User and installer manual (Translation of original EN instructions)



3in1 Mono

Control Panel

First of all, we would like to thank you for having chosen a device of our production.

We are sure you will be happy with it because it represents the state of the art in the technology of home air conditioning.

By following the suggestions contained in this manual, the product you have purchased will operate without problems giving you optimum room temperatures with minimum energy costs.

INNOVA S.r.l.

Conformity

Refer to the Installer Manual of the paired unit.

Markings



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CODING

1.1 Product related coding

This instruction manual refers to the following product codes.

 $\underline{\boldsymbol{\Lambda}}$ Check the correspondence with the technical rating plate on the product.

	3in1 Mono				
PB4P05AC3II	5 M SH	SH - Version with horizontal coupling			
PB4P05MC3II	5 M S	S - Single version			
PB4P05UC3II	5 M SV	SV - Version with vertical coupling			
PB4P07AC3II	7 M SH	SH - Version with horizontal coupling			
PB4P07MC3II	7 M S	S - Single version			
PB4P07UC3II	7 M SV	SV - Version with vertical coupling			



GENERAL INFORMATION

2.1 About the manual

This manual was written to provide all the explanations for the correct management of the appliance.

↑ This instruction manual forms an integral part of the device and therefore must be carefully preserved and must ALWAYS travel with it, even if you transfer the device to another owner or relocate it to other premises. If the manual gets damaged or lost, download a copy from the website.

⚠ Read this manual carefully before proceeding with any operation and follow the instructions in the individual chapters.

⚠ The manufacturer is not responsible for damages to persons or property caused by failure to follow the instructions in this manual.

⚠ This document is restricted in use to the terms of the law and may not be copied or transferred to third parties without the express authorization of the manufacturer.

2.1.1 Editorial pictograms

The pictograms in the next chapter provide the necessary information for correct, safe use of the machine in a rapid, unmistakable way.

Related to security

⚠ High risk warning (bold text)

The operation described above presents a risk of serious physical injury, fatality, major damage to the appliance and/or
to the environment if not carried out in compliance with safety regulations.

▲ Low risk warning (plain text)

• The operation described above presents a risk of minor physical injury or minor damage to the appliance and/or to the environment if not carried out in compliance with safety regulations.

Prohibition (plain text)

· Refers to prohibited actions.

(i) Important information (bold text)

• This indicates important information that must be taken into account during the operations.

In the texts

- procedures
- lists

In the control panels

actions required
 Expected responses following an action.

In the figures

1 The numbers indicate the individual components.

A The capital letters indicate component assemblies.

The white numbers in black marks indicate a series of actions to be carried out in sequence.

(A) The black letter in white identifies an image when there are several images in the same figure.

2.1.2 Pictograms on the product

Symbols are used in some parts of the appliance:

Related to security



Caution: electrical danger

• The concerned personnel is informed to the presence of electricity and the risk of suffering an electric shock.

2.1.3 Recipients

Hser

Non-expert person capable of operating the product in safe conditions for people, for the product itself and the environment, interpreting an elementary diagnostic of faults and abnormal operating conditions, carrying out simple adjustment, checking and maintenance operations.

Installer

Expert person qualified to position and connect (hydraulically, electrically, etc.) the unit to the plant; this person is responsible for handling and correct installation according to the instructions provided in this manual and the national standards currently in force.

To work on the refrigeration circuit, the installer must comply with the provisions of Regulation 303/2008/EC which defines, in accordance with Directive 842/2006/EC, the requirements for companies and personnel with regard to fixed refrigeration, air conditioning and heat pump equipment containing certain fluorinated greenhouse gases (F-gas licence).

Technical Service Centre

Expert and qualified person authorised directly by the manufacturer to carry out all routine and supplementary maintenance operations, as well as every adjustment, check, repair and replacement of parts necessary during the life of the unit itself. Service personnel must comply with the provisions of Regulation 303/2008/EC which defines, in accordance with Directive 842/2006/EC, the requirements for companies and personnel with regard to fixed refrigeration, air conditioning and heat pump equipment containing certain fluorinated greenhouse gases (F-gas licence).

2.1.4 Manual organisation

The manual is divided into sections each dedicated to one or more target groups.

General information

It addresses all recipients.

It contains general information and important warnings that should be known before installing and using the appliance.

Product presentation

It addresses all recipients.

It contains the information to identify the product, its components, compatible accessories and destination of use.

Use

It is addressed exclusively to the User.

It contains all the information necessary for the user to operate the appliance.

Menu structure

It is addressed only and exclusively to the Installer and the Technical Assistance Centre.

It contains the menu structure of the control, the operating parameters, the input and output statuses, the alarms and the installer parameters.

Functions

It is addressed only and exclusively to the Installer and the Technical Assistance Centre.

These are sections dedicated to the different types of units that use the same Control Panel and contain specific information for that combination.

Troubleshooting

It is addressed exclusively to the Technical Assistance Centre.

Contains troubleshooting concerning the product.

2.2 Disposal





The symbol on the product or its packaging indicates that the product must not be treated as normal household waste, but must be taken to the appropriate collection point for the recycling of electrical and electronic equipment.

Proper disposal of this product avoids harm to humans and the environment and promotes the reuse of valuable raw materials

For more detailed information about the recycling of this product, contact your local city office, your household waste disposal service or the shop where you purchased the product.

Illegal disposal of the product by the user involves the application of the administrative sanctions provided for by the regulations in force.

This provision is only valid in the EU Member States.



MENU STRUCTURE

3.1 Remote Control Panel

3.1.1 Menu navigation

- Button (##)
 to enter the main menus
 - to exit the menu sub-levels
 - to exit without saving

Button OK

- to enter the menu sub-levels
- to confirm

Button (%)

- to modify a parameter

Buttons 🔷

- to move through the menusto change the parameter values

Buttons $\triangleleft \triangleright$ - to move between the digits of the values



3.1.2 Structure overview User menu Contains: all the parameters that the user can modify according to the needs of the # plantGeneral status Contains: information (in display only) on the current operation of the unit Input/output status **Contains:** information (in display only) on the input and output status of the unit. Alarm log **Records:** error and/or malfunction conditions of the unit Installer menu # **Contains:** the parameters that only the installer or qualified personnel can modify Installer parameters Change Password | Service menu Contains: the most advanced parameters that only the Technical Service Centre can modify 3.1.3 Structure details User menu Set temp. Domestic hot water **Visible** only if the domestic hot water function is activated. Date and time Language **Machine status** Set plant temperature **Indicates:** required water plant temperature Value: tenths of °C (divide the displayed value by 10 to obtain the correct value e.g. displayed $100 - 10 = 10 \, ^{\circ}\text{C}$ Set DHW temp. **Indicates:** requested domestic hot water temperature # Value: tenths of °C (divide the displayed value by 10 to obtain the correct value e.g. # displayed $100 - 10 = 10 ^{\circ}C$) Plant request # **Indicates:** machine operating status **0:** the machine is not in plant calling mode # 1: the machine is in Plant Water heating call mode # 2: the machine is in Plant Water cooling call mode DHW request # **Indicates:** domestic hot water function status 0: the machine is not calling for domestic hot water # 1: the machine is calling for domestic hot water heating **Defrosting status Indicates:** defrosting function status # **0:** the function is not active # 1: the function is active Antifreeze status **Indicates:** antifreeze function status **0:** the function is not active

1: the function is active

>	Anti-Legionella status	
	#	Indicates: anti-legionella function status
	#	0: anti-legionella cycle not running or deactivated
	#	1: anti-legionella cycle enabled but not running
	#	2: anti-legionella cycle enabled and running
>	Set freq. compr.	
	#	Indicates: the instantaneous frequency that the compressor must reach
	#	Value: set frequency
>	Freq. compr. real	
	#	Indicates: real compressor frequency
	#	Value: real frequency
>	Compressor protection	n
	#	Indicates: compressor protection status
	#	0: normal operation
	#	2: pressure too high
	#	4: suction temperature too low
	#	32: no water circulation 64: compressor discharge temperature over the maximum threshold
		64: compressor discharge temperature over the maximum threshold
•	Inverter driver error	
	#	Indicates: driver error code
	#	0: no error > 0: driver error
	Driver com. error	2 d. driver error
		Indicates: connection error with the inverter driver
	#	0: no error
	#	1: connection error
	Pressure switch status	
	#	Indicates: the pressure switch status
	#	0: normal operation
	#	1: low-pressure switch tripped
	#	2: high-pressure switch tripped
>	Flow switch status	
	#	Indicates: the flow switch status
	#	0: normal operation
	#	1: flow switch tripped
>	EEV status	
	#	Indicates: electronic expansion valve regulation status
	#	0: normal operation
	#	> 0: operation in protected mode
ut/output	status	
>	PT5-S	
	#	Views: water exchanger outlet temperature in split versions
	PT6-S	Views, water exchanger outlet temperature in spire versions
		· · · · · · · · · · · · · · · · · · ·
	#	Views: water exchanger outlet temperature in split versions
>	PT4	
	#	Views: domestic hot water storage temperature
>	PT1	
	#	Views: plant water temperature
>	PT5-M	
.	#	Views: water exchanger outlet temperature in the monobloc version
_	PT6-M	Tiens, mater exertanger outlet temperature in the monopioe version
		Wiewer water eychanger inlet temperature in the manchine version
	# NATC	Views: water exchanger inlet temperature in the monobloc version
▶	MT6	

Views: external air temperature



>	MT2	
		# Views: compressor discharge temperature
>	MT3	
		# Views: battery core temperature
—	MT4	
		# Views: coolant temperature on water exchanger side
_	MT5	" FIETS Coolant temperature on Mater exendinger side
	WITS	# Views: coolant temperature on air exchanger side
	MT1	# VIEWS. Coolant temperature on all exchanger side
	IVIII	# Views compressor suction temporature
	N A T 4	# Views: compressor suction temperature
	MI1	
		# Views: high-pressure switch status # 0: normal operation
		# 1: pressure switch tripped
>	MI2	
•		# Views: low-pressure switch status
		# 0: normal operation
		# 1: pressure switch tripped
>	PI1-S	
		# Indicates: water flow switch status in split versions
		# 0: normal operation
		# 1: flow switch tripped
>	PI4	
		# Views: the status of the digital input associated with Silent or Heating/Cooling switching
		functions # 0: contact open
		# 1: contact closed
>	PI3	
		# Views: the status of the digital input associated with TA
		# 0: contact open
		# 1: contact closed
>	PI5	
		# Views: the status of the digital input associated with the remote ON/OFF
>	PI1-M	
		# Indicates: water flow switch status in the monoblock version
		# 0: normal operation
		# 1: flow switch tripped
•	BC1	and the second s
		# Views: auxiliary generator contact status
		# 0: output off # 1: output on
>	MR1	3. Step 8. St.
-	1411.1	# Views: condensate drip tray heating element status
		# 0: output off
		# 1: output on
>	PR1-S	
		# Views: activation status of auxiliary heating element with split unit
		# 0: output off
		# 1: output on
>	EEV	
		# Views: opening in steps of the electronic expansion valve
>	PV1	
•	PV1	# Views: domestic hot water/plant 3-way valve status
>	PV1	 # Views: domestic hot water/plant 3-way valve status # 0: output activated towards plant # 1: output activated to domestic hot water production



>	PP3	
•		# Views: secondary circuit pump status
		# 0: output off
		# 1: output on
	MV1	
	IVIVI	w >e
		# Views: 4-way valve status
		# 0: heating
		# 1: cooling
	MV2	
		# Not used
>	PR1-M	
		# Views: auxiliary heating element activation status with monoblock unit
		# 0: output off
		# 1: output on
_	BC2	<u>'</u>
	DCZ	" Vi gaparal alarma authorit (anlit vargion anh.)
		# Views: general alarm output (split version only)# Voltage-free contact closes when the machine is in an alarm condition that prever
		activation
	DD4 C	activation
	PP1-S	
		# Views: primary pump status with split unit
		# 0: output off
		# 1: output on
•	PP1-M	
		# Views: primary pump status with monoblock unit
		# 0: output off
		# 1: output on
	PP4	
		# Not used
	COMP	π Not asca
	COMP	
		# Views: compressor rotation frequency
•	FAN	
		# Views: fan speed
log		
	ALRM 001	
	7121111 001	# Indicates: temperature probe malfunction
		# Indicates: temperature probe malfunction # See: Input/output status
	ALDM 002	" See. Input output status
	ALRM 002	
		# Indicates: low-pressure switch tripped
•	ALRM 003	
		# Indicates: high-pressure switch tripped
_	ALRM 004	
	ALNIVI UU4	
		# Indicates: inverter driver high temperature
	ALRM 006	
		# Indicates: inverter driver error
_	ALRM 007	
	ALINIVI 007	W. J. P. A. Communication location between
		# Indicates: compressor suction low temperature
	ALRM 008	
		# Indicates: compressor discharge high temperature
	ALRM 009	
-		# Indicates: communication error between electronic boards
	A1 D14 040	" Indicates. Communication end between electronic boards
	ALRM 010	
		# Indicates: evaporator liquid refrigerant low temperature



Alarm

ALRM 012	
	# Indicates: fan malfunction
ALRM 017	
	# Indicates: plant flow switch tripped
ALRM 022	
	# Indicates: high water temperature during domestic hot water production
ALRM 023	
	# Indicates: high water temperature during heating operation
ALRM 025	
	# Indicates: plant exchanger antifreeze cooling operation
ALRM 027	
	# Indicates: domestic hot water storage tank antifreeze
ALRM 028	
	# Indicates: plant exchanger and tank antifreeze during cooling operation
	ALRM 017 ALRM 022 ALRM 023 ALRM 025 ALRM 027

Installer menu

- Installer parameters (PF)
 - Configuration
 - ▶ PF1
- # **Enables:** Heating mode
- # **0:** off
- # 1: on (default)
- ► PF2
- # **Enables:** Cooling mode
- # **0:** off
- # 1: on (default)
- ► PF3
- # **Enables:** domestic hot water production
- # **0:** off (default)
- # **1:** on
- ► PF4
- # **Selects:** ON/Standby from digital input
- # **0:** off (default)
- **1:** ON with contact closed
- 2: ON with open contact
- ► PF5
- # Selects: Silent or Switching Cooling/Heating from digital input
- # **0:** off (default)
- # **1:** Cooling on closed contact
- 2: Heating on closed contact
- 3: Silent on closed contact
- ► PF6
- # **Enables:** TA via Modbus
- # **0:** deactivated (default)
- # **1:** on
- ► PF7
- # Enables: TA from outside temperature
- # **0:** off (default)
- # **1:** on
- ► PF8
- **# Selects:** the plant water temperature control probe
- # **0:** PT1 plant (circuit breaker or buffer tank)
- # **1:** PT5 plant delivery
- # **2:** PT6 plant return (default)

► PF9

- # **Enables:** dynamic set
- # **0:** off (default)
 - **1:** on

▶ PF10

- # **Enables:** continuous mode primary pump
- # **0:** off
- t 1: on (default)

▶ PF11

- **# Sets:** Fast Heat function duration
- # **Unit** of measurement: minutes
- # Minimum: 10
 - Maximum: 240
- # Setting: 90

▶ PF12

- **Sets:** compressor power reduction for Silent mode
- # **Unit** of measurement: percentage
- # **Minimum:** 0
- # **Maximum:** 100
- # Setting: 90

▶ PF13

- # **Sets:** fan power reduction for Silent mode
- # **Unit** of measurement: percentage
- # Minimum: 0
- # **Maximum:** 100
- Setting: 75

Plant Water

▶ PF21

- **# Sets:** Heating temperature setting
- # Units of measure: °C
- # **Minimum:** 10
- # Maximum: 55
- # Setting: 30

▶ PF22

- **# Sets:** Cooling temperature setting
- # **Units** of measure: °C
- # Minimum: 7
- # Maximum: 40
- Setting: 12

► PF23

- **# Sets:** minimum water temperature
- # **Units** of measure: °C
- # Minimum: 1
- # Maximum: 9
- Setting: 4

► PF27

- # **Sets:** maximum plant tank temperature
- # Units of measure: °C
- # Minimum: 30
- # Maximum: 70
- Setting: 60

Domestic hot water

► PF24

- **# Sets:** domestic hot water temperature
- # Units of measure: °C
- # **Minimum:** 10
- # Maximum: 75
- # Setting: 48



▶ PF25

- # **Sets:** domestic hot water temperature hysteresis
- **# Units** of measure: °C
- # Minimum: 1
 - Maximum: 9
- # Setting: 2.5

► PF28

- **Sets:** maximum domestic hot water tank temperature
- # Units of measure: °C
- # **Minimum:** 30
- # Maximum: 90
- Setting: 70

Dynamic set cooling

▶ PF34

- **Sets:** maximum dynamic set temperature
- # Units of measure: °C
- # **Minimum:** 25
- # Maximum: 50
- # Setting: 35

► PF35

- # Sets: minimum outdoor temperature and activation temperature for TA function from outdoor temperature
- # Units of measure: °C
- # Minimum: 10
- # Maximum: 25
- # Setting: 15

▶ PF36

- # **Sets:** dynamic set plant maximum water temperature
- # Units of measure: °C
- # Minimum: 10
- # Maximum: 25
- # **Setting:** 15

▶ PF37

- # **Sets:** dynamic set plant minimum water temperature
- # Units of measure: °C
- # **Minimum:** 5
- # Maximum: 10
- # Setting: 7

Dynamic set heating

► PF38

- # Sets: maximum temperature and activation temperature for TA function from outdoor temperature
- # **Units** of measure: °C
- # Minimum: 5
- # Maximum: 25
- # Setting: 15

▶ PF39

- **Sets:** minimum dynamic set temperature
- # Units of measure: °C
- # Minimum: -10
- # Maximum: 15
- # **Setting:** 0

► PF40

- # **Sets:** dynamic set plant maximum water temperature
- **# Units** of measure: °C
- # Minimum: 20
- # Maximum: 50
- # **Setting:** 35

▶ PF41

- # **Sets:** dynamic set plant minimum water temperature
- # Units of measure: °C
- # **Minimum:** 15
- Maximum: 35
- # Setting: 25

Auxiliary generator

► PF47

- # **Enables:** the presence of a heat generator (boiler) for domestic hot water integration
- # **0:** off (default)
- # **1:** on

▶ PF48

- # Enables: the presence of a heat generator (boiler) for plant water integration
- # **0:** off (default)
- # **1:** on

▶ PF49

- # Enables: the presence of heating element for domestic hot water integration
- **0:** off (default)
- # **1:** on

▶ PF50

- **Enables:** the presence of heating element for plant water integration
- # **0:** off (default)
- # **1:** on

▶ PF51

- **Enables:** the heat pump to work together with the auxiliary generator
- **0:** off (default)
- # **1:** on

▶ PF52

- # **Enables:** auxiliary generator activation for plant water temperature threshold
- # **0:** off (default)
- # **1:** on

▶ PF53

- # **Enables:** activation of auxiliary generation for domestic hot water temperature threshold
- # **0:** off (default)
- **1:** on

► PF54

- **Sets:** plant water temperature threshold for auxiliary generator activation
- # Units of measure: °C
- # Minimum: 35
- # Maximum: 70
 - Setting: 55

▶ PF55

- # **Sets:** plant water temperature threshold hysteresis for auxiliary generator activation
- # Units of measure: °C
- # Minimum: 1
- # Maximum: 9
 - Setting: 3

► PF56

- # Sets: maximum domestic hot water temperature for auxiliary generator activation
- # Units of measure: °C
- # Minimum: 45
- # Maximum: 55
- # Setting: 53

▶ PF57

- # Enables: auxiliary generator activation for outdoor temperature threshold
- # **0:** off (default)
- # **1:** on



▶ PF58

- # Sets: outdoor air temperature threshold for auxiliary generator activation
- # Units of measure: °C
- # **Minimum:** -25
- # Maximum: 15
- # Setting: -10

► PF59

- # **Sets:** external air temperature threshold hysteresis for auxiliary generator activation
- # Units of measure: °C
- Minimum: 1
- # **Maximum:** 10
- Setting: 2

► PF60

- # Enables: auxiliary generator activation for heating timeout
- # **0:** off (default)
- # **1:** on

► PF61

- **Sets:** plant water auxiliary generator activation timeout
- # Unit of measurement: minutes
- # Minimum: 5
- # Maximum: 360
 - Setting: 120

► PF62

- # **Sets:** domestic hot water auxiliary generator activation timeout
- # **Unit** of measurement: minutes
- # Minimum: 5
- # **Maximum:** 360
- # **Setting:** 90

Anti-legionella

▶ PF67

- # Enables: Anti-legionella on/off
- # **0:** off (default)
- # **1:** on

▶ PF68

- **Sets:** set Anti-legionella temperature
- # Units of measure: °C
- # **Minimum:** 55
- # Maximum: 70
- Setting: 60

► PF69

- # **Sets:** anti-legionella cycle time
- # **Unit** of measurement: minutes
- # Minimum: 30
- # **Maximum:** 240
- # Setting: 60

► PF70

- **Sets:** anti-legionella cycle interval
- **# Unit** of measurement: hours
- # Minimum: 72
- # **Maximum:** 720
- # **Setting:** 720

▶ PF71

- # **Sets:** preferred activation time
- # **Unit** of measurement: time
- # Minimum: 00
- # Maximum: 23
- # **Sets:** 02 (two o'clock at night)



FUNCTION SETTING 3IN1 MONO

4.1 Introduction

The unit is designed to provide:

- water to plant for heating or cooling the rooms
- domestic hot water

If necessary, it is possible to support the heat output generated by the appliance with auxiliary heating systems (backup), which may be:

- heating elements available as accessories and mounted inside the unit from the factory
- combustion heaters (boilers)

The appliance has functions that allow the operation to be set to suit the type of plant on which it has been installed. The settings and function management is done through:

• the Control Panel display

⚠ Digital inputs for activating or deactivating some functions or for connecting external enabling (see the Installation Manual of the unit) are provided in the terminal board of the Control Panel.

via Modbus supervisor

4.2 Plant water management

The following plant types are provided:

- plant with direct delivery and buffer tank
- plant with hydraulic separator and secondary pump
- plant with direct delivery

According to the plant type and the required control type, the plant water temperature can be controlled through:

PT6-M: heat pump input probe (default setting). To be used in case of a plant with direct flow and presence of buffer storage on the return line, when the stability of the heat pump operation is preferred.

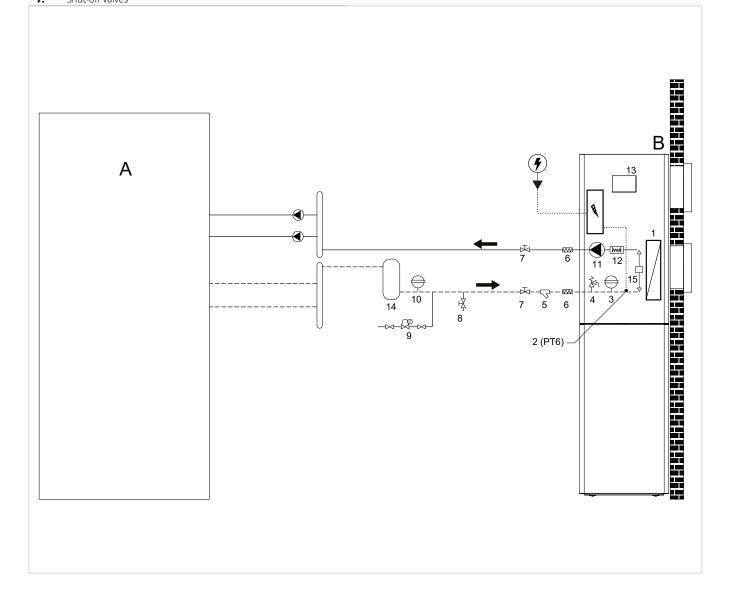
PT1: plant probe. To be used in the case of a plant with a hydraulic separator and secondary pump, it guarantees the stability of both heat pump operation and water temperature for the consumers.

PT5-M: heat pump delivery probe. To be used in case of a plant with direct delivery when guaranteeing the stability of the water temperature for the consumers is necessary.

4.2.1 Schematic diagram with direct delivery and buffer tank

A	Plant
В	3in1 Mono
1.	Plate exchanger
2.	PT6 probe
3.	Expansion vessel
4.	3-bar safety valve
5.	Network water filter
6.	Flexible connections
7.	Shut-off valves

8.	Plant drain cock
9.	Automatic plant filling assembly
10.	Expansion vessel
11.	PP1 primary circulation pump
12.	Heating element
13.	Control Panel
14.	Buffer storage
15.	Flow switch (differential pressure switch)



Water temperature control

Control setting on PT6-M (plant return)

⚠ Factory setting.

"PF8" <u>p. 14</u>: 2 (default)

⚠ The installer will be in charge of selecting the correct set-points for the heating and cooling functions, both with fixed point and with dynamic set adjustment, who will take into consideration the type of terminal and the temperature adjustment point.

PP1 primary circulation pump

The primary pump is set for continuous operation with TA on call.

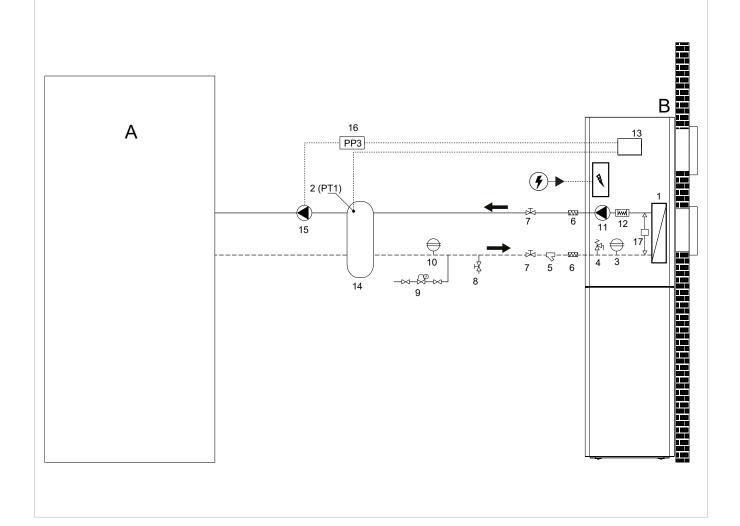
↑ The default setting must be left for this type of plant.

"PF10" *p. 15*: 1 (default)

⚠ Check the primary pump head with the pressure drop of the plant. If this is not sufficient, manifolds must be provided on the delivery and return lines of secondary pumps.

4.2.2 Schematic diagram with hydraulic separator and secondary pump

Α	Plant	9.	Automatic plant filling assembly
В	3in1 Mono	10.	Expansion vessel
1.	Plate exchanger	11.	PP1 primary circulation pump
2.	Plant temperature probe (PT1)		Heating element
3.	Expansion vessel	13.	Control Panel
4.	3-bar safety valve		Hydraulic separator
5.	Network water filter		Secondary circulation pump PP3
6.	Flexible connections		Secondary circulation pump control relay PP3
7.	Shut-off valves	17.	Flow switch (differential pressure switch)
8.	Plant drain cock		



Water temperature control

Setting of the control on PT1 probe to be placed in the separator

"PF8" <u>p. 14</u>: 0

PP1 primary circulation pump

The primary pump is set for continuous operation with TA on call.

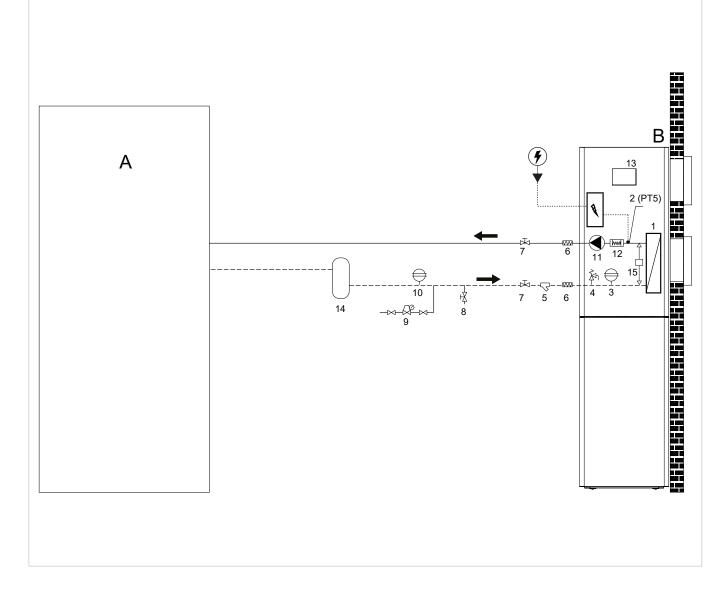
Continuous operation may be disabled so that the pump stops when the set-point is reached for this type of plant.

"PF10" p. 15: 0

⚠ Check the primary pump head with the pressure drop of the plant. If this is not sufficient, manifolds must be provided on the delivery and return lines of secondary pumps.

4.2.3 Principle diagram with direct delivery

Α	Plant	_	8.	Plant drain cock
В	3in1 Mono	_	9.	Automatic plant filling assembly
1.	Plate exchanger	_	10.	Expansion vessel
2.	PT6 probe	_	11.	PP1 primary circulation pump
3.	Expansion vessel	_	12.	Heating element
4.	3-bar safety valve	_	13.	Control Panel
5.	Network water filter	_	14.	Buffer tank
6.	Flexible connections	_	15.	Flow switch (differential pressure switch)
7.	Shut-off valves	_		



Water temperature control

Control setting on PT5-M (plant delivery)

"PF8" <u>p. 14</u>: 1

⚠ The minimum water content of the plant indicated in the installer manual of the unit being installed must be respected. If necessary, provide for the use of a buffer tank on the plant return line.

PP1 primary circulation pump

The primary pump is set for continuous operation with TA on call.

⚠ The default setting must be left for this type of plant.

"PF10" p. 15: 1 (default)

⚠ Check the primary pump head with the pressure drop of the plant. If this is not sufficient, manifolds must be provided on the delivery and return lines of secondary pumps.

4.2.4 Plant cooling/heating function enabling from TA

The connection and activation of an external consents (TA) is essential for the operation of the unit:

- TA from room thermostat
- TA from outside temperature
- TA from Modbus Supervisor

The three types of TA consents can co-exist and the unit will activate when it receives a call from at least one of the three.

TA from room thermostat or a generic potential-free contact contact

Function Logic:

The TA must be connected to digital input PI3:

• on the terminal board of the Control Panel for monoblock versions

Contact logic:

- Closed contact: the unit is switched on for heating or cooling the plant water.
- Open contact: the unit is switched off for heating or cooling the plant water

⚠ If the domestic hot water function is active, this function has priority even when the contact is open.

TA from outside temperature

Function Logic:

The room thermostat is enabled according to the outside temperature.

Logic:

- Outdoor temperature > PF35 the unit switches to Cooling mode
- Outside temperature < PF38 the unit switches to Heating mode

⚠ Hysteresis 2 °C.

↑ The unit does not automatically change the operating mode.

⚠ If the domestic hot water function is active, this function has priority.

Enabling:

Use must be enabled by parameter "PF7" p. 14.

TA from Modbus Supervisor

Function Logic:

The room thermostat is enabled by Modbus Supervisor and controlled by the Modbus register with address 10.

Logic of the register:

The call is managed by the Modbus Supervisor.

- Value 1: the unit is switched on for heating or cooling the plant water.
- Value 0: the unit is switched off for heating or cooling the plant water.

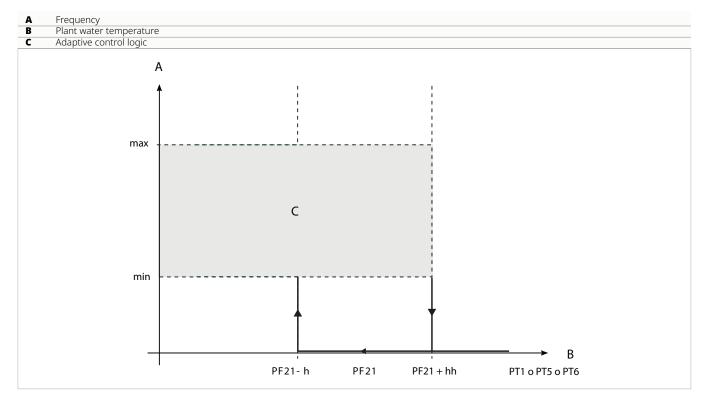
⚠ If the domestic hot water function is active, this function has priority.

Enabling:

Use must be enabled by parameter "PF6" p. 14.



4.2.5 Heating logic



⚠ Min and max depend on the logic corresponding to the active mode (heating) and the configuration of the unit.

PT1, 5, 6: Plant temperature probe. This depends on the setting of "PF8" p. 14

"PF21" p. 15: Setpoint

⚠ If the external climate control is active, the reference setpoint is not PF21, but the dynamically calculated setpoint. View chapter "Dynamic set adjustment" p. 31.

h: general hysteresis (2°C)

hh: upper hysteresis (3 °C)

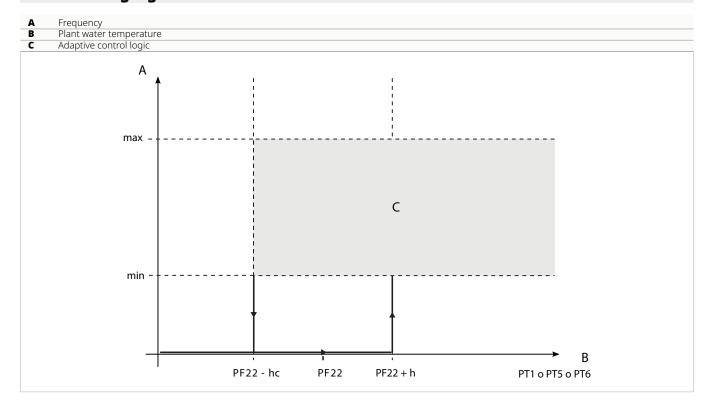
⚠ The function is inhibited by the simultaneous request for domestic hot water (which higher priority) but the priority can be reversed for 90 minutes ("PF11" p. 15) by pressing the Fast Heating button

⚠ The temperature in the separator may not exceed 60 °C.

⚠ During the start-up phase, the compressor reaches the maximum frequency in 3 minutes.

⚠ The dynamic set adjustment is not active.

4.2.6 Cooling logic



⚠ Min and max depend on the logic corresponding to the active mode (cooling) and the configuration of the unit.

PT1, 5, 6: Plant temperature probe. This depends on the setting of "PF8" p. 14

"PF22" <u>p. 15</u>: Setpoint

⚠ If the external climate control is active, the reference setpoint is not PF22, but the dynamically calculated setpoint. View chapter "Dynamic set adjustment" p. 31.

h: general hysteresis (2°C)

hc: lower hysteresis (2 °C)

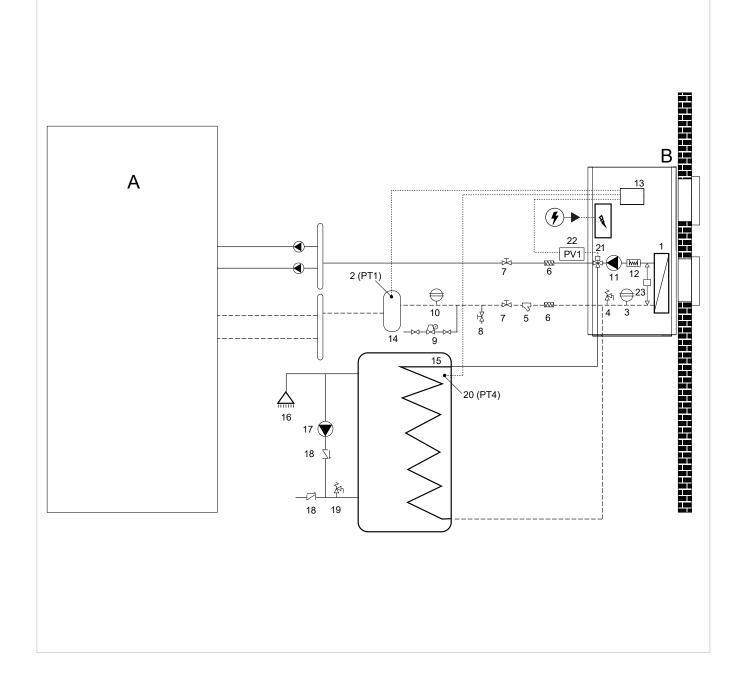
⚠ The function is inhibited by the simultaneous request for domestic hot water (which higher priority) but the priority can be reversed for 90 minutes ("**PF11"** <u>p. 15</u>) by pressing the Fast Heating button

4.3 Domestic hot water management

4.3.1 Schematic diagram with instantaneous domestic hot water storage tank and heating elements

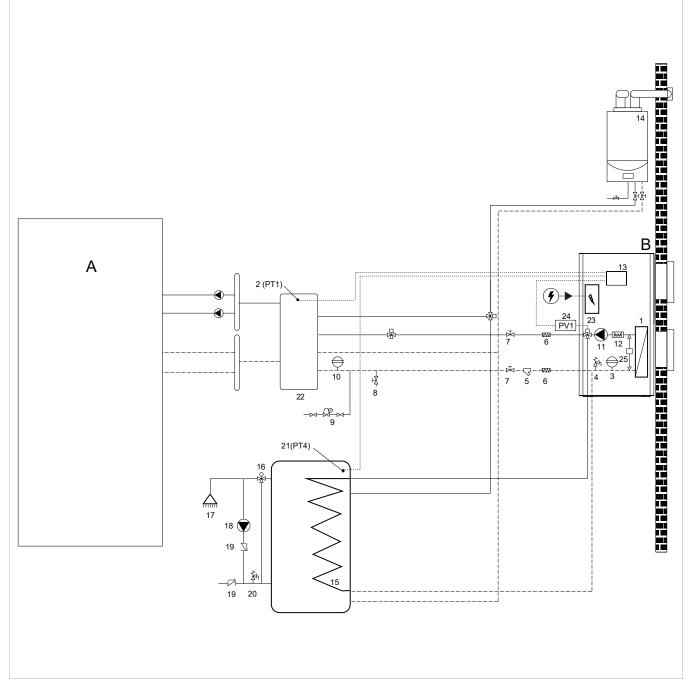
Α	Plant
В	3in1 Mono
1.	Plate exchanger
2.	Plant temperature probe (PT1)
3.	Expansion vessel
4.	3-bar safety valve
5.	Network water filter
6.	Flexible connections
7.	Shut-off valves
8.	Plant drain cock
9.	Automatic plant filling assembly
10.	Expansion vessel
11.	PP1 primary circulation pump

12.	Heating element
13.	Control Panel
14.	Buffer storage
15.	Instant domestic hot water preparation storage
16.	Domestic hot water consumers
17.	Domestic hot water recirculation pump
18.	Check valve
19.	Safety valve
20.	Domestic hot water tank temperature probe (PT4)
21.	3-way on/off valve PV1
22.	Three-way on/off valve control relay
23.	Flow switch (differential pressure switch)



4.3.2 Schematic diagram with sanitary hot water storage and heating generator

Α	Plant	13.	Control Panel
В	3in1 Mono	14.	Heat generator (boiler)
1.	Plate exchanger	15.	Instant domestic hot water preparation storage
2.	Plant temperature probe (PT1)	16.	Thermostatic mixer
3.	Expansion vessel	17.	Domestic hot water consumers
4.	3-bar safety valve	18.	Domestic hot water recirculation pump
5.	Network water filter	19.	Check valve
6.	Flexible connections	20.	Safety valve
7.	Shut-off valves	21.	Domestic hot water tank temperature probe (PT4)
8.	Plant drain cock	22.	Separator
9.	Automatic plant filling assembly	23.	3-way on/off valve PV1
10.	Expansion vessel	24.	Three-way on/off valve control relay
11.	PP1 primary circulation pump	25.	Flow switch (differential pressure switch)
12.	Heating element		·
	reading element		



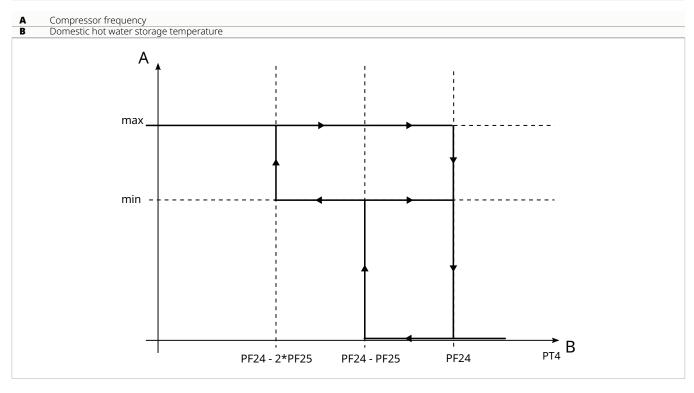
Domestic hot water temperature check

The domestic hot water temperature is controlled by the PT4 probe that must be positioned in the domestic hot water storage tank.

4.3.3 Enable domestic hot water production

The domestic hot water function must be enabled by parameter "PF3" p. 14

4.3.4 Domestic hot water logic



⚠ Min and max depend on the logic corresponding to the active mode (domestic hot water production) and the configuration of the unit.

"PF24" p. 15: set domestic hot water temperature

"PF25" p. 16: domestic hot water temperature hysteresis (2.5 °C)

4.4 Auxiliary heater management (heating element or support heat generator)

The system allows the implementation of an auxiliary heating element or a heat generator (Boiler) to support the heat pump. The auxiliary generators can intervene for producing plant water or domestic hot water with a difference:

- the electrical heating element can operate either in cooperation with the heat pump or switching with heat pump circulation pump
- the boiler can operate only in switching mode using its own circulator

↑ The backup boiler cannot work at the same time as the heat pump.

4.4.1 Function enabling

The auxiliary generators must be enabled by parameter:

"PF47" p. 17: the presence of a heat generator (boiler) for domestic hot water integration

"PF48" p. 17: the presence of a heat generator (boiler) for system water integration

"PF49" p. 17: the presence of a heating element for domestic hot water integration

"PF50" p. 17: the presence of a heating element for plant water integration

⚠ Adjustments and parameter changes must be carried out by the Technical Service Department or a competent person.

4.4.2 Activation logics

The activation logic is the same for the plant water and the domestic hot water.

⚠ The production of domestic hot water has priority over plant water heating.

The auxiliary heating element or boiler is activated to support the heat pump in case of:

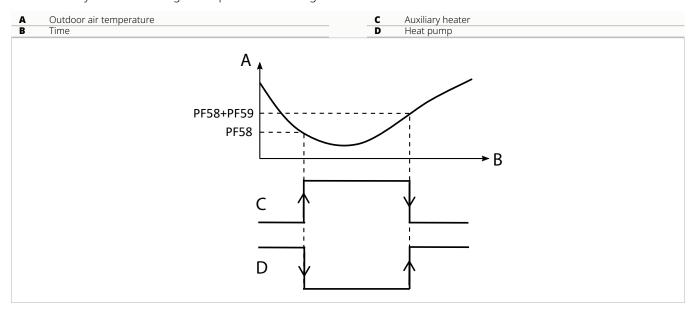
- · Outdoor temperature too low
- setpoint timeout
- water temperature demand higher than the limit that the heat pump can manage

The boiler will shut down in the event of:

- · domestic hot water storage temperature too high alarm
- plant water temperature too high

Outdoor temperature too low

The system activates the auxiliary generator when the outside temperature falls below the threshold value. In this case, three situations may occur according to the parameter setting:



PF51	PF57	Activation methods	Type of operation
1	1	Heat pump + Heating element	In collaboration with
0	1	Heat pump or Heating element or Boiler	Switching
0	0	Only heat pump	-

[&]quot;PF58" p. 18: sets the threshold value

Setpoint timeout

When the heat pump fails to reach the setpoint within a given time, three situations can occur depending on the setting of the connected parameters:

PF51	PF60	Activation methods	Type of operation
1	1	Heat pump + Heating element	In collaboration with
0	1	Heat pump or Heating element or Boiler	Switching
0	0	Only heat pump	-

[&]quot;PF61" p. 18: sets the plant water timeout value

Water high-temperature request

The intervention of the auxiliary generator can be enabled when the required water temperature exceeds the maximum value that can be reached by the heat pump:

The setting can be differentiated for plant water and domestic hot water.

[&]quot;PF59" p. 18: sets the hysteresis value

[&]quot;PF62" p. 18: sets the domestic hot water timeout value

Plant Water

PF52	Operating methods	Туре
1	Heat pump or Heating element or Boiler	Switching

"PF54" p. 17: sets the plant water threshold value

"PF55" p. 17: sets the plant water hysteresis

Domestic hot water

PF53	Operating methods	Туре
1	Heat pump or Heating element or Boiler	Switching

"PF56" p. 17: sets the threshold value for domestic hot water

⚠ The auxiliary backup generators will shut down when the storage temperature is less than the maximum allowed temperature.

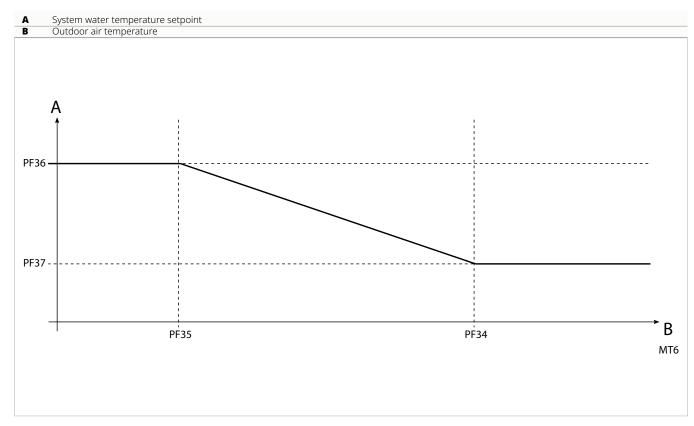
4.5 Dynamic set adjustment

The dynamic set function allows the creation of compensation algorithms based on the settable parameters according to the operating mode.

4.5.1 Function enabling

The dynamic set adjustment must be enabled by parameter "PF9" p. 15

4.5.2 Cooling mode settings



Settable parameters:

"PF34" p. 16: dynamic set maximum temperature

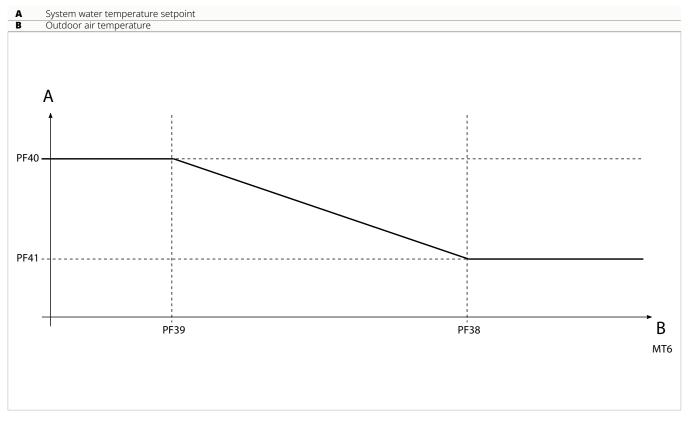
"PF35" p. 16: dynamic set minimum temperature

"PF36" p. 16: maximum water setpoint temperature in the climatic system

"PF37" p. 16: minimum temperature setpoint water system climate

⚠ Check carefully how the parameter setting affects the plant water flow temperature. An excessively high temperature will not allow air dehumidification treated by the hydronic terminals.

4.5.3 Heating mode settings



Settable parameters:

"PF38" p. 16: dynamic set maximum temperature

"PF39" p. 16: dynamic set minimum temperature

"PF40" p. 16: maximum water setpoint temperature in the climatic system

"PF41" p. 17: minimum temperature setpoint water system climate

⚠ Check carefully how the parameter setting affects the plant water flow temperature. An excessively low temperature will not allow sufficient heating of the air treated by the hydronic terminals.

4.6 Anti-legionella

The anti-legionella function must be activated if domestic hot water is stored in a boiler.

The function is not necessary if domestic hot water is produced by the plant water using a rapid exchanger.

⚠ The anti-legionella function is only possible with the electric heater kit.

⚠ The anti-legionella function is only possible with the electric heater kit.

4.6.1 Function enabling

The anti-legionella function must be enabled by parameter "PF67" p. 18.

4.6.2 Settings

Settable parameters:

"PF68" p. 18: anti-legionella temperature setting

"PF69" p. 18: anti-legionella cycle duration

"PF70" p. 18: anti-legionella cycle frequency

"PF71" p. 18: preferred activation time

USE

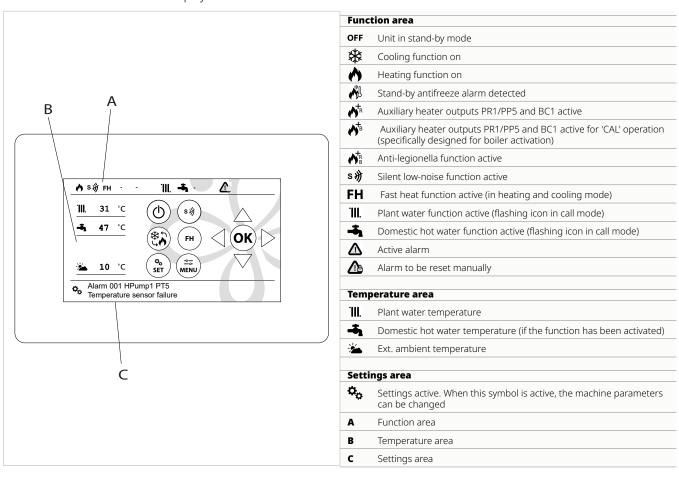
5.1 Interface

5.1.1 Description

The Control Panel regulates and coordinates all the main functions of the appliance. The device can be used to view the machine status, the main temperatures, the alarms and the main operating mode selection.

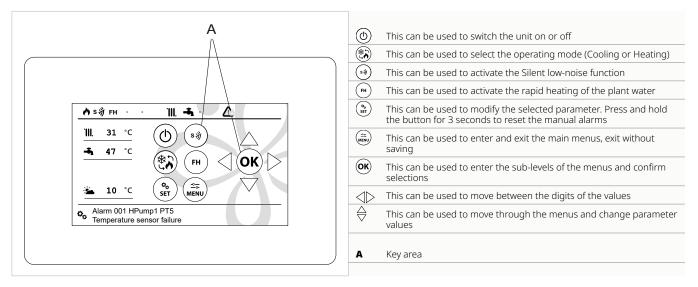
5.1.2 Display

Statuses and active alarms on display.





5.1.3 Keys functions

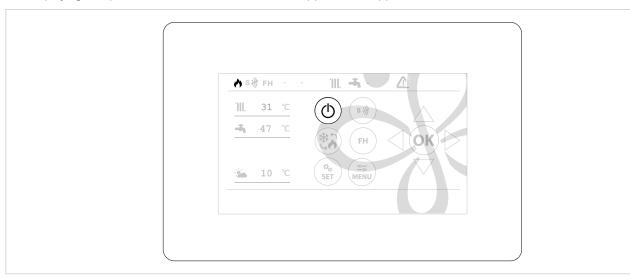


5.2 Control activation

Before the activation:

- set the plant master switch in the ON position.

The display lights up in the set last mode. If OFF (icon) appears, the appliance is off.



To activate the device

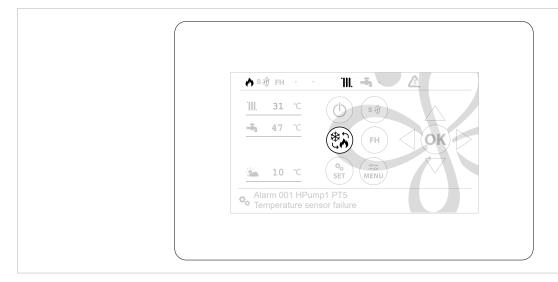
- press the key ⊕ The symbol ♠ or lights up

⚠ The display of the control unit will switch off after a certain time. Touch the screen to reactivate it. The last screen used appears on the display.

5.3 Basic function

5.3.1 Selecting the operating mode

This can be used to select the operating mode (Cooling or Heating)



To select:

in sequence press the button (☼)
 The symbol (३) on indicates that Cooling mode is active
 The symbol (♠) on indicates that Heating mode is active

The unit activates in the selected mode.

The symbol **III.** fixed indicates that the heat pump is being called.

The symbol indicates that the heat pump has started up.

5.3.2 Fast Heat function

The heat pump is set by default to produce domestic hot water as a priority. If fast heating of the rooms is required, priority can be temporarily shifted to the production of plant water with the Fast Heat function.



To activate:

- press the key [™]
The symbol **FH** appears and the function is on for 90 minutes

To deactivate before the timeout:

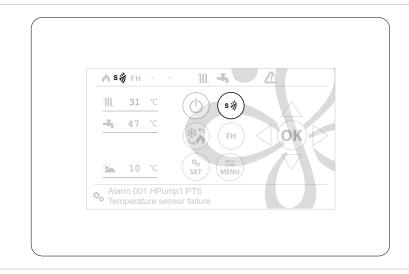
press the key (m)
 The symbol FH disappears and the function is off

5.3.3 Silent function

In particular situations, the noise level of the appliance can be reduced by lowering the operating speed of the compressor and the fan.

⚠ Activating the Silent function reduces the unit performance. Therefore, use is recommended only when necessary and not for normal operation.





To activate:

- press the key ☞ The symbol s → appears and the function is on

To deactivate:

- press the key → The symbol s → disappears and the function is off

5.4 Advanced features

The Control Panel provides access to advanced user functions. These features are present in the User menu:

- Set temp. Domestic hot water (only present if domestic hot water function is activated)
- · Date and time
- Language

To access the advanced features:

- press the key

The User menu appears in the settings area

- press (ок)

The first menu item appears in the settings area

To select the desired function:

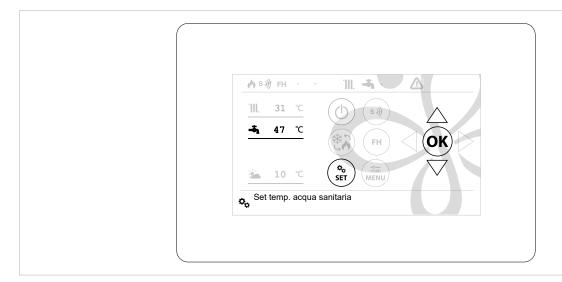
- act on
- select the desired function

⚠ In addition to the User menu, other menus for use by the Technical Assistance Centre or Installer are provided.

5.4.1 Domestic hot water temperature setting

This function makes it possible to set the desired hot water temperature.

⚠ The menu is only present if the Domestic Hot Water function is activated.



To set:

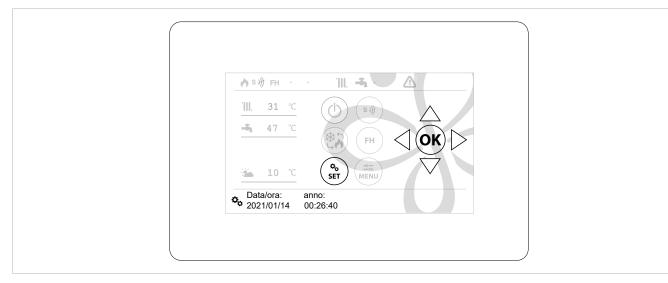
- press (**)
 The symbol appears in the settings area **
 The set value flashes in the temperature area **
- act on to modify the value
- press **OK** to confirm

 The symbol disappears in the settings area **C**The set value keeps flashing in the temperature area

⚠ The measured domestic hot water temperature value reappears when the menu is closed.

5.4.2 Date and time setting

This function can be used to set the current date and time.



To set:

- press (a)
 The symbol appears in the settings area (b)
 The settings area displays the currently set date and time
- click on $\triangleleft \triangleright$ to select the parameter to be modified from among year, month, day, hours, minutes and seconds
- act on ♥ to modify the value
- press (**ox**) to confirm

 The symbol disappears in the settings area **.

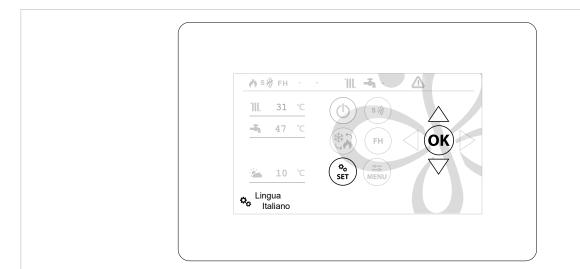


5.4.3 Language setting

The function can be used to set the desired language.

Available languages:

- ItalianEnglish • German



To set:

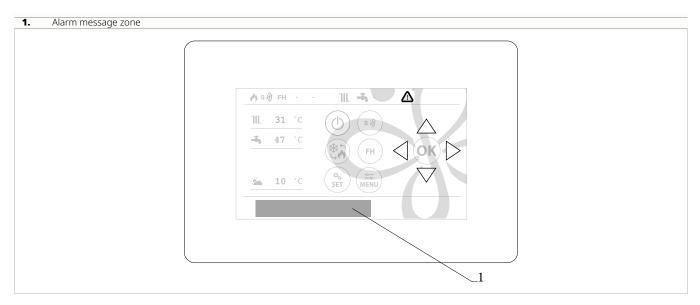
- press (a)

The symbol appears in the settings area have

The current language appears in the settings area

- click on ♥ to select the parameter press (or) to confirm
- The symbol disappears in the settings area 🔩

Alarm signals



The faults are indicated on the display of the Control Panel by the symbol Δ without padlock and with a digit indicating the number of alarms that have occurred. The alarm code and description appear in the settings area.

If more than one alarm has occurred, to display them:

- act on < The settings area displays the alarms that have occurred

- use ∇ to display the entire alarm message

The occurrence of the anomaly may be due to a random situation, in which case the alarm is automatically reset after some time.

⚠ If the anomaly is repeated several times, the appliance is put in safety and the symbol ⚠ appears. In this case, the appliance ance components must be checked in detail by the Technical Assistance Centre.

5.6 Manual reset of alarms

⚠ Manual reset of the alarms is an operation to be carried out by the Technical Assistance Centre. The alarm can be reset after checking the appliance components.

To restore:

- press and hold (%) for a few seconds
 the padlock disappears from the symbol (A)
- then the symbol **A** disappears

TROUBLESHOOTING

6.1 Preliminary warnings

Should you encounter any of the anomalies below:

- the ventilation does not start even if the water circuit is filled with hot or cold water
- the device is losing water in heating mode
- the device is loosing water in cooling mode
- the device generates excessive noise
- · there is dew on the front panel

Follow the instructions below:

- disconnect the device from power supply immediately
- close the water taps
- contact an authorised Technical Assistance Centre or professionally qualified personnel
- ↑ The interventions must be carried out by a qualified installer or by a specialized support center.
- Do not intervene personally.

6.2 Functional aspects not to be interpreted as faults

- · The following functional aspects may occur during the operation of the appliance, these behaviours of the appliance are correct and should not be interpreted as a fault.
- The compressor does not start again until 3 minutes after being shut off.
- · During operation in heating mode of systems with heat pump, heat is produced a few minutes after the compressor starts.
- · Periodic defrosting cycles occur during heating op-
- When switching from domestic hot water production to cooling and vice versa, the external heat pump is kept off for one minute to avoid mixing hot and cold water.

6.3 Faults reported by the Control Panel

Faults are indicated on the display of the Control Panel.

⚠ For reading, refer to the Control Panel Manual.

Manual reset of alarms

Repeating a fault several times will put the appliance in safety and the alarm must be reset manually.

To restore:

- press and hold (%) for a few seconds
- the padlock disappears from the symbol 🗥



- then the symbol **\Lambda** disappears



6.4 Troubleshooting Table

Alarm	Description	Correlated variables	Correlated parameters	Activation conditions	Restoration conditions	Cause
ALRM 001	Temperature probe malfunction	PT1, PT4, PT5, PT6, MT1-6	-	Probe disconnected, faulty or abnormal value		
ALRM 002	Low-pressure switch tripped	MI2	-	Open pressure switch opening contact		Insufficient refrigerant chargeExcessive amount of antifreezeInsufficient air flow to air cooler
ALRM 003	High-pressure switch tripped	MI1	-	Open pressure switch opening contact		 Excessive refrigerant charge Presence of non-condensible gases (air) Insufficient air flow to air cooler Set point setting too high Air temperature outside operating limits
ALRM 004	Inverter driver high temperature	-	-	Driver temperature > 100 °C	Driver temperature < 90 °C	Heat sink obstruction
ALRM 006	Inverter driver error	-	-	Driver active alarm		Faulty driver card
ALRM 007	Compressor suction low temperature	MT1	PM24, PM25	MT1 < PM24	MT1 > PM24 + PM25	 Insufficient refrigerant charge Excessive amount of antifreeze Insufficient air flow to air cooler
ALRM 008	Compressor discharge high temperature	MT2	PM23	MT2 > PM23	MT2 < PM23 - 10 °C	 Incorrect refrigerant charge Presence of non-condensible gases (air)
ALRM 009	Communication error	-	-	Serial connection fault between control panel and Main board		Cable interrupted or disconnected
ALRM 010	Evaporator liquid refrigerant low temperature	MT4 (cooling), MT5 (heating)	PM102, PM1	t < PM102	t > PM102 + PM1	Heating: • insufficient air flow to air cooler Cooling: • insufficient water flow rate • excessive amount of antifreeze
ALRM 012	Fan malfunction	-	-	No feedback from fan		Faulty fan motor
ALRM 017	Plant flowmeter tripped	PI1, PP1	-	PP1 active but PI1 open (with delay)	PP1 active and PI1 closed (with delay)	Check that: the check valves are open the 3-way valve for hot-cold diversion (if present) is in the correct position there are no air bubbles inside the circuit at least one of the consumers has an open circuit or is equipped with a 3-way valve the external sieve filter is not clogged the plant water pressure is correct the circulation pump is working properly (unlock it if necessary)
ALRM 022	High water temperature during domestic hot water production	The maximum value between PT5, PT6, PT4	PF28, PM1	t > PF28	t < PF28 - PM1	 Set point setting too high Incorrect type of domestic hot water storage tank Domestic hot water temperature probe PT4 not positioned correctly
ALRM 023	High water tempera- ture during heating operation	The maximum value between PT5, PT6, PT1 if enabled	PF27, PM1	t > PF27	t < PF27 - PM1	Set point setting too highMinimum water flow rate



Alarm	Description	Correlated variables	Correlated parameters	Activation conditions	Restoration conditions	Cause
ALRM 025	Plant exchanger antifre- eze cooling operation	The minimum value between PT5 and PT6	PF23	t < PF23	t > PF23 + PM1	Check that: • nothing is preventing the good water circulation in the plant (air, partially closed valves, clogged sieve filter, etc. • the thermal gradient between the delivery and return is between 4-7 °C. Query the t1 and t3 parameters • Set a lower circulation pump speed if the thermal gradient is less than 4 °C. • If the thermal gradient is greater than 7 °C, check that all the valves on the plant are open and if necessary add an external pump to increase the water flow rate or insert a hydraulic separator.
ALRM 027	Domestic hot water sto- rage antifreeze during cooling operation	PT4	PF23	t < PF23	t > PF23 + PM1	
ALRM 028	Plant exchanger and tank antifreeze during cooling operation	The minimum value between PT5, PT6, PT1 if enabled	PF23	t < PF23	t > PF23 + PM1	

- Note:
 In general, alarm resetting is automatic when the activation condition is established again.
 The activation or reset conditions must remain for a preset time (e.g. 30 s) before the alarm is activated or deactivated on the display. The duration of the preset time depends on the alarm type.
 If the alarm trips multiple times in a given time (e.g. 3 times in 1 hour), it must be reset manually by the Technical Service Centre.

NOTE





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