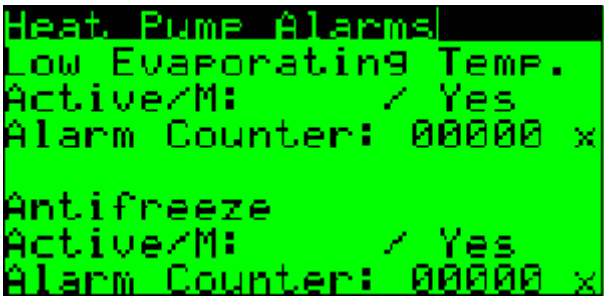
Using UP/DOWN keys lists in the alarm menu. Detailed display is available for each alarm. It shows active or inactive alarm and total alarm counter.

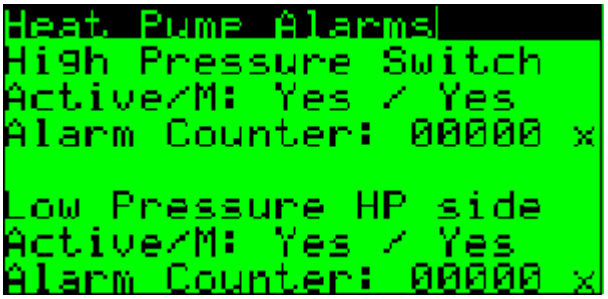


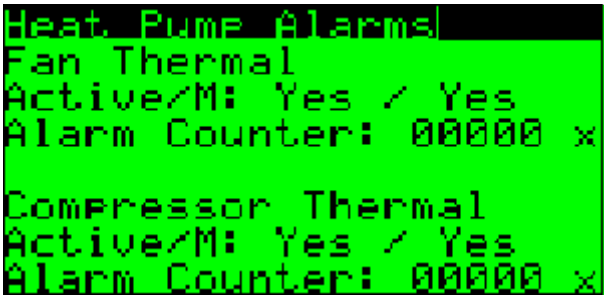


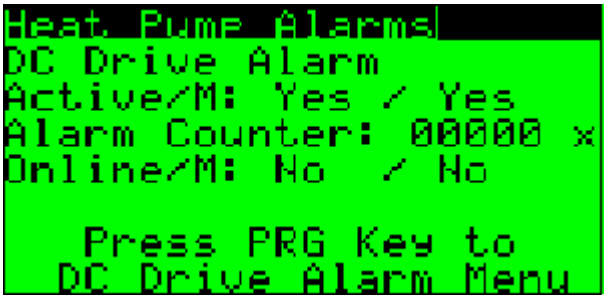












```
Heat Pump Alarms
EVD Evo
Active/M: Yes / Yes
Alarm Counter: 00000 x
EVD Online: No

  Press PRG Key to
 EVD Evo Alarm Menu
```

Parameter:	Range/F.:	Unit	Description
Active	No Yes	-	No: Alarm is not active. Yes: Alarm is actually active.
/M (Memory)	No Yes	-	No: Alarm is not active in memory Yes: Alarm is active in memory, control system is waiting minimum compressor Off time for recovery.
Alarm Counter	0 32000	-	Shows how many alarms of this type happened during unit operation from last counter reset.

Note: For DC Drive and EVD Evo alarms it is possible to enter detailed alarm menu pressing PRG key. You can be asked to enter detailed alarm menu to assist with problem recognition before visit of the service dealer.

4.4 Warnings

Following alarms are not causing unit to stop, but some unit functions could be limited.

```
Heat Pump Alarms
Passive Coling
Probe Alarm
Alarm Counter: -      x

Active: No
Memory: No
```

```
Heat Pump Alarms
Sanitary Hot Water
Probe Alarm
Alarm Counter: -      x

Active: No
Memory: No
```

```
Heat Pump Alarms
Room Temperature
Probe Alarm
Alarm Counter: -      x

Active: No
Memory: No
```

```
Heat Pump Alarms
Solar Probes Alarm

S1 Alarm/M: No  / No

S2 Alarm/M: No  / No

S3 Alarm/M: No  / No
```

```
Heat Pump Alarms

Pool Alarm

Probe Alarm:  No

Alarm Memory: No
```

4.5 To reset alarms

All alarms are reset automatically if the count of one type does not reach 3 in 1 operating hour of the compressor.

4.6 Manual reset

The manual reset is carried out by entering the alarm menu after pressing the ALARM key. Additional pressing of the ALARM key on any alarm display performs Manual Reset

5 What to do if....

5.1 After power is on, the backlighting of the ALR key flashes

It is a normal operating state. The operation of the heat pump is restored after 6 minutes, unless any of the alarms is really active. During this period, all alarms on the alarm screen are displayed as active.

5.2 The main screen with icons shows the symbol flashing

It informs that the regular maintenance period for the unit has elapsed. This situation is NOT ALARM and unit continues in normal operation. After typical compressor time in operation, it is recommended refrigerant circuit service inspection. Typical time is 3000 operating hours, therefore we recommend service inspection in 6 months from service icon appearing.

5.3 The symbol is lit

It indicates the high electric power tariff or remote Off.

5.4 The backlighting of the ALARM key flashes

It informs about an active alarm. Press this key shortly to display the type of the alarm. If the key keeps flashing, automatic reset will be performed and the unit will be put into operation in 6 minutes.

5.5 The ALARM key is lit steadily

The operation of the unit has been blocked as the same active alarm has been detected 3x during 1 operating hour of the compressor.
Press the ALARM key to display the type of the alarm. Refer to the table „What to do in the case of difficulties“ as it must be a more serious failure.
Reset the unit manually according to Chapter 4.6.

5.6 Active icon

The outdoor temperature has dropped below the application limit of the compressor. The compressor is turned off and the heating function is taken over by both of the heating elements. When the outdoor temperature rises above the limit, the compressor will be restarted automatically.

5.7 Defrosting icon flashes

It informs that the temperature conditions to activate defrosting have been met, however, the necessary time between the defrosting cycles has not elapsed yet. It is a normal operating state.

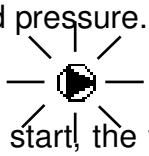
5.8 Defrosting icon is steadily lit

It informs that the defrosting cycle is in progress. At first the compressor and fan are stopped, next the reverse valve is activated and then the compressor is restarted. The defrosting cycle is completed by starting the fan and switching the reversing valve into the heating mode. During this mode the steam/fog could appears in the area of the outdoor unit.

5.9 E! appears on the Main Screen

Safety thermostat of the electric heater was activated and heater could not be switched on. It is neccessary to open the front cover and manually reset this device. Before reseting, please check water inlet filter strainer, sufficient heating water filling and pressure.

5.10 Pump symbol is flashing on the Main Screen

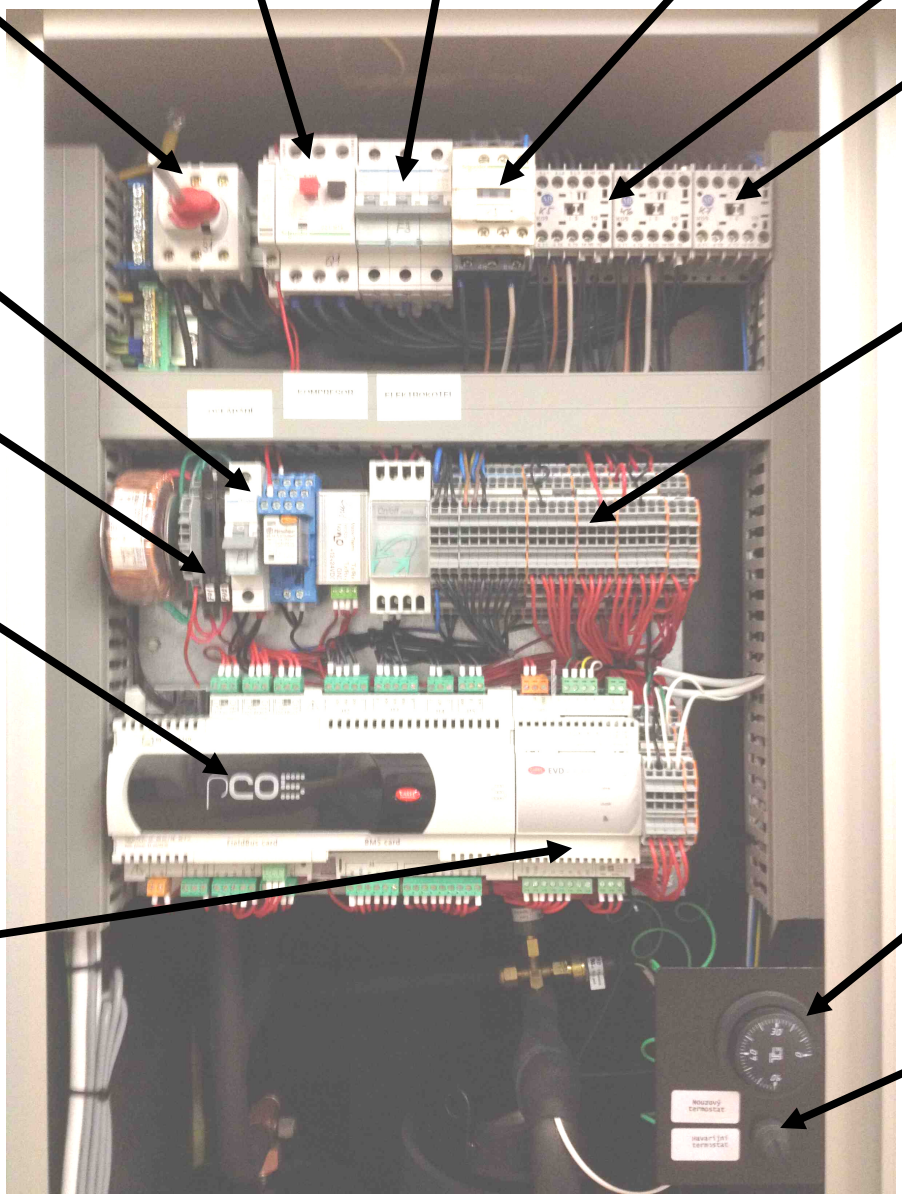


When icon is flashing more than 10s after the circulating pump start, the flow did not start and pump was switched off to protect it from damaging. This situation is called “Pump Alarm”. System tries to restart the pump each compressor off time. This situation is ussually connected to “Flow Alarm”. Please check water inlet filter strainer, sufficient heating water filling and pressure.

6 Switchboard

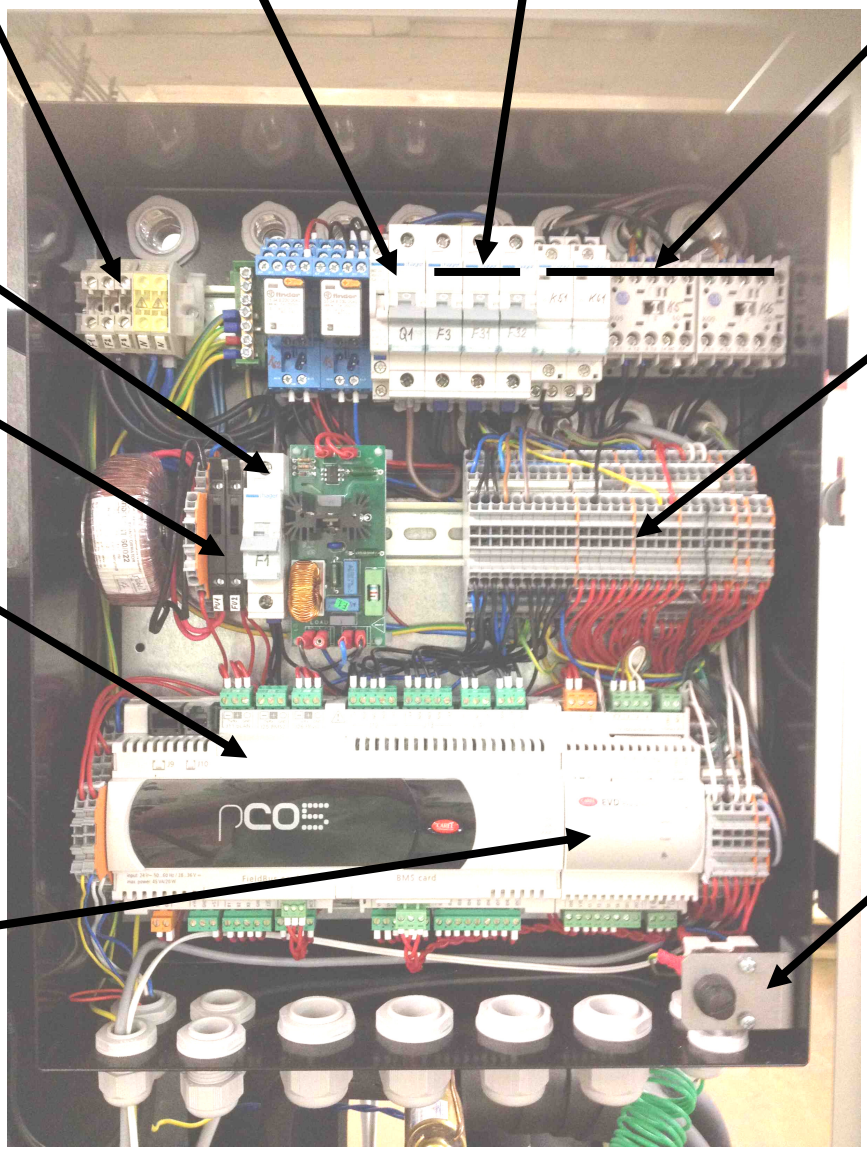
The switchboard is accessible after the main switch is off and the front door of the heat pump is opened. The switchboard comprises all power cut-out devices and electronics.
The layout is presented in the following figure:

6.1 AirMaster, EasyMaster, AquaMaster



WARNING:
BEFORE OPENING THE FRONT COVER, DISCONNECT THE POWER SUPPLY TO THE UNIT IN THE HOUSE MAIN ELECTRIC DISTRIBUTOR !

6.2 BoxAir



WARNING:
BEFORE OPENING THE FRONT COVER, DISCONNECT THE POWER SUPPLY TO THE UNIT IN THE HOUSE MAIN ELECTRIC DISTRIBUTOR !

6.3 Main switch

It is used to turn off the power supply leading to the heat pump switchboard.

6.4 Control circuit breaker

It protects the control devices, circulating pumps, etc.

6.5 Control Circuit Fuses

There are 2 fuses for protecting the transformer. The first is on high voltage side and the second is on the low voltage side. Please check supplied wiring diagram for correct fuse sizing. From production there is always 1 spare fuse on both sides inside the fuse box.

6.6 Auxiliary Heater Safety Thermostat

It is used to block the heaters in the case of its overheating (more than 70°C). For units with integrated storage tank also auxiliary heater circuit breaker is tripped. If this protection is activated, it is necessary to unscrew the thermoregulator plastic cover (anti-clockwise) and press the button located under the cover. If this activation occurred, inform please the installation company about this event.

6.7 Emergency Auxiliary Heater Manual Thermostat

The purpose of the emergency thermoregulator is to ensure emergency operation in the case of compressor outage. The reset is done by turning the thermoregulator to the desired temperature of heating water. By default, the maximum temperature of the thermoregulator has been inhibited to 50°C.

6.8 Auxiliary Heater Circuit Breaker

It is the electric protection element for electric heating rods. The failure may happen for two reasons. Either it is due to excessively heated integrated storage vessel, refer to Chapter 6.6, or there is a short circuit in the electric circuit of the rods. In either case, contact the installation company should a failure like this occurs.

6.9 Compressor circuit breaker

It is a starting circuit breaker for the compressor motor with integrated thermal protection for winding. The manufacturer of the heat pump has adjusted the maximum service current for the compressor on the circuit breaker. It is not allowed to modify this setting. If the service current is adjusted incorrectly, the compressor may get damaged.

7 Throubleshooting

7.1 Water/Water, Brine/Water Heat Pumps

The following chart lists alarms and activities of the operator to rectify the error state.

CODE	Meaning	Control action	Reason	Before you call service
AL01	Low pressure	Switches off compressor and brine circulator	Low closed loop temperature, evaporator freezing, brine circulator malfunction, full closed loop strainer	Switch off unit, clean closed loop strainer, check brine pressure of the closed loop, repeated problem - call service
AL02	High pressure PT	Switches off compressor and brine circulator	Too high water temperature, full water strainer, water circulator malfunction	Decrease requested water temperature, check deareating and water filling, clean water strainer, repeated problem - call service
AL03	High Discharge Temperature	Switches off compressor and brine circulator	Too high water temperature, full water strainer, water circulator malfunction. Could be caused also from slight refrigerant leaking, or temperature probe problem (AL10)	Decrease requested water temperature, check deareating and water filling, clean water strainer, repeated problem - call service
AL04	High Condensing Temperature in heating/cooling mode	Switches off compressor and brine circulator	Too high water/brine temperature, full water/brine strainer, water/brine circulator malfunction	Decrease requested water temperature, check deareating and water/brine filling, clean water/brine strainer, repeated problem - call service
AL05	Low Evaporating Temperature heating/cooling mode	Switches off compressor and brine circulator	Low closed loop/cooling water temperature, evaporator freezing, brine/water circulator malfunction, full closed loop/water strainer	Switch off unit, clean closed loop/water strainer, check brine/water pressure, repeated problem - call service
AL06	Antifreeze water protection	Switches off compressor and brine circulator	Low heating/cooling water temperature	Could be caused during long electricity supply problem, or by low water temperature in cooling mode. Wait for heating of the water by auxiliary heater, increase requested water temperature if cooling mode.
AL07	Brine Pump Malfunction (AQ120.2, 150.2, 180.2 only)	Switches off compressor and brine circulator	Brine circulator motor overheating problem, or ciruit breaker activation.	Call service

CODE	Meaning	Control action	Reason	Before you call service
AL08	Compressor Thermal Protection	Switches off compressor and brine circulator	Too high water temperature, power supply problem - missing phase, compressor motor malfunction	Switch on compressor circuit breaker, call service, if problem returns.
AL09	Low cooling/heating water flow	Switches off compressor and brine circulator	Circulator malfunction, full strainer cooling/heating water	Switch unit off, check water strainer. Repeated problem - call service
AL10	Temperature probe problem	Switches off compressor and brine circulator	Probe malfunction	Call service
AL11	High Pressure Switch	See AL01, AL02	See AL01, AL02	See AL01, AL02
AL12	Low Pressure HP Side	See AL01, AL02	See AL01, AL02	See AL01, AL02
AL13	DC Drive Alarm, Inverter units only	Switches off compressor and brine circulator	Compressor DC Drive Error	Restart unit power supply, if problem returns, please call service
AL14	EVD Evo Alarm	Switches off compressor and brine circulator	Malfunction of EVD Evo module	Restart unit power supply, if problem returns, please call service

7.2 Air/Water Heat Pumps

The following chart lists alarms and activities of the operator to rectify the error state.

CODE	Meaning	Control action	Reason	Before you call service
AL 01	Low pressure	Switches off the compressor and fan	Extremely low temperature of the outdoor air (below -20°C), freezing of the evaporator, operating failure of the fan	Wait for the error status to come to an end, in the case of the freezing of the evaporator, wait for the starting of the unit and perform a manual defrost; if the error occurs repeatedly, contact the installation company
AL 02	High pressure PT	Switches off the compressor and fan	Too high a temperature of the heating water	Reduce the required heating water temperature, check the bleeding and filling of the system, and check and clean the heating water filter; report the error to the installation company if it occurs repeatedly
AL 03	High Discharge Temperature	Switches off the compressor and fan	This error may be caused by insufficient coolant filling or its minor leaks; it may also be caused by a high temperature of the heating water or an extremely low outdoor air temperature. This error also occurs in the case of a sensor failure (AL 10)	Reduce the required heating water temperature, check the bleeding and filling of the system, and check and clean the heating water filter; report the error to the installation company if it occurs repeatedly
AL 04	High Condensing Temperature in heating/cooling mode	Switches off the compressor and fan	In the thawing mode, too high a temperature has been set for the end of thawing; in the cooling mode, a failure of the fan	Check the outdoor unit, and perform a manual reset; the installation company must be contacted
AL 05	Low Evaporating Temperature heating/cooling mode	Switches off the compressor and fan	Extremely low temperature of the outdoor air (below -20°C), freezing of the evaporator, operation failure of the fan	Wait for the error status to come to an end; in the case of the freezing of the evaporator, wait for the starting of the unit and perform a manual thawing; if the error occurs repeatedly, contact the installation company

CODE	Meaning	Control action	Reason	Before you call service
AL 06	Antifreeze water protection	Switches off the compressor and fan	Low temperature of the heating water	Check the circuit-breaker of the built-in electric boiler; check whether the cooling mode has not been activated by mistake
AL 07	Fan Thermal Protection	Switches off the compressor and fan	Fan overloading, faulty fan	Check the outdoor unit, and perform a manual reset; the installation company must be contacted
AL 08	Compressor Thermal Protection	Switches off the compressor	Too high a temperature of the heating water, incorrect setting of the heat protection of the compressor, faulty compressor	Reset the circuit-breaker of the compressor; contact the installation company
AL 09	Low cooling/heating water flow	Switches off the compressor and fan	Circulation pump error, clogged heating water filter	Check and clean the heating water filter. If the error occurs repeatedly, contact the installation company
AL 10	Temperature probe problem	Switches off the compressor and fan	Faulty sensor	Contact the installation company.
AL11	High Pressure Switch	See AL01, AL02	See AL01, AL02	See AL01, AL02, always call serrvice
AL12	Low Pressure HP Side	See AL01, AL02	See AL01, AL02	See AL01, AL02, always call serrvice
AL13	DC Drive Alarm, Inverter units only	Switches off compressor and fan	Pressure transducer malfunction	Call service
AL14	EVD Evo Alarm	Switches off compressor and fan	Malfunction of EVD400 module	Call service

7.3 Reseting Circuit Breakers

Please check the chapter “6 Switchboard” to find correct device and use device switch to reset it.

WARNING:
BEFORE OPENING THE FRONT COVER, DISCONNECT THE POWER SUPPLY TO THE UNIT IN THE HOUSE MAIN ELECTRIC DISTRIBUTOR !

7.4 Reseting the Auxiliary Heater Safety Thermostat

Activation of this safety device is signalized by appearing the “E!” symbol on the Main Screen. Please check the chapter “6 Switchboard” to find device location inside Your unit. If this protection is activated, it is necessary to unscrew the thermoregulator plastic cover (anti-clockwise) and press the button located under the cover. If this activation occurred, inform please the installation company about this event.

WARNING:
BEFORE OPENING THE FRONT COVER, DISCONNECT THE POWER SUPPLY TO THE UNIT IN THE HOUSE MAIN ELECTRIC DISTRIBUTOR !

7.5 Defrost Cycle (Air/Water only)

Due to the principle of operation of Air/Water Heat Pumps, there is air humidity condesation or ice creation on the outdoor unit heat exchanger. From this reason, control system is continuosly checking unit efficiency and when snow/ice layer is too big, the defrost cycle is initiated.
Firstly the compressor and fan are stopped, next the reverse valve is activated and then the compressor is restarted. The defrosting cycle is completed by starting the fan and switching the reversing valve into the heating mode. During this mode the steam/fog could appear in the area of the outdoor unit.

7.5.1 Activating of the Manual Defrost

Defrosting cycle is performed automatically by the control system. From reason of extreme weather conditions with combination of power supply malfunction, the standard automatic procedure might not be sufficient to fully remove the snow/ice from heat exchanger. From thi reason it is possible to activate the defrost cycle manually from pDG display, pressing the UP and DOWN key simultaneously.
Manual defrost could be also activated from the “Defrost Info” mask, please see chapter 3.2.8.1.
Reversible units could be also defrosted by setting the unit to the Cooling Function, please see chapter 3.2.1 “Setting Unit Operation”.

8 Declaration of Conformity

MasterTherm

Master Therm CZ s.r.o.
Václavské Náměstí 819/43, 110 00 Praha 1, Czech Republic ID: 25419714

EC DECLARATION OF CONFORMITY

acc. to §22 act no. 22/1997 Sb. as ammended by the act no.71/2000 Sb

Product: **Heat Pump air/water AirMaster, EasyMaster, BoxAir, BoxAir Inverter**

Models: **AM3015Z, AM3021Z, AM3030Z, AM3038Z, AM3045Z**
AM3060.2Z, AM3076.2Z, AM3090.2Z
AM3130Z, AM3138Z, AM3145Z, AM3160.2Z, AM3176.2Z, AM3190.2Z
EM17Z, EM22Z, EM26Z, EM30Z, EM37Z, EM45Z
BA17Z, BA22Z, BA22I, BA26Z, BA30Z, BA30I, BA37Z, BA45Z
BA17Z1, BA22Z1, BA26Z1, BA30Z1, BA37Z1

Manufacter: Master Therm CZ s.r.o., Praha, ČR

Product Description:
Appliance for energy trasfer from Renewable Energy Sources to Heating, Cooling and Sanitary Hot Water.

Declares that the components of the above mentioned units are conform to the following directives and standards:
NV č.163/2002 Sb.
ČSN EN 60335-2-40, ČSN EN 60335-1, ČSN ISO 11200
ČSN EN 378-1 až 4, ČSN EN 13136, ČSN EN 12263
ČSN EN 60704-2-2, ČSN EN 14511-2, -3, -4, ČSN EN 255-3
NV č.616/2006, ČSN EN 55011

Conformity: according to §7 art. 2 government directive no.163/2002 Sb.

No. of sheets: 1

Praha **1.7.2009**

Ing. Karel Guzek
company executive

MasterTherm

Master Therm CZ s.r.o.
Václavské Náměstí 819/43, 110 00 Praha 1, Czech Republic ID: 25419714

EC DECLARATION OF CONFORMITY

acc. to §22 act no. 22/1997 Sb. as ammended by the act no.71/2000 Sb

Product: **Heat Pump water/water AquaMaster, AquaMaster Inverter**

Models: **AQ17Z, AQ22Z, AQ22I, AQ26Z, AQ30Z, AQ30I, AQ37Z, AQ45Z, AQ45I AQ60Z, AQ60I, AQ75Z, AQ90Z, AQ120.2Z, AQ150.2Z, AQ180.2Z AQ17Z1, AQ22Z1, AQ26Z1, AQ30Z1, AQ37Z1, AQ50Z1, AQ60Z1**

Manufacter: Master Therm CZ s.r.o., Praha, ČR

Product Description:
Appliance for energy trasfer from Renewable Energy Sources to Heating, Cooling and Sanitary Hot Water.

Declares that the components of the above mentioned units are conform to the following directives and standards:

NV č.163/2002 Sb.
ČSN EN 60335-2-40, ČSN EN 60335-1, ČSN ISO 11200
ČSN EN 378-1 až 4, ČSN EN 13136, ČSN EN 12263
ČSN EN 60704-2-2, ČSN EN 14511-2, -3, -4, ČSN EN 255-3
NV č.616/2006, ČSN EN 55011

Conformity: according to §7 art. 2 government directive no.163/2002 Sb.

No. of sheets: 1

Praha **1.7.2009**

Ing. Karel Guzek
company executive

9 Safety and Environment Protection

9.1 Greenhouse Gas

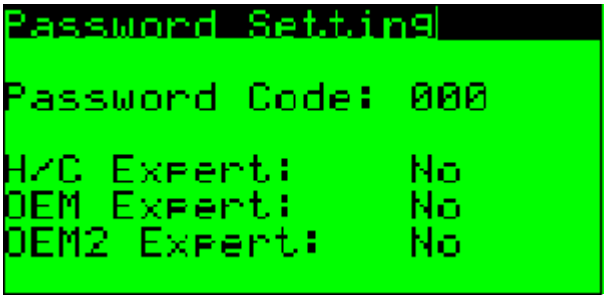
Heat Pumps contains greenhouse gas – refrigerant charge listed in Kjoto Protocol. Venting refrigerant into atmosphere is not allowed.

9.2 Hermetical Sealing

All units are hermatically sealed system after installation.

10 Service Menu

Service menu allows detailed parameters setting. Menu is divided into separate parts accoding to different heat pump functions.
To enter the service menu, press PRG on the main (icon) screen. Password dialog appears. Enter the correct password to reach service level.

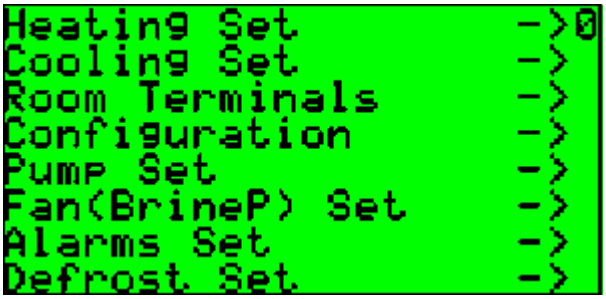


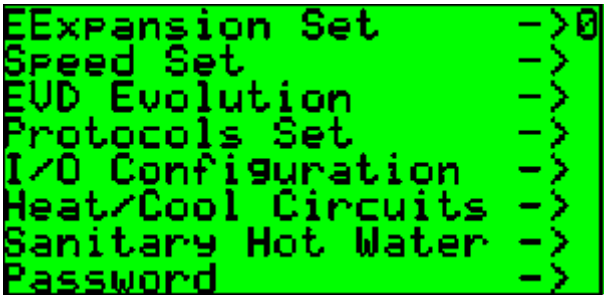
Parameter:	SP	Range/F.:	Unit	Description
Password Code	-	0-999	-	Password Code, 999 H/C, *
H/C Expert	-	Yes/No	-	H/C Expert access level
OEM Expert	-	Yes/No	-	OEM Expert access level
OEM2 Expert	-	Yes/No	-	OEM2 Expert access level

* Please ask Master Therm for other codes

Warning: Entering OEM/OEM2 access levels allows editing parameters, which incorrect setting could damage or destroy heat pump system.

Pressing PRG opens the Service Menu.



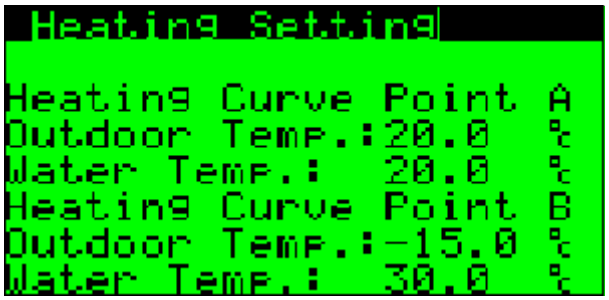


Move cursor to required function setting and press ENTER.

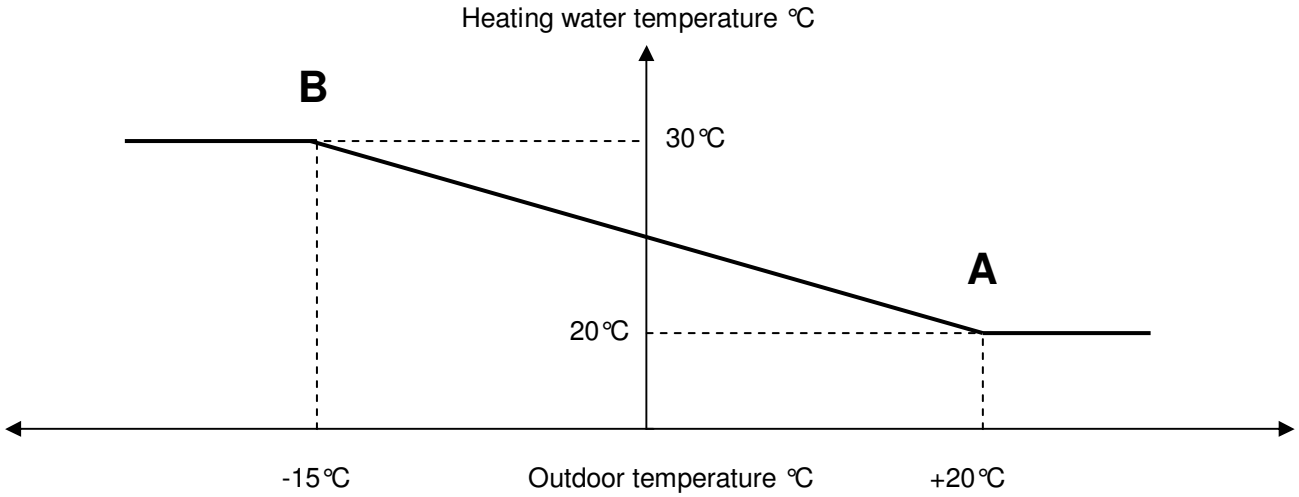
10.1 Heating Set

General setting of the main (heat pump) heating circuit.

10.1.1 Weather compensation Heating



Weather compensation parameters could be shown on following picture:

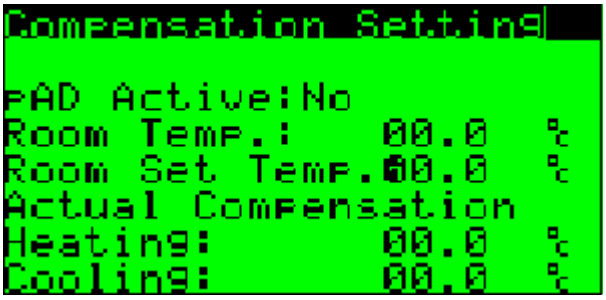


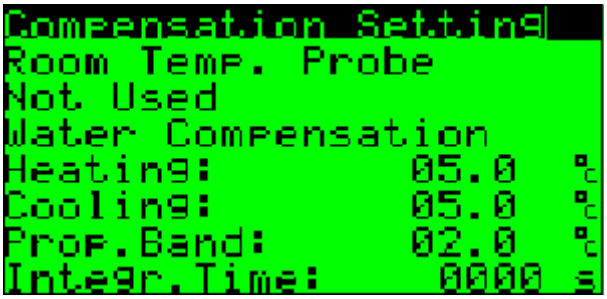
Parameter:	SP	Range/F.:	Unit	Description
Point A Outdoor Temperature	A35	-20.0 30.0 F: 20.0	°C	Point A, outdoor temperature definition.
Point A Water Temperature	A37	*20.0 47.5 F: 20.0	°C	Point A, water temperature definition. Requested heating water temperature for defined Point A outdoor temperature. 20.0°C is typical setting for Under Floor Heating (UFH) and Radiators.
Point B Outdoor Temperature	A36	-20.0 30.0 F: -15.0	°C	Point B, outdoor temperature definition.
Point B Water Temperature	A38	*20.0 47.5 F: 30.0	°C	Point B, water temperature definition. Requested heating water temperature for defined Point B outdoor temperature. 30.0°C is typical setting for UFH. 40.0°C is typical setting for Radiators.

* The real temperature range is limited according to the setting during commisioning.

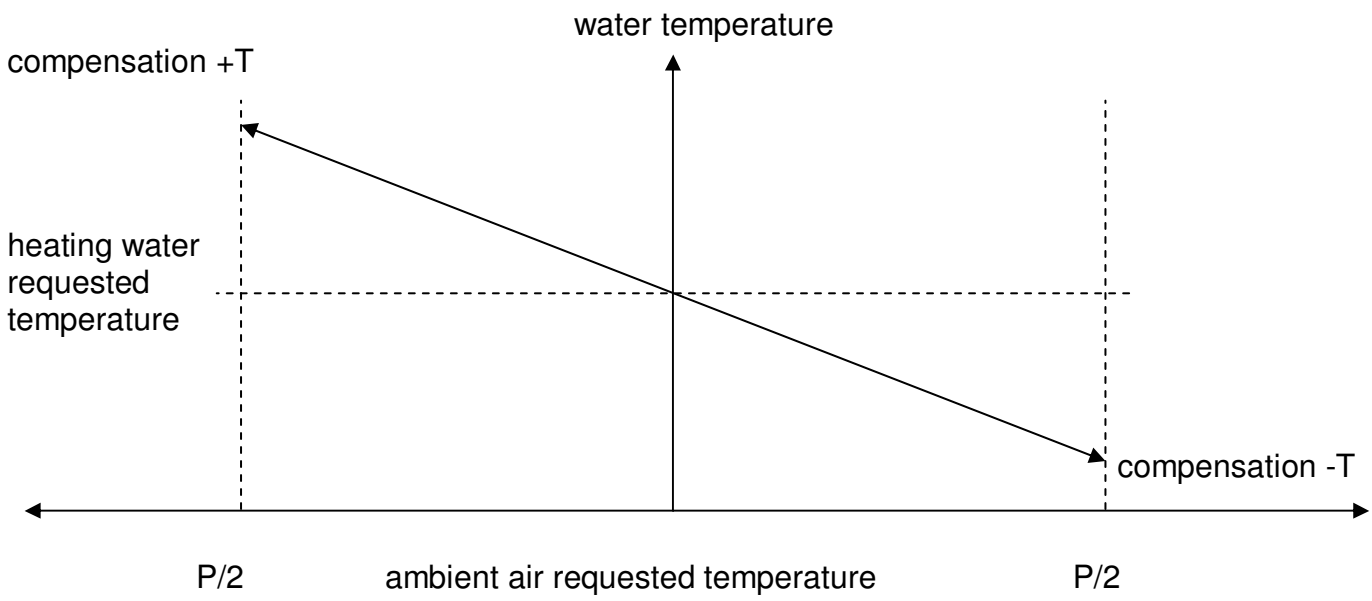
10.1.1.1 Room Compensation

Pressing PRG on 10.1.1 opens Room compensation screens.





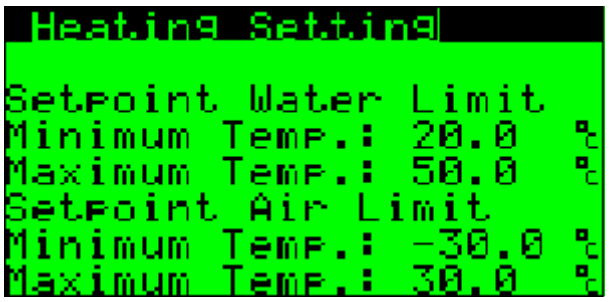
Parameter:	SP	Range/F.:	Unit	Description
pAD Active	D242	Yes/No	-	pAD01 Active status
Room Temp.	A211	-99.9/99.9	°C	Actual room temperature
Room Set Temp.	-	-99.9/99.9	°C	Room setpoint temperature
Actual Compensation Heating	A198	-99.9/99.9	°C	Result of room compensation on requested water temperature Heating
Actual Compensation Cooling	A199	-99.9/99.9	°C	Result of room compensation on requested water temperature Cooling.
Room Temp. Probe	-	B1-B5/pCO5, B1-B4/pCOe	-	Room temperature probe selection. If pAD01 is connected, keep Not Used
Water Compensation Heating	A196	-99.9/99.9 F: 5.0	°C	Maximum/Minimum water temperature compensation in heating mode
Water Compensation Cooling	A197	-99.9/99.9 F: 5.0	°C	Maximum/Minimum water temperature compensation in cooling mode
Prop. Band	A200	-99.9/99.9 F: 2.0	°C	Room temperature proportional band for water compensation calculation
Integr. Time	I180	0-9999 F: 0	S	Integration time of the water compensation calculation. Keep 0 for Proportional function only



Picture above, shows principle of room compensation. Calculated water compensation value is add to weather compensation value of the requested water temperature.

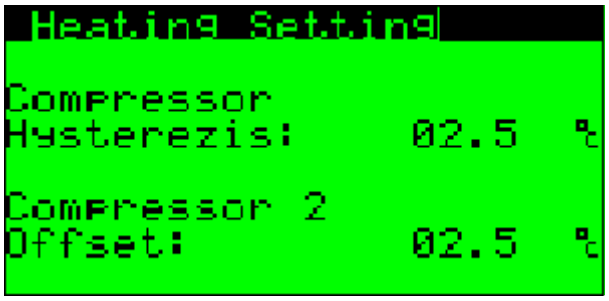
When room probe is not installed, nor the pAD01, the system automatically supposes room temperature 20.0°C. When requested room temperature is adjusted by the user, water compensation is also recalculated with virtual room temperature 20.0°C.

10.1.2 Water/Air Limits Heating



Parameter:	SP	Range/F.:	Unit	Description
Water Minimum Temp.	A299	-99.9/99.9 F: 20.0	°C	Minimum water temperature limit for the unit setpoint
Water Maximum Temp.	A207	-99.9/99.9 F: 50.0	°C	Maximum water temperature limit for the unit setpoint
Air Minimum Temp.	A300	-99.9/99.9 F: -30.0	°C	Minimum Air temperature limit for the unit setpoint. This is not the limit for unit operation.
Air Maximum Temp.	A301	-99.9/99.9 F: 30.0	°C	Maximum Air temperature limit for the unit setpoint. This is not the limit for unit operation.

10.1.3 Compressor Hysterezis / Offset Heating



Parameter:	SP	Range/F.:	Unit	Description
Compressor Hysterezis	A43	-99.9/99.9 F: 2.5	°C	Compressor control hysterezis.
Compressor 2 Offset	A302	-99.9/99.9 F: 2.5	°C	Negative offset of the Compressor 2 setpoint for double compressor units.

10.1.4 Compressor limit

Parameter:	SP	Range/F.:	Unit	Description
Water 30°C	A44	-99.9/99.9 F: *	°C	Compressor operation limit for water temperature 30°C.
Water 50°C	A45	-99.9/99.9 F: *	°C	Compressor operation limit for water temperature 50°C.
Actual Limit	A46	-99.9/99.9	°C	Actual calculated limit according to outdoor temperature.

* Different for different units

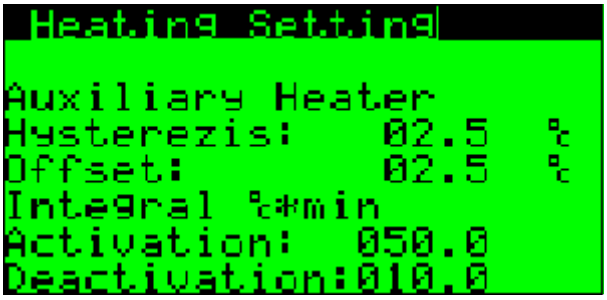
Unit:	Water 30°C	Water 50°C
AQ	-99.9	-99.9
AM	-15.0	-15.0
EM	-15.0	-12.0
BA	-15.0	-12.0
BAI	-15	-7.0

Control works with hysterezis 3.0°C.
Example:
Calculated limit: -15.0°C
Temperature OFF: -18.0°C
Temperature ON: -15.0°C

10.1.5 Auxiliary Heater Limit

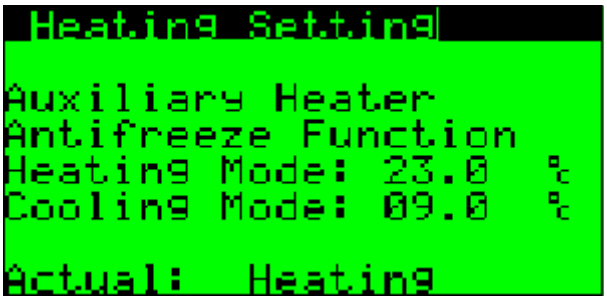
Parameter:	SP	Range/F.:	Unit	Description
Outdoor Temperature Limit	A39	-99.9/99.9 F: 0	°C	Outdoor temperature limit for enabling auxiliary heater.
Actual Integration Value	A10	-9999.9/ 9999.9	°C.min	Actual value of calculated missing heat integration.

10.1.6 Auxiliary Heater Control



Parameter:	SP	Range/F.:	Unit	Description
Hysterezis	A27	-99.9/99.9 F: 2.5	°C	Heater control hysterezis.
Offset	A28	-99.9/99.9 F: 2.5	°C	Heater setpoint offset from compressor setpoint.
Integral Activation	A40	0/999.9 F: 50.0	°C.min	When missing heat integration reaches this value, heater is activated
Integral Deactivation	A41	0/999.9 F: 10.0	°C.min	When missing heat integration reaches this value(negative) , heater is deactivated

10.1.7 Heater Antifreeze function



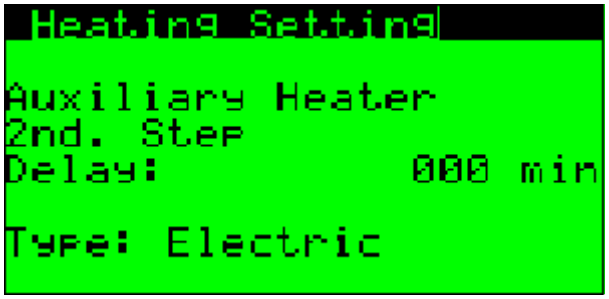
Parameter:	SP	Range/F.:	Unit	Description
Antifreeze Heating Mode	A42	-99.9/99.9 F: *	°C	Antifreeze water setpoint for activation of auxiliary heater in heating mode, below outdoor defrost limit.
Antifreeze Cooling Mode	A151	-99.9/99.9 F: *	°C	Antifreeze water setpoint for activation of auxiliary heater in cooling mode, above outdoor defrost limit.
Actual	-	Heating/ Cooling	-	Shows actual mode for antifreeze heater function.

* Different for different units

Unit:	Heating Mode	Cooling Mode
AQ	15.0	15.0
AM	23.0	13.0
EM	23.0	13.0
BA	15.0	10.0
BAI	15.0	10.0

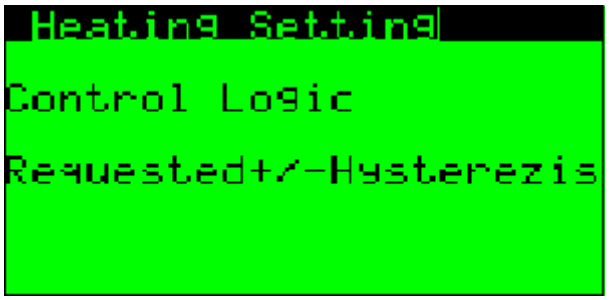
Control works with negative hysterezis.

10.1.8 Auxiliary Heater HW config



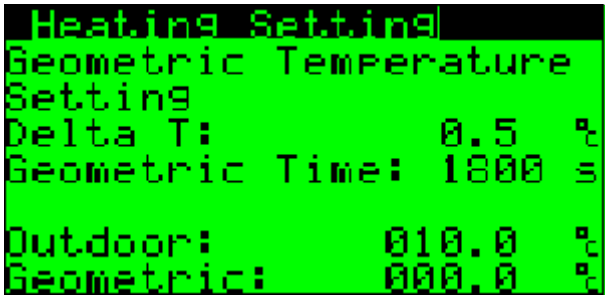
Parameter:	SP	Range/F.:	Unit	Description
2nd. Step Delay	I5	0/999 F: 0	min	Delay of the 2nd. heater stage. When set to 0, 2nd. stage is not activated with running compressor.
Type	-	Electric/Gas F: Electric	-	Specifies heater type. If Gas is selected, heater works beside compressor when unit remotely OFF (tariff control)

10.1.9 Heating Control Logic



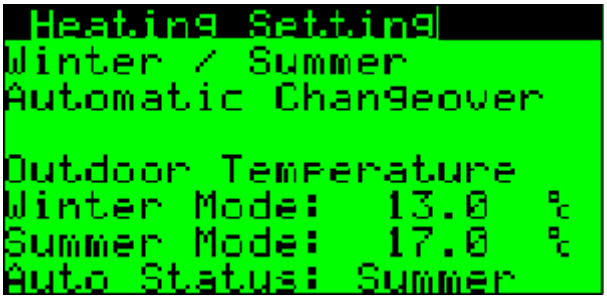
Parameter:	SP	Range/F.:	Unit	Description
Control Logic	D30	0: +/- 1: - F: 0	-	Main heating circuit control logic. When 0, water is controlled in logic setpoint +/- hysterezis. When 1, water is controlled in logic setpoint - hysterezis

10.1.10 Geometric temperature



Parameter:	SP	Range/F.:	Unit	Description
Delta T	A303	0/9.9 F: 0.5	°C	Change of the geometric temperature each period of geometric time (integration step).
Geometric Time	I43	0/9999 F:1800	s	Time period for geometric temperature calculation (integration period).
Outdoor	A3	-99.9/99.9	°C	Actual outdoor temperature.
Geometric	A34	-99.9/99.9	°C	Actual geometric temperature. Note: geometric temperature is reset to outdoor temperature on powering unit ON

10.1.11 Automatic Changeover



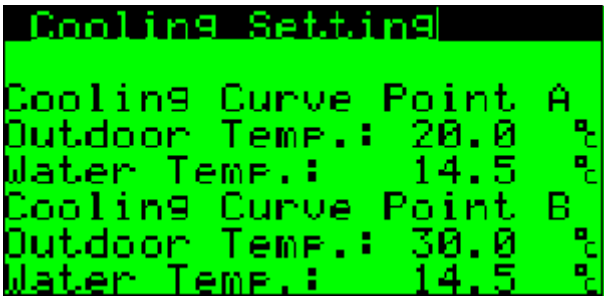
Parameter:	SP	Range/F.:	Unit	Description
Winter Mode	A82	-20.0 40.0 F:+13.0	°C	Outdoor temperature for activation of Winter Mode. Below this temperature, Winter Mode is activated.
Summer Mode	A83	-20.0 40.0 F:+17.0	°C	Outdoor temperature for activation of Summer Mode. Above this temperature, Summer Mode is activated.
Auto Status	-	Winter Summer	-	Result of the Automatic Changeover according to the setting above.

Note: The mode is not changed according to actual outdoor temperature, but geometric outdoor temperature, created inside the controller.

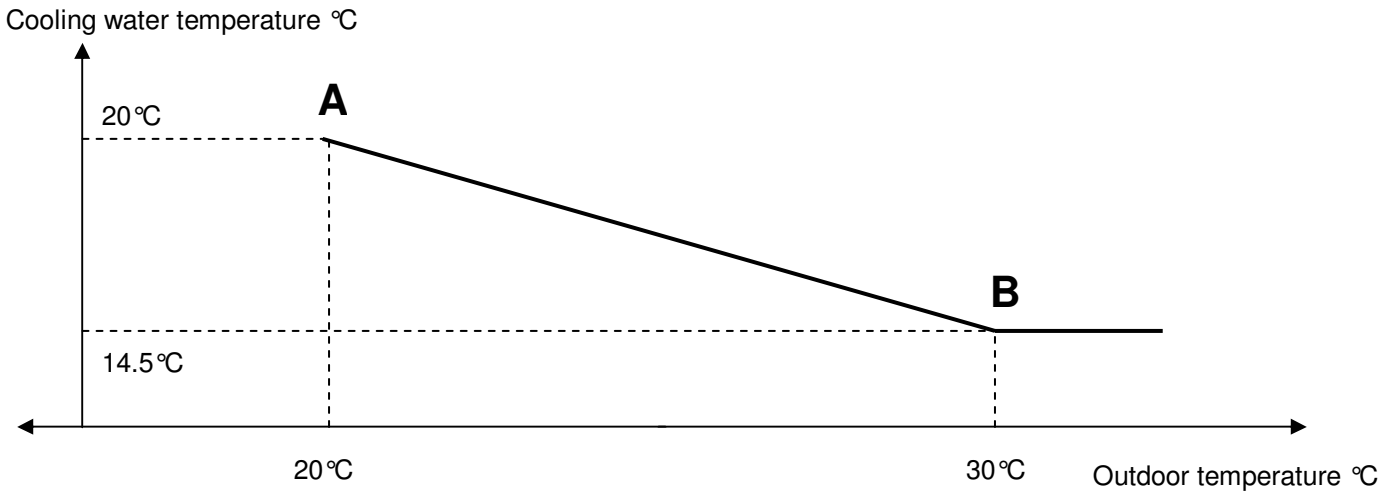
10.2 Cooling Set

10.2.1 Weather compensation Cooling

This display is available only for units with Cooling, or Passive Cooling (Optional Equipment). Display enables setting of the Main Cooling Weather Compensation.



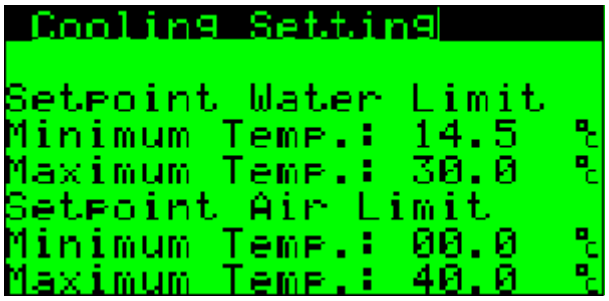
Weather compensation parameters could be shown on following picture:



Parameter:	SP	Range/F.:	Unit	Description
Point A Outdoor Temperature	A47	10.0 40.0 F: 20.0	°C	Point A, outdoor temperature definition.
Point A Water Temperature	A49	*14.5 30.0 F: 14.5	°C	Point A, water temperature definition. Requested cooling water temperature for defined Point A outdoor temperature. 20.0°C is typical setting for Under Floor Heating (UFH) and FanCoils.
Point B Outdoor Temperature	A48	10.0 40.0 F: 30.0	°C	Point B, outdoor temperature definition.
Point B Water Temperature	A50	*14.5 30.0 F: 14.5	°C	Point B, water temperature definition. Requested cooling water temperature for defined Point B outdoor temperature. 18.0°C is typical setting for UFH. 14.5°C is typical setting for FanCoils.

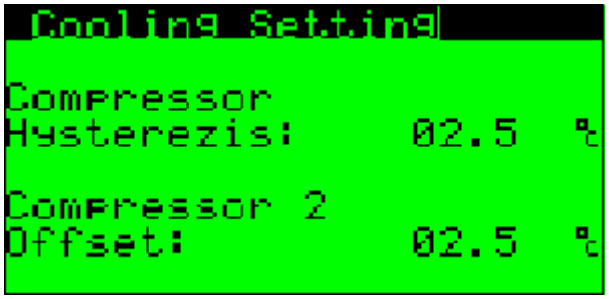
* The real temperature range is limited according to the setting during commisioning. Additional limitation is possible due to the Dew Point protection if it is activated.

10.2.2 Water/Air Limits Cooling



Parameter:	SP	Range/F.:	Unit	Description
Water Minimum Temp.	A305	-99.9/99.9 F: 14.5	°C	Minimum water temperature limit for the unit setpoint
Water Maximum Temp.	A306	-99.9/99.9 F: 30.0	°C	Maximum water temperature limit for the unit setpoint
Air Minimum Temp.	A307	-99.9/99.9 F: 0.0	°C	Minimum Air temperature limit for the unit setpoint. This is not the limit for unit operation.
Air Maximum Temp.	A308	-99.9/99.9 F: 40.0	°C	Maximum Air temperature limit for the unit setpoint. This is not the limit for unit operation.

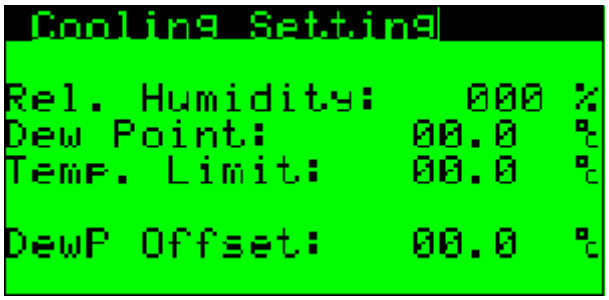
10.2.3 Compressor Hysterezis/Offset Cooling



Parameter:	SP	Range/F.:	Unit	Description
Compressor Hysterezis	A51	-99.9/99.9 F: 2.5	°C	Compressor control hysterezis.
Compressor 2 Offset	A309	-99.9/99.9 F: 2.5	°C	Positive offset of the Compressor 2 setpoint for double compressor units.

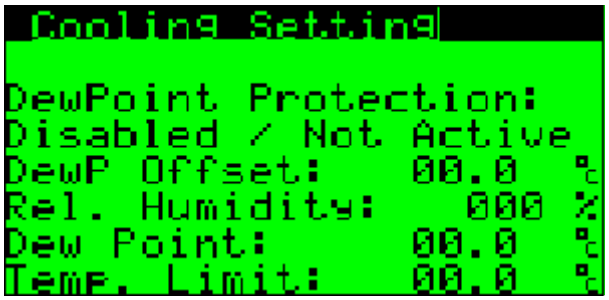
10.2.4 Dew Point Control

Dew point control is function for limitation of the cooling water setpoint to avoid condensation on the cooling surface. This requires pAD room terminal with humidity probe.



Parameter:	SP	Range/F.:	Unit	Description
Rel. Humidity	I185	0/100	%	Actual relative humidity measured by pAD01.
Dew Point	A13	-99.9/99.9	°C	Calculated dew point from relative humidity and temperature
Temp. Limit	A310	-99.9/99.9	°C	Calculated water temperature limit from dew point and dew point offset.
DewP Offset	A14	-99.9/99.9 F: 0.0	°C	Dew point offset for safety margin to avoid condensation.

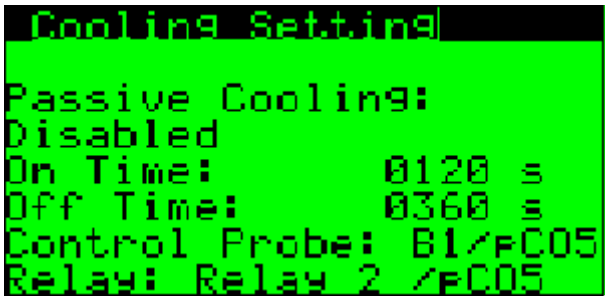
10.2.5 Dew Point Control Enable/Disable (OEM)



Parameter:	SP	Range/F.:	Unit	Description
DewPoint Protection	B196	0: Disabled 1: Enabled F: 0	-	Enabling/Disabling function.
	B197	0: Not Active 1: Active	-	Function is Active/Not Active. When probe alarm, function is not active, although it is Enabled.
DewP Offset	A14	-99.9/99.9 F: 0.0	°C	Dew point offset for safety margin to avoid condensation.
Rel. Humidity	I185	0/100	%	Actual relative humidity measured by pAD01.
Dew Point	A13	-99.9/99.9	°C	Calculated dew point from relative humidity and temperature
Temp. Limit	A310	-99.9/99.9	°C	Calculated water temperature limit from dew point and dew point offset.

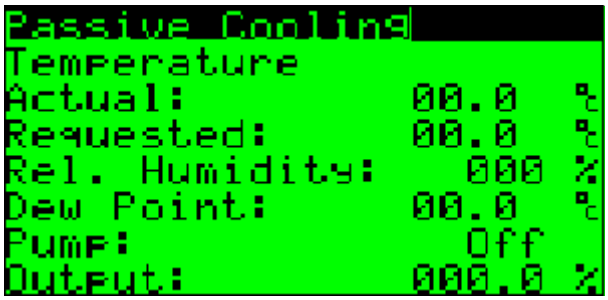
10.2.6 Passive Cooling

Passive cooling function for ground source heat pumps is using ground loop energy for cooling of the house and recovering groud loop.



Parameter:	SP	Range/F.:	Unit	Description
Passive Cooling	B276	0: Disabled 1: Enabled F: 0	-	Enabling/Disabling function.
On Time	I105	0/9999 F: 120	s	Brine pump circulation time to obtain water temperature value, higher than the setpoint.
OFF Time	I106	0/9999 F: 360	s	Brine pump OFF cycle, when temperature is too low. The brine pump although on minimum speed delivered very high cooling capacity resulting the cooling water is too cold.
Control Probe	-	B1-B5/pCO5, B1-B4/pCOe F: B2/pCOe	-	Control probe selection. Normally it is the main control probe, cause it is located between passive cooling heat exchanger and condenser.
Relay	-	R1-R8/pCO5 R1-R4/pCOe F: R2/pCO5	-	Passive cooling 3 way valve selection.

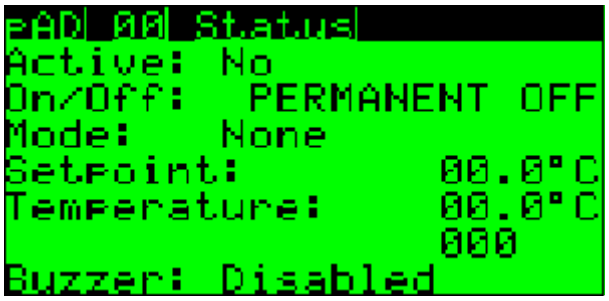
10.2.7 Passive Cooling Info



Parameter:	SP	Range/F.:	Unit	Description
Actual	A311	-99.9/99.9	°C	Actual water temperature measured by probe.
Requested	A312	-99.9/99.9	°C	Requested water temperature.
Rel. Humidity	I185	0/100	%	Actual relative humidity measured by pAD01.
Dew Point	A13	-99.9/99.9	°C	Calculated dew point from relative humidity and temperature
Pump	B277	0: OFF 1: ON	-	Brine pump operation.
Output	A313	0/100.0	%	Brine pump speed.

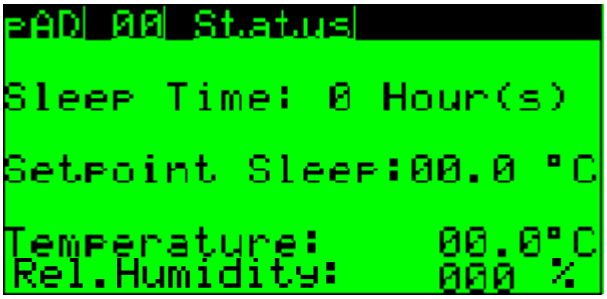
10.3 Room Terminals

Set up of the room terminals.



Parameter:	Range/F.:	Unit	Description
pAD	01, 11-16	-	pAD Identification Number. This Parameter is not adjustable. It is given by pAD Hardware Address. 01: Main Zone Room Terminal 11: Heating Circuit 1 Room Terminal 12: Heating Circuit 2 Room Terminal 13: Heating Circuit 3 Room Terminal 14: Heating Circuit 4 Room Terminal 15: Heating Circuit 5 Room Terminal 16: Heating Circuit 6 Room Terminal
Active	0: No, 1: Yes	-	Informs about pADxx staus. pADxx must be ONLINE and ENABLED to be Active.
On/Off	0: Pernament OFF 1: OFF 2: ON	-	Pernament OFF: Terminal is pernamently OFF and heating/cooling of the zone is disabled. OFF: Terminal is OFF by the scheduler and heating/cooling of the zone is temporarily disabled. ON: Terminal is ON and heating/cooling of the zone is enabled.
Mode	1: Winter 2: Summer	-	For pAD 01 it has the same meaning like the main Mode of the Heat Pump. When unit is equipped with cooling or passive cooling, with Mode change also Function is changed. For pAD11 to 16, the Mode setting has no effect and Mode is forced according to the Heat Pump Mode. Heat Pump has priority to pAD11 to 16.
Setpoint	6.0 to 32.0	°C	Requested Room Temperature set by user.
Temperature	-99.9 to 99.9	°C	Real Room Temperature
Rel. Humidity	0-100	%	Real Room Relative Humidity
Buzzer	Disabled Enabled F: Disabled	-	Enables/Disables Buzzer

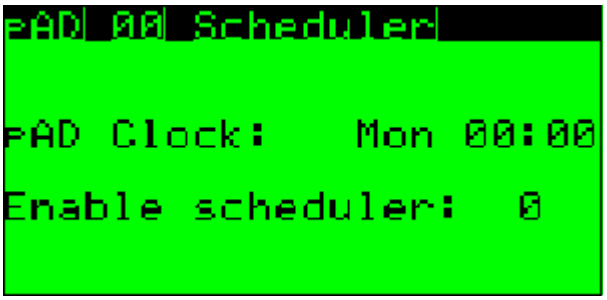
10.3.1 pAD Status

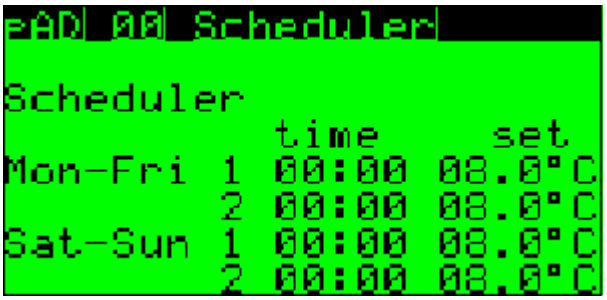


Parameter:	Range/F.:	Unit	Description
pAD	01, 11-16	-	pAD Identification Number. This Parameter is not adjustable. It is given by pAD Hardware Address. 01: Main Zone Room Terminal 11: Heating Circuit 1 Room Terminal 12: Heating Circuit 2 Room Terminal 13: Heating Circuit 3 Room Terminal 14: Heating Circuit 4 Room Terminal 15: Heating Circuit 5 Room Terminal 16: Heating Circuit 6 Room Terminal
Sleep Time	0-9	h	Remaining time of the pAD Sleep Function.
Setpoint Sleep	6.0 – 32.0	°C	Room Temperature Setpoint for pAD Sleep Function. Temporary Room Setpoint for the Sleep Time set. When Sleep Time elapses, Setpoint is returned to standart value set on the pAD.
Temperature	-99.9 to 99.9	°C	Real Room Temperature
Rel. Humidity	0-100	%	Real Room Relative Humidity

10.3.2 pAD Scheduler

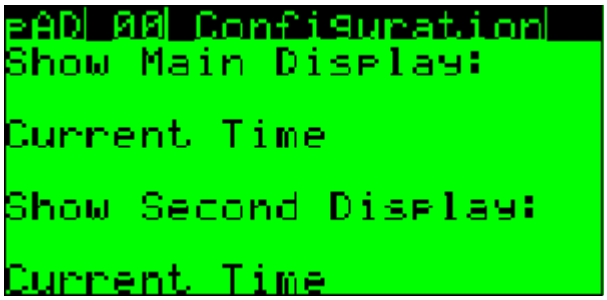
Scheduler setting consists of 2 displays.





Parameter:	Range/F.:	Unit	Description
pAD	01, 11-16	-	pAD Identification Number. This Parameter is not adjustable. It is given by pAD Hardware Address. 01: Main Zone Room Terminal 11: Heating Circuit 1 Room Terminal 12: Heating Circuit 2 Room Terminal 13: Heating Circuit 3 Room Terminal 14: Heating Circuit 4 Room Terminal 15: Heating Circuit 5 Room Terminal 16: Heating Circuit 6 Room Terminal
pAD Clock	Mo-Su 00:00-23:59	d h:m	pAD actual time. Time is automatically synchronized with the main controller.
Enable Scheduler	0 1	-	0: Scheduler is not enabled. 1: Scheduler is enabled.
Mon-Fri time 1 2	 00:00-23:59 00:00-23:59	 h:m h:m	 Start time of the first time zone for Monday to Friday. Start time of the second time zone for Mo to Fr.
Mon-Fri set 1 2	 Off/6.0-32.0/On Off/6.0-32.0/On	 °C/- °C/-	 Room Setpoint, or simple On/Off request for TZ 1. Room Setpoint, or simple On/Off request for TZ 2.
Sat-Sun time 1 2	 00:00-23:59 00:00-23:59	 h:m h:m	 Start time of the first time zone for Sat - Sun. Start time of the second time zone for Sat - Sun.
Sat-Sun set 1 2	 Off/6.0-32.0/On Off/6.0-32.0/On	 °C/- °C/-	 Room Setpoint, or simple On/Off request for TZ 1. Room Setpoint, or simple On/Off request for TZ 2.

10.3.3 pAD Display Config



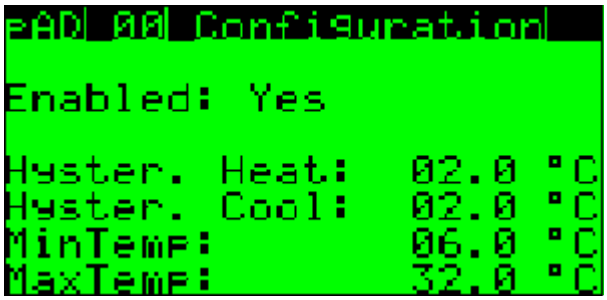
Parameter:	Range/F.:	Unit	Description
pAD	01, 11-16	-	pAD Identification Number. This Parameter is not adjustable. It is given by pAD Hardware Address. 01: Main Zone Room Terminal 11: Heating Circuit 1 Room Terminal 12: Heating Circuit 2 Room Terminal 13: Heating Circuit 3 Room Terminal 14: Heating Circuit 4 Room Terminal 15: Heating Circuit 5 Room Terminal 16: Heating Circuit 6 Room Terminal

Parameter:	Range/**F**.:	Unit	Description
Show Main Display	CurrentTime Temperature Setpoint **Local Temperature** Humidity Setpoint Local Humidity"	-	What is shown on the main display.
Show Second Display	**CurrentTime** Temperature Setpoint Local Temperature Humidity Setpoint Local Humidity"	-	What is shown on the second display.

10.3.4 pAD Key Config

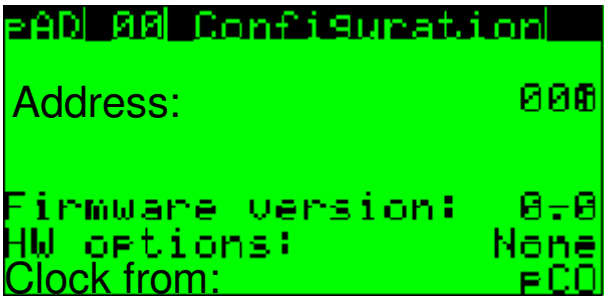
Parameter:	Range/F.:	Unit	Description
pAD	01, 11-16	-	pAD Identification Number. This Parameter is not adjustable. It is given by pAD Hardware Address. 01: Main Zone Room Terminal 11: Heating Circuit 1 Room Terminal 12: Heating Circuit 2 Room Terminal 13: Heating Circuit 3 Room Terminal 14: Heating Circuit 4 Room Terminal 15: Heating Circuit 5 Room Terminal 16: Heating Circuit 6 Room Terminal
Key1F Key2F Key3F Key4F Key5F Key6F	Disabled On/Off Mode Humidity Night/Sleep Clock Temperature PRG Fan Alarm Reset	-	Key function configuration.

10.3.5 pAD Configuration



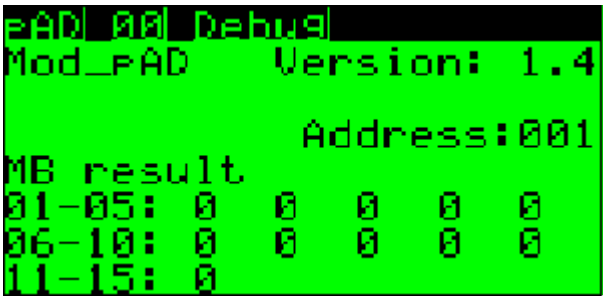
Parameter:	Range/F.:	Unit	Description
pAD	01, 11-16	-	pAD Identification Number. This Parameter is not adjustable. It is given by pAD Hardware Address. 01: Main Zone Room Terminal 11: Heating Circuit 1 Room Terminal 12: Heating Circuit 2 Room Terminal 13: Heating Circuit 3 Room Terminal 14: Heating Circuit 4 Room Terminal 15: Heating Circuit 5 Room Terminal 16: Heating Circuit 6 Room Terminal
Enabled	Yes/No F: No	-	Enabling pADxx terminal.
Hyster. Heat	-99.9/99.9 F: 2.0	°C	Thermostat Hysterezis in heating mode.
Hyster. Cool	-99.9/99.9 F: 2.0	°C	Thermostat Hysterezis in cooling mode.
MinTemp	-99.9/99.9 F: 6.0	°C	Minimum room temperature setpoint.
MaxTemp	-99.9/99.9 F: 6.0	°C	Maximum room temperature setpoint.

10.3.6 pAD HW Setup/Info



Parameter:	Range/F.:	Unit	Description
pAD	01, 11-16	-	pAD Identification Number. This Parameter is not adjustable. It is given by pAD Hardware Address. 01: Main Zone Room Terminal 11: Heating Circuit 1 Room Terminal 12: Heating Circuit 2 Room Terminal 13: Heating Circuit 3 Room Terminal 14: Heating Circuit 4 Room Terminal 15: Heating Circuit 5 Room Terminal 16: Heating Circuit 6 Room Terminal
Address	0/255	-	pAD address in network, must be the same like pAD number.
Firmware	0.0/9.9	-	Firmware version of connected pADxx.
HW options	None Clock Humid Humid+Clock	-	Shows connected pADxx equipment.
Clock from	pAD pCO F: pCO	-	Clock source for pADxx terminal.

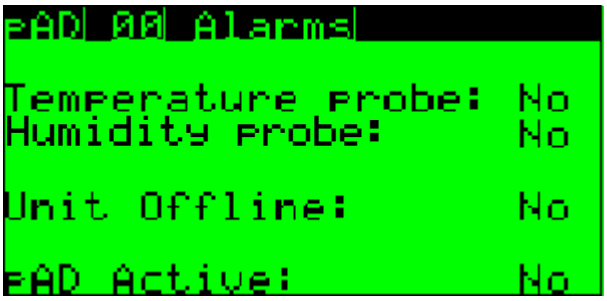
10.3.7 pAD Debug



Parameter:	Range/F.:	Unit	Description
pAD	01, 11-16	-	pAD Identification Number. This Parameter is not adjustable. It is given by pAD Hardware Address. 01: Main Zone Room Terminal 11: Heating Circuit 1 Room Terminal 12: Heating Circuit 2 Room Terminal 13: Heating Circuit 3 Room Terminal 14: Heating Circuit 4 Room Terminal 15: Heating Circuit 5 Room Terminal 16: Heating Circuit 6 Room Terminal
Address	0/255	-	pAD address in network
Version	0.0/9.9	-	Firmware version of connected pADxx.
MB result For Modbus communication, Sublists 01-15	-2	-	Generic error on one or more Modbus commands. Summarizes one or more data errors from Modbus sublists.
	-1	-	Incorrect Uart settings data
	0	-	No Message
	1	-	Uart settings successfully completed
	2	-	Command successfully completed. All commands requested by sublists were successfully completed

10.3.8 pADxx Alarms

If pAD is in Alarm Status it is possible to see it on this display.



Parameter:	Range/F.:	Unit	Description
pAD	01, 11-16	-	pAD Identification Number. This Parameter is not adjustable. It is given by pAD Hardware Address. 01: Main Zone Room Terminal 11: Heating Circuit 1 Room Terminal 12: Heating Circuit 2 Room Terminal 13: Heating Circuit 3 Room Terminal 14: Heating Circuit 4 Room Terminal 15: Heating Circuit 5 Room Terminal 16: Heating Circuit 6 Room Terminal
Temperature Probe	No Yes	-	No: Temperature probe is not in alarm. Yes:Temperature probe has active alarm. Contact Your installation company, pAD must be replaced.
Humidity Probe	No Yes	-	No: Humidity probe is not in alarm. Yes:Humidity probe has active alarm. Contact Your installation company, pAD must be replaced.
Unit Offline	No Yes	-	No: Unit is Online, no alarm. Yes: Unit is Offline = alarm Please check proper pAD location in the plastic frame on the wall. If the position is correct, please contact installation company.

10.3.9 pAD related supervisor parameters

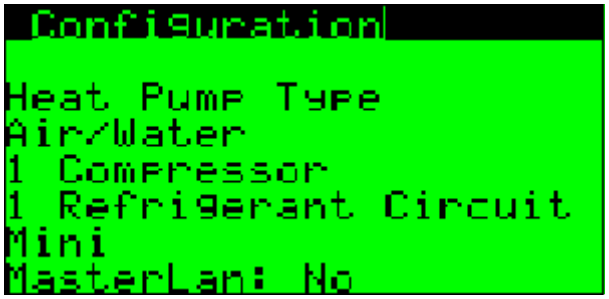
Supervisor Parameters Table

Parameter:	pAD01	pAD11	pAD12	pAD13	pAD14	pAD15	pAD16
Active	B242	B245	B248	B251	B254	B257	B259
On/Off	I16	I15	I6	I227	I230	I239	I210
Mode	I181	I218	I217	I228	I237	I240	I248
Setpoint	A191	A219	A225	A231	A238	A247	A256
Temperature	A190	A220	A226	A232	A239	A248	A257
Humidity	I185	I219	I220	I229	I238	I247	I249
Setpoint Sleep	A263	A264	A267	A270	A273	A276	A277
pAD Enabled	B182	B244	B247	B250	B253	B256	B258
Hyster. Heat	A194	A265	A268	A271	A274	A431	A278
Hyster. Cool	A195	A266	A269	A272	A275	A432	A279
Alarm Temperature Probe	B198	-	-	-	-	-	-
Alarm Humidity Probe	B199	-	-	-	-	-	-

10.4 Configuration

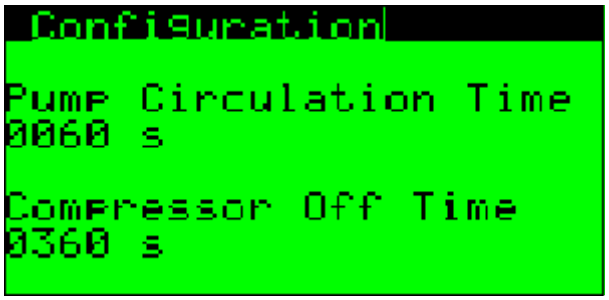
Basic and HW configuration of heat pump system.

10.4.1



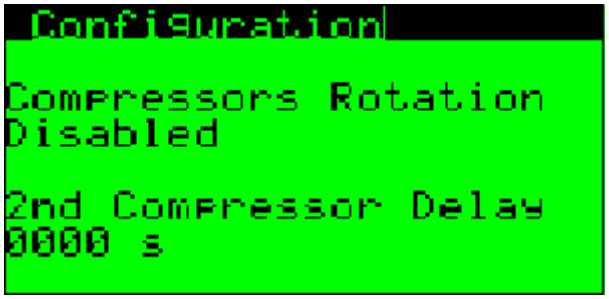
Parameter:	SP	Range/F.:	Unit	Description
HP type	I14	0: A/W 1: B/W 2: W/W 3: DX/W 4: A/W R 5: B/W R 6: W/W R	-	Type of the heat pump system.
Compressors	B40	0: 1 Comp 1: 2 Comp	-	Single or Double compressor unit.
Ref. Circuit	B39	0: 1 RC 1: 2 RC	-	1 or 2 refrigerant circuits present.
Mini/Aku	I208	0: Mini 1: Mini SHW 2: Aku	-	Hydraulic type of the unit. Mini = standard unit, Mini SHW = unit with external storage tank with fresh SHW heat exchanger, Aku = internal storage tank .
MasterLan	-	0: No 1: Yes	-	MasterLan Master/Slave system.

10.4.2 Timing



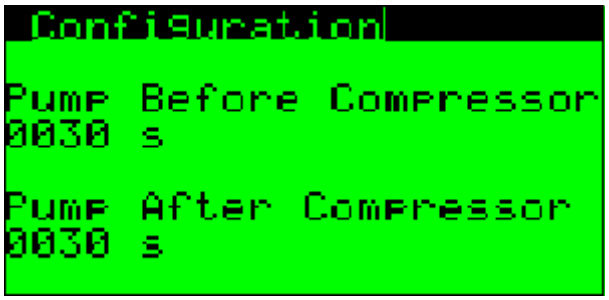
Parameter:	SP	Range/F.:	Unit	Description
Pump Circulation Time	I8	0-9999 F: 60	s	Pump circulation time after compressor Off cycle, the water temperature is measured and compared to setpoint.
Compressor Off Time	I7	0-9999 F: 360	s	Minimum compressor Off time, between On cycles or alarm recovery time. Never set lower than 120s for service purposes.

10.4.3 Double compressor unit setup



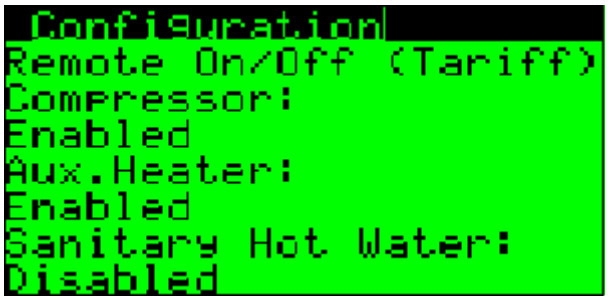
Parameter:	SP	Range/F.:	Unit	Description
Rotation	B206	0: Disabled 1: Enabled F: 1	-	Enables or Disables 2 compressors rotation.
2nd Compressor Delay	I209	0-9999 F: 15	s	Delay of the 2nd compressor start after starting the 1st one.

10.4.4 Pump Timing



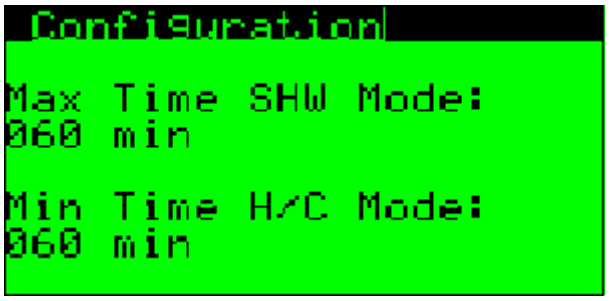
Parameter:	SP	Range/F.:	Unit	Description
Pump Before Compressor	I9	0-9999 F: 30	s	Pump start time before compressor start.
Pump After Compressor	I10	0-9999 F: 30	s	Pump stop time after compressor stop.

10.4.5 Remote On/Off (Tariff) configuration



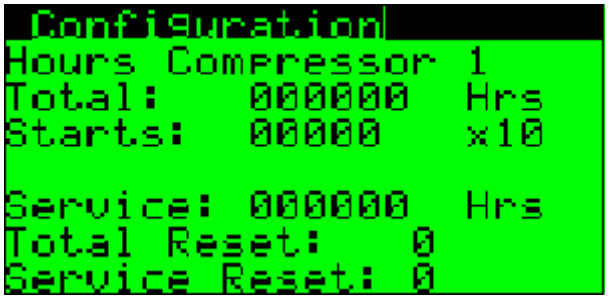
Parameter:	SP	Range/F.:	Unit	Description
Compressor	B75	0: Disabled 1: Enabled	-	When Enabled, compressor starts and stops according to remote on/off input.
Aux. Heater	B74	0: Disabled 1: Enabled	-	When Enabled, auxiliary heater starts and stops according to remote on/off input.
Sanitary Hot Water	B76	0: Disabled 1: Enabled	-	When Disabled, compressor starts and stops to heat sanitary hot water, ignoring remote on/off input.

10.4.6 SHW/H&C timing



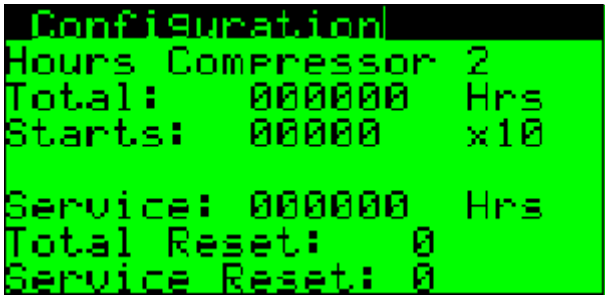
Parameter:	SP	Range/F.:	Unit	Description
Max Time SHW Mode	I53	0-999 F: 60	min	Maximum time the unit stays in SHW mode.
Min Time H/C Mode	I54	0-999 F: 60	min	Minimum time the unit stays in H/C mode before returns to SHW or Pool mode.

10.4.7 Compressor 1 Statistics



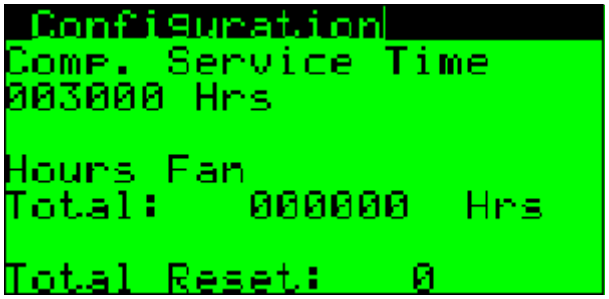
Parameter:	SP	Range/F.:	Unit	Description
Hours Compressor 1 Total	-	0-999999	hrs	Total compressor operating time.
Compressor 1 Starts	I12	0-32000 x10	-	Total compressor starts
Service	I11	0-32000	Hrs	Service compressor operating hours. Operating hours from last service reset.
Total Reset	-	0/1	-	Change to 1 for reset of the total operating hours.
Service Reset	-	0/1	-	Change to 1 for reset of the service operating hours.

10.4.8 Compressor 2 Statistics



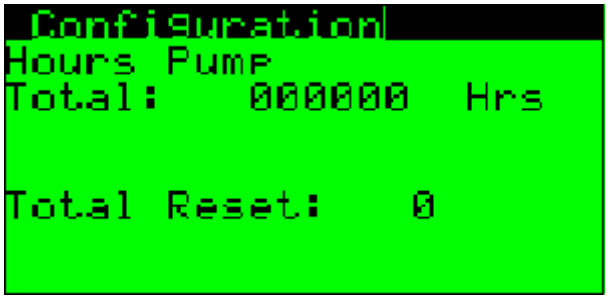
Parameter:	SP	Range/F.:	Unit	Description
Hours Compressor 2 Total	-	0-999999	hrs	Total compressor 2 operating time.
Compressor 2 Starts	-	0-32000 x10	-	Total compressor 2 starts
Service	-	0-32000	Hrs	Service compressor 2 operating hours. Operating hours from last service reset.
Total Reset	-	0/1	-	Change to 1 for reset of the total operating hours.
Service Reset	-	0/1	-	Change to 1 for reset of the service operating hours.

10.4.9 Service Time / Fan Time



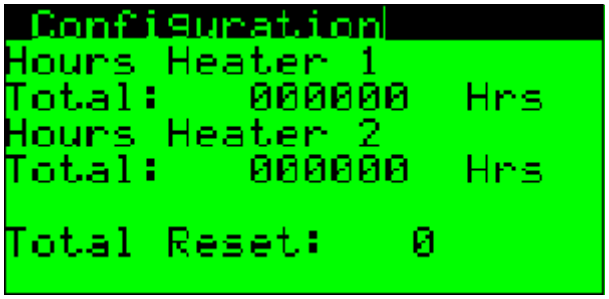
Parameter:	SP	Range/F.:	Unit	Description
Service Time	-	0-999999	hrs	Compressor service period.
Hours Fan	-	0-999999	hrs	Fan operating hours.
Total Reset	-	0/1	-	Change to 1 for reset of the fan operating hours.

10.4.10 Pump Time



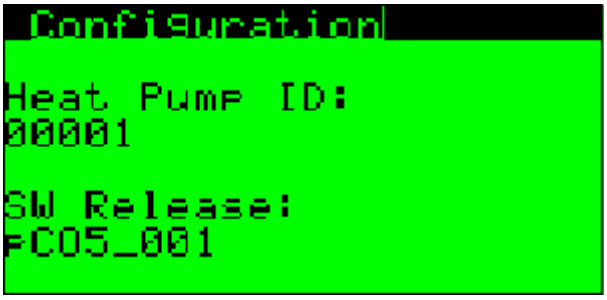
Parameter:	SP	Range/F.:	Unit	Description
Hours Pump	I13	0-999999	hrs	Pump operating hours.
Total Reset	-	0/1	-	Change to 1 for pump operating hours reset.

10.4.11 Heater Statistics



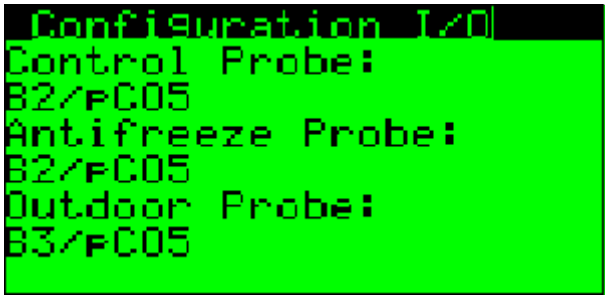
Parameter:	SP	Range/F.:	Unit	Description
Hours Heater 1 Total	I100	0-999999	hrs	Total heater 1 operating time.
Hours Heater 2 Total	I101	0-999999	hrs	Total heater 2 operating time.
Total Reset	-	0/1	-	Change to 1 for heaters operating hours reset.

10.4.12 Heat Pump ID / SW Release



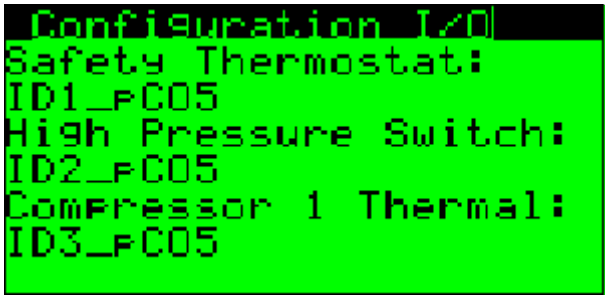
Parameter:	SP	Range/F.:	Unit	Description
ID	I72	0-32000 F: 1	-	Heat Pump ID
SW Release	I104	0-999	-	pCO5 SW Release.

10.4.13 Probes Selection



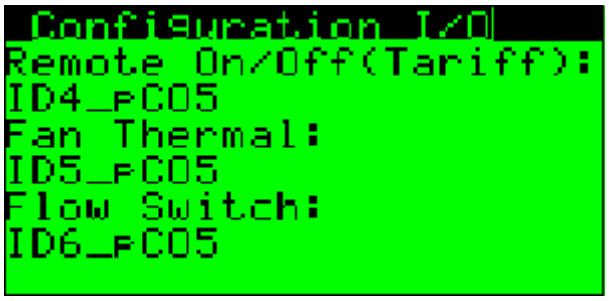
Parameter:	SP	Range/F.:	Unit	Description
Control Probe	-	B1-B5/pCO5 B1-B4/pCOe F: B2/pCO5	-	Water control probe selection.
Antifreeze Probe	-	B1-B5/pCO5 B1-B4/pCOe F: B2/pCO5	-	Antifreeze control probe selection.
Outdoor Probe	-	B1-B5/pCO5 B1-B4/pCOe F: B2/pCO5	-	Outdoor control probe selection.

10.4.14 ID Configuration 1



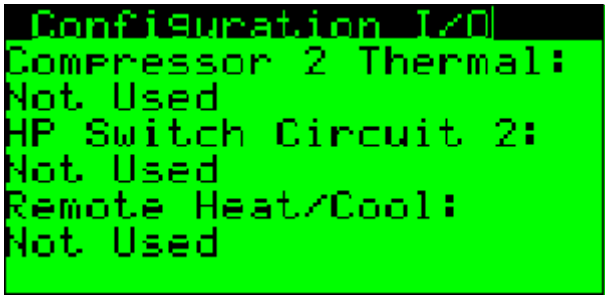
Parameter:	SP	Range/F.:	Unit	Description
Safety Thermostat	-	ID1-ID8_pCO5 F: ID1_pCO5	-	Heater safety thermostat input.
High Pressure Switch	-	ID1-ID8_pCO5 F: ID2_pCO5	-	High pressure switch input.
Compressor 1 Thermal	-	ID1-ID8_pCO5 F: ID3_pCO5	-	Compressor 1 thermal protection input.

10.4.15 ID Configuration 2



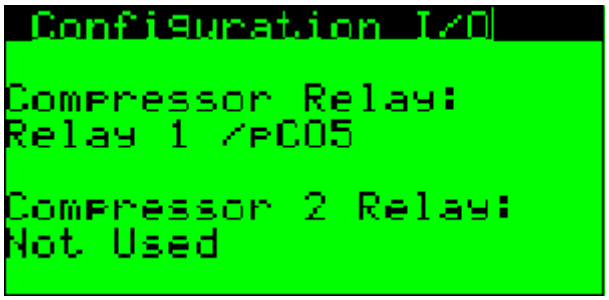
Parameter:	SP	Range/F.:	Unit	Description
Remote On/Off	-	ID1-ID8_pCO5 F: ID4_pCO5	-	Remote On/Off input.
Fan Thermal	-	ID1-ID8_pCO5 F: ID5_pCO5	-	Fan thermal protection input.
Flow Switch	-	ID1-ID8_pCO5 F: ID6_pCO5	-	Flow switch protection input.

10.4.16 ID Configuration 3



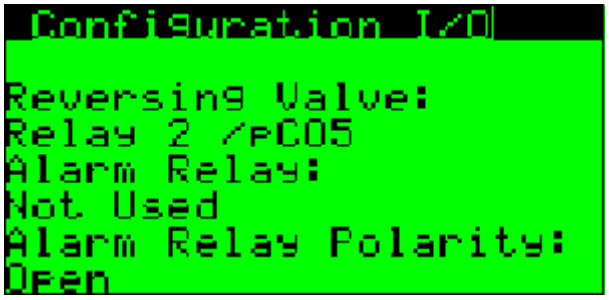
Parameter:	SP	Range/F.:	Unit	Description
Compressor 2 Thermal	-	ID1-ID8_pCO5 F: Not Used	-	Compressor 2 thermal protection input.
HP Switch Circuit 2	-	ID1-ID8_pCO5 F: Not Used	-	High pressure switch of the 2nd refrigeration circuit.
Remote Heat/Cool	-	ID1-ID8_pCO5 F: Not Used	-	Input for function remote control Heating/Cooling.

10.4.17 Relay Configuration 1



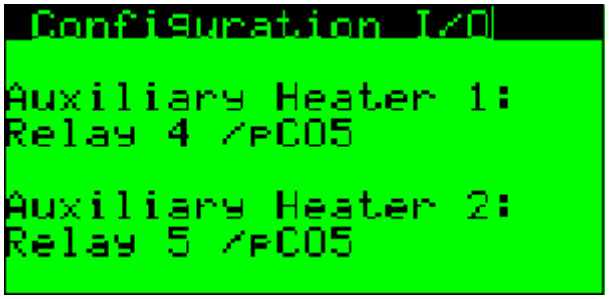
Parameter:	SP	Range/F.:	Unit	Description
Compressor Relay	-	R1-R8/pCO5 F: R1/pCO5	-	Compressor output relay.
Compressor 2 Relay	-	R1-R8/pCO5 F: Not Used	-	Compressor 2 output relay.

10.4.18 Relay Configuration 2



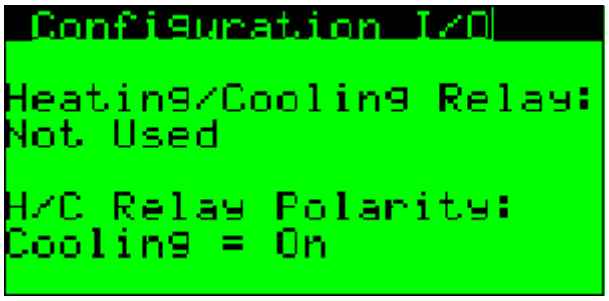
Parameter:	SP	Range/F.:	Unit	Description
Reversing Valve	-	R1-R8/pCO5 F: R2/pCO5	-	Reversing valve output relay.
Alarm Relay	-	R1-R8/pCO5 F: Not Used	-	Alarm relay output.
Alarm Relay Polarity	-	Open Closed	-	Alarm relay output polarity when alarm is active.

10.4.19 Relay Configuration 3



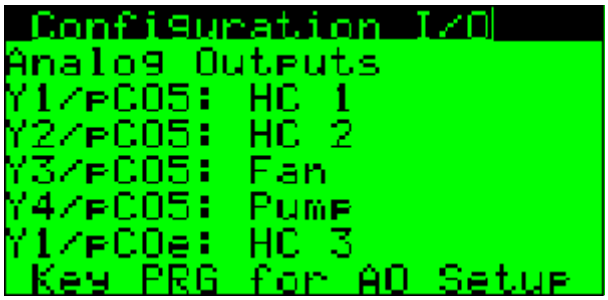
Parameter:	SP	Range/F.:	Unit	Description
Auxiliary Heater 1	-	R1-R8/pCO5 F: R4/pCO5	-	Heater 1 relay output.
Auxiliary Heater 2	-	R1-R8/pCO5 F: R5/pCO5	-	Heater 2 relay output.

10.4.20 Relay Configuration 4



Parameter:	SP	Range/F.:	Unit	Description
Heating/Cooling Relay	-	R1-R8/pCO5 F: Not Used	-	Heating / Cooling function relay output.
H/C Relay Polarity	-	Cooling = On Cooling = OFF	-	H/C relay output polarity.

10.4.21 Analog Output Configuration

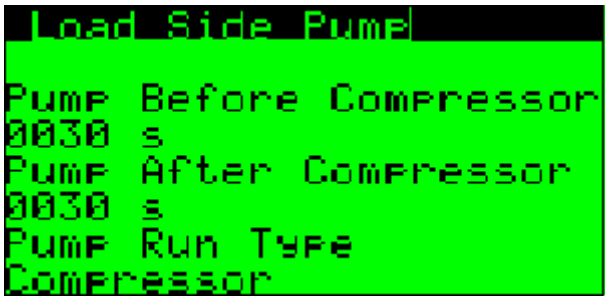


Parameter:	SP	Range/F.:	Unit	Description
Y1/pCO5	-	HC1-HC6 Fan Pump Solar F: HC1	-	Configuration of analog output Y1(0-10V).
Y2/pCO5	-	HC1-HC6 Fan Pump Solar F: HC2	-	Configuration of analog output Y2(0-10V).
Y3/pCO5	-	HC1-HC6 Fan Pump Solar F: Fan	-	Configuration of analog output Y3(PWM).
Y4/pCO5	-	HC1-HC6 Fan Pump Solar F: Pump	-	Configuration of analog output Y4(PWM).
Y1/pCOe	-	HC1-HC6 Fan Pump Solar F: HC3	-	Configuration of analog output Y1/pCOe(0-10V).

10.5 Pump Set

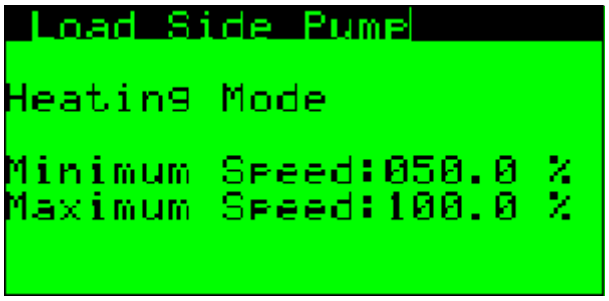
Hot side pump setting.

10.5.1 Pump Timing



Parameter:	SP	Range/F.:	Unit	Description
Pump Before Compressor	I9	0-9999 F: 30	s	Pump start time before compressor start.
Pump After Compressor	I10	0-9999 F: 30	s	Pump stop time after compressor stop.
Pump Run Type	B1	0: Compressor 1: Pernament F: Compressor	-	Type of the pump run. When Compressor, it runs only with compressor, with periodical circulation "Pump Circulation Time" after each "Compressor Off Time". When "Pump Circulation Time" set to 0, pump runs with compressor only (see 10.4.2). When set to Pernament, pump runs except the "Summer Mode".

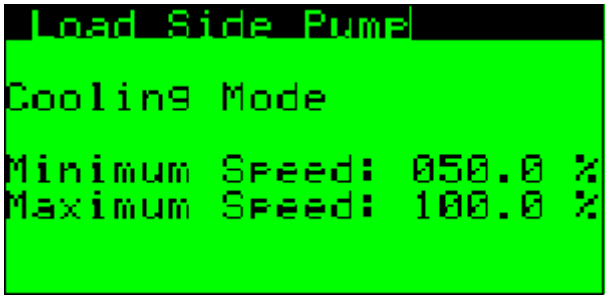
10.5.2 Pump Speed Heating



Parameter:	SP	Range/F.:	Unit	Description
Minimum Speed	A157	0-100 F: 50.0	%	Minimum pump speed for minimum inverter speed.
Maximum Speed	A158	0-100 F: 100.0	%	Maximum pump speed for maximum inverter speed.

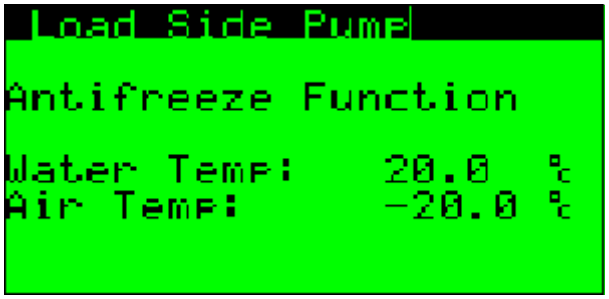
10.5.3 Pump dT Mode (Reserved for future use)

10.5.4 Pump Speed Cooling



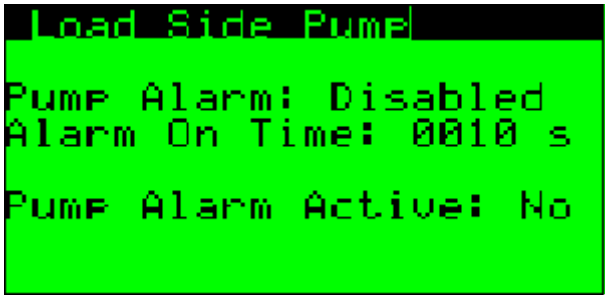
Parameter:	SP	Range/F.:	Unit	Description
Minimum Speed	A496	0-100 F: 50.0	%	Minimum pump speed for minimum inverter speed.
Maximum Speed	A497	0-100 F: 100.0	%	Maximum pump speed for maximum inverter speed.

10.5.5 Pump Antifreeze Function



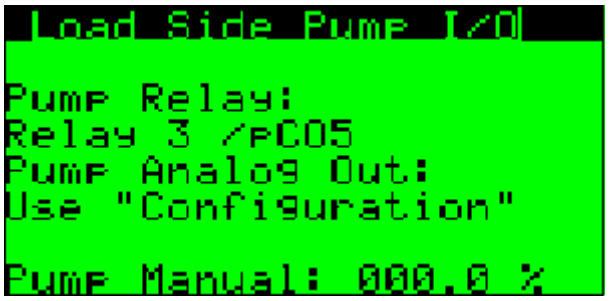
Parameter:	SP	Range/F.:	Unit	Description
Water Temp	A498	-99.9/99.9 F: 20.0	°C	Water temperature to start pump like antifreeze function.
Air Temp	A201	-99.9/99.9 F: -20.0	°C	Outdoor air temperature to start pump like antifreeze function.

10.5.6 Pump Flow Alarm



Parameter:	SP	Range/F.:	Unit	Description
Pump Alarm	B31	0: Disabled 1: Enabled	-	Function Stops pump when no flow after "Alarm On Time" from pump start. Pump symbol flashes on the main screen. It tries to restart the pump after "Compressor Off Time".
Alarm On Time	I55	0-9999 F: 10	s	Pump alarm time delay.
Pump Alarm Active	B385	0: No 1: Yes	-	When Yes, pump alarm is actually active. Pump symbol flashes on the main screen.

10.5.7 Pump HW config



Parameter:	SP	Range/F.:	Unit	Description
Pump Relay	-	R1-R8/pCO5 F: R3/pCO5	-	Pump relay output configuration.
Pump Manual	A499	0-100.0 F: 000.0	%	Manual Pump activation (Pernament memory). When set higher than 1.0%, the relay and analog outputs are activated. Must be set to 0 for automatic operation.

10.6 Fan (Brine Pump) Set

Fan or brine pump configuration.

NOTES:

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