Panasonic

Panasonic Aquarea air-to-water heat pumps (K Generation)

Planning and installation manual

for All in One and bi-bloc systems



heating & cooling solutions

AQUAREA

Notes

Panasonic Aquarea air-to-water heat pumps (K Generation)

Planning and installation manual

for All in One and bi-bloc systems

Original Installation and Commissioning Instructions (English)

Version of the documentation: 02/2025

COPYRIGHT
© Panasonic Marketing Europe GmbH 2025. All rights reserved.

Copyrights and intellectual property rights
The copyright of this Manual remains with the manufacturer. No part of this Manual may be reproduced or processed using electronic systems, or distributed in any form without the written consent of Panasonic Marketing Europe GmbH. Infringements which conflict with the above-mentioned information will render you liable for damages. All trademarks mentioned in this Manual are the property of the respective manufacturers and are hereby acknowledged.

Table of Contents

1 Range of Aquarea heat pump models (K Generation) 8

2 General 10

3 Safety Notes 12

3.1 General Safety Notes for preventing electric shocks and other hazards to health 12

3.2 General Safety Notes relating to preventing material damage 13

3.3 General further information 14

4 Product Description 15

4.1 Operating Principle 15

4.2 Heat Source 19

4.3 Heat pump 20

4.3.1 Functioning and Characteristics 20

4.3.2 Operating mode 20

4.4 Heat use 20

4.4.1 Heating 20

4.4.2 Domestic hot water production 21

4.4.3 Cooling 22

4.5 Model types 22

4.5.1 Bi-bloc systems 22

4.5.2 Series 23

4.5.3 Model code 24

4.6 Functions and technical data 26

4.6.1 Product features 26

4.6.2 Bi-bloc systems 26

4.6.2.1 Components 27

4.6.2.2 Dimensions 31

4.6.2.3 Technical Data 36

4.7 Control 44

4.7.1 Remote controller 44

4.7.1.1 Design and functions of the remote controller 45

4.7.2 External interfaces (inputs/outputs) 50

4.8 Accessories 57

4.8.1 Domestic hot water tanks 57

4.8.1.1 Stainless steel domestic hot water tanks 58

4.8.1.2 Enamelled domestic hot water tanks 60

4.8.2 Combo Tanks 69

4.8.3 Residential Heat Recovery Ventilation Unit 73

4.8.4 Recommended on-site accessories 76

5 Planning 77

5.1 Refrigeration technology and performance criteria 78

5.1.1 Determination of design outside temperature and design heat load 78

5.1.2 Determination of the domestic hot water demand 79

5.1.3 Determination of the heating surface temperature 80

5.1.4 Operating mode and determination of the bivalence point 80

5.1.5 Determination of the pipe length correction factor for bi-bloc systems 81

5.1.6 Example: Calculation of the total heating capacity required 81

5.1.7 Cooling 82

5.1.7.1 Cooling with underfloor heating 83

5.1.7.2 Cooling with fan coils 83

5.2 Installation criteria 83

5.2.1 Acoustics 83

5.2.1.1 Sound pressure level 83

5.2.1.2 Sound power level for approximate calculation of the sound pressure level 84

5.2.2 Installation of a bi-bloc system 86

5.2.2.1 Installation conditions for outdoor units 87

5.2.2.2 Minimum distances for outdoor units 87

5.2.2.3 Securing the outdoor unit 88

5.2.2.4 Requirements of the room for installation of the indoor unit 89

5.2.2.5 Installation conditions for indoor units (hydromodule or All in One unit) 96

5.2.2.6 Minimum distances for indoor units (hydromodules or All in One units) 96

5.2.3 Hydraulics 97

5.2.4 Hydraulic integration 97

5.2.5 Pump discharge head 97

5.2.6 Hydraulic balancing 98

5.2.7 Special points related to cooling 98

5.2.8 Expansion vessel 98

5.2.9 Heating water quality 100

5.2.10 Use of buffer tanks 100

5.3 Electricals 101

5.3.1 Electrical connection to a power source 101

5.3.2 Electricity meters and rates 107

5.4 Heating and cooling capacity depending on supply water temperature and outside temperature 107

5.5 Application examples 110

5.5.1 Example 1: One-zone system without buffer tank 111

5.5.2 Example 2: Two-zone system with buffer tank 112

5.5.3 Example 3: Bivalent two-zone system with buffer tank 113

5.5.4 Example 4: Two-zone system with integrated domestic hot water tank 114

5.5.5 Example 5: One-zone system with integrated domestic hot water tank 115

5.5.6 Example 6: Bivalent two-zone system with solar heating system 116

5.5.7 Example 7: Two-zone system with swimming pool 117

5.5.8 Key for the application examples 118

Contents

6 Installation 120

6.1 Safety notes for installation 120

6.2 Preparing for installation 122

6.3 Creating a hole in the wall 125

6.4 Setting up devices 126

6.4.1 Indoor units 126

6.4.2 Outdoor units 127

6.5 Opening devices 129

6.5.1 All in One units 129

6.5.2 Hydromodules 131

6.5.3 Outdoor units 132

6.6 Connecting the refrigeration circuit 133

6.6.1 Connecting refrigerant pipes to the indoor unit 134

6.6.2 Connecting refrigerant pipes to the outdoor unit 137

6.7 Connecting the water pipework 139

6.7.1 Connecting the heating circuit to the indoor unit 139

6.7.2 Connecting the drainage pipework 142

6.7.2.1 Connecting the condensation drain hose 143

6.7.2.2 Connecting the safety valve drainage tap 145

6.8 Connecting the electrical wiring 148

6.8.1 Connecting the power cord 149

6.8.1.1 Connecting the power cord to the indoor unit 149

6.8.2 Connecting the optional on-site accessories 153

6.8.2.1 Connecting accessories to the indoor unit 153

6.8.2.2 Brief Overview of the external interfaces 156

6.8.3 Installing and connecting the remote controller 157

6.9 Starting up the system 160

6.9.1 Evacuating the refrigerant circuit and carrying out a pressure test 161

6.9.2 Filling and venting the water system 162

6.9.2.1 Filling the hot water tank 162

6.9.2.2 Filling the heating or cooling circuit 163

6.9.3 Checking the system 164

6.9.4 Carrying out a test run 165

6.9.5 Carrying out the system handover and instruction 165

7 Maintenance 166

7.1 Checking the water pressure 166

7.2 Checking the pressure relief valve 167

7.3 Conducting visual checks on the PCBs and terminals 167

7.4 Cleaning the water filters 167

7.5 Checking the residual current circuit breaker (RCCB) 168

7.6 Checking the air purge valve and venting the system 169

7.7 Resetting the thermostatic overload protection 169

7.8 Carrying out maintenance work on the refrigerant circuit 170

8 Appendix 171

8.1 Extract from the operating instructions (K Generation) 171

1 Range of Aquarea heat pump models (K Generation)

		3 kW	5 kW	7 kW
Aquarea High Performance	All in One 1ph	 WH-ADC0309K3E5 [1] WH-ADC0309K3E5AN [1] WH-ADC0309K3E5B WH-ADC0309K3E5UK WH-UDZ03KE5	 WH-ADC0309K3E5 [1] WH-ADC0309K3E5AN [1] WH-ADC0309K3E5B WH-ADC0309K3E5UK WH-UDZ05KE5	 WH-ADC0309K3E5 [1] WH-ADC0309K3E5AN [1] WH-ADC0309K3E5B WH-ADC0309K3E5UK WH-UDZ07KE5
	Bi-bloc 1ph	WH-SDC0309K3E5 [1] WH-UDZ03KE5	WH-SDC0309K3E5 [1] WH-UDZ05KE5	WH-SDC0309K3E5 [1] WH-UDZ07KE5
Aquarea T-CAP	All in One 1ph / 3ph			
	Bi-bloc 1ph / 3ph			

All models with R32 refrigerant.
1) Also available with 6 kW back-up heater. 2) Also available with 9 kW back-up heater.
WH-__E5 1ph // WH-__E8 3ph.

	9 kW	12 kW	16 kW
	 WH-ADC0309K3E5 [1] WH-ADC0309K3E5AN [1] WH-ADC0309K3E5B WH-ADC0309K3E5UK WH-UDZ09KE5		
	 WH-SDC0309K3E5 [1] WH-UDZ09KE5		
	 WH-ADC0912K6E5 WH-ADC0912K6E5AN WH-ADC0912K6E5UK WH-UXZ09KE5 WH-ADC0912K9E8 WH-ADC0912K9E8AN WH-UXZ09KE8	 WH-ADC0912K6E5 WH-ADC0912K6E5AN WH-ADC0912K6E5UK WH-UXZ12KE5 WH-ADC0912K9E8 WH-ADC0912K9E8AN WH-UXZ12KE8	 WH-ADC16K9E8 WH-ADC16K9E8AN WH-UXZ12KE8
	 WH-SXC09K3E5 [1] WH-UXZ09KE5 WH-SXC09K3E8 [2] WH-UXZ09KE8	 WH-SXC12K6E5 WH-UXZ12KE5 WH-SXC12K9E8 WH-UXZ12KE8	 WH-SXC16K9E8 WH-UXZ16KE8

2 General

About this manual

This Manual describes the planning, design, installation and commissioning of the K Series models of Panasonic Aquarea air-to-water heat pumps. The key information is to be found in the following three main chapters.

Chapter 4 - Product Description - contains information covering the following aspects:

- Air-to-water heat pumps method of function
- Model types, functions and technical data relating to the Aquarea heat pump systems
- Accessories

Chapter 5 - Planning - contains information covering the following aspects:

- Selection and design of the heat pump for specific use
- Selection of the installation site
- Planning and preparing for installation

Chapter 6 - Installation - contains information covering the following aspects:

- Installation of the refrigerating, hydraulic and electrical components
- Commissioning

You will also find in Chapter 7 - Maintenance - a description of the key maintenance tasks and in the Appendix an overview of the error codes and operating instructions.

In addition to the information contained in this Manual, attention must also be paid to the information in the installation and operating instructions for the respective device.

Products covered

The current Aquarea K Series heat pump systems are covered in this Manual: bi-bloc systems and All in One (AiO) systems, which are a combination of a hydromodule and a hot water tank. A detailed overview of the models covered can be found at → *1 Model range, p. 8*.

Intended use

Aquarea air-to-water heat pumps from Panasonic are intended for use in space heating and domestic hot water (DHW) production and represent complete, high-quality heating systems. Optionally, they can also be operated with cooling function and combined with hot water tanks, solar thermal or photovoltaic systems and/or further heat sources powered by electricity, oil or gas.

The intended use of the heat pumps requires adherence to the information and instructions contained in this Manual, especially the safety-related information.

Any other use is considered improper and can lead to significant damage.

Panasonic assumes no liability for any damage resulting from improper use.

Target groups

This Manual is aimed at specialist planning and installation operations.

Installation and commissioning of the heat pumps may only be carried out by qualified technicians.

Only persons authorised by the manufacturer may make any changes, conversions and repairs. Any changes or conversions made by customers themselves will basically exclude any liability being incurred by the manufacturer for any damage resulting from this in exactly the same way as with improper use.

Operation of the heat pumps can, in contrast, also be undertaken by private persons.

Information for using this Manual

Various notices, symbols and text representations used in this Manual are briefly explained below.

Safety-related information

Safety-related information, including product safety labels, safety notes and warning messages, warns the user about dangers and provides instructions for the safe and proper use of the product. In this manual, the following layout and symbols are used for warning messages:

WARNING

This signal word warns of a potentially hazardous situation which can lead to death or severe injury.

► Follow the instructions given in the warning messages in order to prevent this.

CAUTION

This signal word warns of a potentially hazardous situation which can result in slight or moderate injury.

► Follow the instructions given in the warning messages in order to prevent this.

ATTENTION

This signal word warns of a situation which can result in material damage occurring.

► Follow the instructions given in the warning messages in order to prevent this.

Additional warning symbols

Warning of electric shock

Further information

IMPORTANT

Important information which must be observed in all cases in order to ensure that the devices function in the intended manner.

Note

Notice for further useful information.

Text representations

►	indicates handling instructions in a warning message
1., 2., 3. ... or a, b, c ...	indicates operating steps which must be executed in the order specified
●	indicates a list
Accentuation	indicates important terms or text passages
(1)	indicates references to image keys in the running text
→ *Cross-reference*	indicates a cross-reference (with hyperlink function)
www.Hyperlink.com	indicates an internet address (with hyperlink function)

3 Safety Notes

To avoid possible harm to persons or damage to products, read and follow these safety notes.

3.1 General Safety Notes for preventing electric shocks and other hazards to health

WARNING

Danger to life from electric shock!

The devices are operated with 230 V or 400 V alternating current. Improper installation can present a danger to life from electric shock as well as a danger of fire occurring due to overheating.

- ► Electrical installation work must be undertaken by a trained electrician.
- ► Service and maintenance work must only be carried out by an accredited electrician or an authorised dealer.
- ► Keep children and people unfamiliar with the equipment away from any installation work.
- ► Adherence to national and local standards and provisions is to be observed when carrying out any installation work.
- ► Ensure that all cables and power connections, including those already in place, are of adequate dimensions for the electrical power of the heat pump.
- ► Only use licensed power cords for connecting to a power source. No modified cables or extension cables are to be used for connecting to the power source.
- ► The heat pumps must be duly earthed. Earthing is not to be undertaken via gas or water pipes, lightning conductors or earthing for a telephone system.
- ► Adherence is to be paid to the respective national electrical wiring regulations and safety arrangements with regard to residual current. Panasonic recommends using a residual current circuit breaker (RCCB).

CAUTION

Danger of frostbite from the skin coming into contact with the refrigerant

Direct contact of the skin with the refrigerant can cause frostbite.

- ► Work on the refrigeration circuit and in connection with the refrigerant must be carried out by a trained technician or an authorised trader holding a refrigerant handling certificate.
- ► Wear gloves when handling refrigerants (e.g. when emptying or filling the refrigeration circuit).
- ► Observe the Safety Notes in force for the relevant refrigerant (R32) as specified in the Service Manual for the relevant model.

Danger of fire and explosion caused by inflammable gases

A danger of fire or explosion arises when any leakages of inflammable gases occur at the installation site of the heat pump.

- ► Do not install heat pumps at sites where inflammable gases can escape.

Danger due to toxic gases if the refrigerant comes into contact with fire

Toxic gases can be created when escaped refrigerants come into contact with fire.

For this reason, if refrigerants escape during installation or operation:

- ► Extinguish any sources of fire (if present).
- ► Thoroughly ventilate the room in which the heat pump is installed.

Danger of explosion and injury caused by pressure in the refrigeration circuit being too high

In the event of improper installation, leaks can occur at the connections of the refrigerant pipes, leading to air being sucked in while the compressor is operating. This results in increased pressure in the refrigeration circuit, leading in turn to increased risk of explosion or injury.

- ► Always use piping, flare nuts and tools, which are explicitly appropriate for R32 and follow the R32-specific safety and installation instructions as specified in the Service Manual for the relevant model.
- ► Carry out installation of the refrigerant pipes in a proper manner and check that there are no leaks in the installation before turning on the compressor.
- ► Before the refrigerant pipes are removed or work is carried out on the pipes, switch the compressor off.

Danger of illnesses caused by colonies of bacteria in the water

The risk of colonies of bacteria, particularly of Legionella, in the water can be raised with an open water circuit.

- ► Only deploy devices in a closed water system.

3.2 General Safety Notes relating to preventing material damage

ATTENTION

Danger of the devices being damaged by incorrect refrigerant

The devices must only be operated with the refrigerant described in this Manual or the respective operating instructions. The use of other refrigerants or multi-component refrigerants can lead to the devices being damaged and to safety risks. Panasonic will not accept any responsibility or liability whatsoever if incorrect refrigerants are used.

- ► Only use R32 refrigerant for Aquarea High Performance and T-CAP series models of the K Series.
- ► Do not mix the prescribed refrigerant with refrigerants of another type or replace it with a refrigerant of another type.

Danger of other material damage to the devices, e.g. due to vibrations, water leaks or fire

- ► Any work on the water circuit must be carried out by a trained technician.
- ► All relevant European and national provisions (including EN 61770 “Electrical appliances connected to the water mains”) are to be observed in installation work for the water circuit.
- ► Adhere to the conditions prescribed for the installation site:
  - Indoor units (hydromodules or All in One units) are only to be installed in indoor areas.
  - Outdoor units are only to be installed in outdoor areas.
- ► Adhere to the prescribed sequence of installation steps.
- ► Only use parts and tools delivered with the equipment or as specified.
- ► As far as possible, avoid installation of outdoor units near the sea, in regions with a high content of sulphur or at sites where large quantities of oil (e.g. machine oil, etc.) are present, as this may result in shortened operating life.

3.3 General further information

The following Notices contain recommendations or further assistance.

Notices

- Whether air-to-water heat pumps are subject to approval depends on the national and local regulations in force at the installation site. In addition, all valid regulations, especially in the area of noise, must be observed.
- Attention must be paid to both the Safety Notes and information in the operating instructions for the respective devices and the information contained in this Manual.

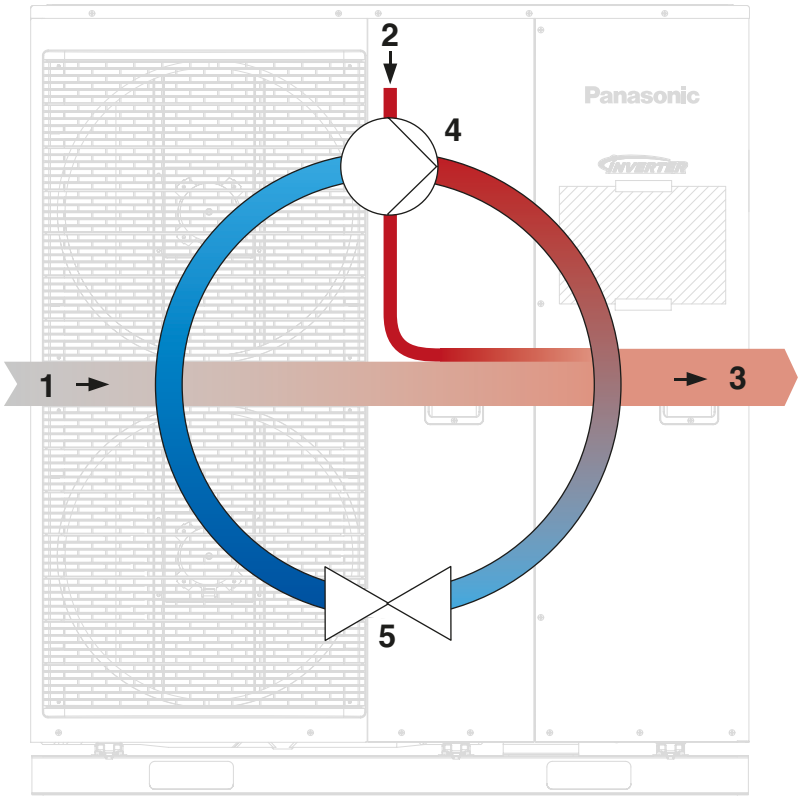
4 Product Description

4.1 Operating Principle

Pleasant indoor temperatures just above 20 °C are needed to ensure living comfort. This temperature does not differ much over most of the year, no matter what the outside temperature is.

In contrast to heating with burners, which generate temperatures of several hundred degrees as part of the combustion process, a heat pump generates only the temperature that is needed at the moment. The Aquarea air-to-water heat pump uses the thermal energy contained in the ambient air to heat the building and to provide hot water. In other words, the system uses freely available ambient heat. Power is only needed to supply the compressor, the electronics and the pumps, and in extremely low outside temperatures, to operate the integrated electric backup heater.

Functioning principle of an air-to-water heat pump



1 Thermal energy contained in the ambient air (evaporator)
2 Power
3 Useful heat (condenser)
4 Compressor
5 Expansion valve

In a circulation process, ambient heat is brought to a higher temperature level. An environmentally-compatible refrigerant passes through four steps:

- In the evaporator (**1**), the refrigerant boils and goes from the liquid phase to the gaseous phase. In this step, heat is extracted from the environment.
- In the compressor (**4**), the pressure of the gaseous refrigerant is sharply increased, and the temperature also rises. This step takes place with supply of electrical energy (**2**).
- In the condenser (**3**), gaseous refrigerant condenses and transfers the heat of condensation to the water to be heated, while it also cools down at the same time.
- When passing through the expansion valve (**5**), the pressure of the fluid refrigerant drops so abruptly that its temperature drops sharply and it can absorb ambient heat again.

This circulation process runs continuously and can be controlled using the Inverter Plus technology of the Aquarea heat pump in such a manner that the current heat requirement is covered.

By inverting the circulation process, it becomes a refrigeration machine. Aquarea heat pumps can thus also be used for space cooling.

Coefficient of Performance and Seasonal Efficiency

The Coefficient of Performance (COP) of a heat pump for the heating mode is defined as the ratio of the emitted thermal output to the electrical power consumed and thus says something about the efficiency of the heat pump at a given moment. The COP of heat pumps differs, depending on the outside temperature and temperature of the generated heat. It is generally true that the COP drops with increasing the temperature difference between the outside temperature and the temperature of the useful heat. A comparison of the efficiency of various heat pumps is only possible at the same temperature. COPs for air-to-water heat pumps are usually measured and stated at the following temperatures for better comparability:

Outside temperature	Useful heat
A–15	W35
A–7	W35
A7	W35
A2	W55

(**A** stands for Air, **W** stands for Water)

Example

Coefficient of Performance = 5.33 (A7 / W35)

At an outside temperature of 7 °C, the air-to-water heat pump generates hot water at 35 °C with a COP of 5.33. Thus, it is possible to generate 5.33 kilowatt hours of heat from one kilowatt hour of energy input.

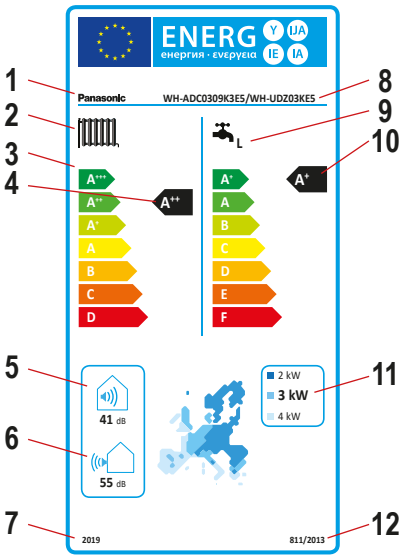
A clearer view on a heat pump's performance under real operating conditions is provided by the Seasonal Coefficient of Performance (SCOP). As specified in EN 14825, the SCOP is defined as the total reference annual heating load QH divided by the total annual power consumption QHE, where QHE includes the COPs (measured at defined operating states), the energy consumption in non-active mode, the rated heating capacity and the duration in active mode (dependent on three simplified climate zones across Europe based on outdoor air temperatures weighted by their occurrences in assumed hours per year).

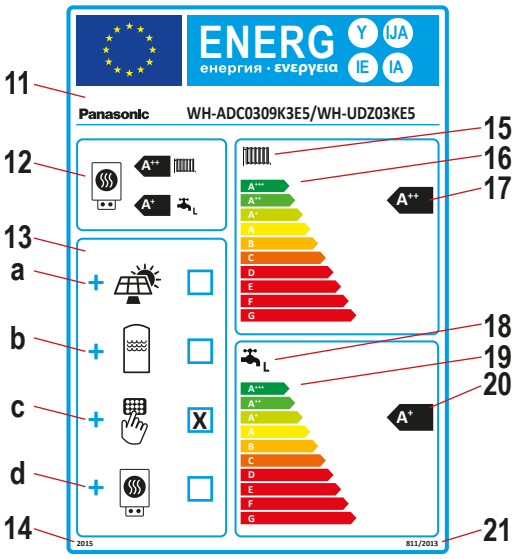
The classification of heat pumps in terms of efficiency, which is stated on the EU energy label, is based on the seasonal space heating energy efficiency η_s, which in turn is calculated from the SCOP.

Similar to the COP for the heating mode is the power factor for the cooling mode (EER = energy efficiency ratio) defined as the ratio of the emitted cooling power to the consumed electrical power.

EU Ecodesign Directive

The European Union's Ecodesign Directive 2009/125/EC provides the framework for establishing the determination of the EU-wide valid requirements applicable for the product design, with which the environmental loads and the CO_2-emission by energy consumption-related products are to be reduced throughout their total life cycle. The Ecodesign Directive must be implemented in every EU member state into national law (e.g. in Germany by the Energy consumption relevant products act (EVPG 2008) or in Austria by the Ecodesign Ordinance (ODV 2007)).





Example of Product Energy label (left)

1 Manufacturer
2 Symbol for space heating function
3 Energy efficiency class scale for space heating
4 Energy efficiency class for space heating
5 Sound power level indoors
6 Sound power level outdoors
7 Year of validity of the Regulation
8 Product name
9 Symbol for water heating function with indication of the load profile
10 Energy efficiency class for water heating
11 Rated heating capacity (kW) for the three European climate zones
12 Regulation number

Example of Package Energy Label (right)

11 Manufacturer and product name
12 Package system
13 Package options:
a Solar system
b Hot water tank
c Control
d Additional heat source (e.g. boiler)
14 Year of validity of the Regulation
15 Symbol for space heating function
16 Energy efficiency class scale for space heating
17 Energy efficiency class for space heating
18 Symbol for domestic hot water function with indication of the load profile
19 Energy efficiency class scale for water heating
20 Energy efficiency class for water heating
21 Regulation number

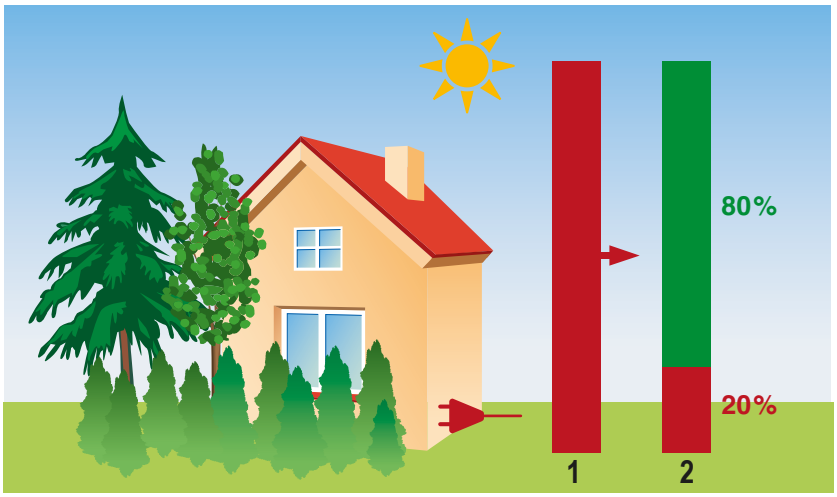
According to this Ecodesign Directive (or ErP Directive - Energy related products), boilers and heat pumps (among other heat generating devices), hot water tanks and domestic ventilation devices must fulfill product-specific minimum requirements in respect of the energy efficiency. Moreover, individual products as well as so called “packages” (e.g. heater plus controls) must be provided with a product or package energy efficiency label. Energy efficiency is calculated according to uniform criteria and indicated on the label as energy efficiency class (A+++ to D for space heating, A+ to F for water heating).

Economical and Environment-Friendly

More than 79 % of the end energy utilisation in the household is used for heating and domestic hot water production. At the same time, the fuel prices (oil, gas, wooden pellets) are subject to high price variations and are becoming more and more expensive.

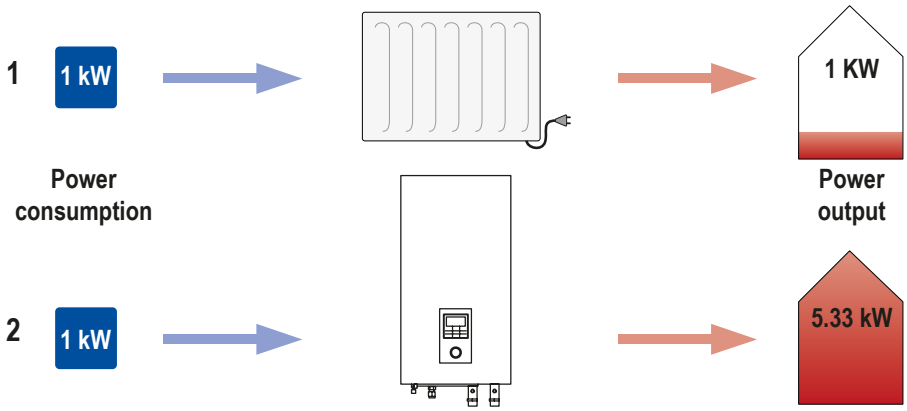
On the other hand, with an Aquarea heat pump, up to 80 % cost-free ambient heat can be used. Only the remaining component of 20 % power needs to be sourced for the operation of the heat pumps. In comparison with a heating, which is purely based on electrical power, the power sourcing is thus reduced to a fifth for the same heat production.

Comparison of the power requirement of an Aquarea heat pump with a purely electrical heater for the same heat production



1 Conventional electrical heater

2 Aquarea heat pump



Against heating systems using fossil fuel, the dependence on oil prices and uncertain energy imports is thus reduced. In addition, the part of renewable energy fraction of the electric power consumed is already around 20 % and shows a rising tendency. Other than the ambient heat, therefore, the power used for heat pumps is also going to increasingly come from renewable energy.

In addition to the low use of electrical power, the lack of a need for stack emission measurements also contributes towards low operating costs. The investment capital for an Aquarea heat pump is comparatively low in comparison with the other heating systems having a natural gas connection, chimney, oil tank or earth probes.

Optionally, the Aquarea heat pumps can also be operated with cooling function and supplemented with a solar system and a heat recovery ventilation system. This in turn helps increase comfort and efficiency.

Based on the environmental and energy policies of the European Union, each member state may offer national state-promoted market incentive programmes for air/water heat pumps including direct investment cost allowances. State-funded promotions are usually linked to certain conditions, like e.g. minimum requirements related to the seasonal energy efficiency or annual power consumption, which must be verifiable through heat and power meters or similar tools. A hydraulic balance and the adjustment of the heating curve may also be required. The current status for state-promoted incentive programmes is country-specific and must be checked individually from time to time. Details are given in the respective current European and national promotion directives.

Note

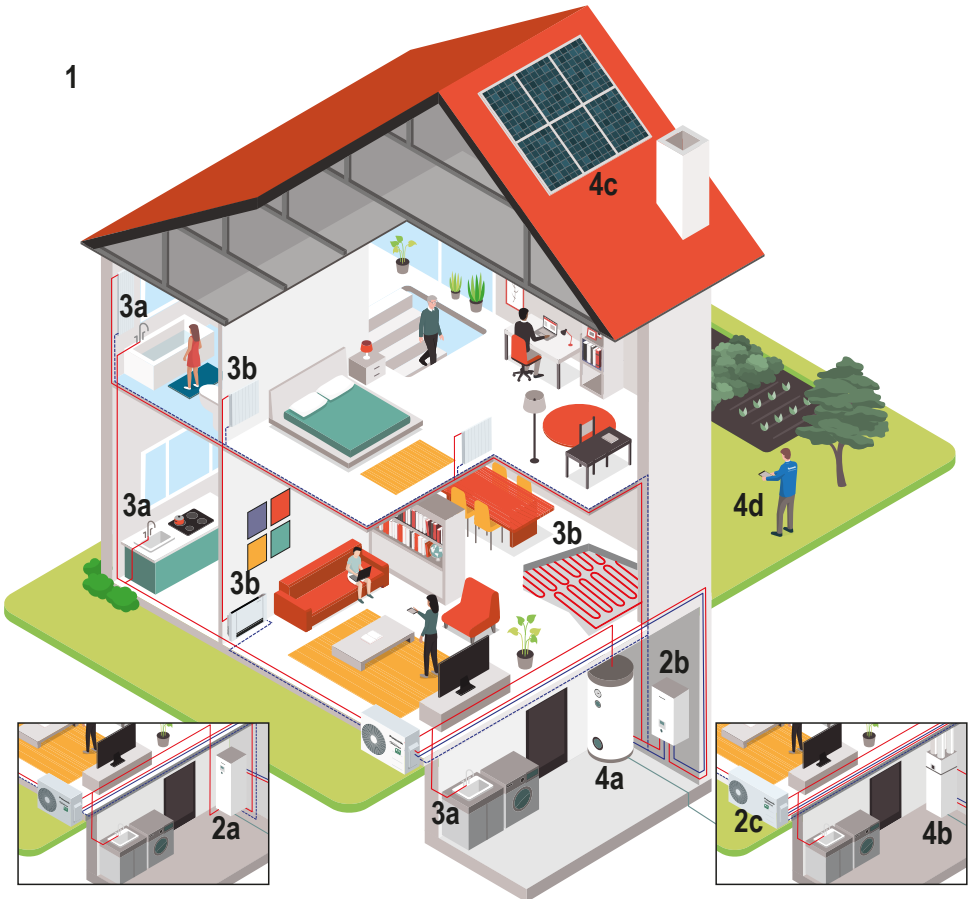
With the Aquarea Designer, Panasonic offers a cost-free online tool for heat pump dimensioning, which can be used for calculating the annual COP (see the section “Panasonic Aquarea Designer” in the planning chapter).

Test certificates for applying for state promotion can be downloaded if required from the Download area of the Panasonic ProClub at www.PanasonicProClub.com.

4.2 Heat Source

Air, as a source of heat, is available everywhere and can be used at very little cost and in any amount by using air-heat exchangers combined with fans. However, the outside temperature has major variations during the year and the requirement for heat varies inversely. That means that much more heat needs to be generated when the source of heat itself is at its coldest. This must be taken into consideration at the time of planning, so that the living comfort remains constant.

Similarly, the noise generation of the fans and the air flow should be taken into consideration; minimum distances to the adjacent properties should be observed and the installation location should be selected accordingly.



1 Heat source: ambient air
2 Heat pump system:
2a All in One system
2b Bi-bloc system
2c Mono-bloc system (not available in K Generation)
3 Heat use:
3a Domestic hot water production (DHW)
3b Space heating/cooling (radiators, fan coil units, floor / ceiling / wall surface-embedded heating systems)
4 Optional accessories
4a Hot water tank
4b Heat recovery ventilation system atop a hot water tank
4c Solar panels
4d Cloud-based control systems

4.3 Heat pump

4.3.1 Functioning and Characteristics

Panasonic has developed the heat pump, as the core of the heat pump system, in two different model series. This makes it possible to offer the best possible solution to address individual heat supply requirements for buildings:

- Aquarea High Performance
  Ideal for low-consumption houses with low-temperature radiators or surface-embedded systems.
- Aquarea T-CAP
  For applications where the nominal heating capacity must be maintained even at outside temperatures ranging from -7 or -20 °C. Care is taken to ensure that sufficient power output is always available for heating the house, even at extremely low outside temperatures, even without support from an additional heat source.

For both series a cooling function can be activated. Moreover, both Aquarea heat pump series offer the choice between two types of bi-bloc systems, where an outdoor unit can be combined either with a standard hydromodule or with an All in One unit (→ *4.5 Model types, p. 22*).

4.3.2 Operating mode

In general: The greater the difference between the outside temperature and temperature of the useful heat, the lower is the COP of the heat pump. As high temperature differences seldom occur over the course of the year on properly planned heat pump systems, brief additional re-heating using backup heaters is often accepted. As an alternative to backup heater, you can also work with a peak load or alternative heat source, such as a condensing boiler or a fireplace. Four operating modes are distinguished as follows:

- Monovalent operating mode:
  The heat pump serves as the sole heat source.
- Mono-energetic operating mode:
  One type of energy (electricity) is used in various heat sources (electric heat pump + electric heating element for peak load).
- Bivalent alternative operating mode:
  As an alternative to the heat pump, a second heat source supplies the object using another type of energy (e.g. fireplace instead of heat pump for outside temperatures < -5 °C).
- Bivalent parallel operating mode:
  Besides the heat pump, a second heat source is used using another type of energy. Both heat sources are operated simultaneously (e.g. heat pump + condensing boiler for outside temperatures < 0 °C).

IMPORTANT

If the heat pump in combination with an electric backup heater is operated mono-energetically, the backup heater should cover a maximum of 15 % of the heat requirement.

4.4 Heat use

4.4.1 Heating

In contrast with heat sources with burners, which generate supply water temperatures of over 80 °C, the maximum water outlet temperature of the Aquarea heat pump is limited to 60 °C (Aquarea High Performance) or 65 °C (Aquarea T-CAP) without using the backup heater. This must be taken into consideration during the planning of the heating circuits. Surface-embedded systems (i.e. underfloor, ceiling or wall heating) that have a supply water temperature of up to 35 °C

and a supply/return water temperature difference (ΔT) of 5 K are recommended. An advantage of underfloor heating with wet screed laying is its high storage capacity, which eliminates the need for a buffer tank for bridging power cut-off times by the energy supply company.

Fan coils have the advantage of good heat emission to the ambient air with quick control performance. Besides, they can be used for both the heating and cooling modes to the same extent.

If radiators are used, plan with the lowest possible design temperature of, for example, 45 °C, to ensure high efficiency of the heat pump system. An internal backup heater of 3 to 9 kW with its mono-energetic operating mode ensures high heating comfort of the Aquarea heat pump even at very low outside temperatures. Alternatively, a bivalent operation is also possible in combination with an external heat source.

The Aquarea heat pump has an outside temperature-dependent control of the supply water temperature and can thus actuate a heating circuit with a room thermostat. The other heating circuits can be controlled through additional heating circuit controllers or a superordinate system controller.

4.4.2 Domestic hot water production

The Aquarea heat pump can also produce domestic hot water (DHW), and this function is integrated in the controls. It switches to this operating mode when necessary and systematically actuates the tank for hot water production through a 3-way valve.

For reasons of efficiency, the hot water temperature is set to a value below 60 °C in heat pump operation. A hot water temperature of 45 °C is normally sufficient and does not compromise comfort in any way. If the hot water temperature is, however, too low, there is the risk of Legionella to be considered; the growth of Legionella is particularly likely in water temperatures between 30 and 50 °C.

Panasonic hot water tanks are fitted with an electrical heating element (DHW tank booster heater) for comfortable hot water supply, which is only switched on when needed or for Legionella prophylaxis (sterilisation).

Aquarea heat pumps can be easily combined with solar systems, which can take over hot water production to a large extent in the summer.

CAUTION

Danger of illnesses due to growth of Legionella in water

Legionella can grow in hot water tanks, and can cause infectious diseases in humans.

► Respect European and national requirements for avoiding Legionella multiplication (example in Germany: DVGW Worksheet W551). For domestic hot water tanks with more than 400 litres volume as well as in buildings with more than two residential units, there may be higher requirements than for one- and two-family houses.

ATTENTION

Danger of damage to water tank due to inadequate water quality

If the contents of chloride and sulphate exceed 250 mg/l, water pretreatment is required. The warranty is invalidated at values above 250 mg/l.

► When using the Panasonic hot water tank, make sure that the water quality conforms to Directive 98/83/EC on drinking water quality.

4.4.3 Cooling

The cooling mode is switched on manually with the wired remote controller or automatically through defined temperature threshold values. Switching to heating mode is also done manually at the end of the cooling season or automatically using the defined temperature threshold.

Space cooling is possible through surface-embedded systems such as floor and wall emitters, cooling ceilings or particularly using fan coils. Individual heating circuits that are not suitable for cooling mode can be disabled by control through a 2-way valve. For all transfer systems, in the cooling mode at high humidity, the temperature on the surface could fall below the dew point, which can cause condensation of water. This should be prevented especially in surface-embedded systems either by using a dew point sensor to control the supply water temperature and increase it by mixing supply water with return water as needed, or by switching the cooling mode off if required. Fan coils can be operated with much lower supply water temperatures, compared to the use of surface-embedded systems for cooling mode, and therefore have greater cooling capacities. However, fan coils for cooling mode must always be fitted with a condensation drain and have tubes with diffusion-proof heat insulation.

ATTENTION

Danger of damage to building or risk of slipping in the floor area

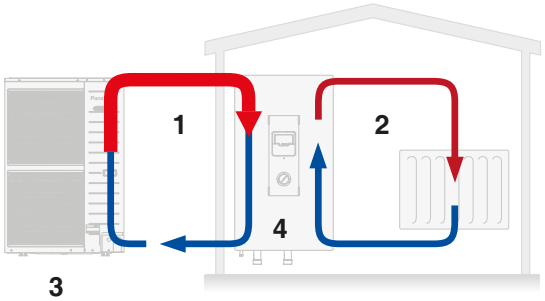
In the cooling mode, a temperature drop below dew point can cause condensation of moisture from the air on the surface of the heat transfer systems. This can damage the building or pose the risk of slipping in the floor area.

- ► Prevent the temperature from dropping below the dew point by suitable placement of dew point sensors.
- ► Alternatively, the condensate that forms can be safely drained.
- ► In addition, insulate the pipes concerned to prevent diffusion.

4.5 Model types

4.5.1 Bi-bloc systems

Working principle of bi-bloc systems



1 Refrigerant circuit
2 Heating circuit (water)
3 Outdoor unit
4 Indoor unit (hydromodule / All in One unit)

Bi-bloc system

Bi-bloc systems consist of an outdoor unit installed in the open air and an indoor unit, either standard hydromodule or All in One unit, which is usually installed in the boiler room or in another frost-free room. The two units of a bi-bloc system are linked through refrigerant pipes, so there is no danger of freezing. The heat pump is operated through the operating panel on the indoor unit.

The All in One unit is a space-saving combination of the hydromodule and a high-quality stainless steel hot water tank. It can be installed quickly and smoothly, because the internal pipes of the device are already laid and the pipe connections are placed on the underside of the device.

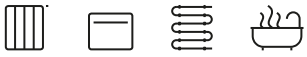
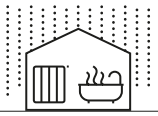
4.5.2 Series

The Aquarea heat pump system has two different series that are in turn available in multiple model variants and various product generations. An overview of the range of models covered in this manual (K Generation) can be found at the beginning of this document (→ *1 Model range, p. 8*).

With the large number of different model variants, which illustrates the large variety of characteristics and functions of the Aquarea heat pumps, Panasonic can achieve a high level of flexibility and adaptability for the most varied applications. This is intended to offer the best possible solution to address individual heat supply and air-conditioning requirements for buildings using Aquarea heat pumps.

The following table shows the K Generation models of the Aquarea heat pump series and their key characteristics in the context of typical applications.

Overview of Aquarea series and model variants (K Generation)

Aquarea High Performance	Aquarea T-CAP
	
Heating - Cooling - DHW	Heating - Cooling - DHW
Single phase from 3 to 9 kW	Single phase from 9 to 12 kW Three phase from 9 to 16 kW
Connectable to	
	
Radiators - Fan coil - Underfloor heating - DHW	Radiators - Fan coil - Underfloor heating - DHW
Application	
	
New buildings and retrofit	Extreme cold ambient and retrofit
Energy efficiency	
A+++ / A++	A+++ / A++
Heating 35 °C / 55 °C [1]	Heating 35 °C / 55 °C [1]
Minimum outdoor temperature	
-25 °C	-28 °C
Maximum supply temperature for heating	
60 °C	65 °C [2]
Control and connectivity	
Smart Grid Contact [3] Wireless LAN Ready	Smart Grid Contact [3] Wireless LAN Ready
Range	
All in One from 3 to 9 kW (185 l) Bi-bloc from 3 to 9 kW	All in One from 9 to 16 kW (185 l) Bi-bloc from 9 to 16 kW

Note: All data in this chart is applicable in most of models in each line up, check product specs to confirm.

1 Scale from A+++ to D

2 It is possible to set temperature to 65 °C on remote controller. Normally, outlet water temperature is 60 °C or lower. In case of ΔT setting with remote controller is 15 °C and the outdoor ambient temperature is 5 to 20 °C, outlet water temperature 65 °C is possible.

3 With CZ-NS5P.

Besides the notable differences as in hydromodule and All in One unit, all models have the same working principle and can therefore be described together in respect of many planning-relevant properties. The relevant differences will be pointed out at the appropriate point.

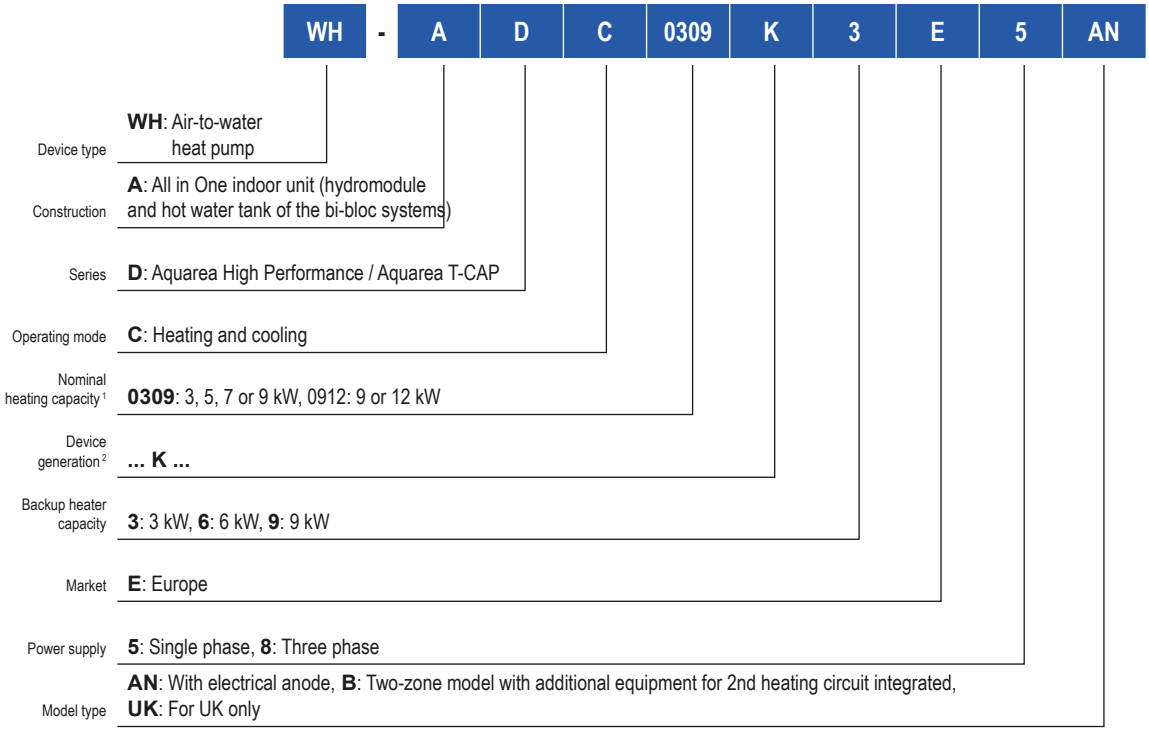
4.5.3 Model code

For easy and clear denomination of the different Aquarea models, a model code is used, from which the models with their respective specific properties and functions can be read off.

Example

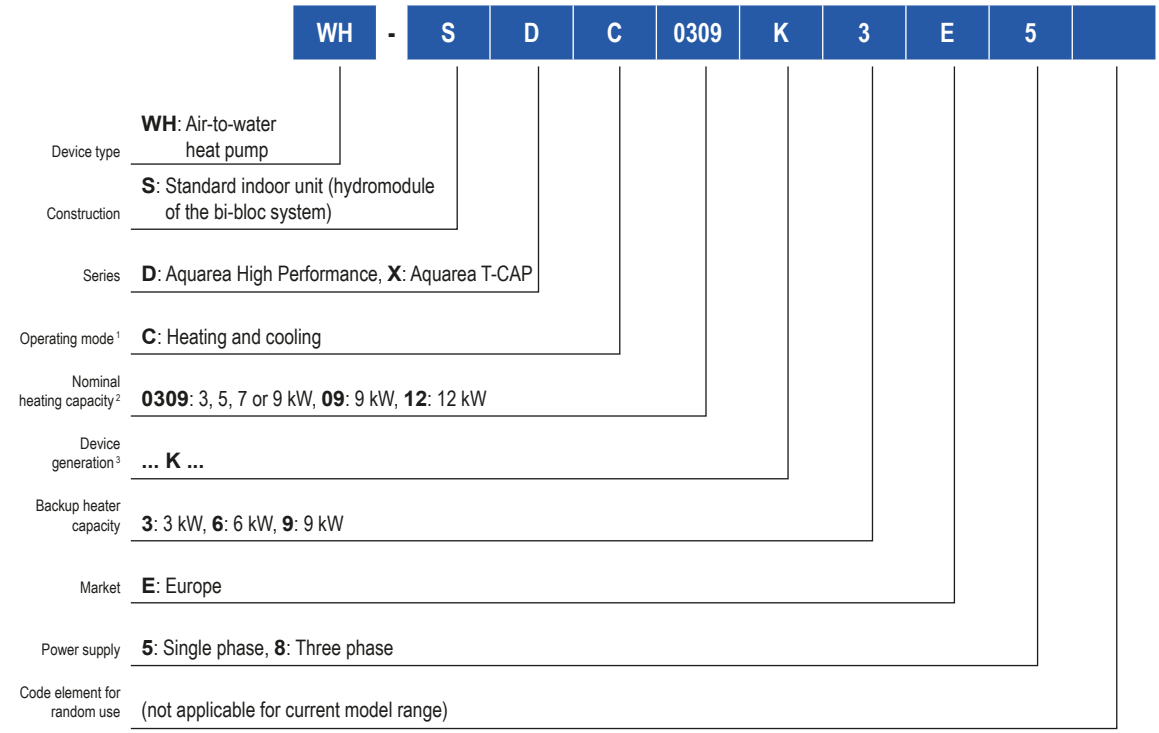
WH-SDC0309K3E5 is a bi-bloc heat pump indoor unit (WH-) in hydromodule design (S) of the High Performance series (D) with cooling function (C), suitable for a nominal power of 3 to 9 kW (0309), of the K Generation (K), for the European market (E), with a single phase power supply (5).

Model code for All in One indoor units (bi-bloc systems)



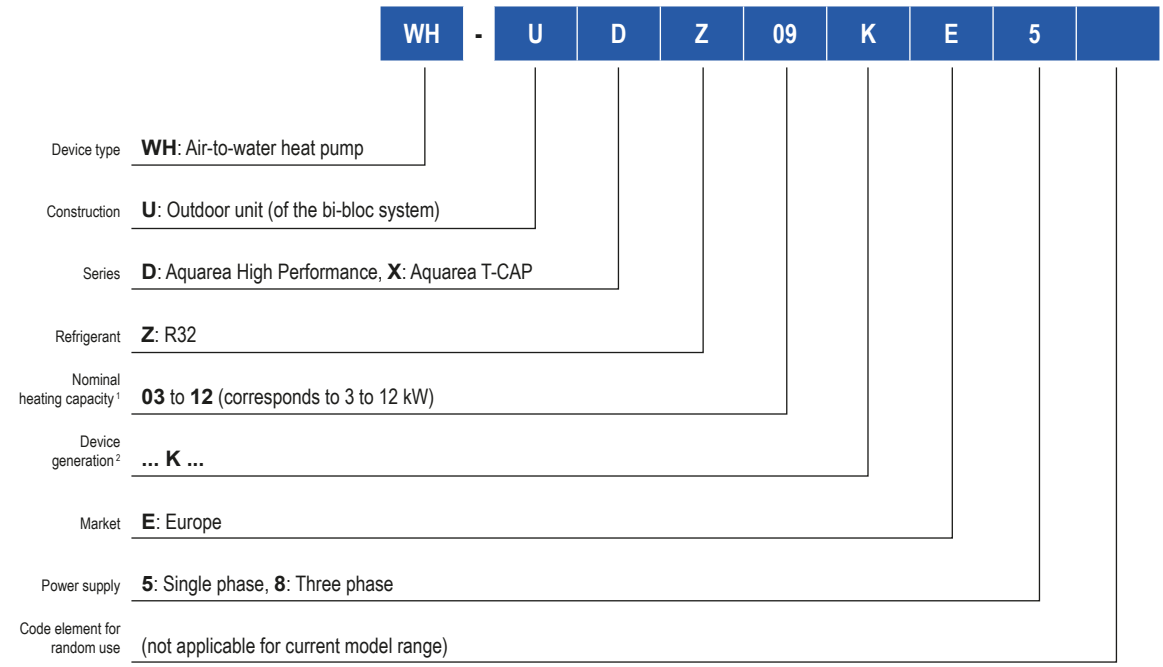
1 The available capacities differ according to the series. An overview is given in the model range (→ *1 Model range, p. 8*).
2 K generation requires refrigerant R32.

Model code for standard indoor units (bi-bloc systems)



1 The available capacities differ according to the series. An overview is given in the model range (→ *1 Model range, p. 8*).
2 K generation requires refrigerant R32.

Model code for outdoor units (bi-bloc systems)



1 The available capacities differ according to the series. An overview is given in the model range (→ *1 Model range, p. 8*).
2 K generation requires refrigerant R32.

4.6 Functions and technical data

4.6.1 Product features

Energy efficiency and environment friendliness

- Up to 80 % of the energy is obtained from the ambient air for greater energy efficiency
- COP of 5.33 for the single-phase 3 kW bi-bloc and All in One systems (High Performance series) or COP of 5.08 for the single-phase or three-phase 9 kW bi-bloc and All in One systems (T-CAP series) for A7 / W35
- Inverter technology allows for a demand-controlled power output of the device and thus contributes to energy savings
- Environmentally friendly refrigerant (R32)
- All systems are fitted with a high-efficiency pump

High Comfort

- Optimum control
- All models designed for heating and cooling
- Integrated control of the hot water tank and heating
- 24-hour timer with mode control
- Model WH-ADC0309K3E5B complete with all necessary equipment for control of two individual heating zones
- Extremely compact All in one indoor units optimised for combination with optional Heat Recovery Ventilation unit (PAW-A2W-VENTA-R/L)

Easy operation

- Contol panel for standard and All in One bi-bloc systems is integrated in the hydromodule, but can be installed separately within the building
- Easy programming via the control panel
- For safety reasons, the hydromodules and All in One units are all fitted with a residual current circuit breaker (RCCB).

Easy Maintenance and Assembly

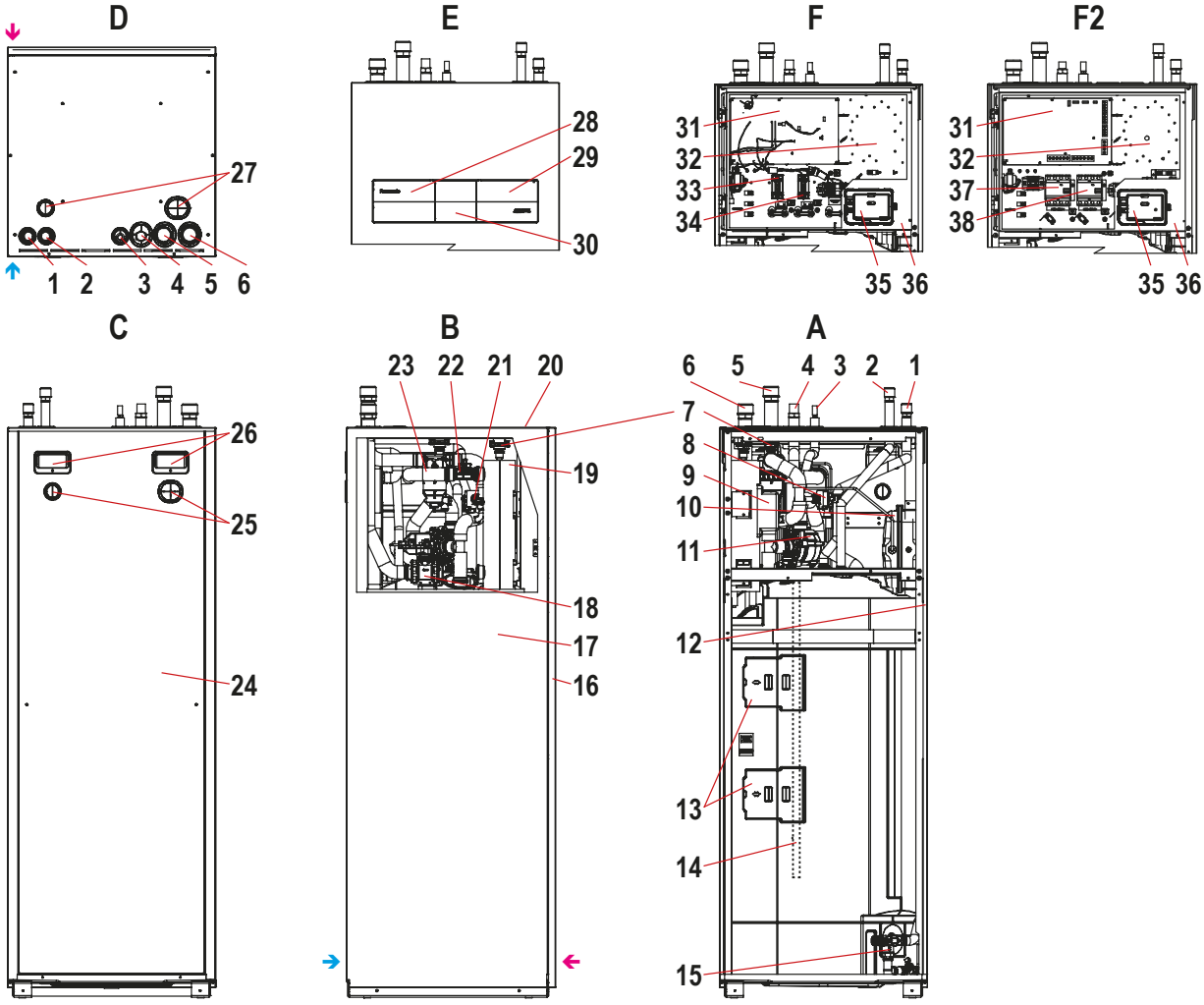
- Compact design
- Easy control of the water pressure by using the hydraulic gauge in the front panel of the hydromodule or All in One unit
- All units are easy to open for optimum accessibility of all internal parts
- All in One units with factory-fitted pipe connections are easy to install
- Flexible installation possibilites due to long pipe runs
- Refrigerant pipe runs of up to 50 metres with a height difference up to 30 metres possible (depending on model and ambient conditions)
- Pipe connections to the outdoor units can be made in four directions (front, rear, side, below)

4.6.2 Bi-bloc systems

The Aquarea bi-bloc systems consist of an indoor unit (which can be a hydromodule or an All in One unit) and an outdoor unit. Both units of the bi-bloc system are configured such that they are mutually matched to one another as a kit, i.e. the outdoor units cannot be combined arbitrarily with the different indoor units. A suitable Aquarea bi-bloc system kit is available for all typical applications.

4.6.2.1 Components

All in One unit | K Generation | Standard configuration (for 1 heating zone) | With optional electrical anode (AN)
WH-ADC0309K*E5, WH-ADC0912K6E5, WH-ADC0912K9E8, WH-ADC16K9E8
WH-ADC0309K*E5AN, WH-ADC0912K6E5AN, WH-ADC0912K9E8AN, WH-ADC16K9E8AN



➔ Front side, ➔ Rear side

A Internal view (seen from front side)
1 Supply water outlet (to hot water tank)
2 Fresh water inlet
3 Refrigerant liquid line
4 Refrigerant gas line
5 Return water inlet (from space heating/cooling)
6 Supply water outlet (to space heating/cooling)
7 Air purge valve
8 Pressure relief valve
9 Overload protector (not visible)
10 Expansion vessel
11 Water circulation pump
12 Right side plate
13 Hot water tank temperature sensor (x 2; not visible: slide covers (left – right) to access sensors)
14 Electrical anode [a] (not visible)
15 Safety valve

B Internal view of upper section (seen from left side)
16 Front side plate
17 Left side plate
18 3-way valve
19 Backup heater assembly
20 Top plate
21 Water pressure sensor
22 Vortex water flow sensor
23 Magnetic water filter set

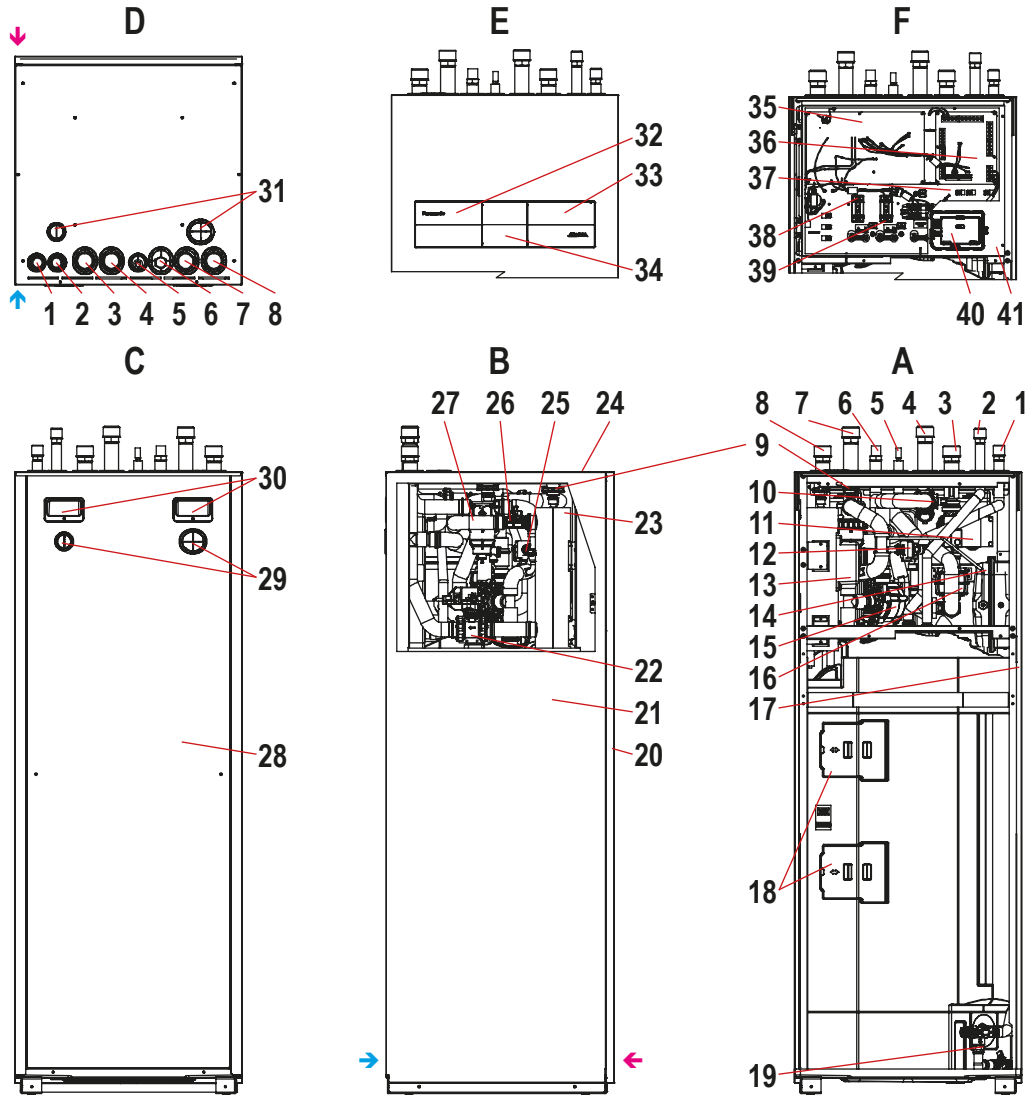
C Rear view
24 Back side plate
25 Back side cable gland (x 2)
26 Handle (x 2)

D Top view
1 to 6: see **A** view
27 Top side cable gland (x 2)

E Detail view of upper section (seen from front side)
28 Left side decoration panel
29 Right side decoration panel
30 Remote controller

F/F2 Internal detail view of upper section (seen from front side)
31 Main PCB
32 Control board
33 Single phase RCCB b (for power supply)
34 Single phase RCCB b (for backup heater)
35 Network adapter holder
36 Control board cover
37 Three phase RCCB c (for power supply)
38 Three phase RCCB c (for backup heater)
a Applicable only for models with anode: WH-ADC0309K*E5AN, WH-ADC0912K6E5AN, WH-ADC0912K9E8AN, WH-ADC16K9E8AN)
b Applicable only for single-phase models: WH-ADC0309K*E5(AN), WH-ADC0912K6E5(AN)
c Applicable only for three-phase models: WH-ADC0912K9E8(AN), WH-ADC16K9E8(AN)

All in One unit | K Generation | Two-zone configuration (for 2 heating zones) (B) WH-ADC0309K3E5B



➔ Front side, ➔ Rear side

A Internal view (seen from front side)

1 Supply water outlet (to hot water tank)
2 Fresh water inlet
3 Zone 2 Supply water outlet (to space heating/cooling)
4 Zone 2 Return water inlet (from space heating/cooling)
5 Refrigerant liquid line
6 Refrigerant gas line
7 Zone 1 Return water inlet (from space heating/cooling)
8 Zone 1 Supply water outlet (to space heating/cooling)
9 Air purge valve
10 Zone 2 Water filter set
11 Zone 2 Circulating water pump
12 Pressure relief valve
13 Overload protector (not visible)
14 Expansion vessel
15 Water circulation pump
16 Zone 2 Mixing valve
17 Right side plate
18 Hot water tank temperature sensor (x 2, not visible: slide covers (left – right) to access sensors)
19 Safety valve

B Internal view of upper section (seen from left side)

20 Front side plate
21 Left side plate
22 3-way valve
23 Backup heater assembly
24 Top plate
25 Water pressure sensor
26 Vortex water flow sensor
27 Magnetic water filter set

C Rear view

28 Back side plate
29 Back side cable gland (x 2)
30 Handle (x 2)

D Top view

1 to 8: see **A** view
31 Top side cable gland (x 2)

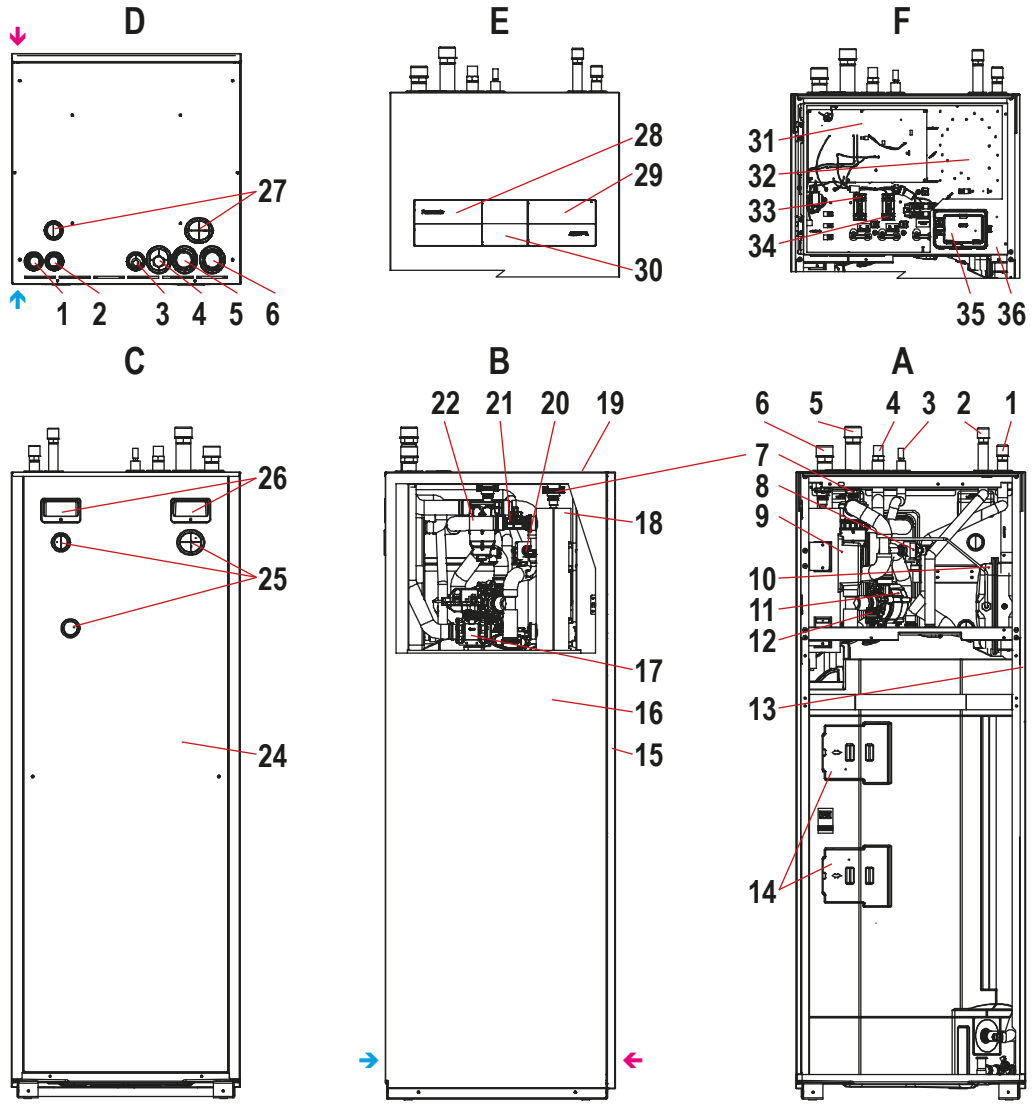
E Detail view of upper section (seen from front side)

32 Left side decoration panel
33 Right side decoration panel
34 Remote controller

F Internal detail view of upper section (seen from front side)

35 Main PCB
36 Optional PCB
37 Control board
38 Single-phase RCCB (for power supply)
39 Single-phase RCCB (for backup heater)
40 Network adapter holder
41 Control board cover

All in One unit | K Generation | Standard configuration (for 1 heating zone) | For UK only (UK)
WH-ADC0309K3E5UK, WH-ADC0912K6E5UK



➔ Front side, ➔ Rear side

A Internal view (seen from front side)
1 Supply water outlet (to hot water tank)
2 Fresh water inlet
3 Refrigerant liquid line
4 Refrigerant gas line
5 Return water inlet (from space heating/ cooling)
6 Supply water outlet (to space heating/ cooling)
7 Air purge valve
8 Pressure relief valve
9 Overload protector (not visible)
10 Expansion vessel
11 Water circulation pump
12 Temperature and pressure relief valve
13 Right side plate
14 Hot water tank temperature sensor (x 2, not visible: slide covers (left – right) to access sensors)

B Internal view of upper section (seen from left side)
15 Front side plate
16 Left side plate
17 3-way valve
18 Backup heater assembly
19 Top plate
20 Water pressure sensor
21 Vortex water flow sensor
22 Magnetic water filter set

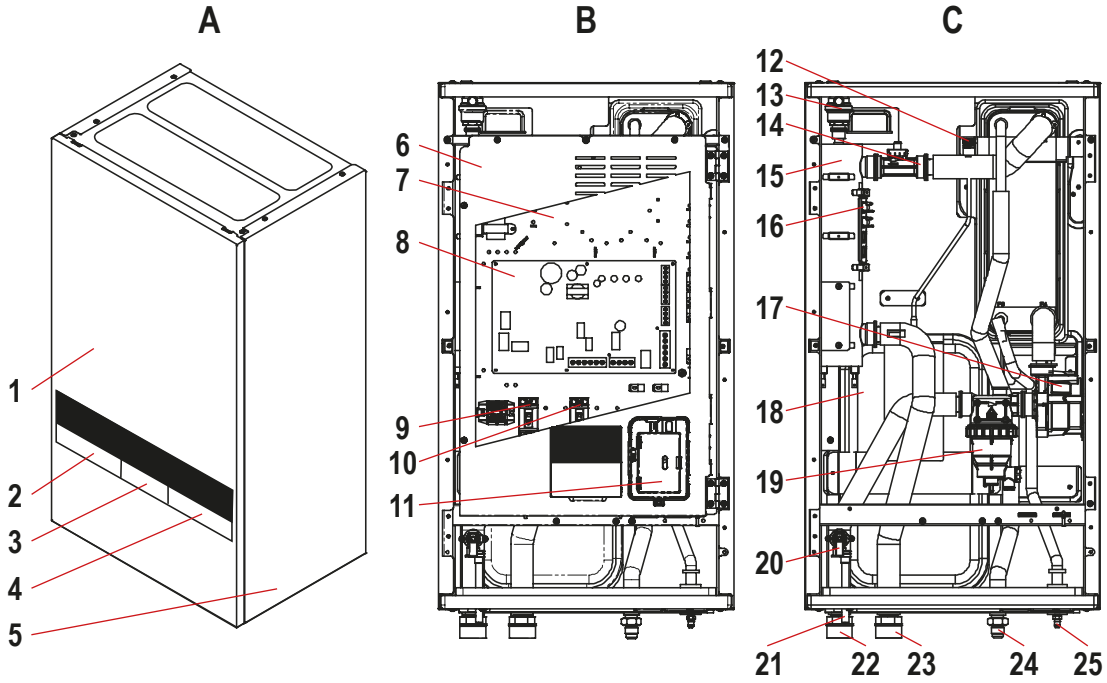
C Rear view
24 Back side plate
25 Back side cable gland (x 3)
26 Handle (x 2)

D Top view
1 to 6: see **A** view
27 Top side cable gland (x 2)

E Detail view of upper section (seen from front side)
28 Left side decoration panel
29 Right side decoration panel
30 Remote controller

F Internal detail view of upper section (seen from front side)
31 Main PCB
32 Control board
33 Single-phase RCCB (for power supply)
34 Single-phase RCCB (for backup heater)
35 Network adapter holder
36 Control board cover

Hydromodule | K Generation
WH-SDC0309K3E5, WH-SDC0309K6E5, WH-SXC09K3E5, WH-SXC09K6E5, WH-SXC12K6E5, WH-SXC09K3E8, WH-SXC09K9E8, WH-SXC12K9E8, WH-SXC16K9E8



A Exterior view
1 Front panel
2 Left decoration panel
3 Remote controller
4 Right decoration panel
5 Side panel (x 2)

B Internal view (seen from front side) with control board cover closed)
6 Control board cover
7 Control board
8 Main PCB
9 Single-phase[a] / Three-phase[b] RCCB (for power supply)
10 Single[c] / Three phase[d] RCCB (for backup heater)
11 Network adapter holder

C Internal view (seen from front side) with control board swung open)
12 Water pressure sensor
13 Air purge valve
14 Vortex water flow sensor
15 Backup heater
16 Overload protector (x 2)
17 Water circulation pump
18 Expansion vessel (10 litres)
19 Magnetic water filter set
20 Safety valve
21 Drain water hole
22 Return water inlet (from space heating/ cooling)
23 Supply water outlet (to space heating/ cooling)
24 Refrigerant gas line
25 Refrigerant liquid line

a Applicable for the following models: WH-SDC0309K3E5, WH-SDC0309K6E5, WH-SXC09K3E5, WH-SXC09K6E5, WH-SXC12K6E5
b Applicable for the following models: WH-SXC09K3E8, WH-SXC09K9E8, WH-SXC12K9E8, WH-SXC16K9E8
c Applicable for the following models: WH-SDC0309K3E5, WH-SDC0309K6E5, WH-SXC09K3E5, WH-SXC09K6E5, WH-SXC12K6E5, and WH-SXC09K3E8
d Applicable for the following models: WH-SXC09K9E8, WH-SXC12K9E8, WH-SXC16K9E8

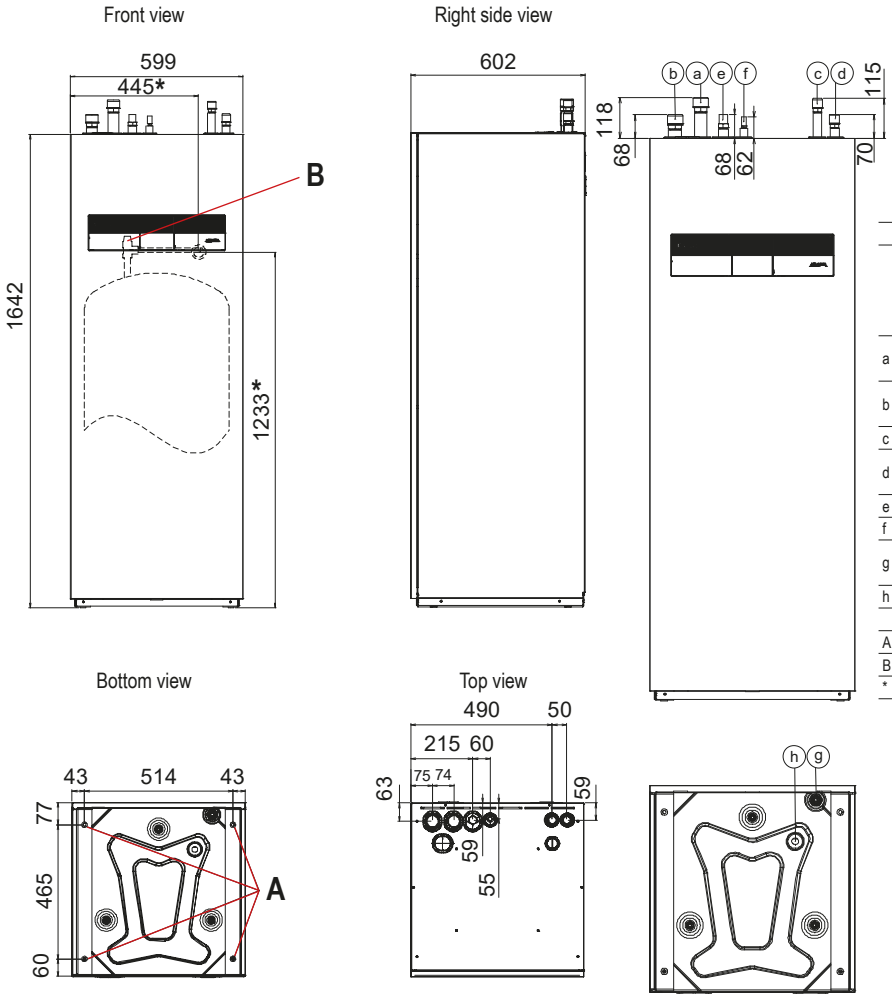
4.6.2.2 Dimensions

Note

All dimensions are indicated in millimetres (mm); the figures are, however, not to scale.

Indoor units

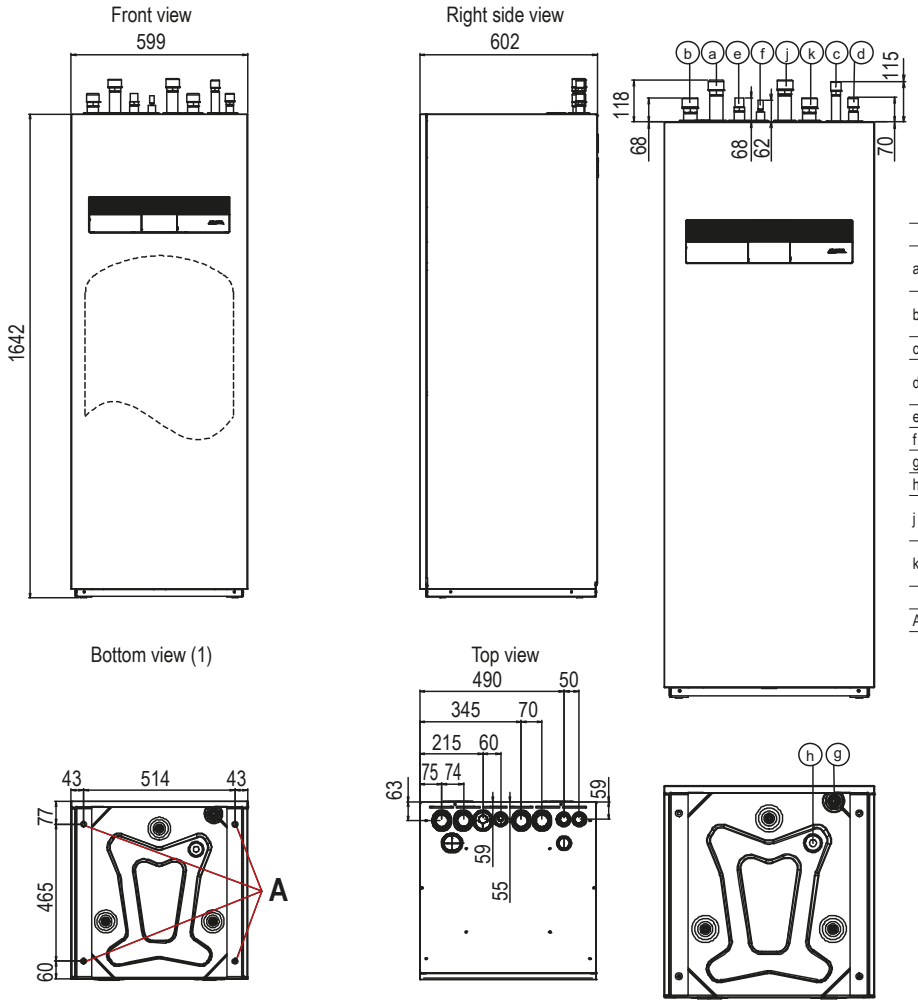
All in One unit | K Generation | Standard configuration
WH-ADC0309K*E5, WH-ADC0912K6E5, WH-ADC0912K9E8, WH-ADC16K9E8
WH-ADC0309K*E5AN, WH-ADC0912K6E5AN, WH-ADC0912K9E8AN, WH-ADC16K9E8AN
WH-ADC0309K3E5UK, WH-ADC0912K6E5UK



	Function	Connector size	
		ADC0309K*E5(AN) ADC0309K3E5UK	ADC0912K6E5(AN) ADC0912K6E5UK ADC0912K9E8(AN) WH-ADC16K9E8(AN)
a	Return water inlet (from space heating/cooling)	R 1¼"	R 1¼"
b	Supply water outlet (to space heating/cooling)	R 1¼"	R 1¼"
c	Fresh water inlet	R ¾"	R ¾"
d	Supply water outlet (to hot water tank)	R ¾"	R ¾"
e	Refrigerant gas line	7/8-14UNF	3/4-16UNF
f	Refrigerant liquid line	7/16-20UNF	7/16-20UNF
g	Hot water tank drainage nozzle	Rc 1/2"	Rc 1/2"
h	Condensate drain hole	–	–

A	4 height-adjustable feet
B	Temperature & pressure relief valve (applicable only for UK models)
*	Dimensions applicable only for UK models

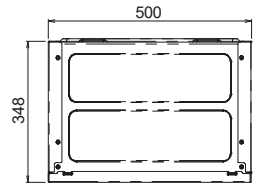
All in One unit | K Generation | Two-zone configuration
WH-ADC0309K3E5B



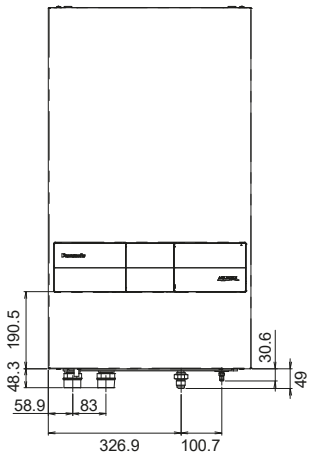
	Function	Connector size
a	Zone 1 Return water inlet (from space heating/cooling)	R 1¼"
b	Zone 1 Supply water outlet (to space heating/cooling)	R 1¼"
c	Fresh water inlet	R ¾"
d	Supply water outlet (to hot water tank)	R ¾"
e	Refrigerant gas line	7/8-14UNF
f	Refrigerant liquid line	7/16-20UNF
g	Hot water tank drainage nozzle	Rc 1/2"
h	Condensate drain hole	–
j	Zone 2 Return water inlet (from space heating/cooling)	R 1¼"
k	Zone 2 Supply water outlet (to space heating/cooling)	R 1¼"
A	4 height-adjustable feet	

Hydromodule | K Generation
WH-SDC0309K3E5, WH-SDC0309K6E5,
WH-SXC09K3E5, WH-SXC09K6E5, WH-SXC12K6E5,
WH-SXC09K3E8, WH-SXC09K9E8, WH-SXC12K9E8, WH-SXC16K9E8

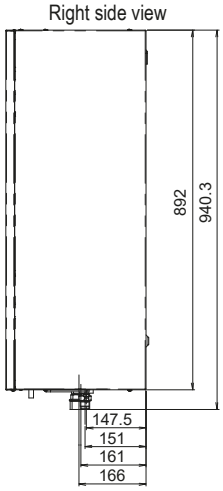
Top view



Front view

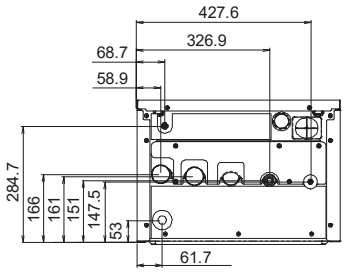


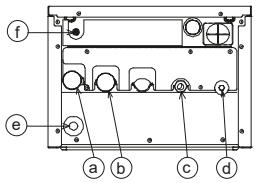
Right side view



	Function	Connector size	
		WH-SDC**	WH-SXC**
a	Return water inlet (from space heating/cooling)	R 1¼"	R 1¼"
b	Supply water outlet (to space heating/cooling)	R 1¼"	R 1¼"
c	Refrigerant gas line	7/8-14UNF	3/4-16UNF
d	Refrigerant liquid line	7/16-20UNF	7/16-20UNF
e	Condensate drain hole	–	–
f	Safety valve drainage	⅜"	⅜"

Bottom view

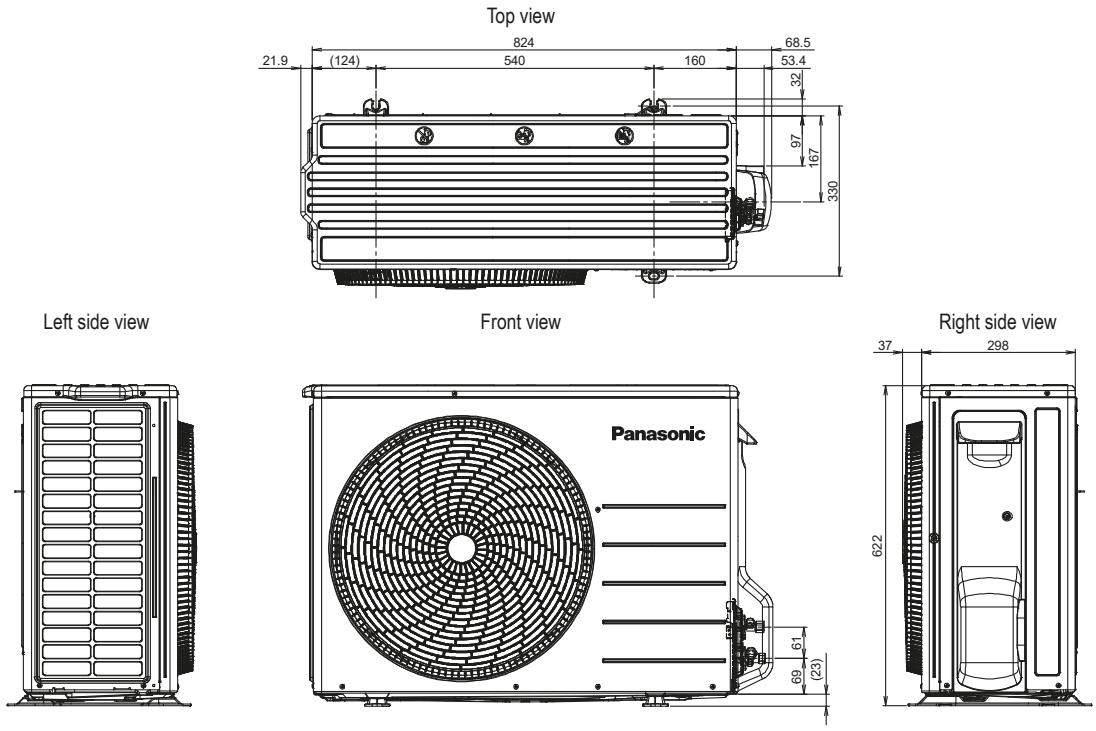




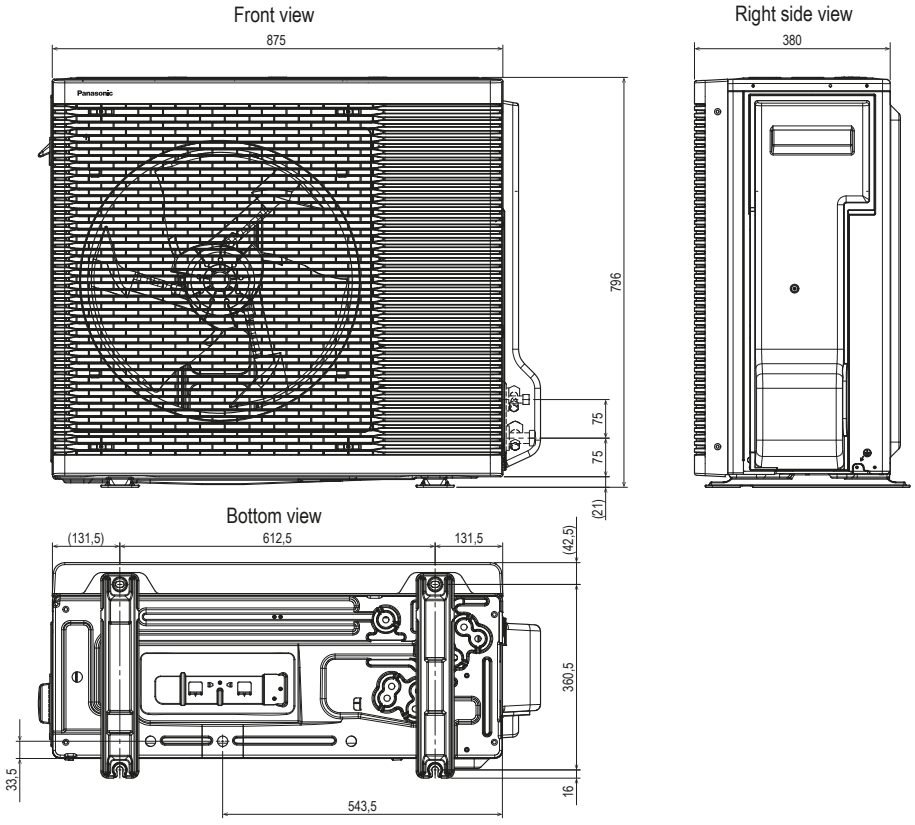
4

Outdoor units

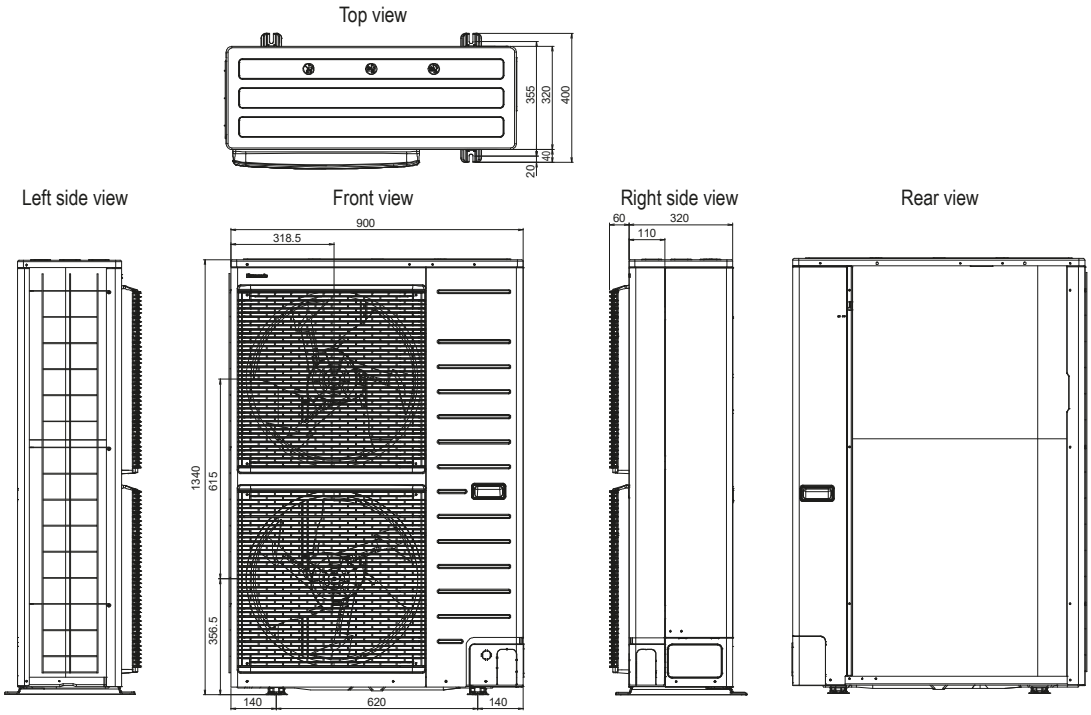
Aquarea High Performance bi-bloc outdoor unit | K Generation | 3 kW
WH-UDZ03KE5



Aquarea High Performance bi-bloc outdoor unit | K Generation | 5 to 9 kW
WH-UDZ05KE5, WH-UDZ07KE5, WH-UDZ09KE5



Aquarea T-CAP bi-bloc outdoor unit | K Generation | 9 and 12 kW
WH-UXZ09KE5, WH-UXZ12KE5, WH-UXZ09KE8, WH-UXZ12KE8



4

4.6.2.3 Technical Data

All in One systems | Aquarea High Performance | K Generation | Single Phase | Heating and Cooling | Standard configuration (for 1 heating zone) | R32

				Single phase (power to indoor)			
Kit 3 kW electric heater				**KIT-ADC03K3E5**	**KIT-ADC05K3E5**	**KIT-ADC07K3E5**	**KIT-ADC09K3E5**
Kit 6 kW electric heater				**KIT-ADC03K6E5**	**KIT-ADC05K6E5**	**KIT-ADC07K6E5**	**KIT-ADC09K6E5**
Heating capacity / COP (A7/W35)			kW / –	3.20 / 5.33	5.00 / 5.10	7.00 / 4.86	9.00 / 4.55
Heating capacity / COP (A7/W55)			kW / –	— / —	5.00 / 3.03	7.00 / 2.92	8.90 / 2.93
Heating capacity / COP (A2/W35)			kW / –	3.20 / 3.64	5.00 / 3.57	6.85 / 3.43	7.00 / 3.40
Heating capacity / COP (A2/ W55)			kW / –	— / —	5.00 / 2.29	6.25 / 2.23	6.30 / 2.18
Heating capacity / COP (A-7/W35)			kW / –	— / —	5.00 / 2.79	5.75 / 2.95	6.25 / 2.84
Heating capacity / COP (A-7/W55)			kW / –	— / —	5.00 / 1.89	5.35 / 1.98	5.90 / 1.93
Cooling capacity / EER (A35/W7)			kW / –	3.20 / 3.52	5.00 / 3.05	6.70 / 3.03	8.20 / 2.72
Cooling capacity / EER (A35/W18)			kW / –	— / —	5.00 / 4.90	6.70 / 4.72	9.00 / 4.18
ErP data for Space Heating							
Average climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	200 / 136	202 / 142	193 / 142	175 / 133
	SCOP	W35 / W55		5.07 / 3.47	5.12 / 3.63	4.90 / 3.62	4.44 / 3.41
	Energy class [1]	W35 / W55		A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
Warm climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	245 / 165	237 / 165	227 / 160	227 / 160
	SCOP	W35 / W55		6.20 / 4.20	6.00 / 4.20	5.75 / 4.07	5.75 / 4.07
	Energy class [1]	W35 / W55		A+++ / A+++	A+++ / A+++	A+++ / A+++	A+++ / A+++
Cold climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	157 / 110	160 / 115	164 / 116	164 / 116
	SCOP	W35 / W55		4.00 / 2.83	4.08 / 2.95	4.18 / 2.98	4.18 / 2.98
	Energy class [1]	W35 / W55		A++ / A+	A++ / A+	A++ / A+	A++ / A+
Indoor unit 3 kW electric heater				**WH-ADC0309K3E5**	**WH-ADC0309K3E5**	**WH-ADC0309K3E5**	**WH-ADC0309K3E5**
Indoor unit 6 kW electric heater				**WH-ADC0309K6E5**	**WH-ADC0309K6E5**	**WH-ADC0309K6E5**	**WH-ADC0309K6E5**
Sound pressure	Heat / Cool		dB(A)	28 / 28	28 / 28	28 / 28	28 / 28
Dimension	H x W x D		mm	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602
Net weight (with 3 kW / 6 kW electric heater)			kg	100 / 101	100 / 101	100 / 101	100 / 101
Water pipe connector			Inch	R 1¼	R 1¼	R 1¼	R 1¼
A class pump	Number of speeds			Variable Speed	Variable Speed	Variable Speed	Variable Speed
	Input power (Min / Max)		W	30 / 120	30 / 120	30 / 120	30 / 120
Heating water flow (ΔT=5 K. 35 °C)			l/min	9.2	14.3	20.1	25.8
Water volume			l	185	185	185	185
Maximum DHW temperature			°C	65	65	65	65
Material inside tank				Stainless steel	Stainless steel	Stainless steel	Stainless steel
Tapping profile according EN16147				L	L	L	L
ErP data for Water Heating							
Average climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	128	140	140	140
	SCOP			3.20	3.50	3.50	3.50
	Energy class [2]			A+	A+	A+	A+
Warm climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	154	160	160	160
	SCOP			3.86	4.00	4.00	4.00
	Energy class [2]			A++	A++	A++	A++
Cold climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	99	112	112	112
	SCOP			2.48	2.80	2.80	2.80
	Energy class [2]			A	A	A	A
Outdoor unit				**WH-UDZ03KE5**	**WH-UDZ05KE5**	**WH-UDZ07KE5**	**WH-UDZ09KE5**
Sound power [3]	Heat		dB(A)	55	55	56	56
Dimension / Net weight	H x W x D		mm / kg	622 x 824 x 298 / 37	795 x 875 x 380 / 55	795 x 875 x 380 / 55	795 x 875 x 380 / 55
Refrigerant (R32) / CO_2 Eq.			kg / t	0.9 / 0.608	1.3 / 0.878	1.3 / 0.878	1.3 / 0.878
Piping diameter	Liquid / Gas		Inch (mm)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 5/8 (15.88)	1/4 (6.35) / 5/8 (15.88)	1/4 (6.35) / 5/8 (15.88)
Pipe length range / Elevation difference (in / out)			m / m	3 ~ 25 / 20	3 ~ 40 (3 ~ 50) [4] / 30	3 ~ 40 (3 ~ 50) [4] / 30	3 ~ 40 (3 ~ 50) [4] / 30
Pre-charged pipe length / Additional gas amount			m / g/m	10 / 20	10 / 25	10 / 25	10 / 25
Operating range	Outdoor ambient	Heat	°C	-20 ~ +35	-25 ~ +35	-25 ~ +35	-25 ~ +35
		Cool	°C	+10 ~ +43	+10 ~ +43	+10 ~ +43	+10 ~ +43
	Water outlet	Heat	°C	20 ~ 60	20 ~ 60	20 ~ 60	20 ~ 60
		Cool	°C	5 ~ 20	5 ~ 20	5 ~ 20	5 ~ 20

Electrical information (Indoor unit)		**3 kW heater**	**6 kW heater**	**3 kW heater**	**6 kW heater**	**3 kW heater**	**6 kW heater**	**3 kW heater**	**6 kW heater**
Electric backup heater	kW	3.00	6.00	3.00	6.00	3.00	6.00	3.00	6.00
Recommended fuse	A	16 / 16	16 / 30	16 / 16	16 / 30	25 / 16	25 / 30	25 / 16	25 / 30
Recommended minimum cable size. supply 1 / 2 [5]	mm²	3 x 1.5 / 3 x 1.5	3 x 1.5 / 3 x 4.0	3 x 1.5 / 3 x 1.5	3 x 1.5 / 3 x 4.0	3 x 2.5 / 3 x 1.5	3 x 2.5 / 3 x 4.0	3 x 2.5 / 3 x 1.5	3 x 2.5 / 3 x 4.0

1 Scale from A+++ to D.

2 Scale from A+ to F.

3 Sound power in accordance to 811/2013. 813/2013 and EN12102-1:2017 at +7 °C.

4 Operation range down to -25 °C in heating with 3 ~ 40 m pipe length range. operation range down to -15 °C in heating with 3 ~ 50 m pipe length range.

5 Check local regulations.

Notes:

EER and COP calculation is based in accordance to EN14511.

This product is designed to comply with the European Water Quality Directive 98/83/EC amended by 2015/1787/EU. The lifespan of the product is not guaranteed in the case of the use of groundwater. such as spring water or well water. the use of tap water when salt or other impurities are contained. nor in areas of acidic water quality. Maintenance and warranty costs related to these cases are the customer's responsibility.

All in One systems | Aquarea High Performance | K Generation | Single Phase | Heating and Cooling | Standard configuration (for 1 heating zone) | With optional electrical anode (AN) | R32

				Single phase (power to indoor)			
Kit 3 kW electric heater				**KIT-ADC03K3E5AN**	**KIT-ADC05K3E5AN**	**KIT-ADC07K3E5AN**	**KIT-ADC09K3E5AN**
Kit 6 kW electric heater				**KIT-ADC03K6E5AN**	**KIT-ADC05K6E5AN**	**KIT-ADC07K6E5AN**	**KIT-ADC09K6E5AN**
Heating capacity / COP (A7/W35)			kW / –	3.20 / 5.33	5.00 / 5.10	7.00 / 4.86	9.00 / 4.55
Heating capacity / COP (A7/W55)			kW / –	3.20 / 2.81	5.00 / 3.03	7.00 / 2.92	8.90 / 2.93
Heating capacity / COP (A2/W35)			kW / –	3.20 / 3.64	5.00 / 3.57	6.85 / 3.43	7.00 / 3.40
Heating capacity / COP (A2/ W55)			kW / –	3.20 / 2.19	5.00 / 2.29	6.25 / 2.23	6.30 / 2.18
Heating capacity / COP (A-7/W35)			kW / –	3.30 / 2.80	5.00 / 2.79	5.75 / 2.95	6.25 / 2.84
Heating capacity / COP (A-7/W55)			kW / –	3.20 / 1.79	5.00 / 1.89	5.35 / 1.98	5.90 / 1.93
Cooling capacity / EER (A35/W7)			kW / –	3.20 / 3.52	5.00 / 3.05	6.70 / 3.03	8.20 / 2.72
Cooling capacity / EER (A35/W18)			kW / –	3.20 / 4.71	5.00 / 4.90	6.70 / 4.72	9.00 / 4.18
ErP data for Space Heating							
Average climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	200 / 136	202 / 142	193 / 142	175 / 133
	SCOP	W35 / W55		5.07 / 3.47	5.12 / 3.63	4.90 / 3.62	4.44 / 3.41
	Energy class [1]	W35 / W55		A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
Warm climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	245 / 165	237 / 165	227 / 160	227 / 160
	SCOP	W35 / W55		6.20 / 4.20	6.00 / 4.20	5.75 / 4.07	5.75 / 4.07
	Energy class [1]	W35 / W55		A+++ / A+++	A+++ / A+++	A+++ / A+++	A+++ / A+++
Cold climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	157 / 110	160 / 115	164 / 116	164 / 116
	SCOP	W35 / W55		4.00 / 2.83	4.08 / 2.95	4.18 / 2.98	4.18 / 2.98
	Energy class [1]	W35 / W55		A++ / A+	A++ / A+	A++ / A+	A++ / A+
Indoor unit 3 kW electric heater				**WH-ADC0309K3E5AN**	**WH-ADC0309K3E5AN**	**WH-ADC0309K3E5AN**	**WH-ADC0309K3E5AN**
Indoor unit 6 kW electric heater				**WH-ADC0309K6E5AN**	**WH-ADC0309K6E5AN**	**WH-ADC0309K6E5AN**	**WH-ADC0309K6E5AN**
Sound pressure	Heat / Cool		dB(A)	28 / 28	28 / 28	28 / 28	28 / 28
Dimension	H x W x D		mm	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602
Net weight (with 3 kW / 6 kW electric heater)			kg	100 / 101	100 / 101	100 / 101	100 / 101
Water pipe connector			Inch	R 1¼	R 1¼	R 1¼	R 1¼
A class pump	Number of speeds			Variable Speed	Variable Speed	Variable Speed	Variable Speed
	Input power (Min / Max)		W	30 / 120	30 / 120	30 / 120	30 / 120
Heating water flow (ΔT=5 K. 35 °C)			l/min	9.2	14.3	20.1	25.8
Water volume			l	185	185	185	185
Maximum DHW temperature			°C	65	65	65	65
Material inside tank				Stainless steel	Stainless steel	Stainless steel	Stainless steel
Tapping profile according EN16147				L	L	L	L
ErP data for Water Heating							
Average climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	128	140	140	140
	SCOP			3.20	3.50	3.50	3.50
	Energy class [2]			A+	A+	A+	A+
Warm climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	154	160	160	160
	SCOP			3.86	4.00	4.00	4.00
	Energy class [2]			A++	A++	A++	A++
Cold climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	99	112	112	112
	SCOP			2.48	2.80	2.80	2.80
	Energy class [2]			A	A	A	A
Outdoor unit				**WH-UDZ03KE5**	**WH-UDZ05KE5**	**WH-UDZ07KE5**	**WH-UDZ09KE5**
Sound power [3]	Heat		dB(A)	55	55	56	56
Dimension / Net weight	H x W x D		mm / kg	622 x 824 x 298 / 37	795 x 875 x 380 / 55	795 x 875 x 380 / 55	795 x 875 x 380 / 55
Refrigerant (R32) / CO_2 Eq.			kg / t	0.9 / 0.608	1.3 / 0.878	1.3 / 0.878	1.3 / 0.878
Piping diameter	Liquid / Gas		Inch (mm)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 5/8 (15.88)	1/4 (6.35) / 5/8 (15.88)	1/4 (6.35) / 5/8 (15.88)
Pipe length range / Elevation difference (in / out)			m / m	3 ~ 25 / 20	3 ~ 40 (3 ~ 50) [4] / 30	3 ~ 40 (3 ~ 50) [4] / 30	3 ~ 40 (3 ~ 50) [4] / 30
Pre-charged pipe length / Additional gas amount			m / g/m	10 / 20	10 / 25	10 / 25	10 / 25
Operating range	Outdoor ambient	Heat	°C	-20 ~ +35	-25 ~ +35	-25 ~ +35	-25 ~ +35
		Cool	°C	+10 ~ +43	+10 ~ +43	+10 ~ +43	+10 ~ +43
	Water outlet	Heat	°C	20 ~ 60	20 ~ 60	20 ~ 60	20 ~ 60
		Cool	°C	5 ~ 20	5 ~ 20	5 ~ 20	5 ~ 20

Electrical information (Indoor unit)			**3 kW heater**	**6 kW heater**	**3 kW heater**	**6 kW heater**	**3 kW heater**	**6 kW heater**	**3 kW heater**	**6 kW heater**
Electric backup heater	kW	3.00	6.00	3.00	6.00	3.00	6.00	3.00	6.00
Recommended fuse	A	16 / 16	16 / 30	16 / 16	16 / 30	25 / 16	25 / 30	25 / 16	25 / 30
Recommended minimum cable size. supply 1 / 2 [5]	mm²	3 x 1.5 / 3 x 1.5	3 x 1.5 / 3 x 4.0	3 x 1.5 / 3 x 1.5	3 x 1.5 / 3 x 4.0	3 x 2.5 / 3 x 1.5	3 x 2.5 / 3 x 4.0	3 x 2.5 / 3 x 1.5	3 x 2.5 / 3 x 4.0

1 Scale from A+++ to D.

2 Scale from A+ to F.

3 Sound power in accordance to 811/2013. 813/2013 and EN12102-1:2017 at +7 °C.

4 Operation range down to -25 °C in heating with 3 ~ 40 m pipe length range. operation range down to -15 °C in heating with 3 ~ 50 m pipe length range.

5 Check local regulations.

Notes:

EER and COP calculation is based in accordance to EN14511.

This product is designed to comply with the European Water Quality Directive 98/83/EC amended by 2015/1787/EU. The lifespan of the product is not guaranteed in the case of the use of groundwater. such as spring water or well water. the use of tap water when salt or other impurities are contained. nor in areas of acidic water quality. Maintenance and warranty costs related to these cases are the customer's responsibility.

All in One systems | Aquarea High Performance | K Generation | Single Phase | Heating and Cooling | Two-zone configuration (for 2 heating zones) (B) | R32

				Single phase (power to indoor)			
Kit				**KIT-ADC03K3E5B**	**KIT-ADC05K3E5B**	**KIT-ADC07K3E5B**	**KIT-ADC09K3E5B**
Heating capacity / COP (A7/W35)			kW / –	3.20 / 5.33	5.00 / 5.10	7.00 / 4.86	9.00 / 4.55
Heating capacity / COP (A7/W55)			kW / –	3.20 / 2.81	5.00 / 3.03	7.00 / 2.92	8.90 / 2.93
Heating capacity / COP (A2/W35)			kW / –	3.20 / 3.64	5.00 / 3.57	6.85 / 3.43	7.00 / 3.40
Heating capacity / COP (A2/ W55)			kW / –	3.20 / 2.19	5.00 / 2.29	6.25 / 2.23	6.30 / 2.18
Heating capacity / COP (A-7/W35)			kW / –	3.30 / 2.80	5.00 / 2.79	5.75 / 2.95	6.25 / 2.84
Heating capacity / COP (A-7/W55)			kW / –	3.20 / 1.79	5.00 / 1.89	5.35 / 1.98	5.90 / 1.93
Cooling capacity / EER (A35/W7)			kW / –	3.20 / 3.52	5.00 / 3.05	6.70 / 3.03	8.20 / 2.72
Cooling capacity / EER (A35/W18)			kW / –	3.20 / 4.71	5.00 / 4.90	6.70 / 4.72	9.00 / 4.18
ErP data for Space Heating							
Average climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	200 / 136	202 / 142	193 / 142	175 / 133
	SCOP	W35 / W55		5.07 / 3.47	5.12 / 3.63	4.90 / 3.62	4.44 / 3.41
	Energy class [1]	W35 / W55		A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
Warm climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	245 / 165	237 / 165	227 / 160	227 / 160
	SCOP	W35 / W55		6.20 / 4.20	6.00 / 4.20	5.75 / 4.07	5.75 / 4.07
	Energy class [1]	W35 / W55		A+++ / A+++	A+++ / A+++	A+++ / A+++	A+++ / A+++
Cold climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	157 / 110	160 / 115	164 / 116	164 / 116
	SCOP	W35 / W55		4.00 / 2.83	4.08 / 2.95	4.18 / 2.98	4.18 / 2.98
	Energy class [1]	W35 / W55		A++ / A+	A++ / A+	A++ / A+	A++ / A+
Indoor unit				**WH-ADC0309K3E5B**	**WH-ADC0309K3E5B**	**WH-ADC0309K3E5B**	**WH-ADC0309K3E5B**
Sound pressure	Heat / Cool		dB(A)	28 / 28	28 / 28	28 / 28	28 / 28
Dimension	H x W x D		mm	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602
Net weight			kg	109	109	109	109
Water pipe connector			Inch	R 1¼	R 1¼	R 1¼	R 1¼
A class pump	Number of speeds			Variable Speed	Variable Speed	Variable Speed	Variable Speed
	Input power (Min / Max)		W	30 / 120	30 / 120	30 / 120	30 / 120
Heating water flow (ΔT=5 K. 35 °C)			l/min	9.2	14.3	20.1	25.8
Water volume			l	185	185	185	185
Maximum DHW temperature			°C	65	65	65	65
Material inside tank				Stainless steel	Stainless steel	Stainless steel	Stainless steel
Tapping profile according EN16147				L	L	L	L
Average climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	128	140	140	140
	SCOP			3.20	3.50	3.50	3.50
	Energy class [2]			A+	A+	A+	A+
Warm climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	154	160	160	160
	SCOP			3.86	4.00	4.00	4.00
	Energy class [2]			A++	A++	A++	A++
Cold climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	99	112	112	112
	SCOP			2.48	2.80	2.80	2.80
	Energy class [2]			A	A	A	A
Outdoor unit				**WH-UDZ03KE5**	**WH-UDZ05KE5**	**WH-UDZ07KE5**	**WH-UDZ09KE5**
Sound power [3]	Heat		dB(A)	55	55	56	56
Dimension / Net weight	H x W x D		mm / kg	622 x 824 x 298 / 37	795 x 875 x 380 / 55	795 x 875 x 380 / 55	795 x 875 x 380 / 55
Refrigerant (R32) / CO_2 Eq.			kg / t	0.9 / 0.608	1.3 / 0.878	1.3 / 0.878	1.3 / 0.878
Piping diameter	Liquid / Gas		Inch (mm)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 5/8 (15.88)	1/4 (6.35) / 5/8 (15.88)	1/4 (6.35) / 5/8 (15.88)
Pipe length range / Elevation difference (in / out)			m / m	3 ~ 25 / 20	3 ~ 40 (3 ~ 50) [4] / 30	3 ~ 40 (3 ~ 50) [4] / 30	3 ~ 40 (3 ~ 50) [4] / 30
Pre-charged pipe length / Additional gas amount			m / g/m	10 / 20	10 / 25	10 / 25	10 / 25
Operating range	Outdoor ambient	Heat	°C	-20 ~ +35	-25 ~ +35	-25 ~ +35	-25 ~ +35
		Cool	°C	+10 ~ +43	+10 ~ +43	+10 ~ +43	+10 ~ +43
	Water outlet	Heat	°C	20 ~ 60	20 ~ 60	20 ~ 60	20 ~ 60
		Cool	°C	5 ~ 20	5 ~ 20	5 ~ 20	5 ~ 20

Electrical information			**WH-ADC0309K3E5B**	**WH-ADC0309K3E5B**	**WH-ADC0309K3E5B**	**WH-ADC0309K3E5B**
Electric backup heater		kW	3.00	3.00	3.00	3.00
Recommended fuse		A	16 / 16	16 / 16	25 / 16	25 / 16
Recommended minimum cable size, supply 1 / 2 [5]		mm²	3 x 1.5 / 3 x 1.5	3 x 1.5 / 3 x 1.5	3 x 2.5 / 3 x 1.5	3 x 2.5 / 3 x 1.5

1 Scale from A+++ to D.

2 Scale from A+ to F.

3 Sound power in accordance to 811/2013, 813/2013 and EN12102-1:2017 at +7 °C.

4 Operation range down to -25 °C in heating with 3 ~ 40 m pipe length range, operation range down to -15 °C in heating with 3 ~ 50 m pipe length range.

5 Check local regulations.

Notes:

EER and COP calculation is based in accordance to EN14511.

This product is designed to comply with the European Water Quality Directive 98/83/EC amended by 2015/1787/EU. The lifespan of the product is not guaranteed in the case of the use of groundwater, such as spring water or well water, the use of tap water when salt or other impurities are contained, nor in areas of acidic water quality. Maintenance and warranty costs related to these cases are the customer's responsibility.

All in One systems | Aquarea High Performance | K Generation | Single Phase | Heating and Cooling | Standard configuration (for 1 heating zone) | For UK only (UK) | R32

				Single phase (power to indoor)			
Kit				**KIT-ADC03K3E5UK**	**KIT-ADC05K3E5UK**	**KIT-ADC07K3E5UK**	**KIT-ADC09K3E5UK**
Heating capacity / COP (A7/W35)			kW / –	3.20 / 5.33	5.00 / 5.10	7.00 / 4.86	9.00 / 4.55
Heating capacity / COP (A7/W55)			kW / –	3.20 / 2.81	5.00 / 3.03	7.00 / 2.92	8.90 / 2.93
Heating capacity / COP (A2/W35)			kW / –	3.20 / 3.64	5.00 / 3.57	6.85 / 3.43	7.00 / 3.40
Heating capacity / COP (A2/ W55)			kW / –	3.20 / 2.19	5.00 / 2.29	6.25 / 2.23	6.30 / 2.18
Heating capacity / COP (A-7/W35)			kW / –	3.30 / 2.80	5.00 / 2.79	5.75 / 2.95	6.25 / 2.84
Heating capacity / COP (A-7/W55)			kW / –	3.20 / 1.79	5.00 / 1.89	5.35 / 1.98	5.90 / 1.93
Cooling capacity / EER (A35/W7)			kW / –	3.20 / 3.52	5.00 / 3.05	6.70 / 3.03	8.20 / 2.72
Cooling capacity / EER (A35/W18)			kW / –	3.20 / 4.71	5.00 / 4.90	6.70 / 4.72	9.00 / 4.18
ErP data for Space Heating							
Average climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	200 / 136	202 / 142	193 / 142	175 / 133
	SCOP	W35 / W55		5.07 / 3.47	5.12 / 3.63	4.90 / 3.62	4.44 / 3.41
	Energy class [1]	W35 / W55		A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
Warm climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	245 / 165	237 / 165	227 / 160	227 / 160
	SCOP	W35 / W55		6.20 / 4.20	6.00 / 4.20	5.75 / 4.07	5.75 / 4.07
	Energy class [1]	W35 / W55		A+++ / A+++	A+++ / A+++	A+++ / A+++	A+++ / A+++
Cold climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	157 / 110	160 / 115	164 / 116	164 / 116
	SCOP	W35 / W55		4.00 / 2.83	4.08 / 2.95	4.18 / 2.98	4.18 / 2.98
	Energy class [1]	W35 / W55		A++ / A+	A++ / A+	A++ / A+	A++ / A+
Indoor unit				**WH-ADC0309K3E5UK**	**WH-ADC0309K3E5UK**	**WH-ADC0309K3E5UK**	**WH-ADC0309K3E5UK**
Sound pressure	Heat / Cool		dB(A)	28 / 28	28 / 28	28 / 28	28 / 28
Dimension	H x W x D		mm	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602
Net weight			kg	100	100	100	100
Water pipe connector			Inch	R 1¼	R 1¼	R 1¼	R 1¼
A class pump	Number of speeds			Variable Speed	Variable Speed	Variable Speed	Variable Speed
	Input power (Min / Max)		W	30 / 120	30 / 120	30 / 120	30 / 120
Heating water flow (ΔT=5 K. 35 °C)			l/min	9.2	14.3	20.1	25.8
Water volume			l	185	185	185	185
Maximum DHW temperature			°C	65	65	65	65
Material inside tank				Stainless steel	Stainless steel	Stainless steel	Stainless steel
Tapping profile according EN16147				L	L	L	L
ErP data for Water Heating							
Average climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	128	140	140	140
	SCOP			3.20	3.50	3.50	3.50
	Energy class [2]			A+	A+	A+	A+
Warm climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	154	160	160	160
	SCOP			3.86	4.00	4.00	4.00
	Energy class [2]			A++	A++	A++	A++
Cold climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	99	112	112	112
	SCOP			2.48	2.80	2.80	2.80
	Energy class [2]			A	A	A	A
Outdoor unit				**WH-UDZ03KE5**	**WH-UDZ05KE5**	**WH-UDZ07KE5**	**WH-UDZ09KE5**
Sound power [3]	Heat		dB(A)	55	55	56	56
Dimension / Net weight	H x W x D		mm / kg	622 x 824 x 298 / 37	795 x 875 x 380 / 55	795 x 875 x 380 / 55	795 x 875 x 380 / 55
Refrigerant (R32) / CO_2 Eq.			kg / t	0.9 / 0.608	1.3 / 0.878	1.3 / 0.878	1.3 / 0.878
Piping diameter	Liquid / Gas		Inch (mm)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 5/8 (15.88)	1/4 (6.35) / 5/8 (15.88)	1/4 (6.35) / 5/8 (15.88)
Pipe length range / Elevation difference (in / out)			m / m	3 ~ 25 / 20	3 ~ 40 (3 ~ 50) [4] / 30	3 ~ 40 (3 ~ 50) [4] / 30	3 ~ 40 (3 ~ 50) [4] / 30
Pre-charged pipe length / Additional gas amount			m / g/m	10 / 20	10 / 25	10 / 25	10 / 25
Operating range	Outdoor ambient	Heat	°C	-20 ~ +35	-25 ~ +35	-25 ~ +35	-25 ~ +35
		Cool	°C	+10 ~ +43	+10 ~ +43	+10 ~ +43	+10 ~ +43
	Water outlet	Heat	°C	20 ~ 60	20 ~ 60	20 ~ 60	20 ~ 60
		Cool	°C	5 ~ 20	5 ~ 20	5 ~ 20	5 ~ 20

Electrical information			**WH-ADC0309K3E5UK**	**WH-ADC0309K3E5UK**	**WH-ADC0309K3E5UK**	**WH-ADC0309K3E5UK**
Electric backup heater		kW	3.00	3.00	3.00	3.00
Recommended fuse		A	16 / 16	16 / 16	25 / 16	25 / 16
Recommended minimum cable size. supply 1 / 2 [5]		mm²	3 x 1.5 / 3 x 1.5	3 x 1.5 / 3 x 1.5	3 x 2.5 / 3 x 1.5	3 x 2.5 / 3 x 1.5

1 Scale from A+++ to D.

2 Scale from A+ to F.

3 Sound power in accordance to 811/2013. 813/2013 and EN12102-1:2017 at +7 °C.

4 Operation range down to -25 °C in heating with 3 ~ 40 m pipe length range. operation range down to -15 °C in heating with 3 ~ 50 m pipe length range.

5 Check local regulations.

Notes:

EER and COP calculation is based in accordance to EN14511.

This product is designed to comply with the European Water Quality Directive 98/83/EC amended by 2015/1787/EU. The lifespan of the product is not guaranteed in the case of the use of groundwater. such as spring water or well water. the use of tap water when salt or other impurities are contained. nor in areas of acidic water quality. Maintenance and warranty costs related to these cases are the customer's responsibility.

All in One systems | T-CAP | K Generation | Single Phase / Three Phase | Heating and Cooling | Standard configuration (for 1 heating zone) | R32

				Single phase (power to indoor)		Three phase (power to indoor)		
Kit				**KIT-AXC09KE5**	**KIT-AXC12KE5**	**KIT-AXC09KE8**	**KIT-AXC12KE8**	**KIT-AXC16KE8**
Heating capacity / COP (A7/W35)			kW / –	9.00 / 5.03	12.10 / 4.84	9.00 / 5.03	12.10 / 4.84	16.00 / 4.38
Heating capacity / COP (A7/W55)			kW / –	9.00 / 3.07	12.10 / 3.04	— / —	— / —	— / —
Heating capacity / COP (A2/W35)			kW / –	9.00 / 3.69	12.00 / 3.44	9.00 / 3.69	12.00 / 3.44	16.00 / 3.10
Heating capacity / COP (A2/W55)			kW / –	9.00 / 2.31	12.00 / 2.29	— / —	— / —	— / —
Heating capacity / COP (A-7/W35)			kW / –	9.00 / 3.00	12.00 / 2.72	— / —	— / —	— / —
Heating capacity / COP (A-7/W55)			kW / –	9.00 / 2.10	12.00 / 2.00	— / —	— / —	— / —
Cooling capacity / EER (A35/W7)			kW / –	8.80 / 3.11	10.70 / 2.68	8.80 / 3.11	10.70 / 2.68	13.40 / 2.64
Cooling capacity / EER (A35/W18)			kW / –	8.80 / 4.63	10.70 / 3.92	— / —	— / —	— / —
ErP data for Space Heating								
Average climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	195 / 140	195 / 140	195 / 140	195 / 140	176 / 129
	SCOP	W35 / W55		4.96 / 3.57	4.96 / 3.57	4.96 / 3.57	4.96 / 3.57	4.46 / 3.31
	Energy class [1]	W35 / W55		A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
Warm climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	256 / 171	256 / 171	256 / 171	256 / 171	232 / 160
	SCOP	W35 / W55		6.47 / 4.34	6.47 / 4.34	6.47 / 4.34	6.47 / 4.34	5.88 / 4,09
	Energy class [1]	W35 / W55		A+++ / A+++	A+++ / A+++	A+++ / A+++	A+++ / A+++	A+++ / A+++
Cold climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	169 / 127	169 / 127	169 / 127	169 / 127	150 / 125
	SCOP	W35 / W55		4.31 / 3.26	4.31 / 3.26	4.31 / 3.26	4.31 / 3.26	3.83 / 3.20
	Energy class [1]	W35 / W55		A++ / A++	A++ / A++	A++ / A++	A++ / A++	A++ / A++
Indoor unit				**WH-ADC0912K6E5**	**WH-ADC0912K6E5**	**WH-ADC0912K9E8**	**WH-ADC0912K9E8**	**WH-ADC16K9E8**
Sound pressure	Heat / Cool		dB(A)	33 / 33	33 / 33	33 / 33	33 / 33	33 / 33
Dimension	H x W x D		mm	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602
Net weight			kg	101	101	102	102	102
Water pipe connector			Inch	R 1¼	R 1¼	R 1¼	R 1¼	R 1¼
A class pump	Number of speeds			Variable Speed	Variable Speed	Variable Speed	Variable Speed	Variable Speed
	Input power (Min / Max)		W	— / 145	— / 145	— / 145	— / 145	— / 173
Heating water flow (ΔT=5 K. 35 °C)			l/min	25.8	34.4	25.8	34.4	45.9
Water volume			l	185	185	185	185	185
Maximum DHW temperature			°C	65	65	65	65	65
Material inside tank				Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Tapping profile according EN16147				L	L	L	L	L
ErP data for Water Heating								
Average climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	112	112	112	112	107
	SCOP			2.80	2.80	2.80	2.80	2.68
	Energy class [2]			A	A	A	A	—
Warm climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	132	132	132	132	128
	SCOP			3.30	3.30	3.30	3.30	3.32
	Energy class [2]			A+	A+	A+	A+	—
Cold climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	88	88	88	88	84
	SCOP			2.20	2.20	2.20	2.20	2.10
	Energy class [2]			A	A	A	A	—
Outdoor unit				**WH-UXZ09KE5**	**WH-UXZ12KE5**	**WH-UXZ09KE8**	**WH-UXZ12KE8**	**WH-UXZ16KE8**
Sound power [3]	Heat		dB(A)	65	65	65	65	65
Dimension / Net weight	H x W x D		mm / kg	1,340 x 900 x 320 / 88	1,340 x 900 x 320 / 88	1,340 x 900 x 320 / 90	1,340 x 900 x 320 / 90	1,340 x 900 x 320 / 103
Refrigerant (R32) / CO_2 Eq.			kg / t	1.60 / 1.08	1.60 / 1.08	1.60 / 1.08	1.60 / 1.08	1.83 / 1.24
Piping diameter	Liquid / Gas		Inch (mm)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 1/2 (12.70)
Pipe length range / Elevation difference (in / out)			m / m	3 ~ 30 / 20	3 ~ 30 / 20	3 ~ 30 / 20	3 ~ 30 / 20	3 ~ 30 / 20
Pre-charged pipe length / Additional gas amount			m / g/m	10 / 30	10 / 30	10 / 30	10 / 30	10 / 30
Operating range	Outdoor ambient	Heat	°C	-28 ~ +35	-28 ~ +35	-28 ~ +35	-28 ~ +35	-28 ~ +35
		Cool	°C	+10 ~ +43	+10 ~ +43	+10 ~ +43	+10 ~ +43	+10 ~ +43
	Water outlet	Heat	°C	20 ~ 60	20 ~ 60	20 ~ 60	20 ~ 60	20 ~ 60
		Cool	°C	5 ~ 20	5 ~ 20	5 ~ 20	5 ~ 20	5 ~ 20

Electrical information		**WH-ADC0912K6E5**	**WH-ADC0912K6E5**	**WH-ADC0912K9E8**	**WH-ADC0912K9E8**	**WH-ADC16K9E8**
Electric backup heater	kW	6.00	6.00	9.00	9.00	9.00
Recommended fuse	A	30 / 30	30 / 30	— / —	— / —	— / —
Recommended minimum cable size, supply 1 / 2 [4]	mm²	3 x 4.0 / 3 x 4.0	3 x 4.0 / 3 x 4.0	— / —	— / —	— / —

1) Scale from A+++ to D.

2) Scale from A+ to F.

3) Sound power in accordance to 811/2013, 813/2013 and EN12102-1:2017 at +7 °C.

4) Check local regulations.

Notes:

EER and COP calculation is based in accordance to EN14511.

This product is designed to comply with the European Water Quality Directive 98/83/EC amended by 2015/1787/EU. The lifespan of the product is not guaranteed in the case of the use of groundwater, such as spring water or well water, the use of tap water when salt or other impurities are contained, nor in areas of acidic water quality. Maintenance and warranty costs related to these cases are the customer's responsibility.

All in One systems | T-CAP | K Generation | Single Phase /Three Phase | Heating and Cooling | Standard configuration (for 1 heating zone) | With optional electrical anode (AN) | R32

				Single phase (power to indoor)		Three phase (power to indoor)		
Kit				**KIT-AXC09KE5AN**	**KIT-AXC12KE5AN**	**KIT-AXC09KE8AN**	**KIT-AXC12KE8AN**	**KIT-AXC16KE8**
Heating capacity / COP (A7/W35)			kW / –	9.00 / 5.03	12.10 / 4.84	9.00 / 5.03	12.10 / 4.84	16.00 / 4.38
Heating capacity / COP (A7/W55)			kW / –	9.00 / 3.07	12.10 / 3.04	— / —	— / —	— / —
Heating capacity / COP (A2/W35)			kW / –	9.00 / 3.69	12.00 / 3.44	9.00 / 3.69	12.00 / 3.44	16.00 / 3.10
Heating capacity / COP (A2/ W55)			kW / –	9.00 / 2.31	12.00 / 2.29	— / —	— / —	— / —
Heating capacity / COP (A-7/W35)			kW / –	9.00 / 3.00	12.00 / 2.72	— / —	— / —	— / —
Heating capacity / COP (A-7/W55)			kW / –	9.00 / 2.10	12.00 / 2.00	— / —	— / —	— / —
Cooling capacity / EER (A35/W7)			kW / –	8.80 / 3.11	10.70 / 2.68	8.80 / 3.11	10.70 / 2.68	13.84 / 2.64
Cooling capacity / EER (A35/W18)			kW / –	8.80 / 4.63	10.70 / 3.92	— / —	— / —	— / —
ErP data for Space Heating								
Average climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	195 / 140	195 / 140	195 / 140	195 / 140	176 / 129
	SCOP	W35 / W55		4.96 / 3.57	4.96 / 3.57	4.96 / 3.57	4.96 / 3.57	4.46 / 3.31
	Energy class [1]	W35 / W55		A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
Warm climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	256 / 171	256 / 171	256 / 171	256 / 171	232 / 160
	SCOP	W35 / W55		6.47 / 4.34	6.47 / 4.34	6.47 / 4.34	6.47 / 4.34	5.88 / 4,09
	Energy class [1]	W35 / W55		A+++ / A+++	A+++ / A+++	A+++ / A+++	A+++ / A+++	A+++ / A+++
Cold climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	169 / 127	169 / 127	169 / 127	169 / 127	150 / 125
	SCOP	W35 / W55		4.31 / 3.26	4.31 / 3.26	4.31 / 3.26	4.31 / 3.26	3.83 / 3.20
	Energy class [1]	W35 / W55		A++ / A++	A++ / A++	A++ / A++	A++ / A++	A++ / A++
Indoor unit				**WH-ADC0912K6E5AN**	**WH-ADC0912K6E5AN**	**WH-ADC0912K9E8AN**	**WH-ADC0912K9E8AN**	**WH-ADC16K9E8**
Sound pressure	Heat / Cool		dB(A)	33 / 33	33 / 33	33 / 33	33 / 33	33 / 33
Dimension	H x W x D		mm	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602	1,642 x 599 x 602
Net weight			kg	101	101	102	102	102
Water pipe connector			Inch	R 1¼	R 1¼	R 1¼	R 1¼	R 1¼
A class pump	Number of speeds			Variable Speed	Variable Speed	Variable Speed	Variable Speed	Variable Speed
	Input power (Min / Max)		W	— / 145	— / 145	— / 145	— / 145	— / 173
Heating water flow (ΔT=5 K. 35 °C)			l/min	25.8	34.4	25.8	34.4	45.9
Water volume			l	185	185	185	185	185
Maximum DHW temperature			°C	65	65	65	65	65
Material inside tank				Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Tapping profile according EN16147				L	L	L	L	L
ErP data for Water Heating								
Average climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	112	112	112	112	107
	SCOP			2.80	2.80	2.80	2.80	2.68
	Energy class [2]			A	A	A	A	—
Warm climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	132	132	132	132	128
	SCOP			3.30	3.30	3.30	3.30	3.32
	Energy class [2]			A+	A+	A+	A+	—
Cold climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	88	88	88	88	84
	SCOP			2.20	2.20	2.20	2.20	2.10
	Energy class [2]			A	A	A	A	—
Outdoor unit				**WH-UXZ09KE5**	**WH-UXZ12KE5**	**WH-UXZ09KE8**	**WH-UXZ12KE8**	**WH-UXZ16KE8**
Sound power [3]	Heat		dB(A)	65	65	65	65	65
Dimension / Net weight	H x W x D		mm / kg	1,340 x 900 x 320 / 88	1,340 x 900 x 320 / 88	1,340 x 900 x 320 / 90	1,340 x 900 x 320 / 90	1,340 x 900 x 320 / 103
Refrigerant (R32) / CO_2 Eq.			kg / t	1.60 / 1.08	1.60 / 1.08	1.60 / 1.08	1.60 / 1.08	1.83 / 1.24
Piping diameter	Liquid / Gas		Inch (mm)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 1/2 (12.70)
Pipe length range / Elevation difference (in / out)			m / m	3 ~ 30 / 20	3 ~ 30 / 20	3 ~ 30 / 20	3 ~ 30 / 20	3 ~ 30 / 20
Pre-charged pipe length / Additional gas amount			m / g/m	10 / 30	10 / 30	10 / 30	10 / 30	10 / 30
Operating range	Outdoor ambient	Heat	°C	-28 ~ +35	-28 ~ +35	-28 ~ +35	-28 ~ +35	-28 ~ +35
		Cool	°C	+10 ~ +43	+10 ~ +43	+10 ~ +43	+10 ~ +43	+10 ~ +43
	Water outlet	Heat	°C	20 ~ 60	20 ~ 60	20 ~ 60	20 ~ 60	20 ~ 60
		Cool	°C	5 ~ 20	5 ~ 20	5 ~ 20	5 ~ 20	5 ~ 20

Electrical information		**WH-ADC0912K6E5AN**	**WH-ADC0912K6E5AN**	**WH-ADC0912K9E8AN [5]**	**WH-ADC0912K9E8AN [5]**	**WH-ADC16K9E8**
Electric backup heater	kW	6.00	6.00	9.00	9.00	9.00
Recommended fuse	A	30 / 30	30 / 30	— / —	— / —	— / —
Recommended minimum cable size, supply 1 / 2 [4]	mm²	3 x 4.0 / 3 x 4.0	3 x 4.0 / 3 x 4.0	— / —	— / —	— / —

1) Scale from A+++ to D.

2) Scale from A+ to F.

3) Sound power in accordance to 811/2013, 813/2013 and EN12102-1:2017 at +7 °C.

4) Check local regulations.

Notes:

EER and COP calculation is based in accordance to EN14511.

This product is designed to comply with the European Water Quality Directive 98/83/EC amended by 2015/1787/EU. The lifespan of the product is not guaranteed in the case of the use of groundwater, such as spring water or well water, the use of tap water when salt or other impurities are contained, nor in areas of acidic water quality. Maintenance and warranty costs related to these cases are the customer's responsibility.

All in One systems | T-CAP | K Generation | Single Phase | Heating and Cooling | Standard configuration (for 1 heating zone) | For UK only (UK) | R32

				Single phase (power to indoor)	
Kit				**KIT-AXC09KE5UK**	**KIT-AXC12KE5UK**
Heating capacity / COP (A7/W35)			kW / –	9.00 / 5.03	12.10 / 4.84
Heating capacity / COP (A7/W55)			kW / –	9.00 / 3.07	12.10 / 3.04
Heating capacity / COP (A2/W)			kW / –	9.00 / 3.69	12.00 / 3.44
Heating capacity / COP (A2/ W55)			kW / –	9.00 / 2.31	12.00 / 2.29
Heating capacity / COP (A-7/W35)			kW / –	9.00 / 3.00	12.00 / 2.72
Heating capacity / COP (A-7/W55)			kW / –	9.00 / 2.10	12.00 / 2.00
Cooling capacity / EER (A35/W7)			kW / –	8.80 / 3.11	10.70 / 2.68
Cooling capacity / EER (A35/W18)			kW / –	8.80 / 4.63	10.70 / 3.92
ErP data for Space Heating					
Average climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	195 / 140	195 / 140
	SCOP	W35 / W55		4.96 / 3.57	4.96 / 3.57
	Energy class [1]	W35 / W55		A+++ / A++	A+++ / A++
Warm climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	256 / 171	256 / 171
	SCOP	W35 / W55		6.47 / 4.34	6.47 / 4.34
	Energy class [1]	W35 / W55		A+++ / A+++	A+++ / A+++
Cold climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	169 / 127	169 / 127
	SCOP	W35 / W55		4.31 / 3.26	4.31 / 3.26
	Energy class [1]	W35 / W55		A++ / A++	A++ / A++
Indoor unit				**WH-ADC0912K6E5UK**	**WH-ADC0912K6E5UK**
Sound pressure	Heat / Cool		dB(A)	33 / 33	33 / 33
Dimension	H x W x D		mm	1,642 x 599 x 602	1,642 x 599 x 602
Net weight			kg	101	101
Water pipe connector			Inch	R 1¼	R 1¼
A class pump	Number of speeds			Variable Speed	Variable Speed
	Input power (Min / Max)		W	— / 145	— / 145
Heating water flow (ΔT=5 K. 35 °C)			l/min	25.8	34.4
Water volume			l	185	185
Maximum DHW temperature			°C	65	65
Material inside tank				Stainless steel	Stainless steel
Tapping profile according EN16147				L	L
ErP data for Water Heating					
Average climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	112	112
	SCOP			2.80	2.80
	Energy class [2]			A	A
Warm climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	132	132
	SCOP			3.30	3.30
	Energy class [2]			A+	A+
Cold climate	Seasonal energy efficiency ($\eta_{w,h}$)		%	88	88
	SCOP			2.20	2.20
	Energy class [2]			A	A
Outdoor unit				**WH-UXZ09KE5**	**WH-UXZ12KE5**
Sound power [3]	Heat		dB(A)	65	65
Dimension / Net weight	H x W x D		mm / kg	1,340 x 900 x 320 / 88	1,340 x 900 x 320 / 88
Refrigerant (R32) / CO_2 Eq.			kg / t	1.60 / 1.08	1.60 / 1.08
Piping diameter	Liquid / Gas		Inch (mm)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 1/2 (12.70)
Pipe length range / Elevation difference (in / out)			m / m	3 ~ 30 / 20	3 ~ 30 / 20
Pre-charged pipe length / Additional gas amount			m / g/m	10 / 30	10 / 30
Operating range	Outdoor ambient	Heat	°C	-28 ~ +35	-28 ~ +35
		Cool	°C	+10 ~ +43	+10 ~ +43
	Water outlet	Heat	°C	20 ~ 60	20 ~ 60
		Cool	°C	5 ~ 20	5 ~ 20

Electrical information			**WH-ADC0912K6E5**	**WH-ADC0912K6E5**
Electric backup heater		kW	6.00	6.00
Recommended fuse		A	30 / 30	30 / 30
Recommended minimum cable size, supply 1 / 2 [4]		mm²	3 x 4.0 / 3 x 4.0	3 x 4.0 / 3 x 4.0

1) Scale from A+++ to D.

2) Scale from A+ to F.

3) Sound power in accordance to 811/2013, 813/2013 and EN12102-1:2017 at +7 °C.

4) Check local regulations.

5) All data is tentative.

Notes:

EER and COP calculation is based in accordance to EN14511.

This product is designed to comply with the European Water Quality Directive 98/83/EC amended by 2015/1787/EU. The lifespan of the product is not guaranteed in the case of the use of groundwater, such as spring water or well water, the use of tap water when salt or other impurities are contained, nor in areas of acidic water quality. Maintenance and warranty costs related to these cases are the customer's responsibility.

Bi-bloc systems | Aquarea High Performance | K Generation | Single Phase | Heating and Cooling | R32

				Single phase (power to indoor)			
Kit 3 kW electric heater				**KIT-WC03K3E5**	**KIT-WC05K3E5**	**KIT-WC07K3E5**	**KIT-WC09K3E5**
Kit 6 kW electric heater				**KIT-WC03K6E5**	**KIT-WC05K6E5**	**KIT-WC07K6E5**	**KIT-WC09K6E5**
Heating capacity / COP (A7/W35)			kW / –	3.20 / 5.33	5.00 / 5.10	7.00 / 4.86	9.00 / 4.55
Heating capacity / COP (A7/W55)			kW / –	3.20 / 2.81	5.00 / 3.03	7.00 / 2.92	8.90 / 2.93
Heating capacity / COP (A2/W)			kW / –	3.20 / 3.64	5.00 / 3.57	6.85 / 3.43	7.00 / 3.40
Heating capacity / COP (A2/ W55)			kW / –	3.20 / 2.19	5.00 / 2.29	6.25 / 2.23	6.30 / 2.18
Heating capacity / COP (A-7/W35)			kW / –	3.30 / 2.80	5.00 / 2.79	5.75 / 2.95	6.25 / 2.84
Heating capacity / COP (A-7/W55)			kW / –	3.20 / 1.79	5.00 / 1.89	5.35 / 1.98	5.90 / 1.93
Cooling capacity / EER (A35/W7)			kW / –	3.20 / 3.52	5.00 / 3.05	6.70 / 3.03	8.20 / 2.72
Cooling capacity / EER (A35/W18)			kW / –	3.20 / 4.71	5.00 / 4.90	6.70 / 4.72	9.00 / 4.18
ErP data for Space Heating							
Average climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	200 / 136	202 / 142	193 / 142	175 / 133
	SCOP	W35 / W55		5.07 / 3.47	5.12 / 3.63	4.90 / 3.62	4.44 / 3.41
	Energy class [1]	W35 / W55		A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
Warm climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	245 / 165	237 / 165	227 / 160	227 / 160
	SCOP	W35 / W55		6.20 / 4.20	6.00 / 4.20	5.75 / 4.07	5.75 / 4.07
	Energy class [1]	W35 / W55		A+++ / A+++	A+++ / A+++	A+++ / A+++	A+++ / A+++
Cold climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	157 / 110	160 / 115	164 / 116	164 / 116
	SCOP	W35 / W55		4.00 / 2.83	4.08 / 2.95	4.18 / 2.98	4.18 / 2.98
	Energy class [1]	W35 / W55		A++ / A+	A++ / A+	A++ / A+	A++ / A+
Indoor unit 3 kW electric heater				**WH-SDC0309K3E5** [5]	**WH-SDC0309K3E5** [5]	**WH-SDC0309K3E5** [5]	**WH-SDC0309K3E5** [5]
Indoor unit 6 kW electric heater				**WH-SDC0309K6E5** [5]	**WH-SDC0309K6E5** [5]	**WH-SDC0309K6E5** [5]	**WH-SDC0309K6E5** [5]
Sound pressure	Heat / Cool		dB(A)	28 / 28	28 / 28	30 / 30	30 / 31
Dimension	H x W x D		mm	892 x 500 x 348	892 x 500 x 348	892 x 500 x 348	892 x 500 x 348
Net weight			kg	—	—	—	—
Water pipe connector			Inch	R 1¼	R 1¼	R 1¼	R 1¼
A class pump	Number of speeds			Variable Speed	Variable Speed	Variable Speed	Variable Speed
	Input power (Min / Max)		W	30 / 120	30 / 120	30 / 120	30 / 120
Heating water flow (ΔT=5 K. 35 °C)			l/min	9.2	14.3	20.1	25.8
Outdoor unit				**WH-UDZ03KE5**	**WH-UDZ05KE5**	**WH-UDZ07KE5**	**WH-UDZ09KE5**
Sound power [2]	Heat		dB(A)	55	55	56	56
Dimension	H x W x D		mm	622 x 824 x 298	795 x 875 x 320	795 x 875 x 320	795 x 875 x 320
Net weight			kg	37	55	55	55
Refrigerant (R32) / CO_2 Eq.			kg / t	0.9 / 0.608	1.3 / 0.878	1.3 / 0.878	1.3 / 0.878
Piping diameter	Liquid / Gas		Inch (mm)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 5/8 (15.88)	1/4 (6.35) / 5/8 (15.88)	1/4 (6.35) / 5/8 (15.88)
Pipe length range			m	3 ~ 25	3 ~ 40 (3 ~ 50) [3]	3 ~ 40 (3 ~ 50) [3]	3 ~ 40 (3 ~ 50) [3]
Elevation difference (in / out)			m	20	30	30	30
Pre-charged pipe length			m	10	10	10	10
Additional gas amount			g/m	20	25	25	25
Operating range	Outdoor ambient	Heat	°C	-20 ~ +35	-25 ~ +35	-25 ~ +35	-25 ~ +35
		Cool	°C	+10 ~ +43	+10 ~ +43	+10 ~ +43	+10 ~ +43
	Water outlet	Heat	°C	20 ~ 60	20 ~ 60	20 ~ 60	20 ~ 60
		Cool	°C	5 ~ 20	5 ~ 20	5 ~ 20	5 ~ 20

Electrical information (Indoor unit)		**3 kW heater**	**6 kW heater**	**3 kW heater**	**6 kW heater**	**3 kW heater**	**6 kW heater**	**3 kW heater**	**6 kW heater**
Electric backup heater	kW	3.00	6.00	3.00	6.00	3.00	6.00	3.00	6.00
Recommended fuse	A	16 / 16	16 / 30	16 / 16	16 / 30	25 / 16	25 / 30	25 / 16	25 / 30
Recommended minimum cable size, supply 1 / 2 [4]	mm²	3 x 1.5 / 3 x 1.5	3 x 1.5 / 3 x 4.0	3 x 1.5 / 3 x 1.5	3 x 1.5 / 3 x 4.0	3 x 2.5 / 3 x 1.5	3 x 2.5 / 3 x 4.0	3 x 2.5 / 3 x 1.5	3 x 2.5 / 3 x 4.0

1) Scale from A+++ to D.

2) Sound power in accordance to 811/2013, 813/2013 and EN12102-1:2017 at +7 °C.

3) Operation range down to -25 °C in heating with 3 ~ 40 m pipe length range, operation range down to -15 °C in heating with 3 ~ 50 m pipe length range.

4) Check local regulations.

5) All data is tentative.

Notes:

EER and COP calculation is based in accordance to EN14511.

This product is designed to comply with the European Water Quality Directive 98/83/EC amended by 2015/1787/EU. The lifespan of the product is not guaranteed in the case of the use of groundwater, such as spring water or well water, the use of tap water when salt or other impurities are contained, nor in areas of acidic water quality. Maintenance and warranty costs related to these cases are the customer's responsibility.

Bi-bloc systems | T-CAP | K Generation | Single Phase / Three Phase | Heating and Cooling | R32

				Single phase (power to indoor)		Three phase (power to indoor)		
Kit 3 kW electric heater				**KIT-WXC09K3E5**	—	**KIT-WXC09K3E8**	—	—
Kit 6 kW electric heater				**KIT-WXC09K6E5**	**KIT-WXC12K6E5**	—	—	—
Kit 9 kW electric heater				—	—	**KIT-WXC09K9E8**	**KIT-WXC12K9E8**	**KIT-WXC16K9E8**
Heating capacity / COP (A7/W35)			kW / –	9.00 / 5.03	12.10 / 4.84	9.00 / 5.03	12.10 / 4.84	16.00 / 4.38
Heating capacity / COP (A7/W55)			kW / –	9.00 / 3.07	12.10 / 3.04	—/—	—/—	—/—
Heating capacity / COP (A2/W35)			kW / –	9.00 / 3.69	12.00 / 3.44	9.00 / 3.69	12.00 / 3.44	16.00 / 3.10
Heating capacity / COP (A2/ W55)			kW / –	9.00 / 2.31	12.00 / 2.29	—/—	—/—	—/—
Heating capacity / COP (A-7/W35)			kW / –	9.00 / 3.00	12.00 / 2.72	—/—	—/—	—/—
Heating capacity / COP (A-7/W55)			kW / –	9.00 / 2.10	12.00 / 2.00	—/—	—/—	—/—
Cooling capacity / EER (A35/W7)			kW / –	8.80 / 3.11	10.70 / 2.68	8.80 / 3.11	10.70 / 2.68	13.40 / 2.64
Cooling capacity / EER (A35/W18)			kW / –	8.80 / 4.63	10.70 / 3.92	—/—	—/—	—/—
ErP data for Space Heating								
Average climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	195 / 140	195 / 140	195 / 140	180 / 135	176 / 129
	SCOP	W35 / W55		4.96 / 3.57	4.96 / 3.57	4.96 / 3.57	4.58 / 3.46	4.46 / 3.31
	Energy class [1]	W35 / W55		A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
Warm climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	256 / 171	256 / 171	256 / 171	256 / 171	232 / 160
	SCOP	W35 / W55		6.47 / 4.34	6.47 / 4.34	6.47 / 4.34	6.47 / 4.34	5.88 / 4.09
	Energy class [1]	W35 / W55		A+++ / A+++	A+++ / A+++	A+++ / A+++	A+++ / A+++	A+++ / A+++
Cold climate	Seasonal energy efficiency ($\eta_{s,h}$)	W35 / W55	%	169 / 127	169 / 127	169 / 127	169 / 127	150 / 125
	SCOP	W35 / W55		4.31 / 3.26	4.31 / 3.26	4.31 / 3.26	4.31 / 3.26	3.83 / 3.20
	Energy class [1]	W35 / W55		A++ / A++	A++ / A++	A++ / A++	A++ / A++	A++ / A++
Indoor unit 3 kW electric heater				**WH-SXC09K3E5**	—	**WH-SXC09K3E8**	—	—
Indoor unit 6 kW electric heater				**WH-SXC09K6E5**	**WH-SXC12K6E5**	—	—	—
Indoor unit 9 kW electric heater				—	—	**WH-SXC09K9E8**	**WH-SXC12K9E8**	**WH-SXC16K9E8**
Sound pressure	Heat / Cool		dB(A)	33 / 33	33 / 33	33 / 33	33 / 33	33 / 33
Dimension	H x W x D		mm	892 x 500 x 348	892 x 500 x 348	892 x 500 x 348	892 x 500 x 348	892 x 500 x 348
Net weight				**3 kW heater** / **6 kW heater**	**6 kW heater**	**3 kW heater** / **9 kW heater**	**9 kW heater**	**9 kW heater**
			kg	40 / 41	41	40 / 41	41	42
Water pipe connector			Inch	R1¼	R1¼	R1¼	R1¼	R1¼
A class pump	Number of speeds			Variable Speed	Variable Speed	Variable Speed	Variable Speed	Variable Speed
	Input power (Min / Max)		W	—/145	—/145	—/145	—/145	—/173
Heating water flow (ΔT=5 K. 35 °C)			l/min	25.8	34.4	25.8	34.4	45.9
Outdoor unit				**WH-UXZ09KE5**	**WH-UXZ12KE5**	**WH-UXZ09KE8**	**WH-UXZ12KE8**	**WH-UXZ16KE8**
Sound power [2]	Heat		dB(A)	65	65	65	65	65
Dimension	H x W x D		mm	1,340 x 900 x 320	1,340 x 900 x 320	1,340 x 900 x 320	1,340 x 900 x 320	1,340 x 900 x 320
Net weight			kg	88	88	90	90	103
Refrigerant (R32) / CO_2 Eq.			kg / t	1.60 / 1.08	1.60 / 1.08	1.60 / 1.08	1.60 / 1.08	1.83 / 1.24
Piping diameter	Liquid / Gas		Inch (mm)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 1/2 (12.70)	1/4 (6.35) / 1/2 (12.70)
Pipe length range			m	3 ~ 30	3 ~ 30	3 ~ 30	3 ~ 30	3 ~ 30
Elevation difference (in / out)			m	20	20	20	20	20
Pre-charged pipe length			m	10	10	10	10	10
Additional gas amount			g/m	30	30	30	30	30
Operating range	Outdoor ambient	Heat	°C	-28 ~ +35	-28 ~ +35	-28 ~ +35	-28 ~ +35	-28 ~ +35
		Cool	°C	+10 ~ +43	+10 ~ +43	+10 ~ +43	+10 ~ +43	+10 ~ +43
	Water outlet	Heat	°C	20 ~ 60	20 ~ 60	20 ~ 60	20 ~ 60	20 ~ 60
		Cool	°C	5 ~ 20	5 ~ 20	5 ~ 20	5 ~ 20	5 ~ 20
Electrical information (Indoor unit)				**3 kW heater**	**6 kW heater**	**6 kW heater**	**3 kW heater** / **9 kW heater**	**9 kW heater** / **9 kW heater**
Electric backup heater			kW	3.00	6.00	6.00	3.00	9.00	9.00	9.00
Recommended fuse			A	—/—	—/—	—/—	—/—	—/—	—/—	—/—
Recommended minimum cable size, supply 1 / 2 [3]			mm²	—/—	—/—	—/—	—/—	—/—	—/—	—/—

1) Scale from A+++ to D.

2) Sound power in accordance to 811/2013, 813/2013 and EN12102-1:2017 at +7 °C.

3) Check local regulations.

Notes:

EER and COP calculation is based in accordance to EN14511.

This product is designed to comply with the European Water Quality Directive 98/83/EC amended by 2015/1787/EU. The lifespan of the product is not guaranteed in the case of the use of groundwater, such as spring water or well water, the use of tap water when salt or other impurities are contained, nor in areas of acidic water quality. Maintenance and warranty costs related to these cases are the customer's responsibility.

4.7 Control

4.7.1 Remote controller

The Aquarea heat pumps can be operated and programmed through the remote controller included in the scope of delivery. The remote controller has a display for showing the most important operating parameters and various control buttons for retrieving, setting, activating and deactivating the control functions.

To combine the Aquarea heat pumps with external devices such as a solar system or a room thermostat, the remote controller is equipped with the requisite interfaces. The corresponding functions are only available if the accessories in question are connected and activated (→ *4.7.2 External interfaces (inputs/outputs), p. 50*, → *4.8 Accessories, p. 57*, → *6.8.2 Connecting accessories, p. 153*).

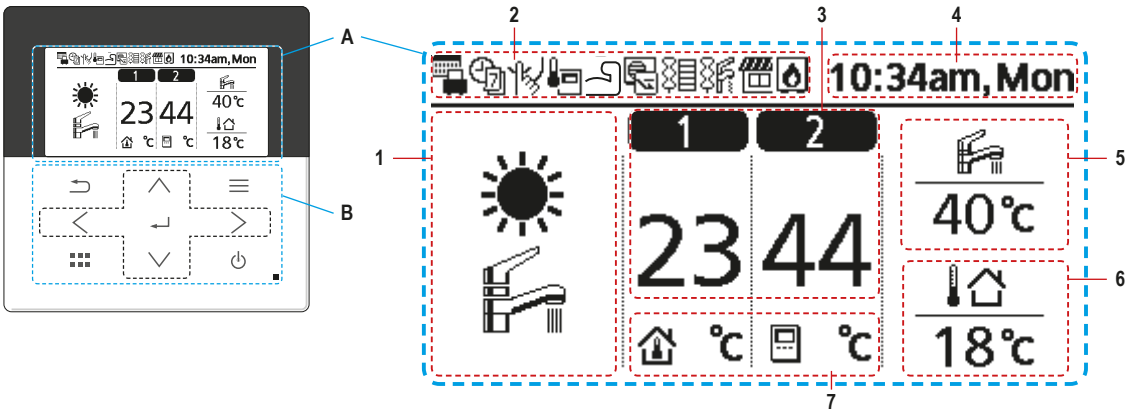
In the case of bi-bloc systems, the remote controller is integrated into the hydromodule or All in One unit, but can be removed from the device to another room for separate installation (→ *6.8.3 Installing and connecting the remote controller, p. 157*).

While the same remote controller is used for all models of one generation, all functions of the remote controller are not directly available for all models of that generation. (For example, the domestic hot water mode is directly available in bi-bloc systems with All in One unit having an internal domestic hot water tank, while in bi-bloc systems with standard hydromodule and external domestic hot water tank this function is available only after the external domestic water temperature sensor is installed, electrically connected and enabled via the remote controller.)

IMPORTANT

It is not possible to cover all remote controller functions for all models within the scope of this manual. So not all functions stated here will be available for all models. Therefore, in order to be sure about the valid functions of each model, it is absolutely mandatory to refer to the operating instructions or service manual for the relevant model when operating the device.

4.7.1.1 Design and functions of the remote controller



Basic Functions

A **Display**
Graphic, background-illuminated LCD display with easily understandable symbols as well as plain text menu displays in 27 different user languages.

1 **Operating mode**
Display of the set operating mode or of the current operating status:

- Heating
- Cooling
- Auto
- Auto heating
- Auto cooling
- Domestic hot water production
- Heat pump in operation

2 Operating Symbols
Display of the currently set function:

- Holiday mode
- Weekly timer
- Quiet mode
- Operation with remote controller as room thermostat
- Powerful operation mode
- Demand control, SG ready or SHP
- Electric heating element for space heating
- Electric heating element for water heating
- Solar mode
- Bivalent heating source

3 Heating Circuit Temperature
Display of the temperature of the heating circuit in question. If the temperature is bordered with a line, it is the set temperature.

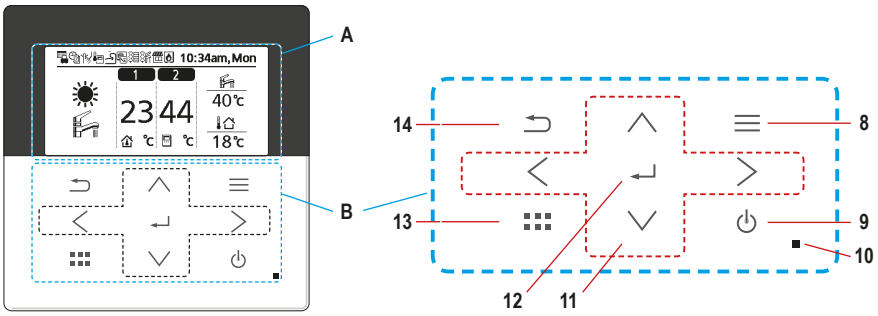
4 Time
Display of the current clock time and the day of the week

5 Tank temperature
Display of the current domestic hot water tank temperature. If the temperature is bordered with a line, it is the set temperature.

6 Outside temperature
Display of the current outside temperature.

7 Temperature sensor
Display of the temperature sensors and the current temperatures:

- Supply water temperature based on compensation curve
- External room thermostat
- Supply water temperature → Directly set
- Internal room thermostat
- Swimming pool temperature set
- Room thermistor



B Key Pad
Touch keys with easily understandable symbols facilitate the operation and support intuitive menu control.

8 Main menu button
Invoking the main menu, which enables users to gain access to all functions, options and parameters with corresponding authorisation.

9 ON/OFF button
Switching the device on / off

10 Operation indicator
Lights up during operation and flashes if there is a fault.

11 Navigation keys (arrow keys) Up Down Left Right
Selecting a menu element or entering a value

12 Confirmation Key
Confirming the selected setting or the selected value

13 Quick menu button
Invoking the Quick Menu with the following options:


Force DHW


Powerful mode


Quiet mode


Force heater


Weekly timer


Force defrost


Error reset


Remote controller lock

14 Back button
Return to the previous display or to the previous element

Other functions

Weekly timer
Setting a weekly timer with up to six switching programmes per day (deactivated if the cooling/heating switch is activated or the Force heater mode is on).

Holiday timer
Setting a holiday period timer to either switch off the system or to reduce the temperature during this period and thus save energy. The weekly timer can be deactivated during this time, so that it will be restored automatically upon completion of the holiday timer period.

Quiet timer
Setting up to six programmes for the quiet mode to reduce the sound level for the set duration.

Backup heater for space heating
Enabling of the backup heater for the heating mode

Backup heater for hot water production
Enabling of the backup heater for the domestic hot water mode

Sterilisation
Activation or deactivation of automatic sterilisation. Observe the locally valid laws and provisions when setting the sterilisation function. If necessary, please contact your authorised installer or service partner.

Domestic hot water mode (DHW)
Selection of the desired domestic hot water mode (Standard / Smart). In standard mode, the heat-up time for the hot water tank is shorter, but the energy consumption is lower in Smart mode. Only available if the domestic hot water tank is activated.

Another option is the selection of the tank sensor to be used (Top / Center). With the top sensor selected, the process for heating up the tank is retarded so that energy consumption is reduced. Setting should be changed to Center when the hot water becomes insufficient.

Domestic hot water capacity
Selection of the desired heating capacity (Variable / Standard) for the domestic hot water tank heat-up. In Variable mode, the tank water is heated up fast, then the tank temperature is kept stable with more efficient part-load operation. In Standard mode, the tank water is heated up uniformly with rated heating capacity.

Selection of the Temperature Sensor
Selecting between water temperature sensor, room temperature sensor and room thermostat. In the case of room thermostat, there is another option, to select between external and internal temperature sensor.

Backup heater capacity
Selection of the maximum power setting desired for the electrical heating element for the heating mode; 3 kW / 6 kW / 9 kW (depending on the model concerned)

Anti freezing
Activating or deactivating the anti-freezing function while the device is switched off.

Base pan heater
Choice whether an optional base pan heater is connected or not and its use type:
Type A - The base pan heater is only switched on during defrost mode.
Type B -The base pan heater is switched on at temperatures of 5 °C and below.

Alternative outdoor sensor
Selection of an alternative outdoor temperature sensor.

Bivalent heating
Selection of a bivalent heating system, so that an additional heat source, e.g. a heating boiler, can heat up the buffer tank and the domestic hot water tank, if the heat pump capacity is not sufficient at lower outside temperatures. The bivalent function can be operated in alternative mode (heat pump and heating boiler are operated alternately) or in parallel mode (heat pump and heating boiler are operated simultaneously) or be set in advanced parallel mode (heat pump is operated and heating boiler is activated for buffer tank and/or domestic hot water, depending on the setting options activated for switching behaviour).

Circulating liquid
Selection as to whether water or glycol is being used as the heating medium.

Pump maximum speed
Setting of flow rate and maximum duty, and switching the pump on / off.

Pump down
Switching the pump-down mode on

Dry concrete
Setting and switching on dry concrete function for drying screed and walls (exclusively during the construction phase).

Force heater
Option to turn on a forced heating mode either manually (by default) or automatically.

Force defrost
Option to turn on forced defrost mode either manually (by default) or automatically. If auto selection is set, outdoor unit will start defrost operation when heating operation has continued for many hours during low outdoor temperature.

Defrost signal
Option to turn on defrost signal to stop fan coil during defrost operation (Yes / No). If the defrost signal option is set to Yes, the bivalent function will not be available to use.

Pump flowrate
Option to set variable flow pump control (ΔT) or fixed pump duty control (Max. duty).

External meter
Option to set which optional external meters are connected and are to be used for energy or electricity generation and/or electricity consumption metering. For energy generation metering, there is a choice of either applying a one-meter system using just one energy meter to measure the energy generation of the heat pump during heating, cooling and DHW operation or applying a two-meter system using one meter for energy generation during heating and cooling and another meter for energy generation during DHW operation. Further options include the possibility to measure the electricity consumption of the heat pump unit or of the complete building and to measure the electricity generation of an optionally connected solar system.

Electrical anode
Option to enable the operation of the electrical anode for models with anode, and to disable the operation for models without anode.

System Monitoring

Energy monitor
Display of a diagram with current or recorded data (Present / Historical chart) with regard to energy consumption, generation or COP. It is possible to have recording intervals of 1 day, 1 month or 1 year. The energy consumption for heating mode, optionally cooling mode and hot water mode as well as total energy consumption is recorded.

System information
Display of all current system information, i.e. inlet water temperature, outlet water temperature, zone 1 temperature, zone 2 temperature, domestic hot water tank temperature, buffer tank temperature, solar circuit temperature, pool temperature, compressor frequency, pump flow rate and water pressure.

Error history
Display of the last occurring error code in reverse chronological order (i.e. the last signal first).

Compressor
Display of technical data on compressor operation, e.g. current compressor frequency, number of starts and total operating time.

Backup heater
Display of the operating hours of the backup heater for space heating/domestic hot water mode respectively.

Note

Detailed information about the control functions is given in the operating instructions (→ *8.1 Operating instructions extract (K Generation), p. 171*) and in the Service manual of the device concerned.

Additional functions of the remote controller on connecting the optional PCB CZ-NS4P

The installation of the optional PCB CZ-NS4P (→ *4.7.2 External interfaces (inputs/outputs), p. 50*) allows the following additional functions to be selected or set.

Control and temperature regulation of a connected buffer tank
Selection of connected buffer tank as well as setting of the temperature difference (ΔT). Only available if the buffer tank is activated.

Control of two heating circuits (including swimming pool heating)
Selection of the number of heating circuits (1 zone or 2 zone system). After a system with two heating circuits has been selected, information is to be provided as to whether the respective heating circuit is being used for space or swimming pool heating. If “swimming pool” has been selected, a temperature difference of “ΔT for swimming pool” must be set between 2 and 10 K.

Input for externally switching off the outdoor unit
Dry contact for an external input signal for switching off the compressor in the outdoor unit (if contact closed). The function must be enabled through the remote controller of the heat pump.

Integration of a solar system (solar thermal panels)
Selection of the buffer tank or of the domestic hot water tank for the solar system as well as setting of the difference between switching on and off temperatures, the frost protection temperature and the upper temperature limit. Only available if the solar system is activated.

External error signal
Dry contact for output of an error message signal (if contact closed) to an external display unit. Even if the fault has been acknowledged through the external display, the error signal remains internally active.

SG ready control
Dry contact with two inputs (Vcc-Bit1 and Vcc-Bit2). The following settings are possible:

Operating state		SG Ready Signal	
		Vcc-Bit1	Vcc-Bit2
1	Heat Pump Lock: Heat pump and backup heater are switched off.	1	0
2	Automatic operation: Heat pump runs in normal mode	0	0
3	Increased capacity: Capacity setting 1 (in %) for heating and domestic hot water	0	1
4	Maximum capacity: Capacity setting 2 (in %) for heating and domestic hot water	1	1

The function must be enabled through the remote controller of the heat pump. Moreover, especially the increased-capacity settings 1 and 2 must be configured via the remote controller. A similar control pattern applies for cooling operation.

SG ready control for bivalent system
In case of a bivalent system, its control pattern can be selected (Auto / SG ready). When the SG ready control pattern is selected, the following settings are possible on the two SG ready inputs (Vcc-Bit1 and Vcc-Bit2:

Operating state		SG Ready Signal	
		Vcc-Bit1	Vcc-Bit2
1	Heat Pump OFF, Bivalent heat source OFF	0	0
2	Heat Pump ON, Bivalent heat source OFF	1	0
3	Heat Pump OFF, Bivalent heat source ON	0	1
4	Heat Pump ON, Bivalent heat source ON	1	1

Demand control
Limiting the operating current according to the actual power demand through a 0–10 Volt input signal. For safety reasons, a minimum operating current is applied for every device. For the change between two power stages, there is a switching hysteresis of 0.2 V (see table). The voltage values are only taken into consideration to the first decimal place and not rounded. The valid assignments between input signal and power stage are as follows:

Analogue input (V)	Power (%)		
0.0	Not active		
0.1 – 0.6			
0.7	10	Not active	
0.8			
0.9 – 1.1	10		
1.2	15	10	
1.3			
1.4 – 1.6	15		
1.7	20	15	
1.8			
1.9 – 2.1	20		
2.2	25	20	
2.3			
2.4 – 2.6	25		
2.7	30	25	
2.8			
2.9 – 31	30		
3.2	35	30	
3.3			
3.4 – 3.6	35		
3.7	40	35	
3.8			

Analogue input (V)	Power (%)		
3.9 – 4.1	40		
4.2	45	40	
4.3			
4.4 – 4.6	45		
4.7	50	45	
4.8			
4.9 – 5.1	50		
5.2	55	50	
5.3			
5.4 – 5.6	55		
5.7	60	55	
5.8			
5.9 – 6.1	60		
6.2	65	60	
6.3			
6.4 – 6.6	65		
6.7	70	65	
6.8			
6.9 – 7.1	70		
7.2	75	70	
7.3			

Analogue input (V)	Power (%)		
7.4 – 7.6	75		
7.7	80	75	
7.8			
7.9 – 8.1	80		
8.2	85	80	
8.3			
8.4 – 8.6	85		
8.7	90	85	
8.8			
8.9 – 9.1	90		
9.2	95	90	
9.3			
9.4 – 9.6	95		
9.7	100	95	
9.8			
9.9	100		

Heating/Cooling Switch
Dry contact for the switching between heating (contact open) and cooling (contact closed). The function must be enabled and configured via the remote controller of the heat pump.

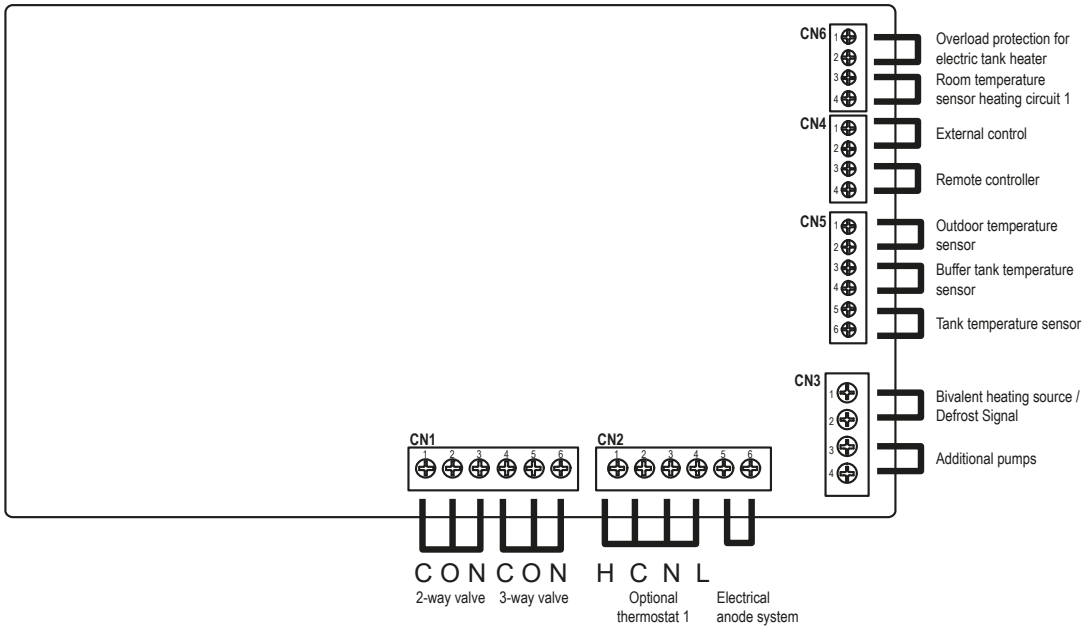
4.7.2 External interfaces (inputs/outputs)

The Aquarea heat pumps offer the option of connecting useful accessories through external interfaces, such as an external room thermostat or integrating the heat pump in a building management system (BMS).

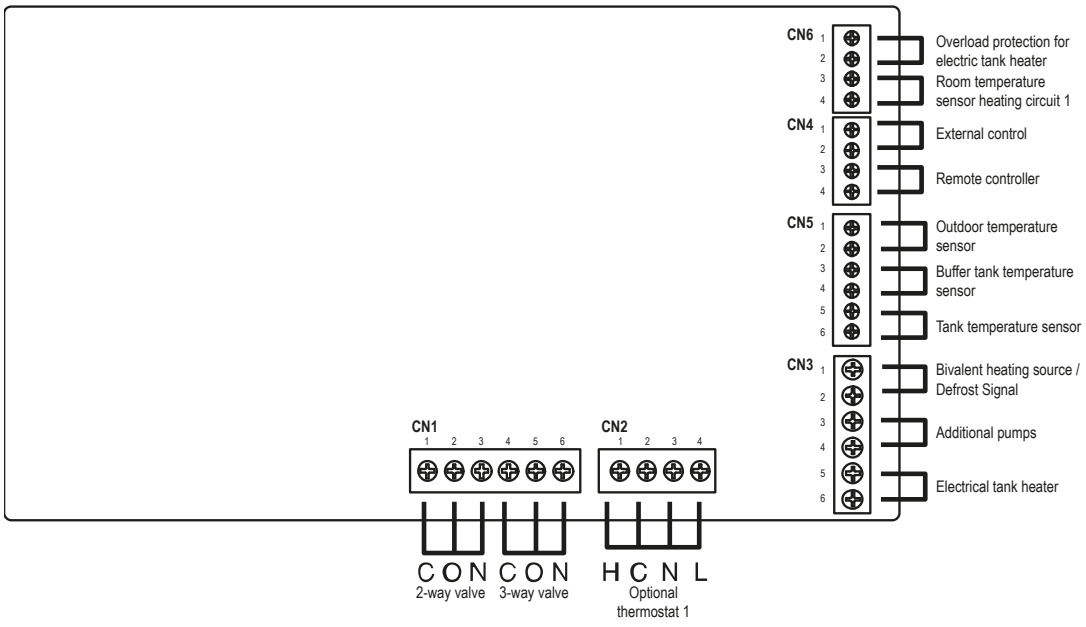
Main PCB

Overview of the external interfaces

For All in One units



For hydromodules



Terminals	Connection	Function	Condition	Cable cross section
CN1 1 to 3	2-way valve	Allows locking a heating circuit in the cooling mode. 230 V AC, 12 VA, N = Neutral, O = Open, C = Closed	Maximum total cable length: 50 m	3 × min. 1.5 mm²
CN1 4 to 6	3-way valve	Allows switchover between heating circuits on connecting hot water tank. 230 V AC, 12 VA, N = Neutral, O = Open, C = Closed = Direction	Maximum total cable length: 50 m	3 × min. 1.5 mm²

Terminals	Connection	Function	Condition	Cable cross section
CN2 1 to 4	Optional thermostat 1	Heating / cooling demand from thermostat. L N = 230 V AC, H = Heating, C = Cooling	Only functions if the optional PCB CZ-NS5P is not connected. Maximum total cable length: 50 m	3 or 4 × min. 0.5 mm²
CN2 5 to 6	Electrical anode system (Applicable for All in One units only)			
CN3 1 to 2	Bivalent heating source / Defrost signal	Allows connection of a second heating source for bivalent operating mode. Dry contact	System setting needed (while defrost signal is enabled, bivalent function is disabled). Maximum total cable length: 50 m	2 × min. 0.5 mm²
CN3 3 to 4	Additional pump	Support of the pumps integrated in the indoor unit, if their capacity is not sufficient. 230 V AC, 0.6 A max.	Maximum total cable length: 50 m	2 × min. 1.5 mm²
CN3 5 to 6	Electric tank heater (Applicable for hydro-modules only)	Power supply for electric tank heater 230 V AC	Maximum total cable length: 50 m	3 × min. 1.5 mm²
CN4 1 to 2	External control	Allows external ON/OFF switching of the operation. Dry contact, Open = not in operation, Closed = in operation	System setting needed. Maximum total cable length: 50 m	2 × min. 0.5 mm²
CN4 3 to 4	Remote controller	Integrated in front covers and connected	Use two-core cable for separate assembly and extensions. Maximum total cable length: 50 m	2 × min. 0.3 mm²
CN5 1 to 2	Outdoor temperature sensor AW-A2W-TSOD	For exact measurement of the outside temperature, for example if the outdoor unit is exposed to direct sunlight.	Maximum total cable length: 30 m	2 × min. 0.3 mm²
CN5 3 to 4	Buffer tank temperature sensor PAW-A2W-TSBU		Use component according to the Panasonic specifications. Maximum total cable length: 30 m	2 × min. 0.3 mm²
CN5 5 to 6	Tank temperature sensor		Use component according to the Panasonic specifications. Maximum total cable length: 30 m	2 × min. 0.3 mm²
CN6 1 to 2	Overload protection for electric tank heater	Allows connection of the overload protection for the electric heater of the domestic hot water tank Dry contact, Vcc-Bit1, Vcc-Bit2, Open / Closed	System setting needed. Maximum total cable length: 30 m	2 × min. 0.5 mm²
CN6 3 to 4	Room temperature sensor PAW-A2W-TSRT for heating circuit 1	For measurement of the indoor temperature in a room other than the one where the indoor unit is installed	Only functions if the optional PCB CZ-NS5P is not connected. Maximum total cable length: 30 m	2 × min. 0.3 mm²

Connection conditions

2-way valve:

- The 2-way valve must be a spring-loaded electronic valve.
- The valve cable must be 3 x min. 1.5 mm² and conform to the code 60245 IEC 57 or higher or a similar double insulated jacket cable.
- The 2-way valve must bear the CE mark.
- The maximum load of the valve is 9.8 VA.
- Maximum total cable length: 50 m

3-way valve:

- The 3-way valve must be a spring-loaded electronic valve.
- The valve cable must be 3 x min. 1.5 mm² and conform to the code 60245 IEC 57 or higher or a similar double insulated jacket cable.
- The component must bear the CE mark.
- In the de-energised state, the flow way must be directed towards the heating side.
- The maximum load of the valve is 9.8 VA.
- Maximum total cable length: 50 m

Room thermostat

- The room thermostat cable must be 4 or 3 x min. 0.5 mm² and conform to the code 60245 IEC 57 or higher or a similar double insulated jacket cable.
- Maximum total cable length: 50 m

Electric heater of the domestic hot water tank

- The maximum power output of the electric tank heater should be maximum 3 kW.
- The cable of the electric tank heater must be 3 x min. 1.5 mm² and conform to the code 60245 IEC 57 or higher.
- Maximum total cable length: 50 m

Additional pump:

- The cable of the additional pump must be 2 x min. 1.5 mm² and conform to the code 60245 IEC 57 or higher.
- Maximum total cable length: 50 m

Bivalent heat source:

- The connecting cable of the bivalent heat source must be 2 x min. 0.5 mm² and conform to the code 60245 IEC 57 or higher.
- Maximum total cable length: 50 m

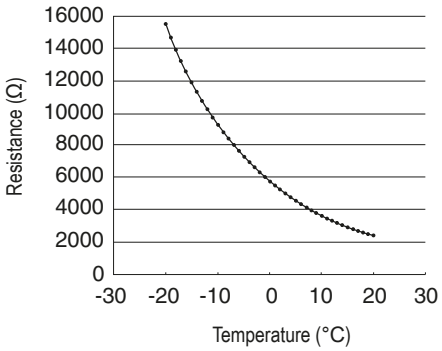
External control (remote switch):

- Use a single pole switch with a contact distance of min. 3.0 mm as remote switch.
- The cable must be 2 x min. 0.5 mm² and have a double insulated PVC or rubber jacket cable.
- The switch used must bear the CE mark.
- The maximum operating current must be less than 3 A_{rms}.
- Maximum total cable length: 50 m

Temperature sensor of the hot water tank:

- The temperature sensor of the hot water tank must be a conductor of heat. The following figure shows the characteristic of the sensor.

Characteristic curve of the tank temperature sensor



- The cable must be 2 x min. 0.3 mm² and have a double insulated PVC or rubber jacket cable (insulation strength min. 30 V).
- Maximum total cable length: 30 m

Room temperature sensor:

- The cable of the room temperature sensor for heating circuit 1 must be 2 x min. 0.3 mm² and have a double insulated PVC or rubber jacket cable.
- Maximum total cable length: 30 m

Outdoor temperature sensor:

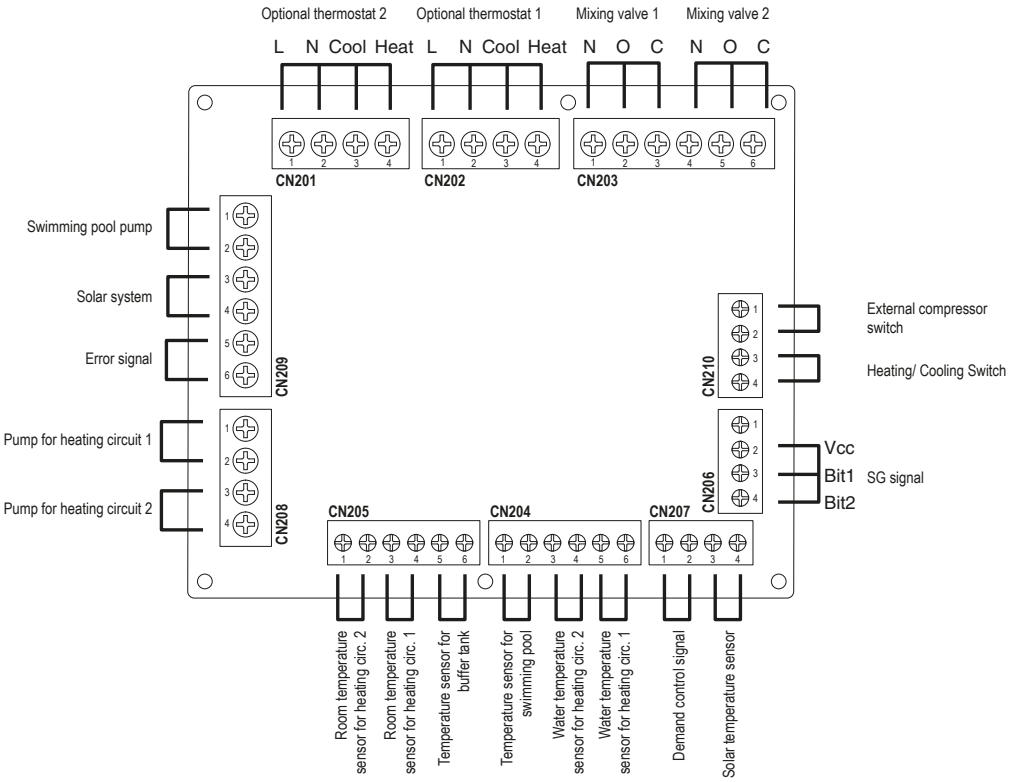
- The cable of the outdoor temperature sensor must be 2 x min. 0.3 mm² and have a double insulated PVC or rubber jacket cable.
- Maximum total cable length: 30 m

Overload protection

- The cable of the overload protection should be 2 x min. 0.5 mm² and have a double insulated PVC- or rubber-jacket cable.
- Maximum total cable length: 30 m

Optional PCB CZ-NS5P

Overview of the external interfaces



Terminals	Connection	Function	Condition	Cable cross section
CN201 1 to 4	Optional thermostat 2	Heating / cooling demand from thermostat. L N = 230 V AC, Heat = heating, Cool = cooling	Maximum total cable length: 50 m	4 × min. 0.5 mm²
CN202 1 to 4	Optional thermostat 1			
CN203 1 to 3	Mixing valve 1	230 V AC, 6 VA, N = Neutral, O = Open, C = Closed = Direction reversal Actuation duration: 30 to 120 s	Maximum total cable length: 50 m	3 × min. 1.5 mm²
CN203 4 to 6	Mixing valve 2			
CN204 1 to 2	Temperature sensor for swimming pool PAW-A2W-TSHC		Maximum total cable length: 30 m	2 × min. 0.3 mm²
CN204 3 to 4	Supply temperature sensor for heat. c. 2 PAW-A2W-TSHC	For measuring the water temperature in the respective heating circuit	Maximum total cable length: 30 m	2 × min. 0.3 mm²
CN204 5 to 6	Supply temperature sensor for heat. c. 1 PAW-A2W-TSHC			
CN205 1 to 2	Room temperature sensor for heat. c. 2 PAW-A2W-TSRT		Maximum total cable length: 30 m	2 × min. 0.3 mm²
CN205 3 to 4	Room temperature sensor for heat. c. 1 PAW-A2W-TSRT			
CN205 5 to 6	Temperature sensor for buffer tank PAW-A2W-TSBU	For measuring the buffer tank temperature	Maximum total cable length: 30 m	2 × min. 0.3 mm²
CN206 2 to 4	SG signal	Smart Grid switch Dry contact, Vcc-Bit1, Vcc-Bit2, Open / Closed	Must be connected to both contacts. System setting needed. Maximum total cable length: 50 m	3 × min. 0.3 mm²

Terminals	Connection	Function	Condition	Cable cross section
CN207 1 to 2	Demand control signal	0–10 V DC signal.	Must be connected to 0–10 V DC control. System setting needed. Maximum total cable length: 50 m	2 × min. 0.3 mm²
CN207 3 to 4	Solar temperature sensor PAW-A2W-TSSO	For measuring the solar module temperature	Maximum total cable length: 30 m	2 × min. 0.3 mm²
CN208 1 to 2	Pump for heating circuit 1	230 V AC, 0.6 A max., <500 W	Maximum total cable length: 50 m	2 × min. 1.5 mm²
CN208 3 to 4	Pump for heating circuit 2			
CN209 1 to 2	Swimming pool pump	230 V AC, 0.6 A max.	Maximum total cable length: 50 m	2 × min. 1.5 mm²
CN209 3 to 4	Solar system	230 V AC , 0.6 A max.	Maximum total cable length: 50 m	2 × min. 1.5 mm²
CN209 5 to 6	Error signal			
CN210 1 to 2	External compressor switch	Dry contact, Open = Outdoor unit ON, Closed = Outdoor unit OFF	System setting needed. Maximum total cable length: 50 m	2 × min. 0.3 mm²
CN210 3 to 4	Heating/ Cooling Switch	Dry contact, Open = Heating, Closed = Cooling	System setting needed. Maximum total cable length: 50 m	2 × min. 0.3 mm²

Connection conditions

The connection of the optional PCB allows temperature control for two heating circuits. Mixing valves, circulation pumps and temperature sensors for heating circuits 1 and 2 are to be connected to the corresponding terminals of the optional PCB. The temperatures in the two heating circuits are controlled mutually independently by the remote controller.

Pumps for heating circuits 1 and 2:

- The cables of the pumps for heating circuits 1 and 2 must each be 2 x min. 1.5 mm² and conform to the code 60245 IEC 57 or higher.
- Maximum total cable length: 50 m

Solar system:

- The cable of the solar system must be 2 x min. 1.5 mm² and conform to the code 60245 IEC 57 or higher.
- Maximum total cable length: 50 m

Swimming pool pump:

- The cable of the swimming pool pump must be 2 x min. 1.5 mm² and conform to the code 60245 IEC 57 or higher.
- Maximum total cable length: 50 m

Room thermostat for heating circuits 1 and 2:

- The cables of the room thermostats for heating circuits 1 and 2 must each be 4 x min. 0.5 mm² and conform to the code 60245 IEC 57 or higher.
- Maximum total cable length: 50 m

Mixing valves for heating circuits 1 and 2:

- The cables of the mixing valves for heating circuits 1 and 2 must each be 3 x min. 1.5 mm² and conform to the code 60245 IEC 57 or higher.
- Maximum total cable length: 50 m

Room temperature sensor for heating circuits 1 and 2:

- The cables of the room temperature sensor for heating circuits 1 and 2 must each be 2 x min. 0.3 mm² and have a double insulated PVC or rubber jacket cable (insulation strength of minimum 30 V).
- Maximum total cable length: 30 m

Temperature sensors for buffer tank, swimming pool and solar system:

- The cables of the temperature sensors for the buffer tank, the swimming pool and the solar system must each be 2 x min. 0.3 mm² and have a double insulated PVC or rubber jacket cable (insulation strength of minimum 30 V).
- Maximum total cable length: 30 m

Supply temperature sensor for heating circuits 1 and 2:

- The cables of the supply temperature sensor for heating circuits 1 and 2 must each be 2 x min. 0.3 mm² and have a double insulated PVC or rubber jacket cable.
- Maximum total cable length: 30 m

Demand control signal:

- The cable of the demand control signal must be 2 x min. 0.3 mm² and have a double insulated PVC or rubber jacket cable.
- Maximum total cable length: 50 m

SG signal:

- The cable of the SG signal must be 3 x min. 0.3 mm² have a double insulated PVC or rubber jacket cable.
- Maximum total cable length: 50 m

Heating/Cooling selector switch:

- The cable of the heating/cooling selector switch must be 2 x min. 0.3 mm² and have a double insulated PVC or rubber jacket cable.
- Maximum total cable length: 50 m

External compressor switch:

- The cable of the external compressor switch must be 2 x min. 0.3 mm² and have a double insulated PVC or rubber jacket cable.
- Maximum total cable length: 50 m

4.8 Accessories

4.8.1 Domestic hot water tanks

A domestic hot water tank is used for the production and intermediate storage of domestic hot water (DHW). By integrating a solar system, solar heat can also be stored in this intermediate storage and used in addition to the heat from the Aquarea heat pump. An electric booster heater

(tank heater) additionally ensures maximum comfort, even at very low outside temperatures, and can also be used for sterilisation.

Panasonic offers various DHW tank models in different sizes for easy domestic hot water production for different requirements.

The scope of delivery for most of the DHW tanks includes the following:

- Electric tank heater (except for PAW-TA15C1E5 and PAW-TA20C1E5C)
- Safety valve, supplied loose (for stainless steel hot water tanks only)
- Immersion temperature sensor with sleeve and 20 m cable
- Sacrificial magnesium anode (for enamelled hot water tanks only)
- Thermostatic overload protection
- Adjustable feet
- Insulation in polyurethane foam (Panasonic U-Vacua™ insulation with minimised thermal conductivity in case of stainless steel hot water tanks)
- 3-way switchover valve set PAW-3WYVLV-HW or CZ-NV2 available as optional accessory.

Note

When installing a domestic hot water tank, observe the respective installation instructions enclosed with each model. The installation instructions may contain important information about specific water quality requirements and about additional accessories, which are needed for the installation of the tank in the heating system and which must be provided by the client.

4.8.1.1 Stainless steel domestic hot water tanks

PAW-TD20C1E5-1 / PAW-TD30C1E5-1 / PAW-TD30C1E5HI-1



PAW-TD20C1E5-1



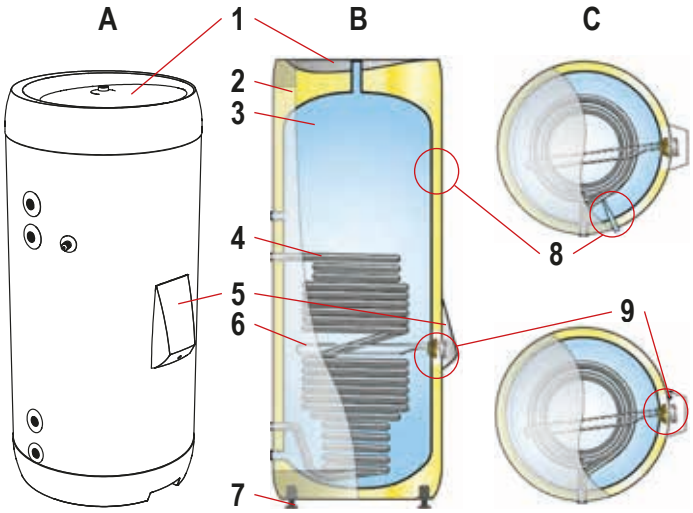
PAW-TD30C1E5-1



PAW-TD30C1E5HI-1

These compact hot water tanks are made of stainless steel, which guarantees a long life cycle. They are available in two different sizes with 200 and 300 litre capacities. All three models with energy efficiency class A need no sacrificial anode and are maintenance-free.

Components



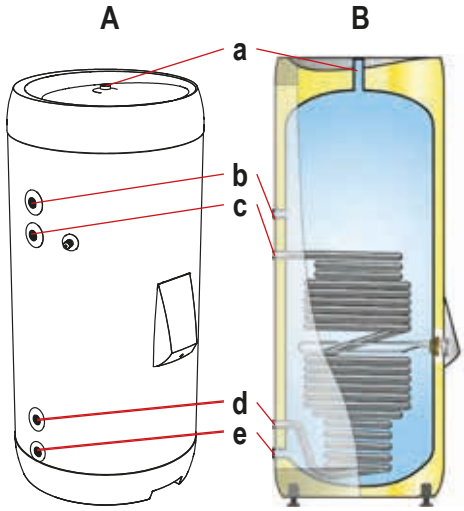
A External view

B Internal view (seen from front side)
1 Lid
2 Heat insulation
3 Hot water tank
4 Heat exchanger coil
5 Connection box cover
6 Electric tank heater
7 Adjustable foot (x 4)

C Internal view (seen from top side)
8 Temperature sensor (PAW-TD20C1E5-1, PAW-TD30C1E5HI-1)
9 Temperature sensor (PAW-TD30C1E5-1)

Note: Schematic figure of PAW-TD30C1E5-1 shown as an example for all models.

Connections

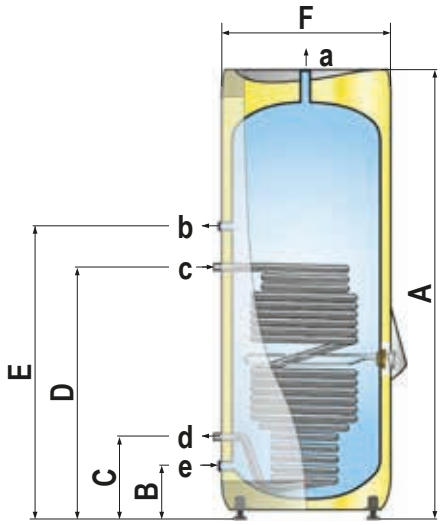


	Connection	PAW-TD20C1E5-1	PAW-TD30C1E5-1	PAW-TD30C1E5HI-1
a	Hot water outlet	3/4“ BSP female	3/4“ BSP female	3/4“ BSP female
b	Circulation pipe inlet	3/4“ BSP female	3/4“ BSP female	3/4“ BSP female
c	Supply water inlet from the heat pump	3/4“ BSP female	3/4“ BSP female	3/4“ BSP female
d	Return water outlet to the heat pump	3/4“ BSP female	3/4“ BSP female	3/4“ BSP female
e	Fresh water inlet	3/4“ BSP female	3/4“ BSP female	3/4“ BSP female

Unit: Inches (")

Note: Schematic figure of PAW-TD30C1E5-1 shown as an example for all models.

Dimensions



Dimension	PAW-TD20C1E5-1	PAW-TD30C1E5-1	PAW-TD30C1E5HI-1
A	1,270	1,750	1,750
B	155	155	155
C	266	266	266
D	866	866	1,245
E	966	1,036	1,245
F (Ø)	595	595	595

Unit: mm

Note: Schematic figure of PAW-TD30C1E5-1 shown as an example for all models.

Technical data

Domestic hot water tanks			Stainless steel hot water tanks		
Model			PAW-TD20C1E5-1	PAW-TD30C1E5-1	PAW-TD30C1E5HI-1
Water volume		l	192	284	280
Max. water temperature		°C	75	75	75
Dimensions	Height / Diameter	mm	1,270 / 595	1,750 / 595	1,750 / 595
Weight (net / incl. water filling)		kg	50 / —	61 / —	65 / -
Power of electric tank heater		kW	1.5	1.5	1.5
Power supply		V	230	230	230
Material inside the tank			Stainless steel	Stainless steel	Stainless steel
Heat exchanger surface		m²	1.8	1.8	2.35
Energy loss in standby at 65 °C [1]		kWh/24 h	1.01	1.18	1.18
3 way valve accessory PAW-3WYVLV-HW or CZ-NV2			Optional	Optional	Optional
20 m temperature sensor cable included			Yes	Yes	Yes
Energy losses		W	42	49	49
Energy efficiency class [2]			A	A	A
Warranty of the inner vessel			2 Years	2 Years	2 Years
Maintenance required			No	No	No

1 Insulation tested according to EN 12897

2 Energy efficiency class scale from A+ to F.

Note: Stainless Steel Tanks are produced by OSO.

4

4.8.1.2 Enamelled domestic hot water tanks

With their generously dimensioned heating surfaces for increased heat transfer, the enamelled hot water tanks are optimally suited for combination with Aquarea heat pumps. They are all equipped with a sacrificial anode for improved protection against corrosion (except for PAW-TA15C1E5 and PAW-TA20C1E5C) and reach a maximum supply water temperature of 95 °C (except for PAW-TA15C1E5 which reaches 90 °C).

PAW-TA15C1E5 / PAW-TA20C1E5STD / PAW-TA30C1E5STD / PAW-TA40C1E5STD



PAW-TA15C1E5



PAW-TA20C1E5STD
PAW-TA30C1E5STD

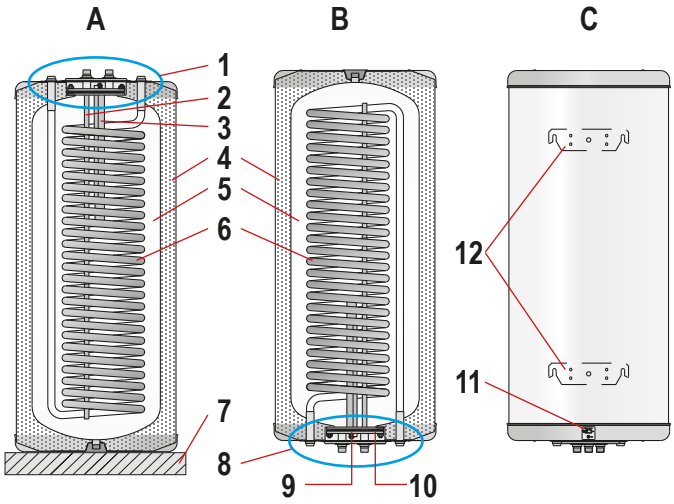


PAW-TA40C1E5STD

PAW-TA15C1E5 has a capacity of 167 litres, no electric tank heater and is suitable for floor-standing or wall-mounted installation.

The other three tanks have capacities of 200, 300 and 400 litres respectively, an electric tank heater with flange connection in the lower tank area, and they can only be installed standing in vertical position.

Components

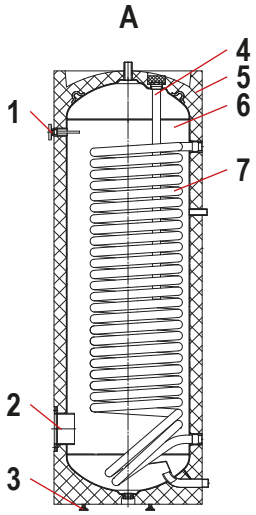


PAW-TA15C1E5

A **Internal view for floor-standing installation**

B **Internal view for wall-mounted installation**
1 Water piping connections on top side
2 Immersion tube for control
3 Sacrificial magnesium anode
4 Heat insulation
5 Hot water tank
6 Heat exchanger coil
7 Floor
8 Water piping connections on bottom side
9 Preinstalled NTC sensor
10 Inspection port

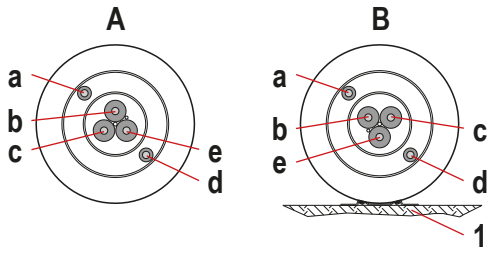
C **External view (seen from front side) for wall-mounted installation**
11 Anode testing device
12 Wall-mounting bracket (x2) (supplied loose, to be mounted on the rear side of the tank)



PAW-TA20C1E5STD / PAW-TA30C1E5STD / PAW-TA40C1E5STD

A **Internal view**
1 Thermometer
2 Cover of electric tank heater (Ø 180 mm)
3 Adjustable foot (x 3, 120° angle)
4 Sacrificial magnesium anode
5 Heat insulation (50 mm thick)
6 Hot water tank
7 Heat exchanger coil

Connections



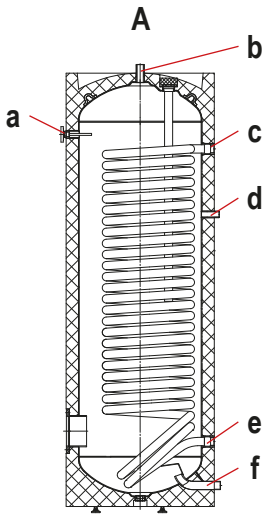
PAW-TA15C1E5

A **Top view view for floor-standing installation:**
Detail view of water piping connections on top side

B **Bottom view for wall-mounted installation:**
Detail view of water piping connections on bottom side
1 Wall

	Connection	PAW-TA15C1E5
a	Return water outlet to the heat pump	G 1/2" (female.)
b	Hot water outlet	G 3/4" (male)
c	Circulation pipe inlet	G 3/4" (male)
d	Supply water inlet from the heat pump	G 1/2" (female)
e	Fresh water inlet	G 3/4" (male)

Unit: Inches (")

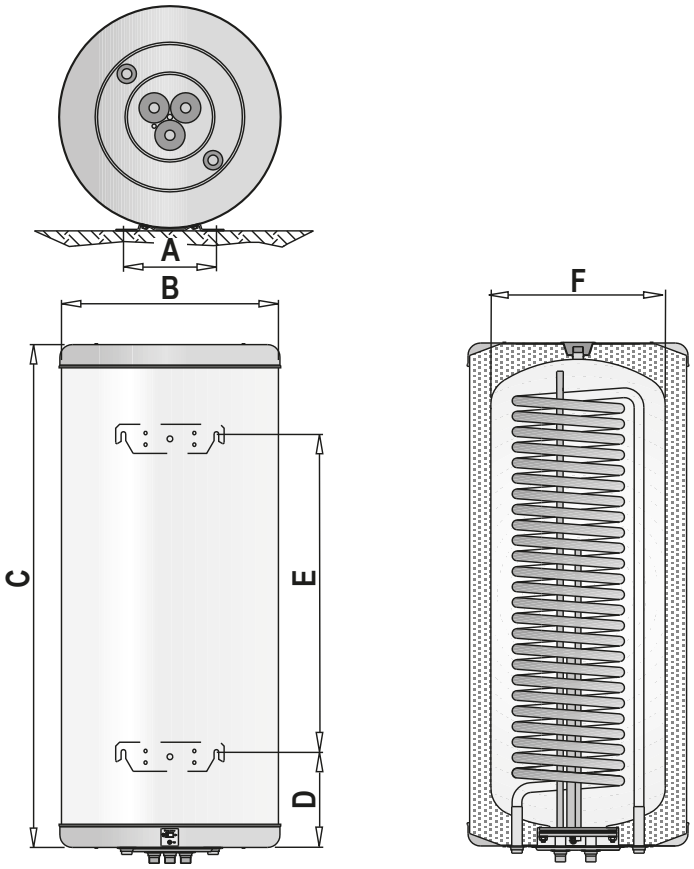


PAW-TA20C1E5STD / PAW-TA30C1E5STD / PAW-TA40C1E5STD

	Connection	PAW-TA20C1E5STD	PAW-TA30C1E5STD	PAW-TA40C1E5STD
a	Thermometer	G 1/2”	G 1/2”	G 1/2”
b	Hot water outlet	G 1”	G 1”	G 1”
c	Supply water inlet from the heat pump	G 1”	G 1”	G 1”
d	Circulation pipe inlet	G 3/4” (160 – 400 l), G 1” (500 l)	G 3/4” (160 – 400 l), G 1” (500 l)	G 3/4” (160 – 400 l), G 1” (500 l)
e	Return water outlet to the heat pump	G 1”	G 1”	G 1”
f	Fresh water inlet	G 1”	G 1”	G 1”

Unit: Inches (")

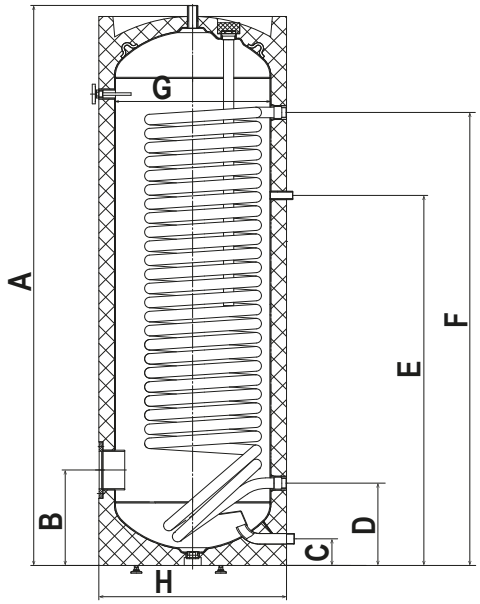
Dimensions



PAW-TA15C1E5

Dimension	PAW-TA15C1E5
A	240
B (Ø)	560
C	1,297
D	245
E	820
F (Ø)	450

Unit: mm



PAW-TA20C1E5STD / PAW-TA30C1E5STD / PAW-TA40C1E5STD

Dimension	PAW-TA20C1E5STD	PAW-TA30C1E5STD	PAW-TA40C1E5STD
A	1,340	1,797	1,832
B	305	305	345
C	85	85	85
D	263	263	320
E	803	983	1,000
F	966	1,036	1,245
G (Ø inside)	500	500	570
H (Ø outside)	610	610	680

Unit: mm

4

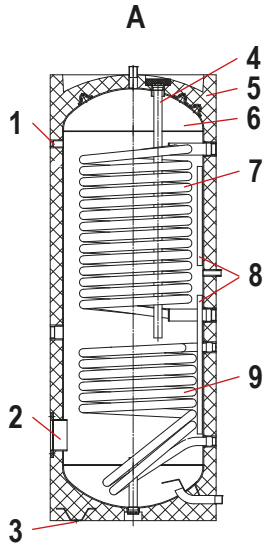
PAW-TA30C2E5STD



PAW-TA30C2E5STD

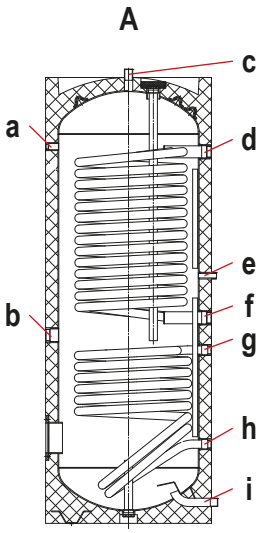
This enamelled hot water tank offers, besides all the above-mentioned properties, the additional option of using it as a bivalent tank with two heat exchangers e.g. for combination with a solar system.

Components



A	**Internal view**
1	Thermometer
2	Cover of electric tank heater (Ø 180 mm)
3	Adjustable foot (x 3, 120° angle)
4	Sacrificial magnesium anode
5	Heat insulation
6	Hot water tank
7	Heat exchanger coil 1 (heat pump circuit)
8	Sensor channel
9	Heat exchanger coil 2 (solar circuit)

Connections

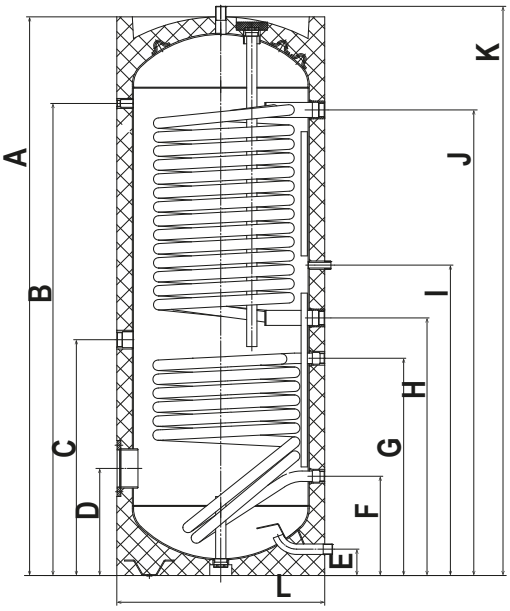


	Connection	PAW-TA30C2E5STD
a	Thermometer	G 1/2"
b	Additional electric heater (optional)	G 6/4"
c	Hot water outlet	G 1"
d	Supply water inlet from the heat pump	G 5/4"
e	Circulation pipe inlet	G 3/4"
f	Return water outlet to the heat pump	G 5/4"
g	Supply water inlet from the solar system	G 1"
h	Return water outlet to the solar system	G 1"
i	Fresh water inlet	G 1"

Unit: Inches (")

4

Dimensions



Dimension	PAW-TA30C2E5STD
A	1,800
B	1,521
C	760
D	345
E	85
F	320
G	700
H	830
I	1,000
J	1,500
K	1,834
L (Ø)	670

Unit: mm

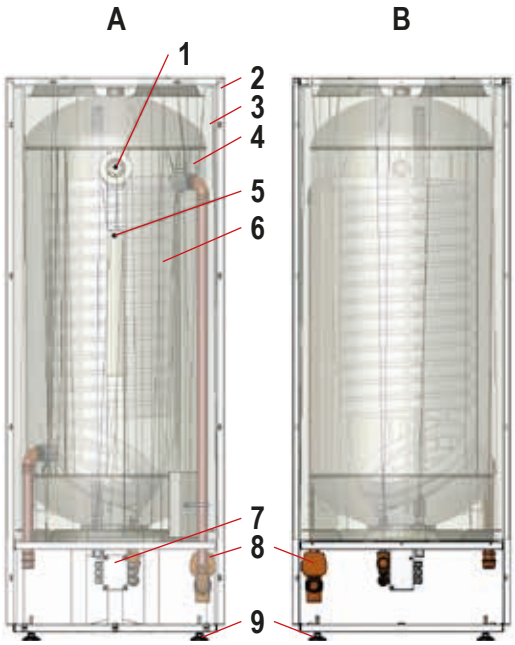
PAW-TA20C1E5C



PAW-TA20C1E5C

This enamelled hot water tank has a square footprint and the outer dimensions of a regular household device like e.g. a refrigerator. It is best suited for combination with the Panasonic Residential Heat Recovery Ventilation Unit (PAW-A2W-VENTA), because the ventilation unit has the same footprint and fits perfectly on top of the compact hot water tank.

Components



A Internal view (seen from front side)
1 Sacrificial magnesium anode
2 Square housing
3 Heat insulation
4 Hot water tank
5 Water temperature sensor
6 Heat exchanger coil
7 Connection box (for 3-way valve and sensor)

B Internal view (seen from rear side)
8 3-way valve
9 Adjustable foot (x 4)

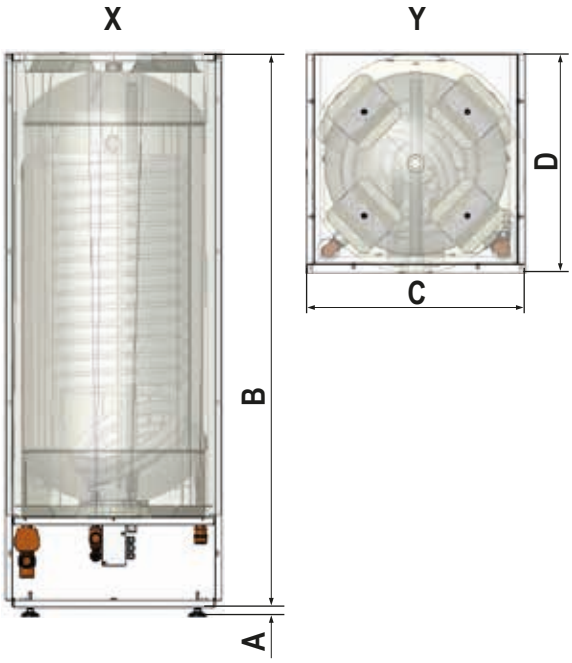
Connections



	Connection	PAW-TA20C1E5C
a	Supply water outlet to heating circuit	1"
b	Supply water inlet from the heat pump	1"
c	Circulation pipe inlet (plugged)	1/2"
d	Fresh water inlet	3/4"
e	Hot water outlet	3/4"
f	Return water outlet to the heat pump	1"

Unit: Inches (")

Dimensions



X Rear view

Y Top view

Dimension	PAW-TA20C1E5C
A	0 – 20
B	1,530
C	600
D	600

Unit: mm

4

Technical Data

Domestic hot water tanks			Enamelled hot water tanks				Enamelled hot water tank with 2 heat exchangers (bivalent: Solar + HP)	Square Tank
Model			**PAW-TA15C1E5**	**PAW-TA20C1E5STD**	**PAW-TA30C1E5STD**	**PAW-TA40C1E5STD**	**PAW-TA30C2E5STD**	**PAW-TA20C1E5C**
Water volume		l	167	200	290	380	350	200
Max. water temperature		°C	90	95	95	95	95	95
Dimensions	Height / Diameter	mm	1,297 / 560	1,340 / 610	1,800 / 610	1,835 / 670	1,835 / 670	1,550 x 600 x 600
Weight (net / incl. water filling)		kg	88 / —	90 / 280	120 / 389	191 / 572	169 / 519	134 / 327
Power of electric tank heater		kW	—	3.00	3.00	3.00	3.00	—
Power supply		V	230	230	230	230	230	—
Material inside the tank			Enamelled	Enamelled	Enamelled	Enamelled	Enamelled	Enamelled
Heat exchanger surface		m²	1.8	1.8	2.6	3.8	3.5 / 1.2	1.83
Energy loss in standby at 65 °C [1]		kWh/24 h	1.08	1.37	1.61	1.76	1.76	1.37
3 way valve accessory PAW-3WYVLV-HW or CZ-NV2			Optional	Optional	Optional	Optional	Optional	Built-in 3 way valve
20 m temperature sensor cable included			Yes	Yes	Yes	Yes	Yes	Yes
Energy losses		W	45	57	67	73	73	57
Energy efficiency class [2]			B	B	B	B	B	B
Warranty of the inner vessel			2 years	2 years	2 years	2 years	2 years	2 years
Maintenance required			Anode [3]	Anode [3]	Anode [3]	Anode [3]	Anode [3]	Anode [3]

1 Insulation tested according to EN 12897

2 Energy efficiency class scale from A+ to F.

3 Refer to the service manual for further details.

Note: PAW-TA15C1E5 is produced by Lapesa. All other enamelled tanks and Square Tank are produced by AEmail.

Buffer Tanks


PAW-BTANK50L-2


PAW-BTANK100L


PAW-BTANKG200L
PAW-BTANKG260L

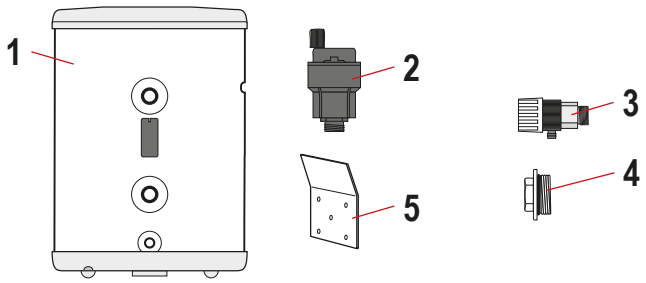
Panasonic offers a variety of stainless steel buffer tanks in different sizes. A buffer tank can reduce the number of start and stop sequences for the air/water heat pump, thus prolonging the lifecycle of the heat pump, increasing the energy efficiency of the heating system and providing greater comfort.

Note

When installing a buffer tank, observe the respective installation instructions enclosed with each model. The installation instructions may contain important information about specific water quality requirements and about additional accessories, which are needed for the installation of the tank in the heating system and which must be provided by the client.

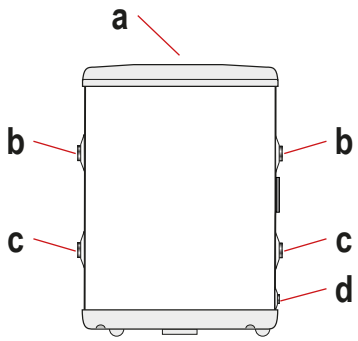
PAW-BTANK50L-2 / PAW-BTANK100L

Components



1 Buffer tank with sensor bracket
2 Automatic air vent (included)
3 Drain cock (included)
4 1“ brass plug with o-ring seal (included)
5 Wall bracket (incl. only for PAW-BTANK50L-2)

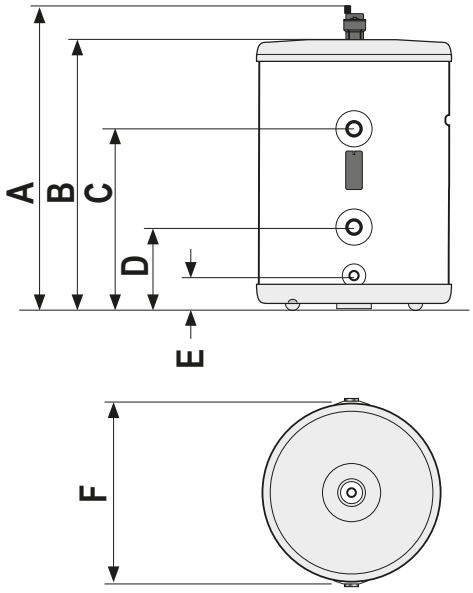
Connections



	Connection	PAW-BTANK50L-2 / PAW-BTANK100L
a	Air purge valve	1/2" BSPP female
b	Upper supply/return connection (x 2)	1" BSPP female
c	Lower supply/return connection (x 2)	1" BSPP female
d	Drain valve	1/4" BSPP female

Unit: Inches (")

Dimensions



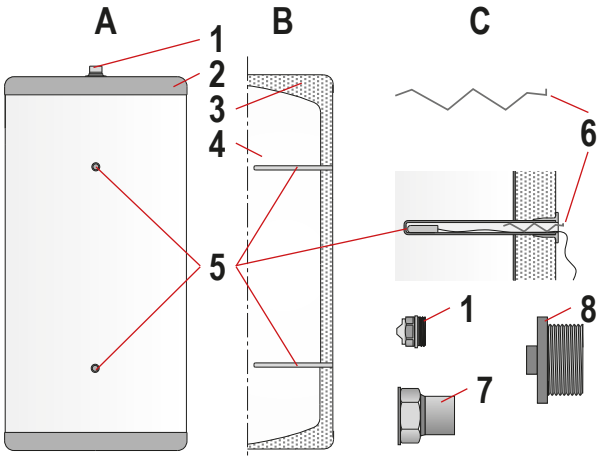
Dimension	PAW-BTANK50L-2	PAW-BTANK100L
A	704	1,243
B	636	1,175
C	422	962
D	192	192
E	96	96
F (Ø)	435	435

Unit: mm

4

PAW-BTANKG200L / PAW-BTANKG260L

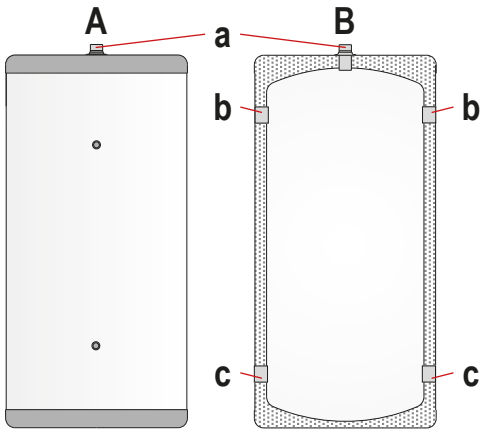
Components



A External view (seen from front side)
B Internal partial view (seen from left side)
C Detail views

1 Air vent (x1)
2 Upper cover
3 Heat insulation
4 Hot water tank
5 Probe tube for sensors
6 Clamping plate (x2), to lock probe tube
7 Adapter (x1), to install the air vent
8 Metallic plug (x2), to lock water pipe connections while not needed

Connections

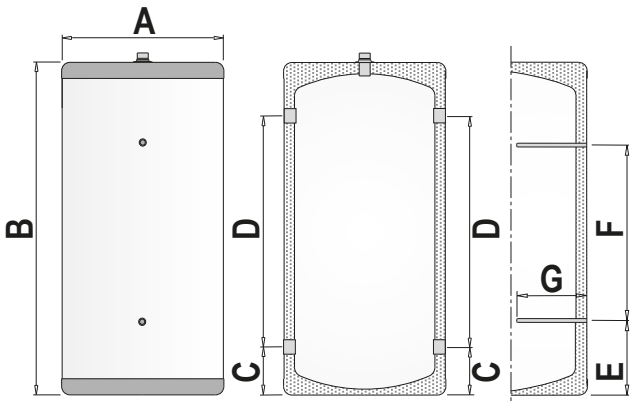


A External view (seen from front side)
B Internal view (seen from front side)

	Connection	PAW-BTANKG200L / PAW-BTANKG260L
a	Air vent connection	G 1" male
b	Upper supply/return connection	G 11/2" (female)
c	Lower supply/return connection	G 11/2" (female)

Unit: Inches (")

Dimensions



Dimension	PAW-BTANKG200L	PAW-BTANKG260L
A (Ø outside)	620	620
B	983	1,293
C	168	168
D	624	873
E	194	279
F	566	652
G	285	285

Unit: mm

Technical data

Buffer tanks					
Model		**PAW-BTANK50L-2**	**PAW-BTANK100L**	**PAW-BTANKG200L**	**PAW-BTANKG260L**
Capacity	l	48	100	194	252
Energy losses	W	35	55	60	83
Energy Efficiency Class (scale from A+ to F)		B	C	B	C
Material		Stainless Steel	Stainless Steel	Carbon Steel	Carbon Steel
Dimension (Hight / Diameter)	mm	636 / 430	1,175 / 430	983 / 620	1,239 / 620
Net weight	kg	17	28	41	46

Notes: Automatic air vent and drain cock are included. Built-in sensor pocket (sensor not included). PAW-BTANK**** buffer tanks are produced by OSO. PAW-BTANKG**** buffer tanks are produced by Lapesa

4

4.8.2 Combo Tanks

The Combo Tanks are modern high-performance tanks, which were developed especially for the requirements of the Aquarea heat pumps. They are a combination of a larger domestic hot water tank located in the upper area of the tank and a smaller buffer tank located in the lower area. This makes the Combo Tanks an ideal solution to supply a household with domestic hot water and heating for radiators or surface-embedded heating system. These compact models ensure very low standby losses and quick assembly due to the pre-installed assembly groups such as 3-way valve or electric tank heater (with safety thermostat and error signal contact)

The use of a Combo Tank helps implement multiple functions efficiently and easily, such as:

- Domestic hot water production
- Hydraulic disconnection of heat pump and heat consumer circuits
- Ensuring minimum required water volume in the heating system
- Buffer function for optimum operation of the Aquarea heat pumps

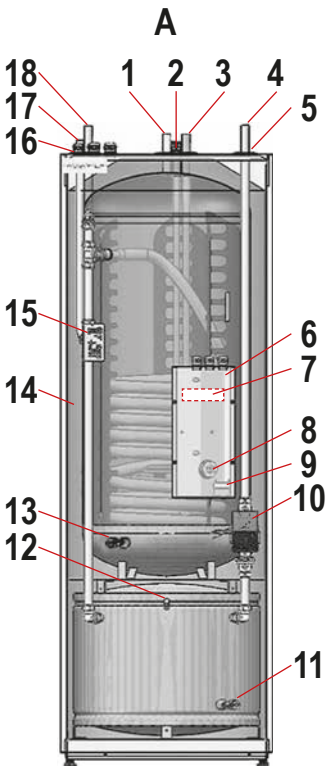
Panasonic offers one enamelled Combo Tank (PAW-TD20B8E3-2) and one stainless steel Combo Tank (PAW-TD23B6E5).

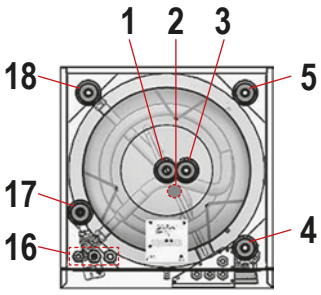
Note

When installing a Combo Tank, observe the respective installation instructions enclosed with each model. The installation instructions may contain important information about specific water quality requirements and about additional accessories, which are needed for the installation of the tank in the heating system and which must be provided by the client.

Enamelled Combo Tank: PAW-TD20B8E3-2

Components



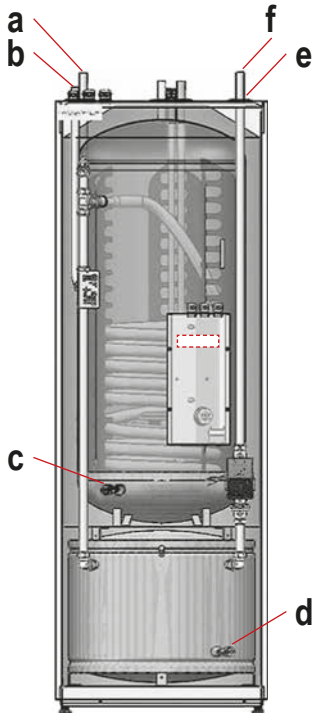


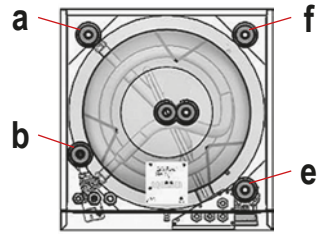
A **Internal view (seen from front side)**

B **Top view**

1 Hot water outlet
2 Sacrificial anode
3 Fresh water inlet
4 Supply water outlet to heating circuit
5 Return water inlet from heating circuit (only seen in top view)
6 Connection box
7 Connection terminal block (for 3-way valve, heating circuit pump, electric tank heater and temperature sensor)
8 Electric tank heater (3 kW)
9 Overheating protection
10 Circulation pump (High efficiency pump)
11 Drain valve of the buffer tank
12 Air purge valve
13 Drain valve of the hot water tank
14 Heat insulation (Polyurethane, 50 mm)
15 3-way-valve
16 Cable gland (x 3)
17 Supply water inlet from the heat pump
18 Return water outlet to the heat pump

Connections

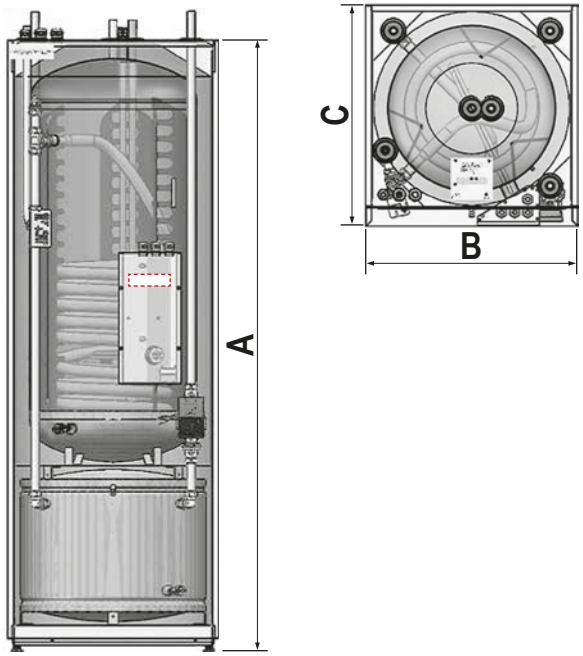




	Connection	PAW-TD20B8E3-2
a	Return water outlet to the heat pump	3/4" (male)
b	Supply water inlet from the heat pump	3/4" (male)
c	Drain valve of the hot water tank	1/2" (female)
d	Drain valve of the buffer tank	1/2" (female)
e	Supply water outlet to heating circuit	3/4" (male)
f	Return water inlet from heating circuit	3/4" (male)

Unit: Inches (")

Dimensions

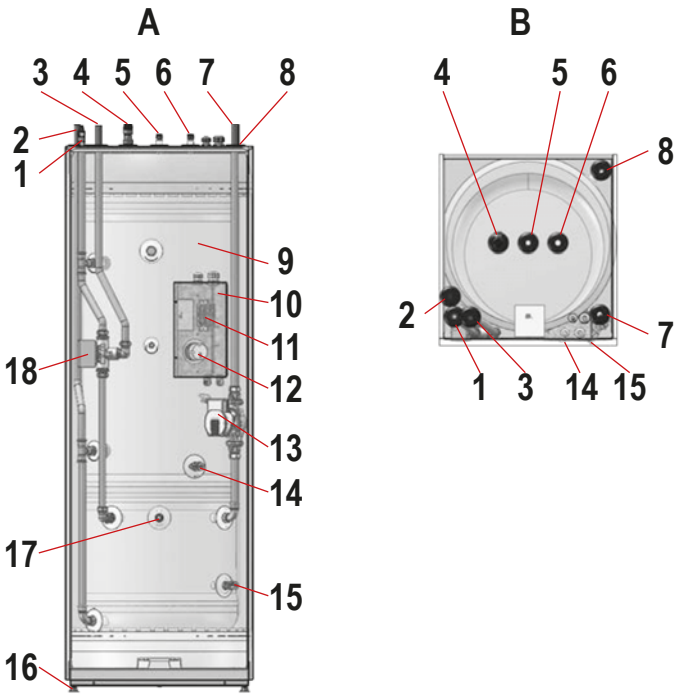


Dimension	PAW-TD20B8E3-2
A	1,770
B	640
C	690

Unit: mm

Stainless steel Combo Tank: PAW-TD23B6E5

Components

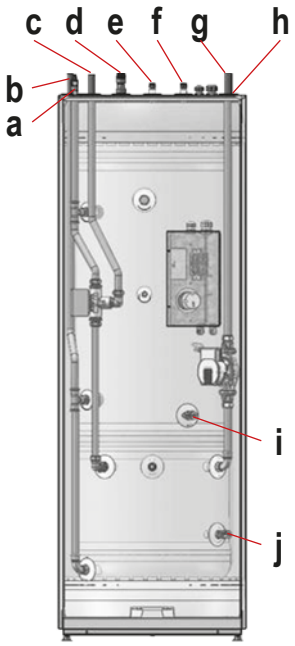


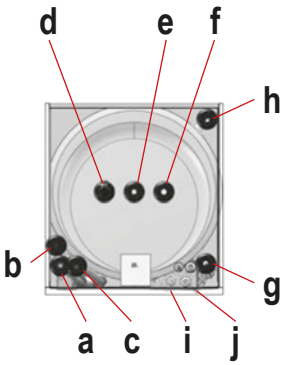
A **Internal view (seen from front side)**

B **Top view**

1 Air purge valve for DHW tank
2 Return water outlet to the heat pump
3 Supply water inlet from the heat pump
4 Temperature and pressure valve
5 Hot water outlet
6 Fresh water inlet
7 Supply water outlet to heating circuit
8 Return water inlet from heating circuit (only seen in top view)
9 Domestic hot water tank
10 Connection box
11 Connection terminal block
12 Electric tank heater
13 Circulation pump
14 Drain valve of the hot water tank
15 Drain valve of the buffer tank
16 Adjustable foot (x 4)
17 Air purge valve of the buffer tank
18 3-way-valve

Connections

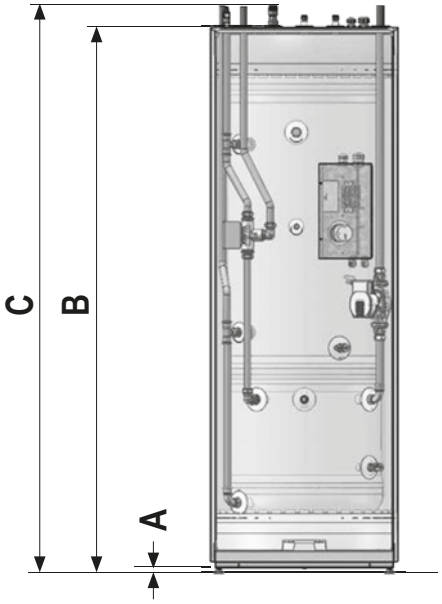


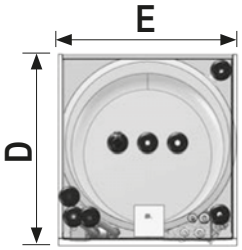


	Connection	PAW-TD23B6E5
a	Air purge valve for hot water tank	1/8"
b	Return water outlet to the heat pump	22 mm
c	Supply water inlet from the heat pump	22 mm
d	Temperature and pressure valve	3/4"
e	Hot water outlet	22 mm
f	Fresh water inlet	22 mm
g	Supply water outlet to heating circuit	22 mm
h	Return water inlet from heating circuit	22 mm
i	Drain valve of the hot water tank	DN15
j	Drain valve of the buffer tank	DN15

4

Dimensions





A **Internal view (seen from front side)**

B **Top view**

Dimension	PAW-TD23B6E5
A	17 – 37
B	1,751
C	1,853
D	646
E	599

Unit: mm

Technical Data

Combo Tanks		Enamelled		Stainless steel	
Model		PAW-TD20B8E3-2		PAW-TD23B6E5	
Dimensions (H x W x D)	mm	1,770 x 640 x 690		1,750 x 600 x 646	
Weight (empty)	kg	150		111	
Volume	l	185 + 80		230 + 60	
Power supply	V / Phase / Hz	230 / 1 / 50		230 / 1 / 50	
		Hot water tank	Buffer tank	Hot water tank	Buffer tank
Volume	l	185	80	230	60
Max working pressure	MPa (bar)	0.8 (8)	0.6 (6)	1.0 (10)	0.3 (3.0)
Pressure test	MPa (bar)	1.2 (12)	0.9 (9)	1.5 (15)	0.39 (3.9)
Max working temp	°C	90	90	80	80
Connections	mm	Ø22	Ø22	Ø22	Ø22, copper
Material		S 275 JR vitrified	S235 JR	EN 14521	EN 14521
Insulation (material / thickness)	– / mm	PUR / 50	PUR / 40	PUR / 50	PUR / 50
Heating coil surface	m²	2.1	—	1.8	—
Electrical heater	W	3000	—	2800	—
Energy loss at 65 °C [1]	kWh/24h	1.3	—	1.25	—
Energy efficiency class [2]		B	B	B	A
Standing loss	W	53	46	52	29

1 Tested pursuant to EN 12897:2006.

2 According to EU Regulation 812/2013.

Note: Enamelled Combo Tank is produced by Lapesa. Stainless Steel Combo Tank is produced by OSO.

4.8.3 Residential Heat Recovery Ventilation Unit

PAW-A2W-VENTA-L / PAW-A2W-VENTA-R



PAW-A2W-VENTA-L



PAW-A2W-VENTA-R

The Panasonic Residential Heat Recovery Ventilation Unit is designed to serve two important purposes: ensuring a good indoor air quality and recovering heat that would otherwise be lost through manual ventilation.

The ventilation unit provides fresh filtered outside air to a residential building while keeping a high thermal comfort within the building by using the exhaust indoor air to precondition the incoming air, leading to lower heating requirements in the building. To this end, the unit is equipped with a highly energy-efficient rotary heat exchanger with EC technology fans.

For a space-saving solution, the compact ventilation unit is optimised for installation atop the Panasonic Square Tank (PAW-TA20C1E5C) or the Aquarea All in One indoor units (WH-ADC0309K3E5/AN/UK/B, WH-ADC0309K6E5/AN, WH-ADC0912K6E5/AN, WH-ADC0912K9E8/AN). However, it can also be combined with Aquarea bi-bloc systems with hydromodule. In all these cases, the residential ventilation unit and the Aquarea heat pump can be controlled with one single user-friendly controller.

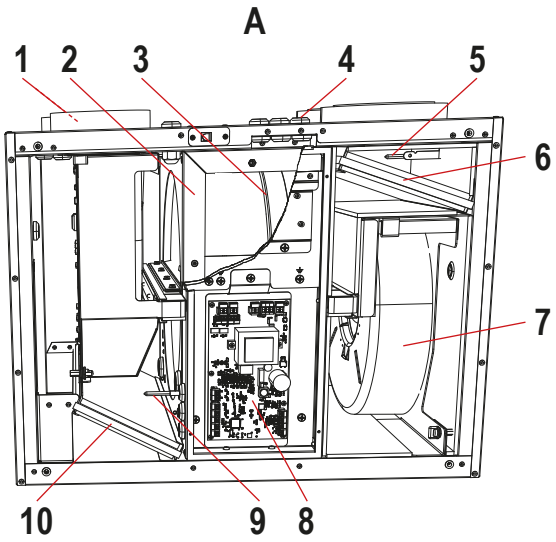
For improved comfort and optimised indoor air quality control, the residential ventilation unit can be supplemented with duct-mounted electrical heaters (PAW-VEN-HTR06, PAW-VEN-HTR12) and various sensors, monitoring the CO2 content (PAW-VEN-S-CO2-D/-W) and relative humidity of the indoor air (PAW-VEN-S-CO2RH-W).

The residential ventilation unit is available in two versions: with the supply air connection on the left-hand side (PAW-A2W-VENTA-L) or on the right-hand side (PAW-A2W-VENTA-R).

Note

When installing a residential ventilation unit, observe the respective installation instructions enclosed with each model. The installation instructions may contain important information about additional accessories, which are needed for the installation and which must be provided by the client.

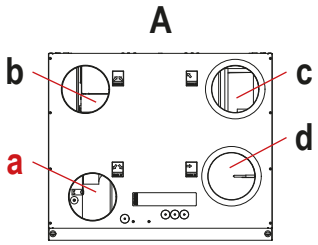
Components



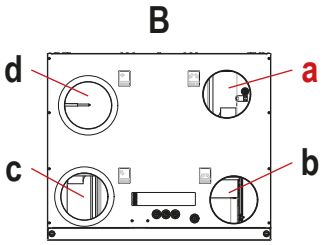
A	**Internal view (seen from front side)**
1	Supply air temperature sensor (only visible from top)
2	Rotating heat exchanger
3	Drive belt for rotating heat exchanger
4	Cable glands for external PCB connections
5	Outdoor air temperature sensor
6	Supply air filter
7	Return air fan
8	Main printed circuit board (PCB)
9	Relative humidity/Extract air temperature sensor
10	Return air filter

Note: Internal view of PAW-A2W-VENTA-L shown as an example.

Duct connections



PAW-A2W-VENTA-L



PAW-A2W-VENTA-R

A **PAW-A2W-VENTA-L**

B **PAW-A2W-VENTA-R**

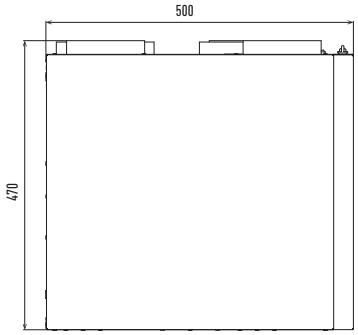
	Duct connection	Diameter
a	Supply air connection	125
b	Return air connection	125
c	Exhaust air connection	125
d	Outdoor air connection	125

Unit: mm

Dimensions

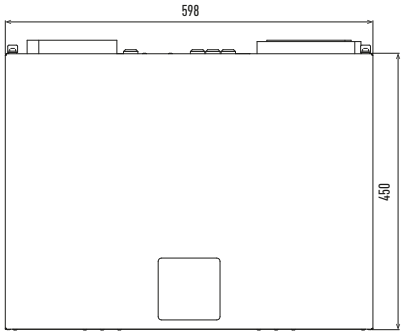
PAW-A2W-VENTA-L/-R

Left side view



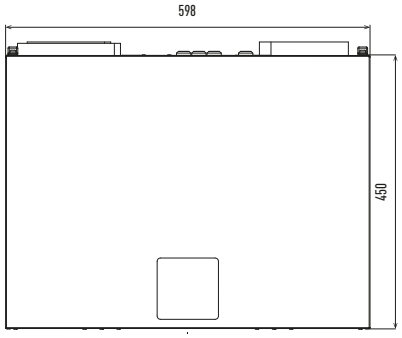
PAW-A2W-VENTA-L

Front view



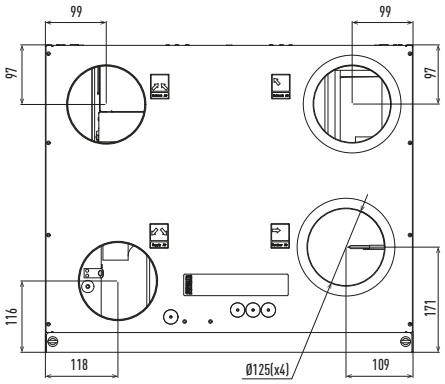
PAW-A2W-VENTA-R

Front view



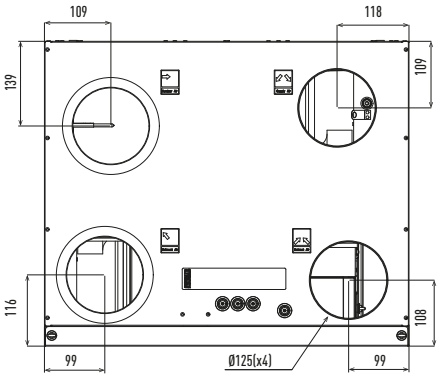
PAW-A2W-VENTA-L

Top view



PAW-A2W-VENTA-R

Top view



Unit: mm

Technical data

Residential Heat Recovery Ventilation Unit		PAW-A2W-VENTA-L	PAW-A2W-VENTA-R
Supply side		Left	Right
Nominal airflow rate @ 50 Pa	m³/h	204	
Maximum airflow rate @ 100 Pa	m³/h	292	
Specific fan power (SFP) @ 204 m³/h		1.24	
Heat exchanger rotor drive type		Variable speed	
Exchanger type		Rotating	
Heat recovery efficiency 1		84 %	
Power supply	V / Ph / Hz	230 / 1 / 50	
Power consumption	W	176	
Energy Class, basic unit		A	
Energy Class, unit with local control on demand		A	
Noise level	dB(A)	40	
Dimension (W x H x D)	mm	598 x 450 x 500	
Weight	kg	46	
Mounting position		Vertical	
Duct connections	mm	DN125	
Filter class, supply air		F7/ePM$_1$ 60 %	
Filter class, return air		M5/ePM$_{10}$ 50 %	
Minimum outdoor temperature	°C	-20	

1) Heat recovery efficiency according to EN 13141-7.

Note:

Residential Heat Recovery Ventilation Unit is produced by Systemair.

4.8.4 Recommended on-site accessories

Panasonic recommends the following on-site accessories. It is particularly advisable to use building components and accessories recommended by the manufacturer. Use the correct interfaces (→ *4.7.2 External interfaces (inputs/outputs), p. 50*) and connection conditions when connecting the accessories.

Overview of the specifications of the recommended on-site accessories

Construction / Indoor unit type							Bi-bloc systems				
							with All in One unit				with hydromodule
Model type (configuration)							–	AN	B	UK	
No.	Component	Quantity	Description	Model	Power supply	Make					
A	2-way valve set	1	Electrical motor actuator	SFA21/18	230 V AC	Siemens	●[2]	●[2]	●[2]	●[2]	●[2]
			2-way valve	VXI46/25	–		●[2]	●[2]	●[2]	●[2]	–
				VVI46/25	–		–	–	–	–	●[2]
B	3-way valve set	2	Electrical motor actuator	SFA21/18	230 V AC	Siemens	–	–	–	–	●
			3-way valve	VVI46/25	–		–	–	–	–	●
C	Room thermostat	1	Wired	PAW-A2W-RTWIRED	230 V AC	[1]	●	●	●	●	●
			Wireless	PAW-A2W-RTWIRELESS	230 V AC	[1]	●	●	●	●	●
D	Mixing valve	1	–	167032	230 V AC	Caleffi	●	●	[3]	●	●
E	Pump	1	–	Yonos 25/6	230 V AC	Wilo	●	●	[3]	●	●
F	Temperature sensor for buffer tank	1	–	PAW-A2W-TSBU	–	[1]	●	●	[3]	●	●
G	Outdoor air temperature sensor	1	–	PAW-A2W-TSOD	–	[1]	●	●	[3]	●	●
H	Supply water temperature sensor for heating circuit	1	–	PAW-A2W-TSHC	–	[1]	●	●	[3]	●	●
I	Room temperature sensor	1	–	PAW-A2W-TSRT	–	[1]	●	●	[3]	●	●
J	Solar sensor	1	–	PAW-A2W-TSSO	–	[1]	●	●	[3]	●	●
K	Base pan heater for outdoor units	1	Only for models with 3 to 9 kW	CZ-NE2P	–	Panasonic	●	●	●	●	●
L	Base pan heater for outdoor units	1	For all models after the F Generation with > 5 kW	CZ-NE3P	–	Panasonic	●	●	–	●	●
M	Additional PCB for expanded controller functionality	1	–	CZ-NS5P	–	Panasonic	●	●	[3]	●	●
N	Interface for the control over the Internet via Aquarea Smart Cloud	1	–	CZ-TAW1B	–	Panasonic	●	●	●	●	●
O	10 m extension cable for CZ-TAW1B	1	–	CZ-TAW1-CBL	–	Panasonic	●	●	●	●	●
P	Remote controller case	1	For separate installation of the remote controller	–	–	Panasonic	●	●	●	●	●

1 To be sourced through Panasonic
2 Only for unlocked cooling functionality.
3 Already installed at the time of dispatch

We recommend that the client-provided accessories be sourced from the manufacturers named in the table.

5 Planning

IMPORTANT

The planning of the heat pump system is described in this chapter with the example of Germany, i.e. some of the legal regulations, planning aids, information sources, parameters, promotion programmes etc. may apply only to Germany. For planning a heat pump system in other European countries, the corresponding specifications and information sources must be determined and taken into account when planning.

Planning steps

There are multiple steps involved in planning the heat pump system. The list of individual steps given below also points to the corresponding sections in which the concrete planning steps are described:

1. Refrigeration technology and performance criteria (→ *5.1, p. 78*)
   > Determination of design outside temperature θe and design heat load (→ *5.1.1, p. 78*)
   > Determination of the domestic hot water demand (→ *5.1.2, p. 79*)
   > Determination of the heating surface temperature (→ *5.1.3, p. 80*)
   > Operating mode and determination of the bivalence point (→ *5.1.4, p. 80*)
   > Determination of the pipe length correction factor for bi-bloc systems (→ *5.1.5, p. 81*)
   > Example: Calculation of the total heating capacity required (→ *5.1.6, p. 81*)
   > Cooling (→ *5.1.7, p. 82*)
2. Installation criteria (→ *5.2, p. 83*)
   > Acoustics (→ *5.2.1, p. 83*)
   > Installation of a bi-bloc system (→ *5.2.2, p. 86*)
3. Hydraulics (→ *5.2.3, p. 97*)
4. Electricals (→ *5.3, p. 101*)
5. Heating and cooling capacity depending on supply water temperature and outside temperature (→ *5.4, p. 107*)
6. Application examples (→ *5.5, p. 110*)

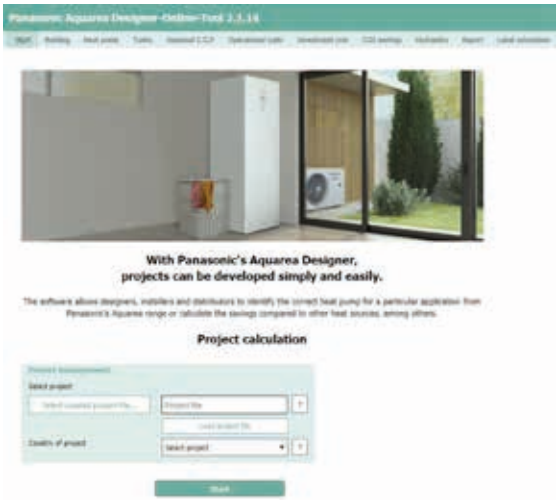
Planning with Panasonic Aquarea Designer Online Tool

For easy and quick calculation as well as optimisation of heating systems with heat pump, Panasonic offers the Aquarea Designer Online Tool, which is accessible for free on www.PanasonicProClub.com.

The online tool offers the following functions:

- Design of the heat pump based on the building and consumption data
- Design calculation based on the integrated climate and weather database
- Quick selection of the suitable heat pump
- Calculation of the bivalence point
- Calculation of the seasonal coefficient of performance
- Cost comparison
- Report download possible

View of the initial screen of the Panasonic Aquarea Designer Online Tool



5.1 Refrigeration technology and performance criteria

5.1.1 Determination of design outside temperature and design heat load

The heat load of a building is determined according to EN 12831 “Energy performance of buildings – Method for calculation of the design heat load” and the possible valid national appendices and is seen in the planning documents for new buildings. The design heat load is calculated for the design outside temperature θe. The design outside temperature is the lowest two-day average of the outside temperature, which has been reached or fallen below 10 times in 20 years. The design outside temperature is therefore suitable as the design point for the heat pump.

Example of Germany: Determination of the design outside temperature θe according to EN 12831 Annexure 1

Location	Design outside temperature θe (°C)	Annual average of the outside temperature (°C)
Berlin	-14	9.5
Bremerhaven	-10	9.0
Eisenach	-16	8.8
Frankfurt / Main	-12	10.2
Hamburg-Fuhlsbüttel	-12	8.5
Constance	-12	7.9
Magdeburg	-14	9.5
Munich	-16	7.9
Nuremberg	-16	7.9
Rostock-Warnemünde	-10	8.4

For existing buildings, you can alternatively use the approximate calculation method to determine the heating load as described below. It should serve as a reference point, because a number of factors play a role in the calculation, such as house type, heat insulation and the ventilation behaviour. In the course of the years, the specific heat requirement of buildings has dropped steadily due to the ever stricter heat insulation requirements. Due to this fact, the performances per square metre of heated living space stated in the table below can be used.

Example of Germany: Typical values for the specific heating load of residential buildings for rough determination of the design heat load

Existing building up to 1977	130 to 200 W / m²
Building after 1977	70 to 130 W / m²
Building after 1982	60 to 100 W / m²
Building after 1995	40 to 60 W / m²
Building after 2002	30 to 50 W / m²
Low energy house	25 to 40 W / m²
Ultra-low energy house	15 to 30 W / m²
Passive	10 W / m²

Example

In the case of a residential house in Frankfurt/Main from the year 1992 with a heated living space of 120 m², the design heat load thus calculated is 9.6 kW (80 W/m²).

The design outside temperature for the residential house can be read from the table of the design outside temperatures for the observed location with θe = -12 °C. The heat pump should therefore provide the determined heating capacity of 9.6 kW at an outside temperature of -12 °C.

IMPORTANT

The approximate calculation method shown only yields rough reference values for the heat load. For correct designing, a heating expert must precisely calculate the required heating capacity in order to provide the correct design. Panasonic cannot be held responsible for any wrong calculations under any circumstances.

5.1.2 Determination of the domestic hot water demand

The domestic hot water demand can only be estimated based on the following table for various comfort expectations.

Example of Germany: Typical domestic hot water demand per person for one- or two-family houses at 45 °C tapping temperature.

Comfort expectation	Daily requirement per person in litres (45 °C)	kW per person and day
Low	15 to 30	0.6 to 1.2
Normal	30 to 60	1.2 to 2.4
High	60 to 120	2.4 to 4.8
Washing machine or dishwasher with hot water mode	≈ 20 (See manufacturer's documents)	0.8

Depending on the number of persons and the comfort expectations, the domestic hot water demand can be very different. It is advisable to select the size of the domestic hot water tank according to the domestic hot water demand. It is important to make sure that the hot water output capacity required (e.g. 120 litres for a bath) is covered by the tank volume. At the same time, do not choose an unnecessarily large tank volume, to ensure low dwell time in the tank. For one- and two-family houses, the tank sizes given in the following table are recommended.

Example of Germany: Recommended tank sizes for one- and two-family houses

Persons	Tank volume
2 to 3	200 l
3 to 6	300 l
> 6	> 300 l

CAUTION

Danger of illnesses due to growth of Legionella in water

Legionella can grow in domestic hot water tanks, and can cause infectious diseases in humans.

► Respect European and national requirements for avoiding Legionella multiplication (example in Germany: DVGW Worksheet W551). For domestic hot water tanks with more than 400 litres volume as well as in buildings with more than two residential units, there may be higher requirements than for one- and two-family houses.

IMPORTANT

The domestic hot water demand has the highest influence on the degree of coverage of solar systems for domestic hot water production. A proven ratio between tank volume and the surface area of the solar collectors is between 50 to 80 litres per square metre of collector area.

Hot water circulation increases the heat demand for the domestic hot water production and can be up to 100 % of the heat load for domestic hot water production if the connection distance is very long. Hot water circulation pumps should therefore always be operated in a time- and temperature-dependent manner.

5.1.3 Determination of the heating surface temperature

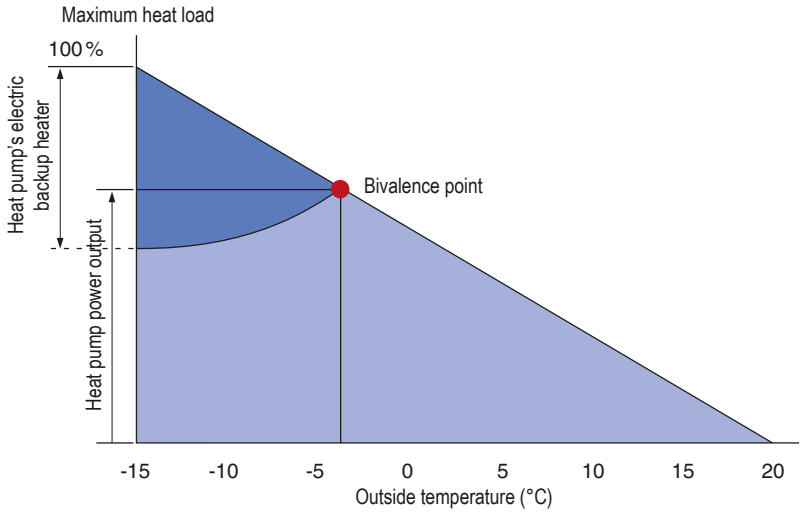
The temperature of the heating surfaces at design outside temperature should not be taken any higher than 55 °C. Surface-embedded heating systems with a supply temperature of 35 °C and radiators with a supply temperature of 45 °C are recommended. When replacing heat sources with burners in existing buildings for an Aquarea heat pump, reduce the supply temperature as much as possible by using additional heat insulation and refurbishing measures. Conventional heat sources with burners are operated with supply temperatures up to 75 °C. By adapting proper refurbishing measures, the old radiators can often continue to be used at a lower temperature and thermal output. For this purpose, check on the basis of conversion factors, whether the heating capacity of the radiators suffices even at a lower supply temperature.

5.1.4 Operating mode and determination of the bivalence point

First, the desired operating mode of the heat pump must be defined (→ *4.3.2 Operating mode, p. 20*). In order not to over-dimension the heat pump and to save on costs, a bivalent mode is preferred. In this case, another heat source is hooked up below a defined outside temperature and the associated heating capacity of the heat pump. The additional heat source can be integrated externally (e.g. a boiler or fireplace) or internally through the electric backup heater of the heat pump. If the additional heat source uses electric power for heat production, the operating mode is called mono-energetic.

The bivalent mode only supports the air-to-water heat pump while the outside temperatures are very low. As this is the case only for a few days a year, the heat generated by the electric backup heater only amounts to a few percent of the totally generated amount of heat.

Bivalent parallel operating mode (mono-energetic) via the heat pump's internal electric backup heater



IMPORTANT

The bivalence point is defined individually for each building (→ *5.1.6 Calculation example: total heating capacity required, p. 81*). Due to the inverter technology, Aquarea heat pumps can work efficiently even below their nominal capacity, without cycling.

5.1.5 Determination of the pipe length correction factor for bi-bloc systems

The performance of bi-bloc systems with hydromodule or All in One indoor unit falls in proportion to the increase in length of the refrigerant pipe. Depending on the nominal capacity of the heat pump, the decrease of performance differs for the models with up to 7 kW nominal capacity and the models with more than 7 kW nominal capacity (see the tables below). However, the correction factors given in the following tables and any calculations based on these correction factors can only serve as a rough estimation. For accurate calculations, refer to the relevant Service Manual.

Pipe length correction factors for bi-bloc systems up to 7 kW nominal capacity

Length of refrigerant pipe (one way)	up to 10 m	up to 20 m	up to 30 m
Pipe length correction factor	1.0	0.95	0.90

Pipe length correction factors for bi-bloc systems above 9 kW nominal capacity

Length of refrigerant pipe (one way)	up to 7 m	up to 10 m	up to 20 m	up to 30 m
Pipe length correction factor	1.0	0.95	0.90	0.85

5.1.6 Example: Calculation of the total heating capacity required

The main requirements for the air-to-water heat pump are defined through the design heat load and the design outside temperature. Moreover, the domestic hot water demand and electricity shutdown times imposed by the electric utility company must be taken into account. Also, the length of the connection pipes between outdoor unit and indoor unit (hydromodule or All in One unit) are to be considered, because long pipes lead to a lower heating capacity. And not the least, besides the heat pump power, the supply water temperature at design outside temperature is also decisive for selecting the right heat pump.

On the other hand, Aquarea heat pumps have an internal electric backup heater, which can provide additional heating capacity while outside temperatures are very low.

For calculating the total heating capacity required, all the above-mentioned criteria should be taken into consideration together:

1. Design outside temperature
2. Design heat load
3. Tank charging (time required for domestic hot water production with the heat pump)
4. Possible electricity shutdown times imposed by the utility company (e.g. 1 x per day for 2 hours)
5. Pipe length correction factor

$$\text{Heating capacity} \geq \frac{\text{Design heat load x 24 h}}{\text{(24 h – tank charging – shutdown times) x pipe length correction factor}}$$

IMPORTANT

In new buildings, a phase of building drying usually takes place in the initial two years after occupation, when the humidity from the construction phase escapes from the building; during this time the heat demand is higher than after the phase of building drying. This increased heat demand can be covered by the heat pump's internal electric backup heater.

Example

- Residential house in Frankfurt/Main with a heat load of 9.6 kW for a design outside temperature of θe = -12 °C
- Domestic hot water production for four persons with normal comfort expectation (45 litres per person and day at 45 °C tapping temperature or 1.8 kWh): 4 x 1.8 = 7.2 kWh per day. For domestic hot water production, a heat pump with a heating capacity of 9.6 kW would need 7.2 kWh / 9.6 kW = 0.75 h operation. Rounding up, this results in a tank charging time of 1 hour (1 h).
- The pipe length correction factor is yielded on the basis of a connection distance of 15 m (one way) as the mean value of 0.95 and 0.90 for a pipe length correction factor = 0.93.

$$\text{Total heating capacity required} \geq \frac{9.6 \text{ x } 24 \text{ h}}{(24\text{ h} - 1\text{ h}) \times 0.93} = \frac{230.4}{21.39} \quad 10.77\text{ kW}$$

The additional consideration of an electricity shutdown time of 2 hrs per day results in:

$$\text{Total heating capacity required} \geq \frac{9{,}6 \times 24\text{ h}}{(24\text{ h} - 1\text{ h} - 2\text{ h}) \times 0.93} = \frac{230.4}{19.53} \quad 11.80\text{ kW}$$

The calculated total heating capacity required must be generated while maintaining the supply water temperature of 35 °C required for underfloor heating.

IMPORTANT

The determination of the total heating capacity required, shown above, can deviate a little from the detailed calculation with the Aquarea Designer, but can be used quickly as a rule-of-thumb guide and without using a calculation programme.

5.1.7 Cooling

For Aquarea heat pump models with cooling function (High Performance and T-CAP series), the cooling function must be activated by a qualified service technician during commsissioning. After that, the cooling mode can be switched on/off and controlled by the end user via the remote controller.

ATTENTION

Risk of damage to building or of slipping on the floor

In cooling mode, a temperature drop below dew point can cause condensation of moisture from the air on the surface of the heat transfer systems. This can damage the building or pose the risk of slipping on the floor.

- ► Prevent the temperature from dropping below the dew point by suitable placement of dew point sensors.
- ► Alternatively, safely drain the condensate that forms.
- ► In addition, insulate the pipes concerned to prevent diffusion.

5.1.7.1 Cooling with underfloor heating

Underfloor heating (or any surface-embedded heating system) is generally suitable for the cooling mode, however cannot be operated with very low supply water temperatures, because the level of comfort drops, and the danger of falling below the dew point arises. In general, therefore, the surface temperature should be limited to at least 20 °C. If the temperature difference between supply and return water temperature (ΔT) is 3 to 4 K, it is possible to achieve a specific cooling capacity of 30 to 40 W/m². The cooling capacity is influenced considerably by the pipe distance and the pipe diameter of the underfloor heating as well as the floor covering. In the case of a tiled floor, the heat transfer is significantly better than, say, with a carpeted floor, which directly affects the cooling capacity.

Due to the systemic limits to the cooling capacity of underfloor heating, room cooling cannot be regulated to a fixed indoor temperature. However, at least the supply water temperature must be set to a value that prevents the room temperature from dropping below dew point.

5.1.7.2 Cooling with fan coils

Fan coils can be operated with very much lower supply water temperatures than underfloor heating. Correspondingly, fan coils allow you to achieve a higher cooling capacity than underfloor heating and also greater comfort due to the type of room climate control. Due to the low supply water temperatures, which can be obtained when using fan coils for room cooling, the pipe must be covered by a diffusion-proof insulation and the condensate must be drained via a connection pipe to the house drainage system or to the outside.

5.2 Installation criteria

5.2.1 Acoustics

5.2.1.1 Sound pressure level

Sound is produced when air is made to start vibrating. This vibration widens as a pressure wave in the air and this way travels from the sound emission source to the eardrum of the human ear (immission point). Irrespective of the type of sound (language or engine sound), the sound can be measured as sound pressure. The higher the sound pressure, the louder is the sound perception. The human ear can perceive a range from 20 x 10^{-6} Pa (audible threshold) to 20 Pa (pain threshold). This range, which corresponds to a ratio of 1:1,000,000, is however not perceived by the human ear in a linear manner, but a logarithmic one. For this reason, the sound pressure is also not indicated as pressure but as a sound pressure level in Decibels (dB).

Typical sound situations and thereby occurring sound pressure levels and sound pressures

Sound	Sound pressure level in dB (A)	Sound pressure in µPa	Sensitivity
Woods	20	100	Very soft
Library	40	1,000	Soft
Conversation	55	10,000	Normal
Road	80	100,000	Loud
Pneumatic hammer	100	1,000,000	Very loud

The result of the non-linear perception of the sound pressure is that two equally loud sound sources are not perceived doubly as loud as one sound source, but only as 3 dB louder than one sound source. Doubling the sound intensity (volume) of a sound is linked to a sound pressure level increase by 10 dB.

The measurable sound pressure level, which is converted into a rating level, in order to take into account other factors such as tonal components of a sound, is the decisive condition for maintaining the limit values. This must not exceed the valid immission guide values for immission points outside buildings (example of Germany: Technical Instructions on Noise Abatement (TA Lärm)).

Example of Germany: Immission guide values according to “TA Lärm”

Industrial Areas	By day and night	70 dB(A)
Commercial areas	By day	65 dB(A)
	By night	50 dB(A)
Business zones	By day	60 dB(A)
	By night	45 dB(A)
General residential zones	By day	55 dB(A)
	By night	40 dB(A)
Purely residential areas	By day	50 dB(A)
	By night	35 dB(A)
Spa areas, hospitals	By day	45 dB(A)
	By night	35 dB(A)

The values relate to the measurable value at a distance of 0.5 m from the centre of the opened window of the room affected and requiring protection. They are mean values and may be exceeded by short sound peaks.

The measurable sound pressure level depends on the distance to the sound source and decreases with increasing distance.

5.2.1.2 Sound power level for approximate calculation of the sound pressure level

The sound power level is a quantity for rating the sound source independently of the distance and direction of the sound propagation. It is a mathematically determinable quantity, which is determined for individual devices in laboratory measurements under defined conditions. Based on the sound power level of a specific device, the sound pressure level can be roughly determined at a certain distance and for corresponding sound propagation conditions for a given situation.

Sound propagates equally in all directions with the sound power of the sound source. The area, through which the sound passes, increases as the distance to the sound source increases. This results in a continuous reduction in the sound pressure level for the same sound power.

The sound pressure level is also affected by the following factors during the sound propagation:

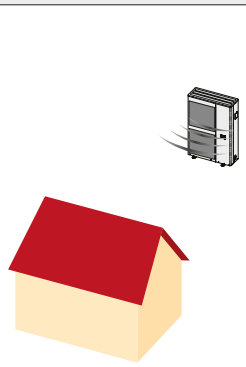
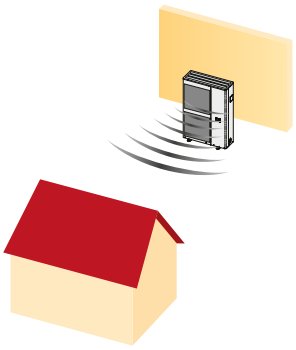
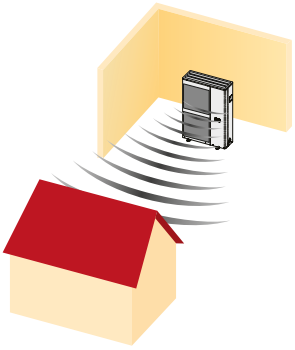
- Acoustical shadows cast by obstacles such as buildings, walls or land formations
- Reflection on reverberant surfaces such as walls, glass facades, buildings or asphalted floors as well as stone flooring
- Absorption of the sound, for example by grass, bark mulch, leaves or freshly fallen snow
- Wind can strengthen or reduce the sound pressure level (depending on the wind direction)

A rough determination of the sound pressure level L_{Aeq} at a certain location at a distance r to the heat pump can be calculated with the following formula and based on the sound power level L_{WAeq}:

$$L_{Aeq} = L_{WAeq} + 10 \times \log \left(\frac{Q}{4 \times \pi \times r^2} \right)$$

This only requires the direction factor Q in addition, which takes into account the spatial propagation conditions of the sound source.

Direction factor Q for different arrangements of the sound source

Sound propagation	In half space (1 boundary surface: floor)	In quarter space (2 boundary surfaces: floor + 1 wall)	In eighth space (3 boundary surfaces: floor + 2 walls)
Q=	2	4	8
Arrangement			

Example

The outdoor unit WH-UXZ16KE8 of a T-CAP bi-bloc system has a sound power level of 65 dB(A) and is set up such that the sound can propagate in the quarter space (Q = 4). The sound pressure level at 10 m distance is then:

$$L_{Aeq}(10\,m) = 65\,dB(A) + 10 \times \log \left(\frac{4}{4 \times \pi \times 10^2} \right) = 40\,dB(A)$$

At a distance of 20 m, the sound pressure level is however still only:

$$L_{Aeq}(20\,m) = 65\,dB(A) + 10 \times \log \left(\frac{4}{4 \times \pi \times 20^2} \right) = 34\,dB(A)$$

The sound pressure level can roughly be calculated even more easily by using the table below, by subtracting the table value from the device-specific sound power level (→ *4.6.2.3 Technical data (bi-bloc systems), p. 36*).

Table for rough determination of the sound pressure level based on the sound power level

Guide factor Q		Distance from the sound source (m)								
		1	2	4	5	6	8	10	12	15
	2	-8	-14	-20	-22	-23.5	-26	-28	-29.5	-31.5
	4	-5	-11	-17	-19	-20.5	-23	-25	-26.5	-28.5
	8	-2	-8	-14	-16	-17.5	-20	-22	-23.5	-25.5

IMPORTANT

The sound propagation can be facilitated or reduced by selecting the installation location. Avoid setting up on reverberant floor surfaces. Sound propagation can be reduced further by construction obstacles, but the air flow should not be hindered.

Choice of the blowing direction of the outdoor unit should preferably be towards the road, because neighbouring rooms requiring protection rarely face in this direction.

If in doubt, use an acoustician's services.

5.2.2 Installation of a bi-bloc system

A bi-bloc system consists of an outdoor unit and an indoor unit (hydromodule or All in One unit). Depending on the power output and model, the outdoor unit has one or two fans and thus their installed size differs (→ *1 Model range, p. 8*).

In general, the following points should be remembered regarding the distance between outdoor unit and indoor unit of a bi-bloc system:

- If the length of the refrigerant pipes is greater than the pre-filled pipe length of the device (10 m), the quantity of additional refrigerant stated in the technical data must be added (→ *4.6.2.3 Technical data (bi-bloc systems), p. 36*).
- The maximum length of the refrigerant pipes between indoor and outdoor unit is 25, 30, 40 or 50 m, depending on the model and limitating conditions (→ *Technical data (bi-bloc systems), p. 36*). This value must not be exceeded.
- The minimum length of the refrigerant pipes between indoor and outdoor unit is 3 m and must not fall below that value.
- The maximum elevation difference between indoor and outdoor unit is 20 or 30 m, depending on the model (→ *Technical data (bi-bloc systems), p. 36*). This value must not be exceeded.
- The wall thickness of the copper tubes for the refrigerant pipes must be larger than 0.8 mm.

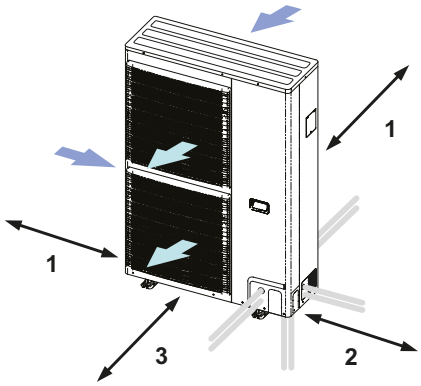
5.2.2.1 Installation conditions for outdoor units

The installation conditions for outdoor units are as follows:

- The outdoor unit is designed for outdoor installation only and must not be installed indoors.
- For condensed water drainage in defrost mode, drainage is recommended via a drain pipe to the frost-free ground with gravel fill (→ *5.2.2.3 Securing the outdoor unit, p. 88*).
- Maintain the minimum distances (→ *5.2.2.2 Minimum distances (outdoor units), p. 87*), which apply also to walls, ceilings, awnings and covers, expecially built for the purpose of protecting the outdoor unit from the effects of the weather.
- The heat emission of the outdoor unit must not be impeded by additional protection devices such as awnings or such.
- No objects should be put up that can cause short-circuiting of the exhaust air. Even when using multiple outdoor units (e.g. in case of heat pump cascades), avoid any air flow short-circuiting. To this end, multiple outdoor units must not be placed back to front nor front to front and at a minimum distance of 100 mm when placing them side by side (→ *Correct arrangement of multiple outdoor units, p. 88*).
- The operating noise of the outdoor unit must not cause any nuisance to the user or to neighbours. In certain countries or regions, the installation of air-to-water heat pumps may require permission. All provisions regarding noise valid at the location must be taken into account (→ *5.2.1 Acoustics, p. 83*).
- Additional anti-vibration dampers can be used for enhanced noise isolation.
- Installing an outdoor unit near to the sea, in regions with a high content of sulphur or at sites where large quantities of oil (e.g. machine oil, etc.) are present, may shorten its operating lifecycle.
- The outdoor unit is to be installed on a concrete foundation or a stable base frame, which may be located on the outer wall of a building. Also, it must be horizontally aligned and bolted down (Ø 10 mm).
- In the case of installation locations experiencing strong winds e.g. on building rooftops or between buildings, the outdoor unit must be additionally secured to prevent tipping over, either by special accessory, which can be obtained from Panasonic (Overturn prevention fitting, model number: K-KYZP15C) or by field-supplied means (e.g. by bracing).

5.2.2.2 Minimum distances for outdoor units

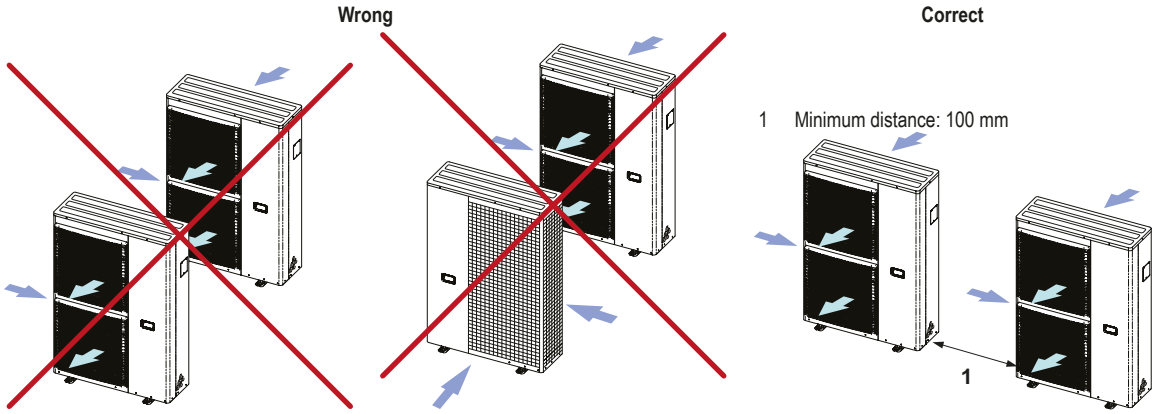
Minimum distance of the outdoor unit to the neighbouring walls and objects with representation of the air flow direction



1 Minimum distance: 100 mm
2 Minimum distance: 300 mm
3 Minimum distance: 1,000 mm

Notes:
The refrigerant pipe connections can be made in four directions (front, rear, side, bottom).
Schematic figure for explanation purposes only.

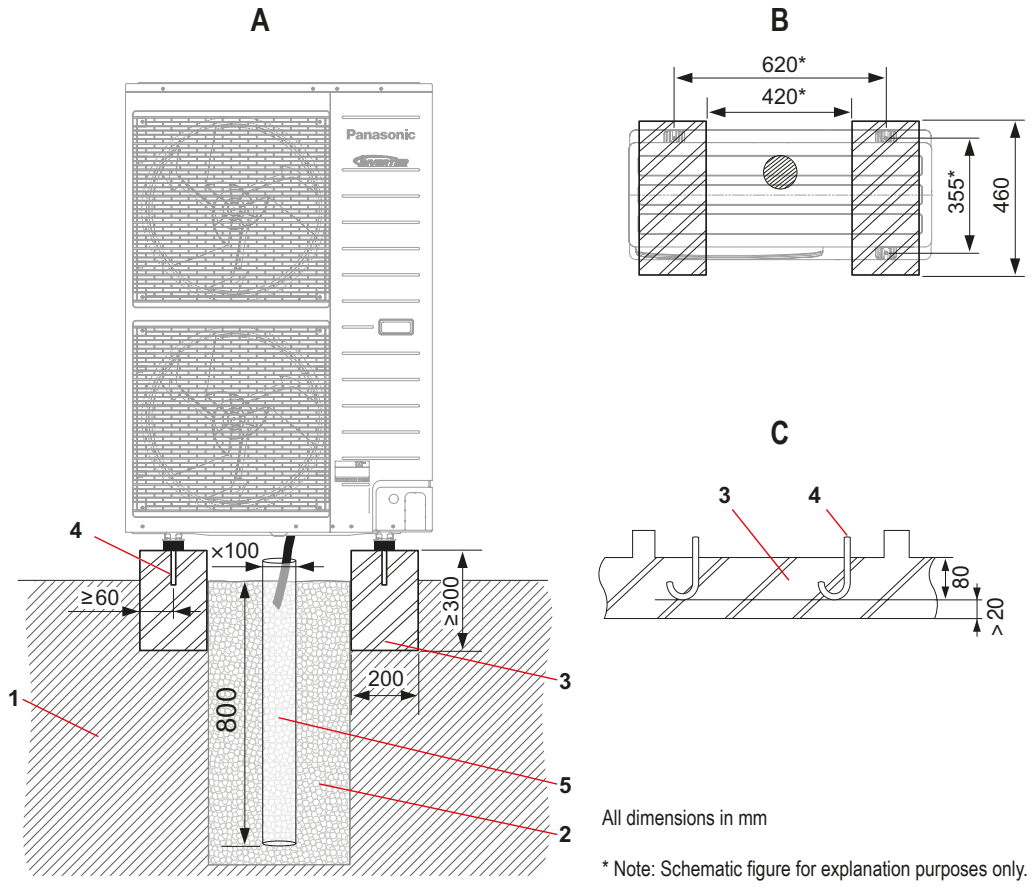
Correct arrangement of multiple outdoor units with representation of the air flow direction



5.2.2.3 Securing the outdoor unit

The outdoor unit must be mounted on a flat, horizontal and solid surface. Besides the weight of the device, the weight of the water must also be taken into account. The unit is to be mounted with four M12 anchor bolts, each having a tensile force of more than 15,000 N.

Minimum requirements for anchoring the outdoor unit on the ground by means of a foundation (A and B) or directly in the floor plate (C)



All dimensions in mm

* Note: Schematic figure for explanation purposes only.

A Front view: Anchoring by means of foundation
1 Ground
2 Gravel filling
3 Strip foundation
4 Anchor bolts
5 Drain pipe

B Top view
C Detailed view: Anchoring in the floor plate
3 Strip foundation
4 Anchor bolts

5.2.2.4 Requirements of the room for installation of the indoor unit

When designing the installation room, consider all devices and components of the heat pump system, which are not installed outside the building:

- Hydromodule or All in One unit (only for bi-bloc systems).
- Pipes, cables and wall bushings should be arranged in a useful manner and using the shortest path (electrical cables, refrigerant and heating water pipes).
- Tank (domestic hot water tank as well as possibly buffer tank)

Further, see that the installation room is dry and frost-free and that the installation location is easily accessible for maintenance work.

Required volume of the installation room

In bi-bloc systems, the refrigerant is partly in the building, which must be taken into consideration with respect to the minimum required volume. If no special machine room (as specified in EN 378 - Part 1) is available, then the minimum required volume of the installation room (Vmin) for heat pumps must be calculated according to EN 378 – Part 1 as follows:

$$V_{min} = \frac{G}{c}$$

Where:

G = Refrigerant charge in kg

c = practical limit in kg / m³
(for R32 is c = 0.061 kg/m³)

ATTENTION

Danger of the devices being damaged by incorrect refrigerant

The devices must only be operated with the refrigerant described in this Manual or the respective operating instructions. The use of other refrigerants or multi-component refrigerants can lead to the devices being damaged and to safety risks. Panasonic will not accept any responsibility or liability whatsoever if incorrect refrigerants are used.

► Only use R32 refrigerant for Aquarea High Performance and T-CAP series models of the K Generation.

► Do not mix the prescribed refrigerant with refrigerants of another type or replace it with a refrigerant of another type.

IMPORTANT

The refrigerant and the refrigerant charge quantity differ for the individual models and are also dependent on the additional refrigerant charge, which is added in the field due to longer pipe runs exceeding the pre-filled pipe length. Details to be taken from the technical data (→ *4.6.2.3 Technical data (bi-bloc systems), p. 36*.

Indoor floor area requirement for R32 models

Due to the classification of R32 with regard to safety, toxicity and flammability, limitations regarding the refrigerant quantity in relation to the floor area must be observed based on European regulation and standards, e.g. EN 378, and local regulation and standards:

- If the total refrigerant charge in the system is <1.84 kg, no additional minimum floor area is required.
- If the total refrigerant charge in the system is ≥1.84 kg, perform the following steps to determine, if the room is large enough to install the indoor unit or if any additional safety measures need to be taken.

Symbol	Description	Unit
m_c	Total refrigerant charge in system where: Total refrigerant charge in system, m_c (kg) = Pre-charged refrigerant amount in unit (kg) + Additional refrigerant amount after installation (kg)	kg
m_{max}	Maximum allowed refrigerant charge	kg
m_{excess}	Excess refrigerant charge quantity ($m_c - m_{max}$)	kg
A_{room}	Floor area of the installation room	m²
B_{room}	Floor area of the room adjacent to the installation room	m²
H	Installation height	m
VA_{min}	Minimum ventilation opening area	cm²
$A_{min\ total}$	Minimum required total floor area ($A_{room} + B_{room}$)	m²

Step A: Determine the maximum allowed refrigerant charge (m_{max}):

1. Calculate the floor area of the installation room (A_{room}).
2. Based on Table I (see below), select the maximum allowed refrigerant charge (m_{max}), which corresponds to the calculated A_{room} value.
3. If the maximum allowed refrigerant charge is larger than the total refrigerant charge in the system ($m_{max} \geq m_c$), the unit can be installed in the installation room at the installation height, which is specified in Table I, and without additional floor area or any additional ventilation.
4. If not ($m_{max} < m_c$), proceed to Step B and Step C, to determine how the floor area of the installation room (A_{room}) can be "enlarged" by the floor area of an adjacent room (B_{room}) by providing sufficiently large ventilation openings between the two rooms.

5

Table I: Maximum refrigerant charge allowed in a room

For All in One units

A_{room} (m²)	Maximum refrigerant charge (m_{max}) (kg)	A_{room} (m²)	Maximum refrigerant charge (m_{max}) (kg)	A_{room} (m²)	Maximum refrigerant charge (m_{max}) (kg)
	H = 0.6 m		H = 0.6 m		H = 0.6 m
1	0.138	18	1.454	35	2.028
2	0.276	19	1.494	36	2.057
3	0.414	20	1.533	37	2.085
4	0.553	21	1.571	38	2.113
5	0.691	22	1.608	39	2.141
6	0.829	23	1.644	40	2.168
7	0.907	24	1.679	41	2.195
8	0.970	25	1.714	42	2.221
9	1.028	26	1.748	43	2.248
10	1.084	27	1.781	44	2.274
11	1.137	28	1.814	45	2.299
12	1.187	29	1.846	46	2.325
13	1.236	30	1.877	47	2.350
14	1.283	31	1.909	48	2.375
15	1.328	32	1.939	49	2.399
16	1.371	33	1.969	50	2.424
17	1.413	34	1.999	51	2.448

Notes:

For H values lower than 0.6 m, the value of H is to be considered as 0.6 m to comply to IEC 60335-2-40:2018 Clause GG2.

For intermediate A_{room} values, the value that corresponds to the **lower** A_{room} value from the table is to be considered.
Example: For A_{room} = 10.5 m², the value that corresponds to "A_{room} = 10 m²" is to be considered.

For hydromodules

A_{room} (m^2)	Maximum refrigerant charge (m_{max}) (kg)							
	H = 1.15 m	H = 1.20 m	H = 1.30 m	H = 1.40 m	H = 1.50 m	H = 1.60 m	H = 1.70 m	H = 1.80 m
1	0.265	0.276	0.299	0.322	0.345	0.368	0.391	0.414
2	0.530	0.553	0.599	0.645	0.691	0.737	0.783	0.829
3	0.794	0.829	0.898	0.967	1.036	1.105	1.174	1.243
4	1.059	1.105	1.197	1.289	1.382	1.474	1.566	1.658
5	1.324	1.382	1.497	1.612	1.727	1.842	1.957	2.072
6	1.589	1.658	1.796	1.934	2.072	2.210	2.349	2.487
7	1.738	1.814	1.965	2.116	2.267	2.418	2.570	2.721
8	1.858	1.939	2.101	2.262	2.424	2.585	2.747	2.909
9	1.971	2.057	2.228	2.399	2.571	2.742	2.914	3.085
10	2.078	2.168	2.349	2.529	2.710	2.891	3.071	3.252
11	2.179	2.274	2.463	2.653	2.842	3.032	3.221	3.411
12	2.276	2.375	2.573	2.771	2.969	3.166	3.364	3.562
13	2.369	2.472	2.678	2.884	3.090	3.296	3.502	3.708
14	2.458	2.565	2.779	2.993	3.206	3.420	3.634	3.848

Notes:

For intermediate H values, the value that corresponds to the **lower** H value from the table is to be considered.
Example: For H = 1.25 m, the value that corresponds to "H = 1,20 m" is to be considered.

For intermediate A_{room} values, the value that corresponds to the **lower** A_{room} value from the table is to be considered.
Example: For A_{room} = 10.5 m^2, the value that corresponds to "A_{room} = 10 m^2" is to be considered.

Step B: Determine compliance of total floor area (A_{room} + B_{room}) to minimum required total floor area ($A_{min\ total}$):

1. Calculate the floor area (B_{room}) of the room adjacent to the installation room.
2. Determine the minimum required total floor area ($A_{min\ total}$) based on the total refrigerant charge (m_c) as specified in Table II (see below).
3. If the total floor area of both rooms (A_{room} + B_{room}) exceeds the minimum required total floor area ($A_{min\ total}$), proceed to Step C, to determine how large the ventilation openings between the two rooms must be. If not, the unit must not be installed.

Table II: Minimum allowed total floor area

For All in One units

m_c (kg)	Minimum floor area ($A_{min\ total}$) (m^2)	m_c (kg)	Minimum floor area ($A_{min\ total}$) (m^2)	m_c (kg)	Minimum floor area ($A_{min\ total}$) (m^2)
	H = 0.6 m		H = 0.6 m		H = 0.6 m
1.84	28.81	2.06	36.12	2.28	44.24
1.86	29.44	2.08	36.82	**2.30**	45.02
1.88	30.08	2.10	37.53	2.32	45.81
1.90	30.72	2.12	38.25	2.34	46.60
1.92	31.37	2.14	38.98	2.36	47.40
1.94	32.03	2.16	39.71	2.38	48.21
1.96	32.70	2.18	40.45	2.40	49.02
1.98	33.37	**2.20**	41.19	2.42	49.84
2.00	34.04	2.22	41.94	**2.43**	50.26
2.02	34.73	2.24	42.70		
2.04	35.42	2.26	43.47		

Notes:

For H values lower than 0.6 m, the value of H is to be considered as 0.6 m to comply to IEC 60335-2-40:2018 Clause GG2.

For intermediate m_c values, the value that corresponds to the **higher** m_c value from the table is to be considered.
Example: If m_c = 1.85 kg, the value that corresponds to "m_c = 1.86 kg" is to be considered.

Systems with total refrigerant charge lower than 1.84 kg are not subjected to any floor area requirements.

For WH-ADC0912K6E5(AN/UK) and WH-ADC0912K9E8(AN), charges above 2.20 kg are not allowed in the unit.
For WH-ADC0309K3E5(AN/B/UK) and WH-ADC0309K6E5(AN), charges above 2.30 kg are not allowed in the unit.
For WH-ADC16K9E8(AN), charges above 2.43 kg are not allowed in the unit.

For hydromodules

m_c (kg)	Minimum floor area ($A_{min\ total}$) (m^2)							
	H = 1.15 m	H = 1.20 m	H = 1.30 m	H = 1.40 m	H = 1.50 m	H = 1.60 m	H = 1.70 m	H = 1.80 m
1.84	7.84	7.20	6.15	5.71	5.33	4.99	4.70	4.44
1.86	8.02	7.36	6.27	5.77	5.39	5.05	4.75	4.49
1.88	8.19	7.52	6.41	5.83	5.44	5.10	4.80	4.54
1.90	8.36	7.68	6.54	5.89	5.50	5.16	4.85	4.58
1.92	8.54	7.84	6.68	5.96	5.56	5.21	4.91	4.63
1.94	8.72	8.01	6.82	6.02	5.62	5.27	4.96	4.68
1.96	8.90	8.17	6.96	6.08	5.67	5.32	5.01	4.73
1.98	9.08	8.34	7.11	6.14	5.73	5.37	5.06	4.78
2.00	9.27	8.51	7.25	6.25	5.79	5.43	5.11	4.83
2.02	9.45	8.68	7.40	6.38	5.85	5.48	5.16	4.87
2.04	9.64	8.85	7.54	6.51	5.91	5.54	5.21	4.92
2.06	9.83	9.03	7.69	6.63	5.96	5.59	5.26	4.97
2.08	10.02	9.21	7.84	6.76	6.02	5.65	5.31	5.02
2.10	10.22	9.38	8.00	6.89	6.08	5.70	5.37	5.07
2.12	10.41	9.56	8.15	7.03	6.14	5.75	5.42	5.12
2.14	10.61	9.74	8.30	7.16	6.24	5.81	5.47	5.16
2.16	10.81	9.93	8.46	7.29	6.35	5.86	5.52	5.21
2.18	11.01	10.11	8.62	7.43	6.47	5.92	5.57	5.26
2.20	11.21	10.30	8.77	7.57	6.59	5.97	5.62	5.31
2.22	11.42	10.49	8.93	7.70	6.71	6.03	5.67	5.36
2.24	11.62	10.68	9.10	7.84	6.83	6.08	5.72	5.40
2.26	11.83	10.87	9.26	7.98	6.96	6.13	5.77	5.45
2.28	12.04	11.06	9.42	8.13	7.08	6.22	5.82	5.50
2.30	12.26	11.26	9.59	8.27	7.20	6.33	5.88	5.55
2.32	12.47	11.45	9.76	8.41	7.33	6.44	5.93	5.60
2.34	12.69	11.65	9.93	8.56	7.46	6.55	5.98	5.65
2.36	12.90	11.85	10.10	8.71	7.58	6.67	6.03	5.69
2.38	13.12	12.05	10.27	8.85	7.71	6.78	6.08	5.74
2.40	13.34	12.26	10.44	9.00	7.84	6.89	6.13	5.79
2.42	13.57	12.46	10.62	9.15	7.97	7.01	6.21	5.84
2.43	13.68	12.56	10.71	9.23	8.04	7.07	6.26	5.86

Notes:

For intermediate H values, the value that corresponds to the **lower** H value from the table is to be considered.
Example: For H = 1.25 m, the value that corresponds to "H = 1,20 m" is to be considered.

For intermediate m_c values, the value that corresponds to the **higher** m_c value from the table is to be considered.
Example: If m_c = 1.85 kg, the value that corresponds to "m_c = 1.86 kg" is to be considered.

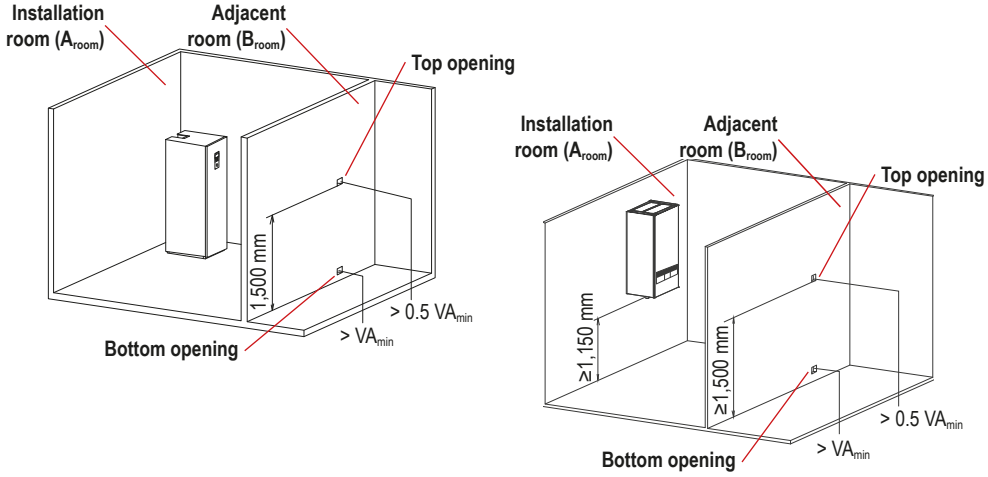
Systems with total refrigerant charge lower than 1.84 kg are not subjected to any floor area requirements.

For WH-SXC09K3E5, WH-SXC09K6E5, WH-SXC12K6E5, WH-SXC09K3E8, WH-SXC09K9E8 and WH-SXC12K9E8, charges above 2.20 kg are not allowed in the unit.
For WH-SDC0309K3E5 and WH-SDC0309K6E5 charges above 2.30 kg are not allowed in the unit.
For WH-SXC16K9E8 charges above 2.43 kg are not allowed in the unit.

Step C: Determine the minimum venting opening area (VA_{min}) for natural ventilation:

1. Determine the excess refrigerant charge quantity (m_{excess}), as specified in Table III (see below).
2. Then determine the minimum ventilation opening area (VA_{min}) corresponding to the determined m_{excess} value, as specified in Table III, for natural ventilation between the installation room and the adjacent room.
3. The unit can be installed in a specific room only if the following conditions are fulfilled:

> Two permanent openings, one at the bottom, another at the top, are made between the installation room and the adjacent room for ventilation purposes.



> The bottom opening fulfills the following requirements:
  - Must comply to the minimum area requirement of VA_{min}.
  - Opening must be located ≤300 mm from the floor.
  - At least 50 % of required opening area must be ≤200 mm from the floor.
  - The bottom of the opening shall not be higher than the point of release when the unit is installed and must be situated ≤100 mm above the floor.
  - Must be as close as possible to the floor and lower than H.
> The top opening fulfills the following requirements:
  - The total size of the top opening must be more than 50 % of VA_{min}.
  - Opening must be located ≥1500 mm above the floor.
> The height of the openings must be more than 20 mm.
> A direct ventilation opening to outside is NOT encouraged for ventilation opening (because the user might block the opening when it is cold).
> For All in One units, the value of H is considered as 0.6 m to comply to IEC 60335-2-40:2018 Clause GG2.

Table III: Minimum venting opening area for natural ventilation

For All in One units

m_c (kg)	m_{max} (kg)	$m_{excess} = m_c - m_{max}$ (kg)	Minimum venting opening area (VA_{min}) (cm^2)
			H = 0.6 m
2.20	0.10	2.10	850
2.20	0.30	1.90	769
2.20	0.50	1.70	688
2.20	0.70	1.50	607
2.20	0.90	1.30	541
2.20	1.10	1.10	506
2.20	1.30	0.90	450
2.20	1.50	0.70	376
2.20	1.70	0.50	286
2.20	1.90	0.30	181
2.20	2.10	0.10	64
2.20	2.20	0.00	0

For All in One units

m_c (kg)	m_{max} (kg)	$m_{excess} = m_c - m_{max}$ (kg)	Minimum venting opening area (VA_{min}) (cm^2)
			H = 0.6 m
2.30	0.10	2.20	890
2.30	0.30	2.00	809
2.30	0.50	1.80	728
2.30	0.70	1.60	647
2.30	0.90	1.40	583
2.30	1.10	1.20	552
2.30	1.30	1.00	500
2.30	1.50	0.80	430
2.30	1.70	0.60	343
2.30	1.90	0.40	242
2.30	2.10	0.20	127
2.30	2.30	0.00	0
2.43	0.10	2.33	943
2.43	0.30	2.13	862
2.43	0.50	1.93	781
2.43	0.70	1.73	700
2.43	0.90	1.53	637
2.43	1.10	1.33	612
2.43	1.30	1.13	565
2.43	1.50	0.93	500
2.43	1.70	0.73	418
2.43	1.90	0.53	320
2.43	2.10	0.33	210
2.43	2.30	0.13	86
2.43	2.43	0.00	0

Notes:

For H values lower than 0.6 m, the value of H is to be considered as 0.6 m to comply to IEC 60335-2-40:2018 Clause GG2.

For intermediate m_{excess} values, the value that corresponds to the **higher** m_{excess} value from the table is to be considered.
Example: For m_c = 2.30 kg and m_{excess} = 1.45 kg, the value that corresponds to "m_{excess} = 1.6 kg" is to be considered.

For hydromodules

m_c (kg)	m_{max} (kg)	$m_{excess} = m_c - m_{max}$ (kg)	Minimum venting opening area (VA_{min}) (cm^2)							
			H = 1.15 m	H = 1.20 m	H = 1.30 m	H = 1.40 m	H = 1.50 m	H = 1.60 m	H = 1.70 m	H = 1.80 m
2.20	0.10	2.10	614	601	577	556	537	520	505	490
2.20	0.30	1.90	555	543	522	503	486	471	457	444
2.20	0.50	1.70	497	486	467	450	435	421	409	397
2.20	0.70	1.50	438	429	412	397	384	372	360	350
2.20	0.90	1.30	380	372	357	344	333	322	312	304
2.20	1.10	1.10	321	315	302	291	281	272	264	257
2.20	1.30	0.90	263	257	247	238	230	223	216	210
2.20	1.50	0.70	205	200	192	185	179	173	168	163
2.20	1.70	0.50	149	143	137	132	128	124	120	117
2.20	1.90	0.30	95	91	84	79	77	74	72	70
2.20	2.10	0.10	33	32	29	27	26	25	24	23
2.20	2.20	0.00	0	0	0	0	0	0	0	0

For hydromodules

m_c (kg)	m_{max} (kg)	$m_{excess} = m_c - m_{max}$ (kg)	Minimum venting opening area (VA_{min}) (cm^2)							
			H = 1.15 m	H = 1.20 m	H = 1.30 m	H = 1.40 m	H = 1.50 m	H = 1.60 m	H = 1.70 m	H = 1.80 m
2.30	0.10	2.20	643	629	605	583	563	545	529	514
2.30	0.30	2.00	584	572	550	530	512	495	481	467
2.30	0.50	1.80	526	515	495	477	461	446	433	420
2.30	0.70	1.60	468	458	440	424	409	396	385	374
2.30	0.90	1.40	409	400	385	371	358	347	336	327
2.30	1.10	1.20	351	343	330	318	307	297	288	280
2.30	1.30	1.00	292	286	275	265	256	248	240	234
2.30	1.50	0.80	234	229	220	212	205	198	192	187
2.30	1.70	0.60	179	172	165	159	154	149	144	140
2.30	1.90	0.40	126	121	112	106	102	99	96	93
2.30	2.10	0.20	66	64	59	54	51	50	48	47
2.30	2.20	0.10	34	33	30	28	26	25	24	23
2.43	0.10	2.33	681	666	640	617	596	577	560	544
2.43	0.30	2.13	622	609	585	564	545	528	512	497
2.43	0.50	1.93	564	552	530	511	494	478	464	451
2.43	0.70	1.73	506	495	475	458	443	429	416	404
2.43	0.90	1.53	447	438	420	405	391	379	368	357
2.43	1.10	1.33	389	380	366	352	340	329	320	311
2.43	1.30	1.13	330	323	311	299	289	280	272	264
2.43	1.50	0.93	272	266	256	246	238	230	224	217
2.43	1.70	0.73	218	209	201	193	187	181	175	170
2.43	1.90	0.53	167	160	148	140	136	131	127	124
2.43	2.10	0.33	109	105	97	90	84	82	79	77
2.43	2.30	0.13	45	43	40	37	35	32	31	30
2.43	2.43	0.00	0	0	0	0	0	0	0	0

Notes:

For intermediate H values, the value that corresponds to the **lower** H value from the table is to be considered.
Example: For H = 1.25 m, the value that corresponds to “H = 1,20 m” is to be considered.

For intermediate m_{excess} values, the value that corresponds to the **higher** m_{excess} value from the table is to be considered.
Example: For m_c = 2.30 kg and m_{excess} = 1.45 kg, the value that corresponds to “m_{excess} = 1.6 kg” is to be considered.

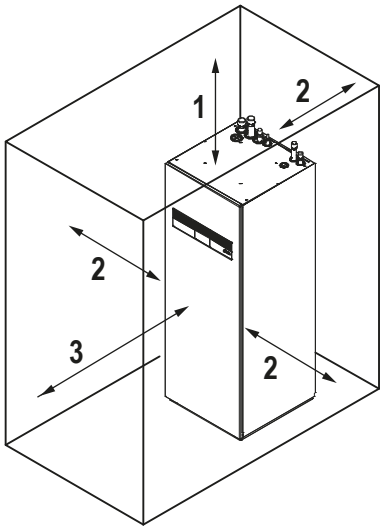
5.2.2.5 Installation conditions for indoor units (hydromodule or All in One unit)

The installation conditions for the indoor units are as follows:

- The indoor units are designed for indoor installation only and must not be installed outdoors.
- The installation space must be dry and frost-free and the installation location easily accessible for maintenance work.
- Pipes, cables and wall bushings should be arranged in a useful manner and using the shortest path (electrical cables, refrigerant and heating water pipes).
- Ensure good air circulation in the installation room.
- There must not be any heat or vapour sources near the indoor unit. Even laundries or other rooms with high humidity are not suitable, because high humidity causes rusting and can damage the device.
- The condensed water from the condensation drain of the indoor unit should be able to flow away freely without obstacles, because incorrect draining can cause damage.
- Development of noise in the room should be taken into account (→ *5.2.1 Acoustics, p. 83*).
- Do not mount the device near the door.
- Maintain the minimum distances (→ *5.2.2.6 Minimum distances (indoor units), p. 96*).
- The hydromodule must be installed vertically on the wall, where the wall should be strong and solid, so that no vibration occurs.
- The All in One unit must be installed standing vertically on the floor, where the floor should be strong enough to withstand the weight of the water-filled unit.
- In case electrical devices are installed on wooden buildings with metal strips or cable cleats, no electrical contacts are allowed between device and building according to the corresponding standards for electrical work.

5.2.2.6 Minimum distances for indoor units (hydromodules or All in One units)

All in One units K generation

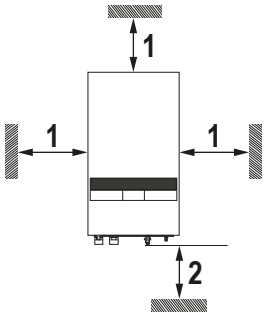


Minimum distances All in One units K generation

1 Minimum distance: 350 mm
2 Minimum distance: 100 mm
3 Minimum distance: 700 mm

Note: Schematic figure for explanation purposes only.

Hydromodules K generation



Minimum distances hydromodules K generation

1 Minimum distance: 100 mm
2 Minimum distance: 1,150 mm

Note: Schematic figure for explanation purposes only.

IMPORTANT

As the compressor is in the outdoor unit of the bi-bloc system, only the operation of the circulation pump in the hydromodule or All in One unit needs to be taken into consideration as the cause for the development of operating noise.

5.2.3 Hydraulics

5.2.4 Hydraulic integration

All Aquarea heat pump systems have an integrated water circulation pump that transports the heating water into the heat transfer system. A high-efficiency pump is used for the purpose.

In general, a hydraulic separation of heat pump circuit and heat consumer circuit is always advisable if a different volumetric flow must be provided for the consumer circuit than is required for the heat pump circuit. In such a case, separate pumps must be provided for the respective circuits. To avoid these pumps influencing each other with their different pressure and volumetric flow parameters, hydraulic separation is necessary.

If, besides the integrated water circulation pump, one or more water circulation pumps are required for the respective heating circuits, hydraulic separation of the heat pump circuit and the heat consumer circuit through a buffer tank or a low-loss header (hydraulic balancer) must be effected.

If hydraulic integration is to be achieved without hydraulic separation, it must be ensured that the minimum flow rate of the respective heat pump (→ *4.6.2.3 Technical data (bi-bloc systems), S. 36*) is maintained at all times. Using automatically regulating mixers or thermostat valves bears the risk that the hot water circulation is throttled down so low that the flow rate falls below the minimum. To rule this out, Panasonic recommends to always equip heat transfer systems, which have no hydraulic separation, with an overflow valve between the supply and the return heating pipe. The overflow valve is to be designed for the nominal flow rate of the respective heat pump.

Another option is a bypass in the form of multiple non-adjustable or permanently opened heating circuits. Rooms with a continuously high heat requirement, such as bathrooms, are particularly suited for this purpose. Even for this variant, it is necessary to ensure that the minimum flow rate of the heat pump is always guaranteed.

System volume

Depending on the nominal heating capacity of the heat pump system, the recommendations for the minimum total water volume in the system are as follows:

- Nominal heating capacity up to and including 9 kW: 30 litres
- Nominal heating capacity above 12 kW up to and including 16 kW: 50 litres

IMPORTANT

If the total water volume in the system is below the indicated values, the system volume should be increased, e.g. by using a buffer or an additional vessel.

5.2.5 Pump discharge head

Discharge head and displacement volume of the integrated water circulation pumps depend on the respective heat pump model (see technical data of the respective pump).

Pipe network resistance

Designing the pump discharge head requires consideration of all components of the pipe network and their individual resistances for nominal flow rate. Choose components such as mixers, valves and heat meters such that the nominal throughput is matched to the nominal flow rate of the heat pump system.

Consideration of the nominal flow rate

For efficient heat generation, heat pumps use a temperature difference of about 5 K between the supply and return water flow. This distinguishes them from heat sources with boilers, which can work without any problem with a temperature difference of about 10 or 20 K between the supply and return water flow. A consequence of the small temperature difference in heat pumps is that the flow rate of heat pumps, which is needed to transport the heat within the circuit, must be higher than for heat sources with boilers with the same thermal output. The nominal flow rate and the resulting resistance of the pipe network must therefore be given special attention at the time of design.

Consideration of the nominal pipe diameter

The pressure drop in the pipe rises exponentially with the flow rate. This means that doubling the flow rate causes the pressure drop to increase by a factor of 4. The decisive aspect for this is the flow speed in the pipe that depends on the flow rate and inner diameter.

As an alternative to a pipe network calculation, a nomogram can be used to determine the pressure drop across pipe segments. Recommendations for designing the main distribution circuit are:

- The flow speed should be in the range of 0.3 to max. 1.5 m/s.
- The pressure drop per metre should be about 0.1 kPa/m.

Based on these criteria, the required nominal pipe diameter can be read off from the copper tube nomogram. To determine the pipe network resistance of a complete pipe run, first, the pressure drop per metre must be multiplied by the length of each pipe segment, and then the pressure drops of all segments must be summed up. The total resistance of a complete pipe run is obtained as the total pressure drop of all pipe segments multiplied by a lump sum supplement factor of 1.5.

IMPORTANT

The total of the individual resistances of all components of the pipe network must not exceed the pump discharge head for the nominal flow rate. If the pipe network resistance is too high, the unit's integrated water circulation pump cannot achieve the nominal flow rate. The heat pump control functions will register a shortfall of the minimum circulation quantity and throw an alarm.

5.2.6 Hydraulic balancing

Hydraulic balancing of the heat transfer system is the process of optimising the set flow rates for several pipe segments through regulating valves. This prevents individual building areas from being excessively overheated, while other areas with a lower flow rate remain cold. Hydraulic balancing therefore raises the living comfort and is, at the same time, also a requirement for efficient operation of the air-to-water heat pump. Therefore, hydraulic balancing is also a prerequisite for the financial promotion of heat pumps.

5.2.7 Special points related to cooling

Hydraulically, a heat pump system with cooling mode does not differ from a heating-only system. However, to correctly determine the total annual amount of heat and cold delivered by the heat pump, which is needed to calculate the seasonal coefficient of performance, it is necessary to use energy meters which record the amount of heat as well as the amount of cold.

5.2.8 Expansion vessel

The Aquarea heat pumps have an integral expansion vessel with a volume of 10 litres and an initial pressure of 1 bar.

The volume of the expansion vessel is adequate for heating systems whose total water quantity and its static height (difference of the highest point of the system to the expansion vessel) must not exceed defined limits (see table).

Limit values for the integrated expansion vessel

		All K generation models
Expansion vessel volume	l	10
Initial pressure	bar	1
Total water quantity in the heating system (max.)	l	200
Static height	m	7
Pressure stage safety valve (max.)	bar	3

In case the total quantity of water is greater than 200 litres, or greater static heights are required, it is necessary to maintain the pressure by means of an expansion vessel to be installed on site. Generally, pay attention to the pressure stage of the safety valve. This is given in the technical data and is maximum 3 bar.

The following criteria must be taken into consideration when designing the necessary expansion vessel nominal volume V_N.

Nominal volume	V_N	(nominal volume of the expansion vessel)
Expansion volume	V_e	(expansion volume of the expansion vessel)
System volume	V_A	(total volume of the heating system)
Water reserve	V_V	(volume of the water reserve)
Maximum temperature	T_{max}	(highest temperature in the system e.g. 60 °C)
Final pressure of the safety valve	p_e	(depends on the safety valve, max. 2.5 bar)
Initial pressure of expansion vessel	p_0	(initial pressure 1 bar)

$$V_N = (V_e + V_V) \frac{p_e + 1}{p_e - p_0}$$

1. The expansion volume V_e is obtained from the system volume, and the maximum temperature is obtained from the coefficient of expansion of water according to the following table:

T_{max} (°C)	40	50	60	70	80	90	100
n (%)	0.93	1.29	1.71	2.22	2.81	3.47	4.21

   Percentage expansion of water:

$$V_e = V_A \frac{n}{100}$$

2. The volume of the water reserve V_V can be calculated in a simplified manner as follows:

   $V_V = 0.2 \times V_N$ (for a nominal volume $V_N < 15$ litres) or

   $V_V = 0.005 \times V_A$ (for a nominal volume $V_N > 15$ litres, where $V_V \geq 3$ litres)

3. The final pressure of the safety valve p_e is obtained from the response pressure of the safety valve minus a tolerance of 0.5 bar:

   p_e = Safety valve response pressure – 0.5 bar

4. Select the initial pressure p_0 such that it corresponds to the static height of the heating system plus a supplement factor of max. 0.5 bar. 10 metres static height corresponds to 1 bar. Adjust the initial pressure of the Aquarea expansion vessel, if necessary.

Note

The calculation of the expansion vessel is done according to EN 12828 “Heating systems in buildings – Design for water-based heating systems”. The design programs for expansion vessels, which are provided by the respective manufactuerer, can be used to design the expansion vessel based on the local requirements. These programs can also determine the required initial pressures to be set on the expansion vessel.

5.2.9 Heating water quality

ATTENTION

Danger of damage to pipes due to corrosion

Ingress of oxygen into open water systems can cause excessive corrosion of the pipes and the subsequent problems in operation.

► Install Aquarea heat pumps only as closed systems without direct contact of the heating water to the ambient air.

To avoid damage to the heating system and to the heat pump, use water that complies with the currently valid version of the European Water Quality Directive 98/83/EC and respect any corresponding national requirements, which are applicable. It is recommended to avoid the use of groundwater, such as spring water or well water, the use of tap water, when salt or other impurities are contained, and the use of acidic water. Furthermore, the heating system is to be thoroughly purged before filling with heating water.

5.2.10 Use of buffer tanks

Buffer tanks can fulfil three functions in the context of heat pumps:

- Bridging electricity shutdown times imposed by the electric utility company
- Hydraulic separation of heat pump circuit and heat transfer system
- Extension of the heat pump run time to avoid frequent on/off switching (cycling), which reduces the system efficiency

Thanks to inverter technology, system performance can be controlled by Aquarea heat pumps based on the current heat demand. The heat pumps can therefore be operated even without a buffer tank, to achieve higher efficiency and save on space. To bridge electricity shutdown times imposed by the electric utility company, heat transfer systems with greater tank capacity such as under-floor heating can provide adequate intermediate storage.

5.3 Electricals

5.3.1 Electrical connection to a power source

WARNING

Danger to life from electric shock!

The devices are operated with 230 V or 400 V alternating current. Improper installation can present a danger to life from electric shock as well as a danger of fire occurring due to overheating.

- ► Electrical installation work must be undertaken by a trained electrician.
- ► Adherence to national and local standards and regulations is to be observed when carrying out any installation work.
- ► The heat pumps must be duly earthed. Earthing is not to be undertaken via gas or water pipes, lightning conductors or earthing for a telephone system.
- ► Adherence is to be paid to the respective national electrical wiring regulations and safety arrangements with regard to residual current. Panasonic recommends using a residual current circuit breaker (RCCB).

ATTENTION

Danger of damage due to unprofessional installation

- ► When making electrical wiring connections, respect the relevant requirements for cable type, cable cross-section and recommended fuse (→ *4.6.2.3 Technical data (bi-bloc systems), p. 36*), the minimum required contact clearance (5 mm) and the maximum permissible cable length (if indicated) as well as the connecting conditions for the individual devices mentioned below.
- ► The connection to the electricity supply must be led via a disconnetor. The disconnetor must have a contact clearance of minimum 3.0 mm.
- ► For the protection fuse of the mains power supply connections, bear in mind the power consumption and the cable cross-sections used. An unsuitable fuse can cause premature triggering or damage the cable. Respect the relevant rules, especially IEC 60364-4-43 and IEC 60364-5-52 or their national implementation.

In general, the Aquarea heat pumps can either be single-phase or three-phase devices. Depending on the nominal heating capacity and the power of the internal electric backup heater, the individual models further differ in the type of the mains connections.

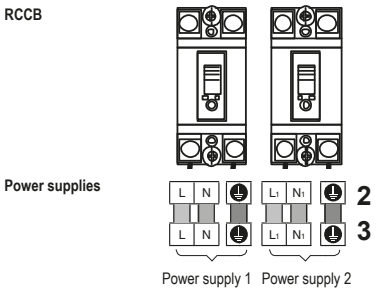
In the case of a bi-bloc system, the mains connection is on the indoor unit (hydromodule or All in One unit), while the power supply to the outdoor unit is provided by an additional connecting cable between indoor unit and outdoor unit.

An overview of the said differences is shown in the following tables. The connection conditions for the individual devices are explained in paragraphs following each table.

Bi-bloc systems with All in One unit

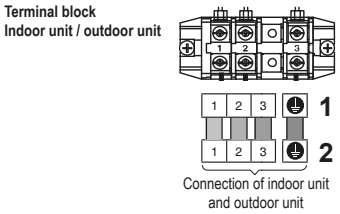
Models	Power supply 1				Power supply 2			
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Min. cable size (mm²)	Phases	Max. current consumption (A)	Max. power consumption (kW)	Min. cable size (mm²)
WH-ADC0309K3E5(AN/B/UK) + WH-UDZ03KE5	1	12.0	2.59	3 x 1.5	1	13.0	3.0	3 x 1.5
WH-ADC0309K3E5(AN/B/UK) + WH-UDZ05KE5	1	14.9	3.36	3 x 1.5	1	13.0	3.0	3 x 1.5
WH-ADC0309K3E5(AN/B/UK) + WH-UDZ07KE5	1	15.9	3.58	3 x 2.5	1	13.0	3.0	3 x 1.5
WH-ADC0309K3E5(AN/B/UK) + WH-UDZ09KE5	1	15.9	3.58	3 x 2.5	1	13.0	3.0	3 x 1.5
WH-ADC0309K6E5(AN) + WH-UDZ03KE5	1	12.0	2.59	3 x 1.5	1	26.0	6.0	3 x 4.0
WH-ADC0309K6E5(AN) + WH-UDZ05KE5	1	14.9	3.36	3 x 1.5	1	26.0	6.0	3 x 4.0
WH-ADC0309K6E5(AN) + WH-UDZ07KE5	1	15.9	3.58	3 x 2.5	1	26.0	6.0	3 x 4.0
WH-ADC0309K6E5(AN) + WH-UDZ09KE5	1	15.9	3.58	3 x 2.5	1	26.0	6.0	3 x 4.0
WH-ADC0912K6E5(AN/UK) + WH-UXZ09KE5	1	29.0	6.40	3 x 4.0	1	26.0	6.0	3 x 4.0
WH-ADC0912K6E5(AN/UK) + WH-UXZ12KE5	1	29.0	6.40	3 x 4.0	1	26.0	6.0	3 x 4.0

RCCB and power supplies



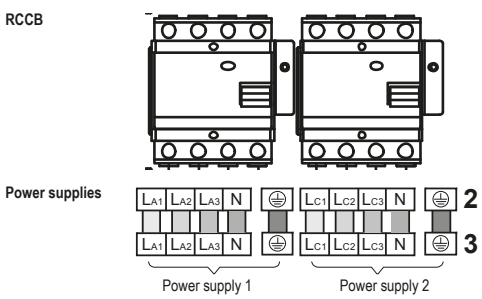
Indoor unit / outdoor unit connection

1 Terminals on outdoor unit
2 Terminals on indoor unit
3 Terminals on disconnector of the power supply



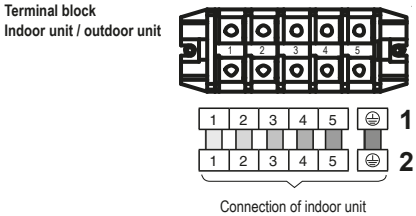
Models	Power supply 1				Power supply 2			
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Min. cable size (mm²)	Phases	Max. current consumption (A)	Max. power consumption (kW)	Min. cable size (mm²)
WH-ADC0912K9E8(AN) + WH-UXZ09KE8	3	10.4	6.60	5 x 1.5	3	13.0	9.0	5 x 1.5
WH-ADC0912K9E8(AN) + WH-UXZ12KE8	3	11.8	7.60	5 x 1.5	3	13.0	9.0	5 x 1.5
WH-ADC16K9E8(AN) + WH-UXZ16KE8	3	16.4	11.09	5 x 2.5	3	13.0	9.0	5 x 1.5

RCCB and power supplies



Indoor unit / outdoor unit connection

1 Terminals on outdoor unit
2 Terminals on indoor unit
3 Terminals on disconnector of the power supply



Connection conditions

- For the connection to the power supply, an approved polychloroprene-sheathed power cord, type designation 60245 IEC 57 or heavier cord, is to be used for power supply 1 connection and power supply 2 connection.
- As connecting cable between indoor and outdoor units, an approved polychloroprene-sheathed flexible cord, type designation 60245 IEC 57 or heavier cord, is to be used.

For All in One units WH-ADC0309K3E5(AN/B/UK) + WH-UDZ03KE5 / WH-UDZ05KE5 / WH-UDZ07KE5 / WH-UDZ09KE5:

- The equipment's power supply 1 complies with IEC/EN 61000-3-2.
- The equipment's power supply 1 complies with IEC/EN 61000-3-3 and can be connected to current supply network.
- The equipment's power supply 2 complies with IEC/EN 61000-3-2.
- The equipment's power supply 1 complies with IEC/EN 61000-3-3 and can be connected to current supply network.

For All in One units WH-ADC0309K6E5(AN) + WH-UDZ03KE5 / WH-UDZ05KE5 / WH-UDZ07KE5 / WH-UDZ09KE5:

- The equipment's power supply 1 complies with IEC/EN 61000-3-2.
- The equipment's power supply 1 complies with IEC/EN 61000-3-3 and can be connected to current supply network.
- The equipment's power supply 2 complies with IEC/EN 61000-3-12.
- The equipment's power supply 2 complies with IEC/EN 61000-3-11 and shall be connected to suitable supply network, with the following maximum permissible system impedance Z_{max} = 0.123 Ω at the interface. Please liaise with supply authority to ensure that the power supply 2 is connected only to a supply of that impedance or less.

For All in One units WH-ADC0912K6E5(AN/UK) + WH-UXZ09KE5 / WH-UXZ12KE5:

- The equipment's power supply 1 complies with IEC/EN 61000-3-12 provided that the short-circuit power S_{sc} is greater than or equal to 4,250 kW at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{sc} greater than or equal to 4,250 kW.
- The equipment's power supply 2 complies with IEC/EN 61000-3-12.
- The equipment's power supply 2 complies with IEC/EN 61000-3-11 and shall be connected to suitable supply network, with the following maximum permissible system impedance Zmax = 0.123 Ω at the interface. Please liaise with supply authority to ensure that the power supply 2 is connected only to a supply of that impedance or less.

For All in One units WH-ADC0912K9E8(AN) + WH-UXZ09KE8 / WH-UXZ12KE8:

- The equipment's power supply 1 complies with IEC/EN 61000-3-2.
- The equipment's power supply 1 complies with IEC/EN 61000-3-3 and can be connected to current supply network.
- The equipment's power supply 2 complies with IEC/EN 61000-3-2.
- The equipment's power supply 2 complies with IEC/EN 61000-3-3 and can be connected to current supply network.

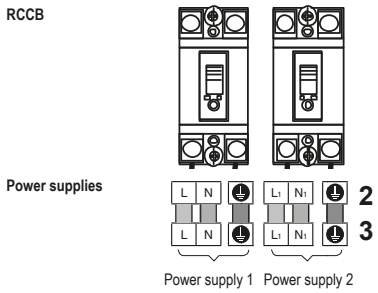
For All in One units WH-ADC16K6E8(AN) + WH-UXZ16KE8:

- The equipment's power supply 1 complies with IEC/EN 61000-3-12 provided that the short-circuit power S_{sc} is greater than or equal to 650 kW at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{sc} greater than or equal to 650 kW.
- The equipment's power supply 1 complies with 61000-3-11, and IEC/EN 61000-3-3 limits and can be connected to current supply network.
- The equipment's power supply 2 complies with IEC/EN 61000-3-2.
- The equipment's power supply 2 complies with IEC/EN 61000-3-3 and can be connected to current supply network.

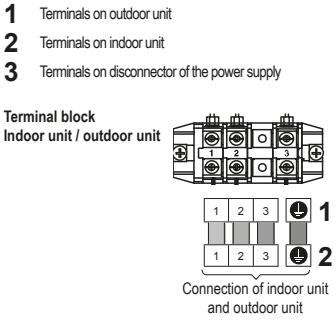
Bi-bloc systems with hydromodule

Models	Power supply 1				Power supply 2			
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Min. cable size (mm²)	Phases	Max. current consumption (A)	Max. power consumption (kW)	Min. cable size (mm²)
WH-SDC0309K3E5 + WH-UDZ03KE5	1	12.0	2.59	3 x 1.5	1	13.0	3.0	3 x 1.5
WH-SDC0309K3E5 + WH-UDZ05KE5	1	14.9	3.36	3 x 1.5	1	13.0	3.0	3 x 1.5
WH-SDC0309K3E5 + WH-UDZ07KE5	1	15.9	3.58	3 x 2.5	1	13.0	3.0	3 x 1.5
WH-SDC0309K3E5 + WH-UDZ09KE5	1	15.9	3.58	3 x 2.5	1	13.0	3.0	3 x 1.5
WH-SDC0309K6E5 + WH-UDZ03KE5	1	12.0	2.59	3 x 1.5	1	26.0	6.0	3 x 4.0
WH-SDC0309K6E5 + WH-UDZ05KE5	1	14.9	3.36	3 x 1.5	1	26.0	6.0	3 x 4.0
WH-SDC0309K6E5 + WH-UDZ07KE5	1	15.9	3.58	3 x 2.5	1	26.0	6.0	3 x 4.0
WH-SDC0309K6E5 + WH-UDZ09KE5	1	15.9	3.58	3 x 2.5	1	26.0	6.0	3 x 4.0
WH-SXC09K3E5 + WH-UXZ09KE5	1	29.0	6.40	3 x 4.0	1	13.0	3.0	3 x 1.5
WH-SXC09K6E5 + WH-UXZ09KE5	1	29.0	6.40	3 x 4.0	1	26.0	6.0	3 x 4.0
WH-SXC12K6E5 + WH-UXZ12KE5	1	29.0	6.40	3 x 4.0	1	26.0	6.0	3 x 4.0

RCCB and power supplies

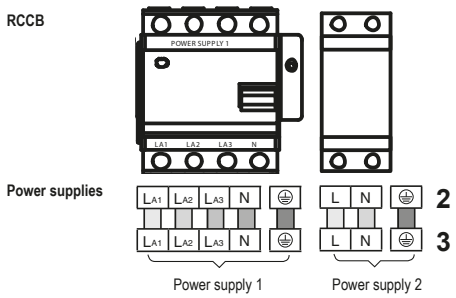


Indoor unit / outdoor unit connection



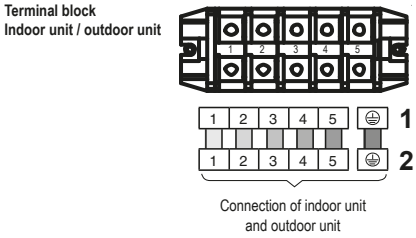
Models	Power supply 1				Power supply 2			
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Min. cable size (mm²)	Phases	Max. current consumption (A)	Max. power consumption (kW)	Min. cable size (mm²)
WH-SXC09K3E8 + WH-UXZ09KE8	3	14.7	9.60	5 x 1.5	1	13.0	3.0	3 x 1.5

RCCB and power supplies



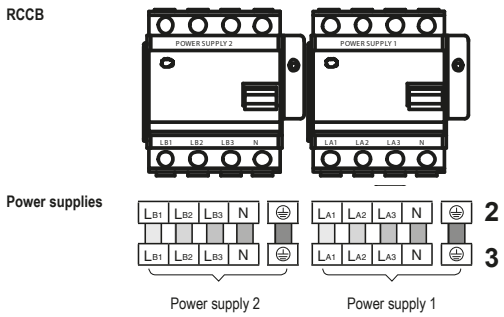
Indoor unit /outdoor unit connection

1 Terminals on outdoor unit
2 Terminals on indoor unit
3 Terminals on disconnector of the power supply



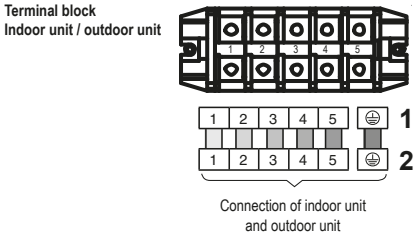
Models	Power supply 1				Power supply 2			
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Min. cable size (mm²)	Phases	Max. current consumption (A)	Max. power consumption (kW)	Min. cable size (mm²)
WH-SXC09K9E8 + WH-UXZ09KE8	3	10.4	6.60	5 x 1.5	3	13.0	9.0	5 x 1.5
WH-SXC12K9E8 + WH-UXZ12KE8	3	11.8	7.60	5 x 1.5	3	13.0	9.0	5 x 1.5
WH-SXC6K9E8 + WH-UXZ16KE8	3	16.4	11.09	5 x 2.5	3	13.0	9.0	5 x 1.5

RCCB and power supplies



Indoor unit / outdoor unit connection

1 Terminals on outdoor unit
2 Terminals on indoor unit
3 Terminals on disconnector of the power supply



5

Connection conditions

- For the connection to the power supply, an approved polychloroprene-sheathed power cord, type designation 60245 IEC 57 or heavier cord, is to be used for power supply 1 connection and power supply 2 connection.
- As connecting cable between indoor and outdoor units, an approved polychloroprene-sheathed flexible cord, type designation 60245 IEC 57 or heavier cord, is to be used.

For hydromodule WH-SDC0309K3E5 + WH-UDZ03KE5 / WH-UDZ05KE5 / WH-UDZ07KE5 / WH-UDZ09KE5:

- The equipment's power supply 1 complies with IEC/EN 61000-3-2.
- The equipment's power supply 1 complies with IEC/EN 61000-3-3 and can be connected to current supply network.
- The equipment's power supply 2 complies with IEC/EN 61000-3-2.
- The equipment's power supply 2 complies with IEC/EN 61000-3-3 and can be connected to current supply network.

For hydromodule WH-SDC0309K6E5 + WH-UDZ03KE5 / WH-UDZ05KE5 / WH-UDZ07KE5 / WH-UDZ09KE5:

- The equipment's power supply 1 complies with IEC/EN 61000-3-2.
- The equipment's power supply 1 complies with IEC/EN 61000-3-3 and can be connected to current supply network.
- The equipment's power supply 2 complies with IEC/EN 61000-3-12.
- The equipment's power supply 2 complies with IEC/EN 61000-3-11 and shall be connected to suitable supply network, with the following maximum permissible system impedance Z_{max} = 0.123 Ω at the interface. Please liaise with supply authority to ensure that the power supply 2 is connected only to a supply of that impedance or less.

For hydromodule WH-SXC09K3E5 + WH-UXZ09KE5:

- The equipment's power supply 1 complies with IEC/EN 61000-3-12 provided that the short-circuit power S_{sc} is greater than or equal to 4,450 kW at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{sc} greater than or equal to 4,450 kW.
- The equipment's power supply 2 complies with IEC/EN 61000-3-2.
- The equipment's power supply 2 complies with EC/EN 61000-3-3 and can be connected to current supply network

For hydromodules WH-SXC09K6E5 + WH-UXZ09KE5 and WH-SXC12K6E5 + WH-UXZ12KE5:

- The equipment's power supply 1 complies with IEC/EN 61000-3-12 provided that the short-circuit power S_{sc} is greater than or equal to 4,450 kW at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{sc} greater than or equal to 4,450 kW.
- The equipment's power supply 2 complies with IEC/EN 61000-3-12.
- The equipment's power supply 2 complies with IEC/EN 61000-3-11 and shall be connected to suitable supply network, with the following maximum permissible system impedance Z_{max} = 0.123 Ω at the interface. Please liaise with supply authority to ensure that the power supply 2 is connected only to a supply of that impedance or less.

For hydromodule WH-SXC09K3E8 + WH-UXZ09KE8:

- The equipment's power supply 1 complies with IEC/EN 61000-3-2.
- The equipment's power supply 1 complies with IEC/EN 61000-3-3 and can be connected to current supply network.
- The equipment's power supply 2 complies with IEC/EN 61000-3-2.
- The equipment's power supply 2 complies with IEC/EN 61000-3-3 and can be connected to current supply network.

For hydromodules WH-SXC09K9E8 + WH-UXZ09KE8 and WH-SXC12K9E8 + WH-UXZ12KE8:

- The equipment's power supply 1 complies with IEC/EN 61000-3-2.
- The equipment's power supply 1 complies with IEC/EN 61000-3-3 and can be connected to current supply network.
- The equipment's power supply 2 complies with IEC/EN 61000-3-2.
- The equipment's power supply 2 complies with IEC/EN 61000-3-3 and can be connected to current supply network.

For hydromodule WH-SXC16K9E8 + WH-UXZ16KE8:

- The equipment's power supply 1 complies with IEC/EN 61000-3-12 provided that the short-circuit power S_{sc} is greater than or equal to 600 kW at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{sc} greater than or equal to 600 kW.
- The equipment's power supply 1 complies with 61000-3-11, and IEC/EN 61000-3-3 limits and can be connected to current supply network.
- The equipment's power supply 2 complies with IEC/EN 61000-3-2.
- The equipment's power supply 2 complies with EC/EN 61000-3-3 and can be connected to current supply network

5.3.2 Electricity meters and rates

For connecting a heat pump to the power grid, consent should be obtained from the competent electric utility company and connection conditions should be requested. In this context, it is also necessary to provide data regarding the building and about the heat pump and its operating mode. If it is possible to utilise special electricity tariffs for heat pumps, possible electricity shutdown times and their duration are to be requested and taken into account for design.

The power consumption of the heat pump is measured by a dedicated electricity meter, to which all power connections of the heat pump are connected, and used to determine the seasonal coefficient of performance and to calculate a deviating special heat pump tariff.

ATTENTION

Danger of water pipes freezing up during electricity shutdown times by the utility company

If electricity shutdown times imposed by the electric utility company coincide with frost periods, there can be frost damage, if the device ensuring frost-free operation of the heat pump is also affected by the electricity shutdown times.

► When connecting the base pan heater or other devices ensuring frost-free operation to the power grid, make sure that it cannot be affected by the electricity shutdown times.

5.4 Heating and cooling capacity depending on supply water temperature and outside temperature

Key for the capacity tables

The values in the capacity tables show the Panasonic measurement data matching with EN 14511-2. The data should be considered as reference values and do not offer any performance guarantee.

T_{amb}: Ambient temperature (°C)
LWC: Leaving water condenser temperature (°C)
HC: Heating capacity (kW)
CC: Cooling capacity (kW)
IP: Input power (kW)
COP: Coefficient of performance (heating mode)
EER: Energy efficiency ratio (cooling mode)

Bi-bloc systems | Aquarea High Performance | K Generation | Single Phase | Heating and Cooling | R32

WH-UD03KE5

T_{amb}	HC	IP	COP	HC	IP	COP	HC	IP	COP	HC	IP	COP	HC	IP	COP
LWC	25	25	25	35	35	35	45	45	45	55	55	55	60	60	60
-20	2.50	1.11	2.25	2.52	1.31	1.92	2.24	1.59	1.41	2.12	1.80	1.18	—	—	—
-15	3.00	1.14	2.63	3.20	1.37	2.34	3.00	1.62	1.85	2.75	1.92	1.43	—	—	—
-7	2.99	0.91	3.29	3.30	1.18	2.80	3.25	1.47	2.21	3.20	1.79	1.79	3.00	1.88	1.60
2	2.92	0.69	4.23	3.20	0.88	3.64	3.20	1.13	2.83	3.20	1.46	2.19	3.15	1.67	1.89
7	3.09	0.49	6.31	3.20	0.60	5.33	3.20	0.84	3.81	3.20	1.14	2.81	2.95	1.22	2.42
25	3.27	0.23	14.22	3.27	0.38	8.61	3.61	0.63	5.73	4.06	1.11	3.66	4.03	1.14	3.54

WH-UD05KE5

T_{amb}	HC	IP	COP	HC	IP	COP	HC	IP	COP	HC	IP	COP	HC	IP	COP
LWC	25	25	25	35	35	35	45	45	45	55	55	55	60	60	60
-20	—	—	—	4.05	1.95	2.07	3.76	2.20	1.71	3.39	2.48	1.37	—	—	—
-15	—	—	—	5.00	2.11	2.37	4.75	2.49	1.91	4.30	2.61	1.65	—	—	—
-7	—	—	—	5.00	1.79	2.79	5.00	2.14	2.34	5.00	2.65	1.89	4.68	2.71	1.73
2	—	—	—	5.00	1.40	3.57	5.00	1.79	2.79	5.00	2.18	2.29	4.80	2.40	2.00
7	—	—	—	5.00	0.98	5.10	5.00	1.31	3.82	5.00	1.65	3.03	4.58	1.90	2.41
25	—	—	—	6.39	0.78	8,19	6.17	1.19	5.19	6.53	1.58	4.13	5.15	1.33	3.87

WH-UD07KE5

T_{amb}	HC	IP	COP	HC	IP	COP	HC	IP	COP	HC	IP	COP	HC	IP	COP
LWC	25	25	25	35	35	35	45	45	45	55	55	55	60	60	60
-20	—	—	—	4.45	2.12	2.10	4.23	2.48	1.71	3.90	2.85	1.37	—	—	—
-15	—	—	—	5.60	2.38	2.35	5.30	2.78	1.91	5.00	3.20	1.56	—	—	—
-7	—	—	—	5.75	1.95	2.95	5.65	2.30	2.46	5.35	2.70	1.98	4.98	2.90	1.72
2	—	—	—	6.85	2.00	3.43	6.75	2.40	2.81	6.25	2.80	2.23	6.18	2.91	2.12
7	—	—	—	7.00	1.44	4.86	7.00	1.92	3.65	7.00	2.40	2.92	6.86	2.73	2.51
25	—	—	—	6.07	1.07	5.67	6.67	1.50	4.45	7.15	1.77	4.04	6.88	1.90	3.62

WH-UD09KE5

T_{amb}	HC	IP	COP	HC	IP	COP	HC	IP	COP	HC	IP	COP	HC	IP	COP
LWC	25	25	25	35	35	35	45	45	45	55	55	55	60	60	60
-20	—	—	—	4.95	2.43	2.04	4.58	2.70	1.70	4.04	3.00	1.35	—	—	—
-15	—	—	—	7.40	3.20	2.31	6.45	3.28	1.97	5.40	3.42	1.58	—	—	—
-7	—	—	—	6.25	2.20	2.84	6.10	2.68	2.28	5.90	3.06	1.93	5.65	3.24	1.74
2	—	—	—	7.00	2.06	3.40	6.85	2.50	2.74	6.30	2.89	2.18	7.26	3.31	2.19
7	—	—	—	9.00	1.98	4.55	9.00	2.58	3.49	8.90	3.04	2.93	8.60	3.42	2.51
25	—	—	—	7.97	1.37	5.82	8.75	1.93	4.53	9.16	2.34	3.91	6.08	1.72	3.53

WH-UDZ03KE5

T_{amb}	CC	IP	EER	CC	IP	EER	CC	IP	EER
LWC	7	7	7	14	14	14	18	18	18
16	3.56	0.57	6.25	4.32	0.55	7.85	3.47	0.41	8.46
25	3.29	0.73	4.51	4.06	0.72	5.64	3.27	0.52	6.29
35	3.20	0.91	3.52	3.56	0.93	3.83	3.20	0.68	4.71
43	2.68	1.06	2.53	3.34	1.09	3.06	2.79	0.82	3.40

WH-UDZ05KE5

T_{amb}	CC	IP	EER	CC	IP	EER	CC	IP	EER
LWC	7	7	7	14	14	14	18	18	18
25	5.47	1.37	3.99	6.62	1.39	4.76	5.54	0.80	6.93
35	5.00	1.64	3.05	6.69	1.76	3.80	5.00	1.02	4.90
43	4.18	1.83	2.28	5.54	1.84	3.01	4.45	1.27	3.50

WH-UDZ07KE5

T_{amb}	CC	IP	EER	CC	IP	EER	CC	IP	EER
LWC	7	7	7	14	14	14	18	18	18
25	6.32	1.72	3.67	8.16	1.93	4.23	6.63	1.12	5.92
35	6.70	2.21	3.03	8.19	2.42	3.38	6.70	1.42	4.72
43	5.72	2.62	2.18	7.47	2.80	2.67	8.40	2.84	2.96

WH-UDZ09KE5

T_{amb}	CC	IP	EER	CC	IP	EER	CC	IP	EER
LWC	7	7	7	14	14	14	18	18	18
25	8.31	2.50	3.32	10.43	2.67	3.91	8.85	1.72	5.15
35	8.20	3.02	2.72	10.28	3.25	3.16	9.00	2.15	4.19
43	5.00	2.15	2.33	6.38	2.15	2.97	7.02	2.14	3.28

Bi-bloc systems | Aquarea T-CAP | K Generation | Single Phase | Heating and Cooling | R32

WH-UXZ09KE5												
T_{amb}	HC	IP	COP	HC	IP	COP	HC	IP	COP	HC	IP	COP
LWC	35	35	35	45	45	45	55	55	55	60	60	60
-20	8.80	4.79	1.84	8.80	5.30	1.66	8.55	5.90	1.45	—	—	—
-15	9.00	3.45	2.61	9.00	4.30	2.09	9.00	4.95	1.82	8.80	6.37	1.38
-7	9.00	3.00	3.00	9.00	3.82	2.36	9.00	4.28	2.10	9.00	4.72	1.91
2	9.00	2.44	3.69	9.00	3.05	2.95	9.00	3.90	2.31	9.00	4.05	2.22
7	9.00	1.79	5.03	9.00	2.42	3.72	9.00	2.93	3.07	9.00	3.43	2.62
25	7.95	1.20	6.63	9.00	1.56	5.77	11.30	3.13	3.61	11.00	2.86	3.85

WH-UXZ12KE5												
T_{amb}	HC	IP	COP	HC	IP	COP	HC	IP	COP	HC	IP	COP
LWC	35	35	35	45	45	45	55	55	55	60	60	60
-20	11.50	6.05	1.90	10.20	6.02	1.69	8.70	6.00	1.45	—	—	—
-15	12.00	4.90	2.45	11.00	5.38	2.04	10.50	6.20	1.69	—	—	—
-7	12.00	4.41	2.72	12.00	5.54	2.17	12.00	5.24	2.29	11.80	6.59	1.79
2	12.00	3.49	3.44	1.2.00	4.25	2.82	12.00	5.24	2.29	12.00	5.77	2.08
7	12.10	2.50	4.84	12.10	3.38	3.58	12.10	3.98	3.04	12.00	4.52	2.65
25	10.90	1.61	6.77	10.87	2.44	4.45	11.30	3.13	3.61	12.00	3.11	3.86

WH-UXZ09KE5									
T_{amb}	CC	IP	EER	CC	IP	EER	CC	IP	EER
LWC	7	7	7	14	14	14	18	18	18
25	8.98	2.37	3.79	10.60	2.41	4.40	9.00	1.57	5.73
35	8.80	2.83	3.11	9.07	3.01	3.01	8.80	1.90	4.63
43	6.48	3.27	1.98	7.65	3.27	2.34	6.68	2.46	2.72

WH-UXZ12KE5									
T_{amb}	CC	IP	EER	CC	IP	EER	CC	IP	EER
LWC	7	7	7	14	14	14	18	18	18
25	11.10	3.35	3.31	13.03	3.43	3.80	11.63	2.34	4.97
35	10.70	4.00	2.68	11.42	4.20	2.72	10.70	2.73	3.92
43	6.62	3.29	2.01	7.89	3.30	2.39	8.68	3.28	2.65

5

Bi-bloc systems | Aquarea T-CAP | K Generation | Three Phase | Heating and Cooling | R32

WH-UXZ09KE8												
T_{amb}	HC	IP	COP	HC	IP	COP	HC	IP	COP	HC	IP	COP
LWC	35	35	35	45	45	45	55	55	55	60	60	60
-20	8.80	4.79	1.84	8.80	5.30	1.66	8.55	5.90	1.45	—	—	—
-15	9.00	3.45	2.61	9.00	4.30	2.09	9.00	4.95	1.82	8.80	6.37	1.38
-7	9.00	3.00	3.00	9.00	3.82	2.36	9.00	4.28	2.10	9.00	4.72	1.91
2	9.00	2.44	3.69	9.00	3.05	2.95	9.00	3.90	2.31	9.00	4.05	2.22
7	9.00	1.79	5.03	9.00	2.42	3.72	9.00	2.93	3.07	9.00	3.43	2.62
25	7.95	1.20	6.63	9.00	1.56	5.77	11.30	3.13	3.61	11.00	2.86	3.85

WH-UXZ12KE8												
T_{amb}	HC	IP	COP	HC	IP	COP	HC	IP	COP	HC	IP	COP
LWC	35	35	35	45	45	45	55	55	55	60	60	60
-20	11.50	6.05	1.90	10.20	6.02	1.69	8.70	6.00	1.45	—	—	—
-15	12.00	4.90	2.45	11.00	5.38	2.04	10.50	6.20	1.69	—	—	—
-7	12.00	4.41	2.72	12.00	5.54	2.17	12.00	5.24	2.29	11.80	6.59	1.79
2	12.00	3.49	3.44	12.00	4.25	2.82	12.00	5.24	2.29	12.00	5.77	2.08
7	12.10	2.50	4.84	12.10	3.38	3.58	12.10	3.98	3.04	12.00	4.52	2.65
25	10.90	1.61	6.77	10.87	2.44	4.45	11.30	3.13	3.61	12.00	3.11	3.86

WH-UXZ16KE8												
T_{amb}	HC	IP	COP	HC	IP	COP	HC	IP	COP	HC	IP	COP
LWC	35	35	35	45	45	45	55	55	55	60	60	60
-20	16.00	8.20	1.95	15.00	9.00	1.67	12.00	9.30	1.29	—	—	—
-15	16.00	6.91	2.32	16.00	8.44	1.90	16.00	9.97	1.60	—	—	—
-7	16.00	6.70	2.39	16.00	7.85	2.04	16.00	9.33	1.71	15.00	9.70	1.55
2	16.00	5.16	3.10	16.00	6.40	2.50	16.00	7.72	2.07	16.00	9.20	1.74
7	16.00	3.65	4.38	16.00	4.72	3.39	16.00	5.88	2.72	15.20	5.90	2.58
25	16.00	2.30	6.96	16.00	3.20	5.00	16.00	4.00	4.00	14.50	4.30	3.37

WH-UXZ09KE8									
T_{amb}	CC	IP	EER	CC	IP	EER	CC	IP	EER
LWC	7	7	7	14	14	14	18	18	18
25	8.98	2.37	3.79	10.60	2.41	4.40	9.00	1.57	5.73
35	8.80	2.83	3.11	9.07	3.01	3.01	8.80	1.90	4.63
43	6.48	3.27	1.98	7.65	3.27	2.34	6.68	2.46	2.72

WH-UXZ12KE8									
T_{amb}	CC	IP	EER	CC	IP	EER	CC	IP	EER
LWC	7	7	7	14	14	14	18	18	18
25	11.10	3.35	3.31	13.03	3.43	3.80	11.63	2.34	4.97
35	10.70	4.00	2.68	11.42	4.20	2.72	10.70	2.73	3.92
43	6.62	3.29	2.01	7.89	3.30	2.39	8.68	3.28	2.65
WH-UXZ16KE8									
T_{amb}	CC	IP	EER	CC	IP	EER	CC	IP	EER
LWC	7	7	7	14	14	14	18	18	18
25	15.00	4.00	3.75	17.00	4.20	4.05	17.00	3.40	5.00
35	13.40	5.08	2.64	15.50	5.30	2.92	13.40	5.08	2.64
43	8.80	4.20	2.10	10.50	4.30	2.44	11.50	4.20	2.74

5.5 Application examples

This section illustrates various application examples for Aquarea air-to-water heat pumps.

IMPORTANT

The figures used are purely schematic representations showing the principal components and can be used as the basis for designing concrete systems. They do not, however, include all the components needed according to EN 12828 nor all necessary safety devices.

Please follow all the relevant standards and guidelines while designing concrete systems.

The following application examples only relate to the current bi-bloc systems of the K generation with hydromodule or with All in One unit in standard or two-zone configuration (“B”) (→ *4.6.2.3 Technical data (bi-bloc systems), p. 36*).

The hydraulic schematics were created with the Hydraulic Scheme Generator. Based on the installation requirements entered, this online tool creates an exact hydraulic schematic to facilitate the proper connection of the heat pumps. Panasonic provides it free of cost at www.PanasonicProClub.com.

You will find a detailed legend for all the hydraulic schematics subsequent to the graphic representations (→ *5.5.8 Key for the application examples, p. 118*).

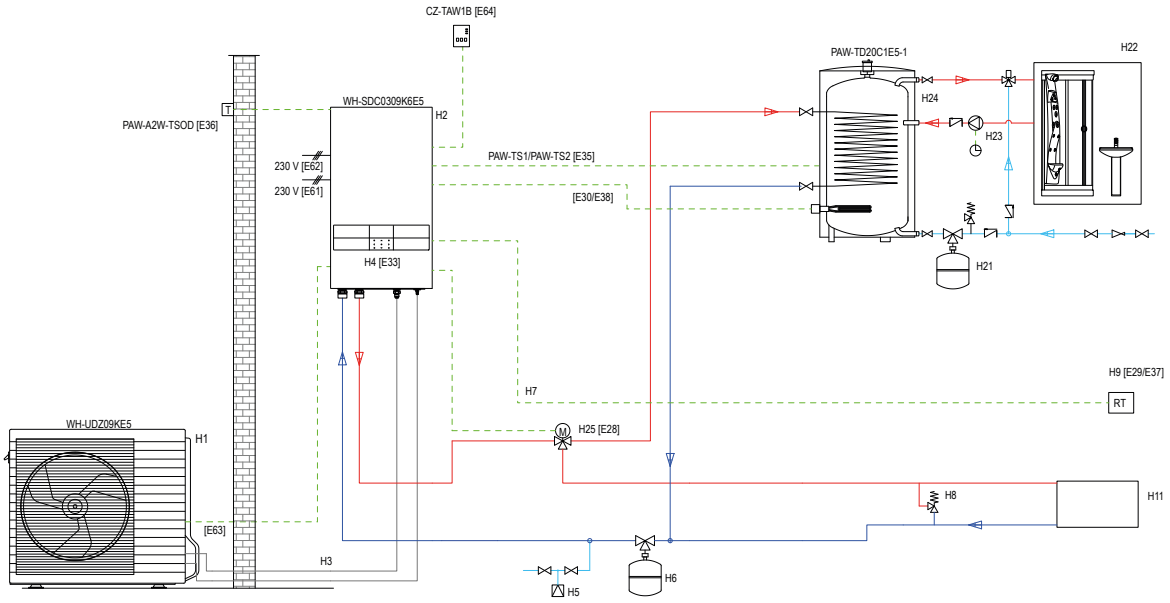
Details about the settings on the remote controller for the various application examples are given in the operating instructions for the respective device.

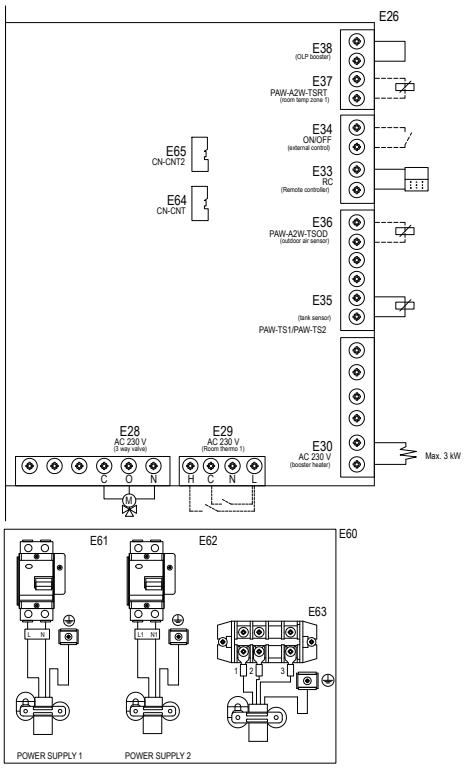
Note

You will find information about application examples with bi-bloc systems of earlier generations in the Planning Manual of 2022.

5.5.1 Example 1: One-zone system without buffer tank

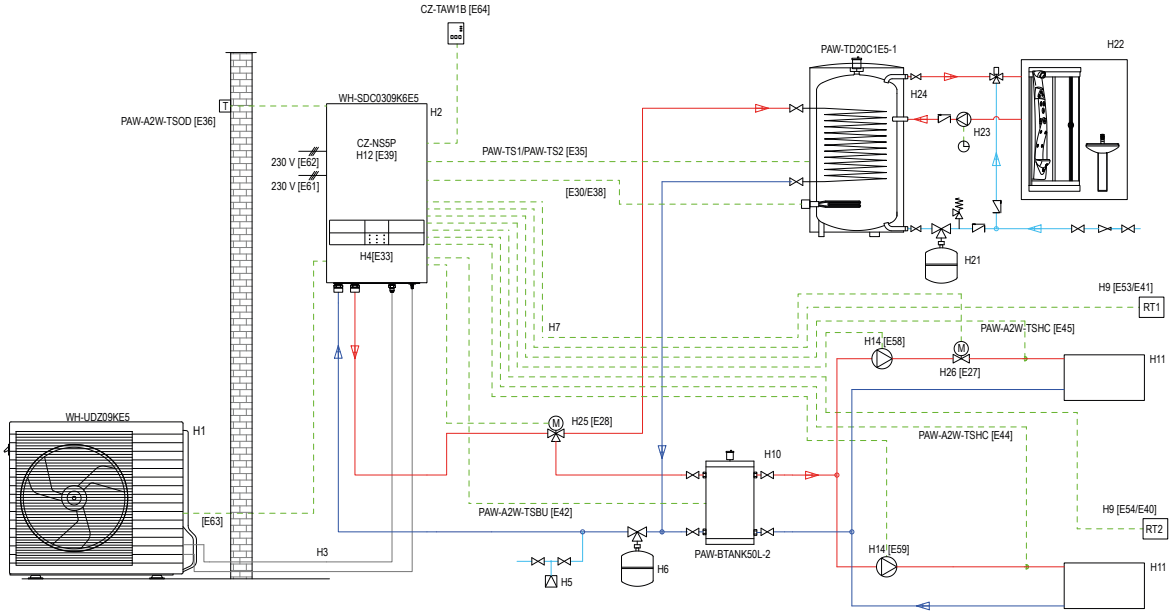
Hydromodule, High Performance, 9 kW, 1 Ph, domestic hot water tank

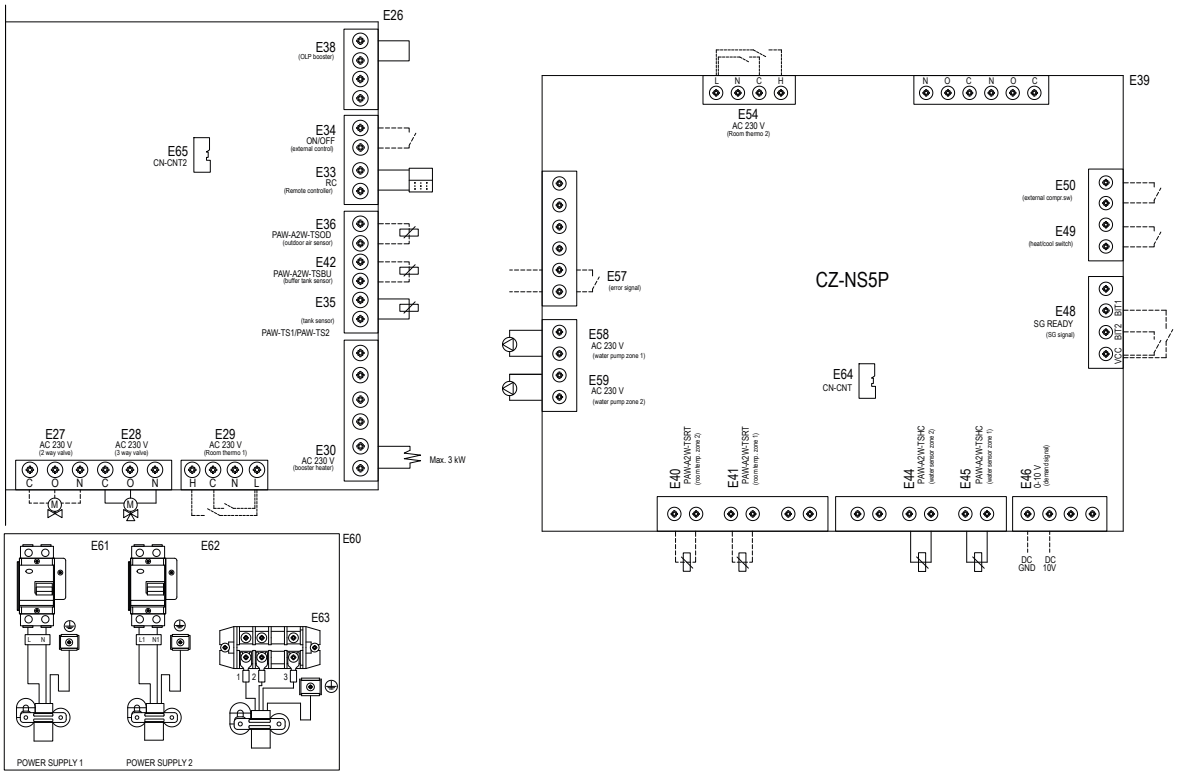




5.5.2 Example 2: Two-zone system with buffer tank

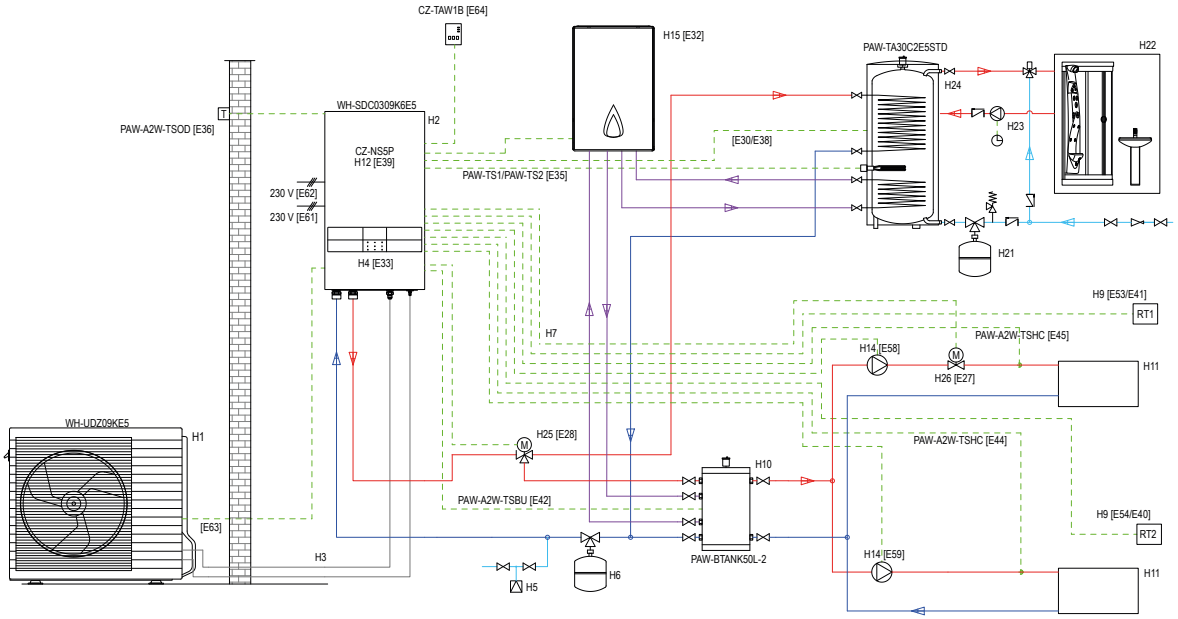
Hydromodule, High Performance, 9 kW, 1 Ph, domestic hot water tank

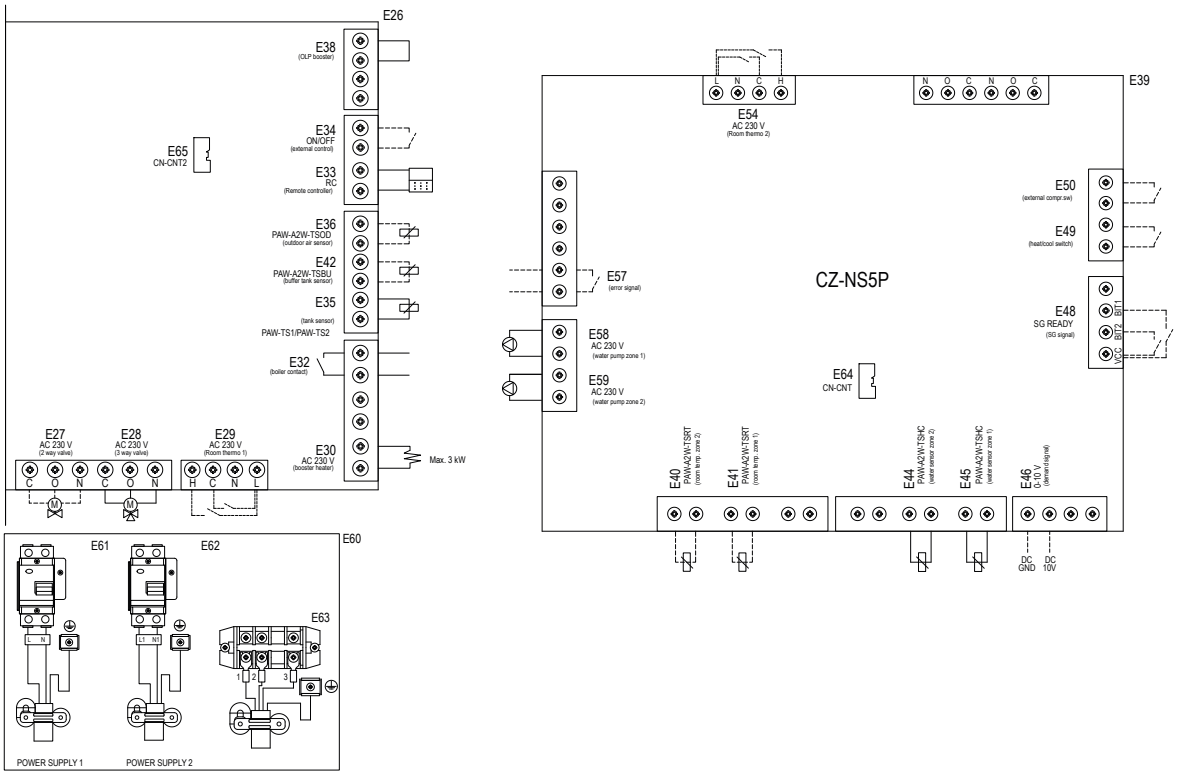




5.5.3 Example 3: Bivalent two-zone system with buffer tank

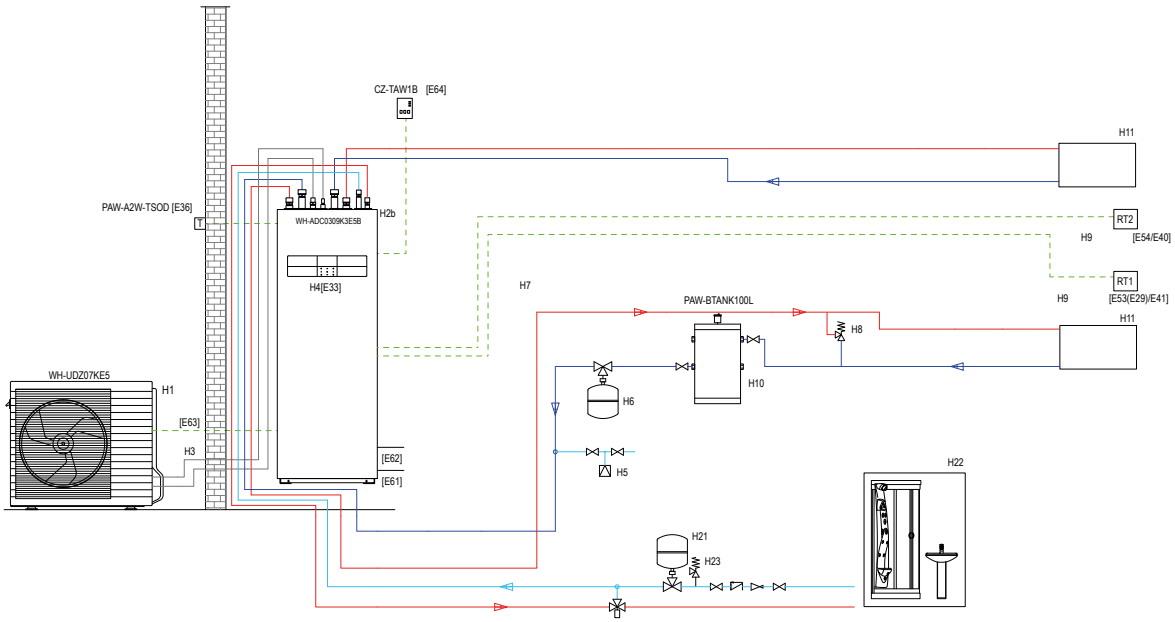
Hydromodule, High Performance, 9 kW, second heat source, domestic hot water tank, 2 heating zones

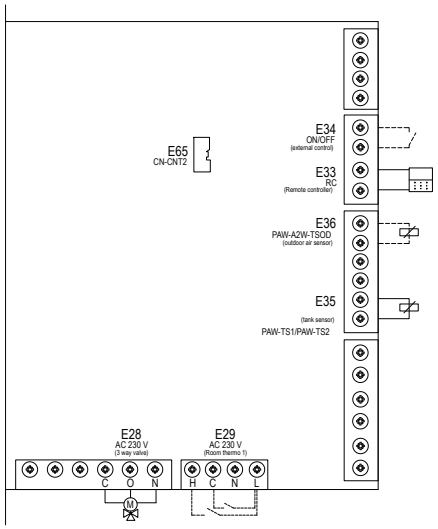


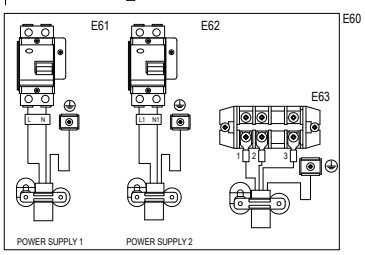


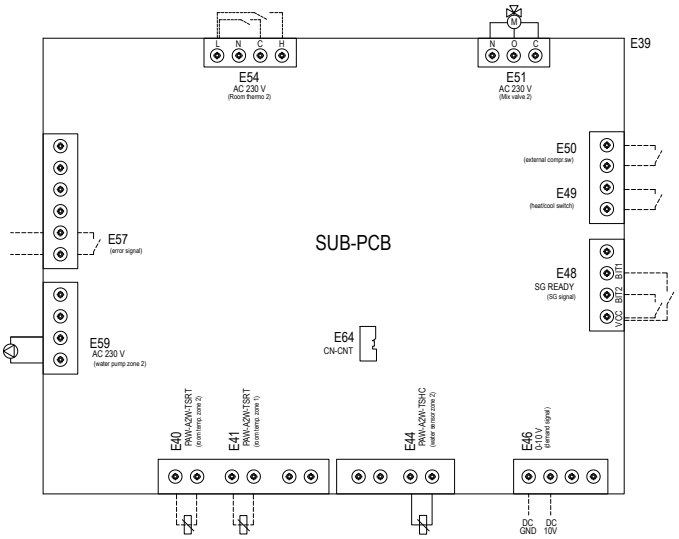
5.5.4 Example 4: Two-zone system with integrated domestic hot water tank

All in One unit in two-zone configuration (“B”), High Performance, 7 kW, buffer tank



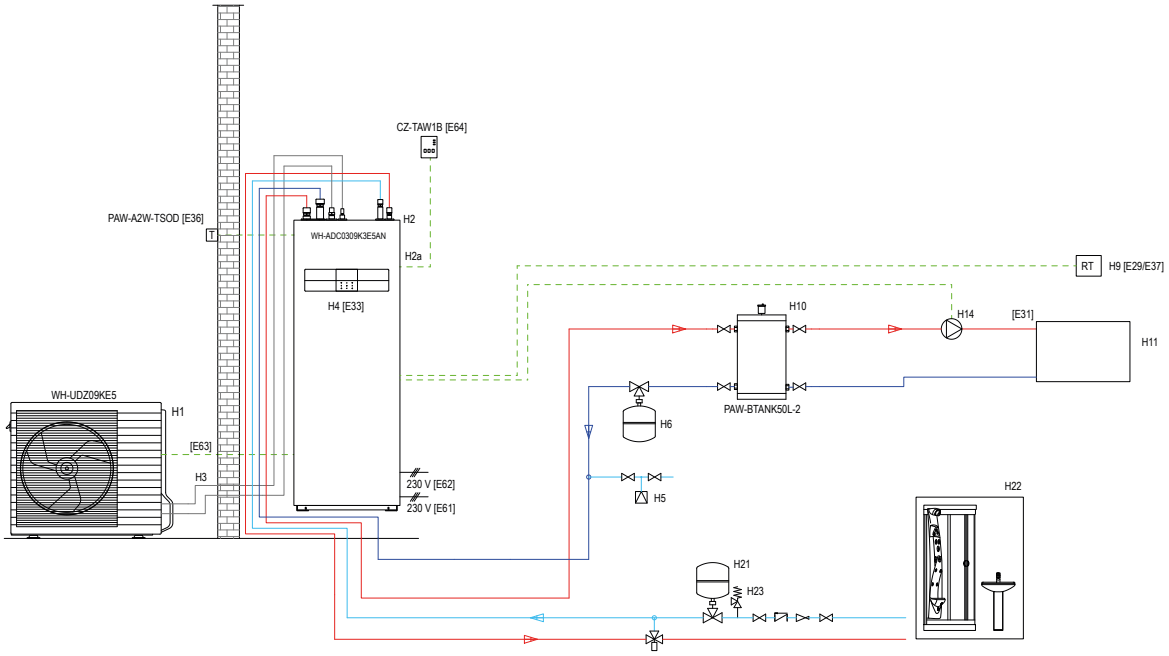


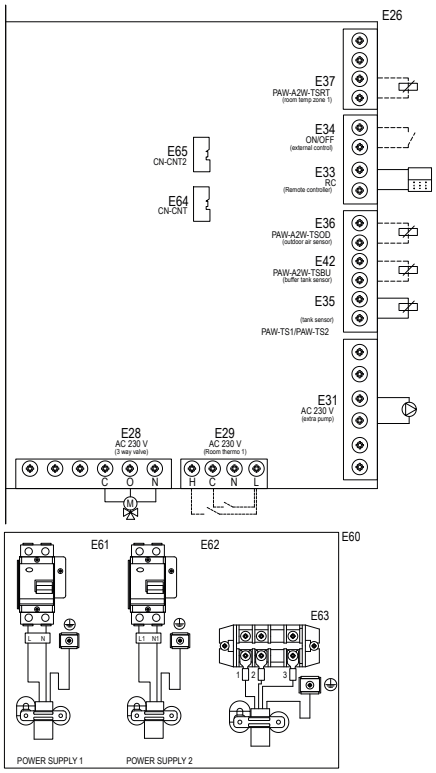




5.5.5 Example 5: One-zone system with integrated domestic hot water tank

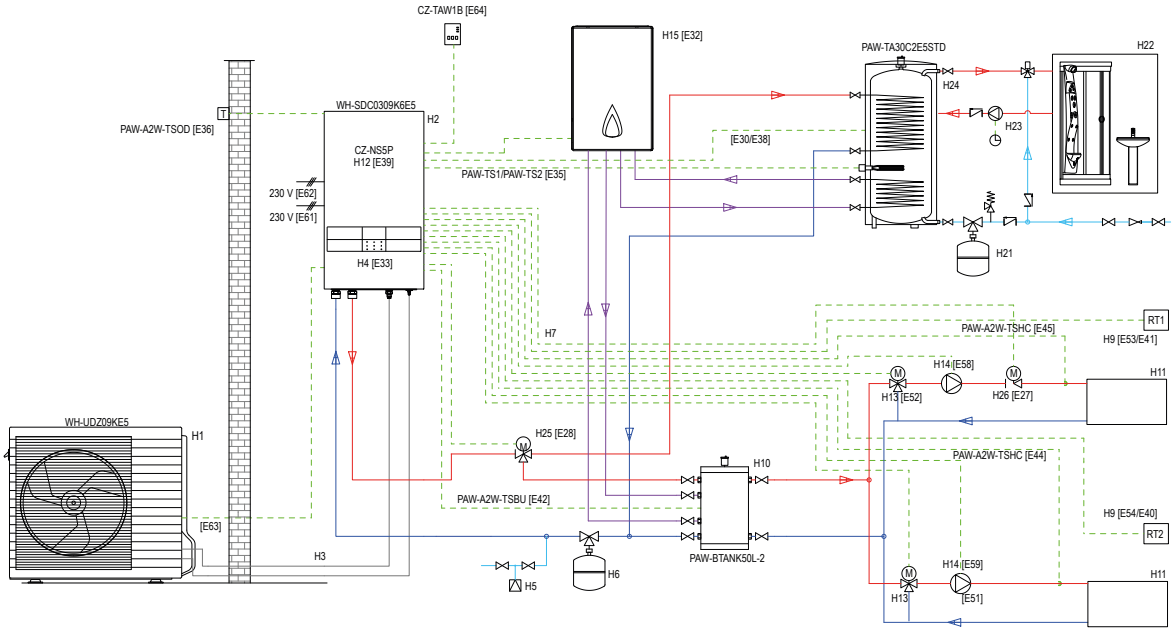
All in One unit in standard configuration, High Performance, 9 kW

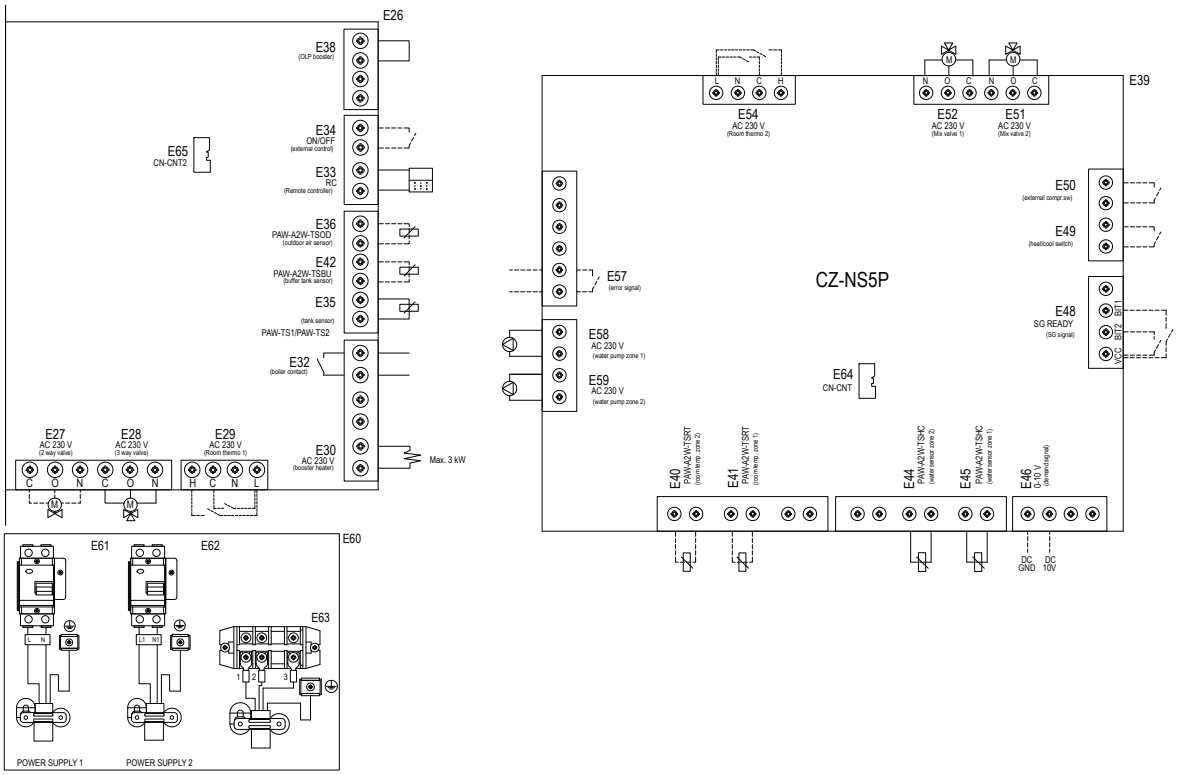




5.5.6 Example 6: Bivalent two-zone system with solar heating system

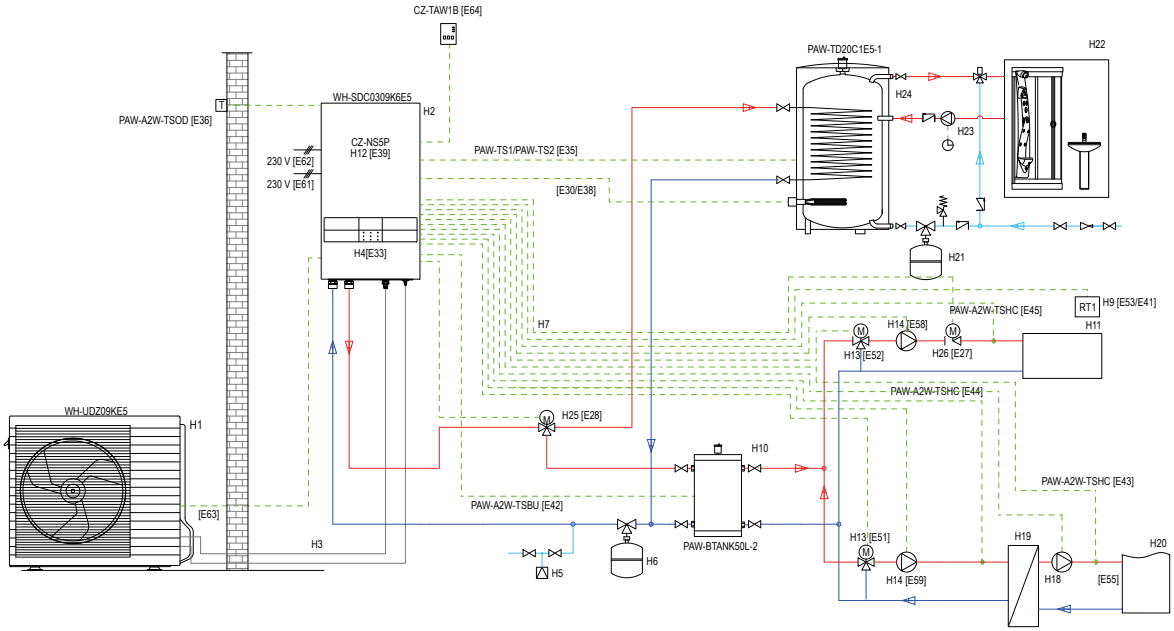
Hydromodule, second heat source, solar heat, bivalent hot water tank, buffer tank

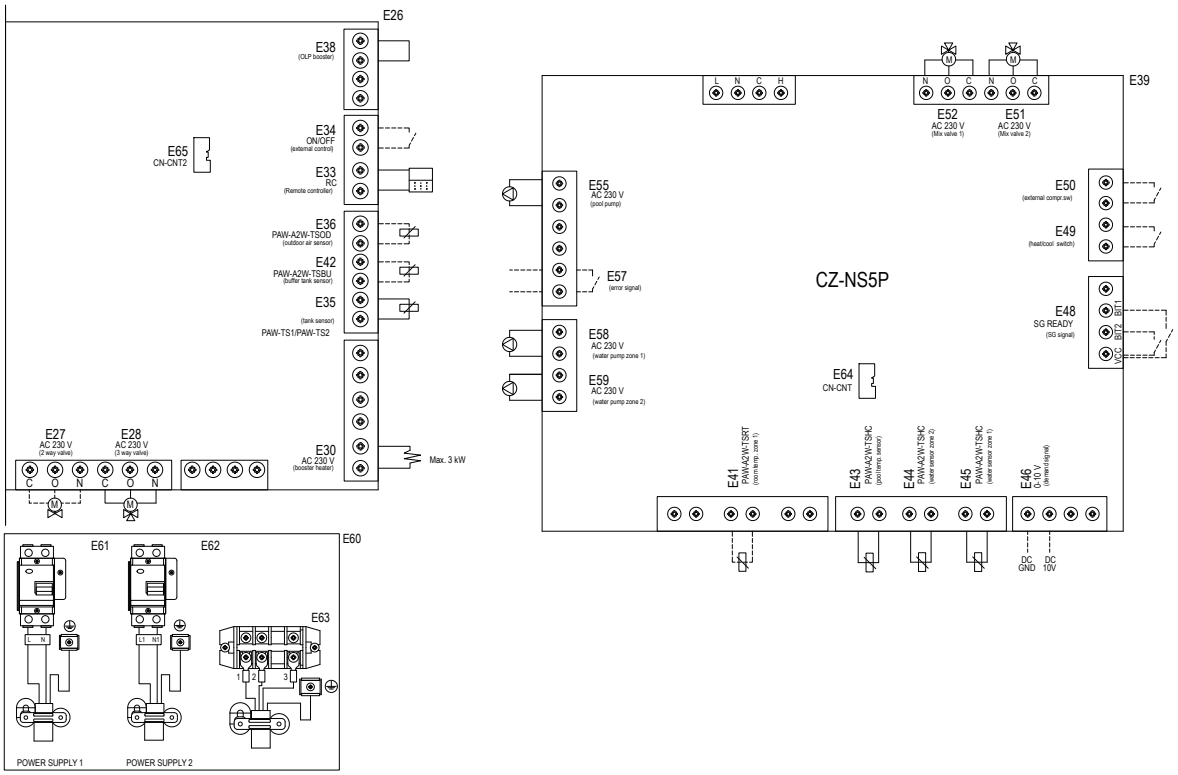




5.5.7 Example 7: Two-zone system with swimming pool

Hydromodule, domestic hot water tank, buffer tank, swimming pool heating





5.5.8 Key for the application examples

Key for the hydraulic part

H1 Outdoor unit of the bi-bloc system (provide condensation drain on the outdoor unit)

H2 Indoor unit (hydromodule) of the bi-bloc system: The magnetic filter and the flow meter are included in all K generation heat pumps.

H2a Indoor unit (All in One unit) of the bi-bloc system: The All in One unit includes a 185 litres domestic hot water tank, a tank temperature sensor, a 3-way valve and a hydromodule. The All in One unit must be set up inside a building. The magnetic filter and the flow meter are included in all K generation heat pumps.

H2b Indoor unit (All in One unit in two-zone configuration ("B")) of the bi-bloc system: The two-zone All in One unit ("B") with additional equipment for a second heating circuit includes a 185 litres domestic hot water tank, a tank temperature sensor, a 3-way valve, a hydromodule, a mixing valve, a water circulation pump, a water temperature sensor and a water filter for the additional mixed heating circuit (in the "upper section"). The All in One unit must be set up inside a building. The magnetic filter and the flow meter are included in all K generation heat pumps.

H3 The heat pumps are charged with R32. For all bi-bloc systems a maximum connection distance and a maximum height difference between indoor and outdoor unit applies, which is specified in the technical data and must be observed. For all bi-bloc systems, the minimum connection distance between indoor and outdoor units is 3 m. The pre-charged amount of R32 refrigerant caters for a pipe length of 10 m.

H4 Remote controller of the Heat pump. Dual remote controls may be used (optional).

H5 System charge and backflow device

H6 Expansion vessel: Every heat pump has a 10 litres expansion vessel that will cater for 200 litres at 55 °C in the fully open heat pump circuit. Any variation, greater than the specification stated, will require a secondary expansion vessel added to the system.

H7 Electrical connections: To be defined when the hydraulic scheme and the system control logic have been selected.

H8 Automatic bypass valve

H9 Optional thermostat: Every heating circuit can be controlled by an optional thermostat, either by means of a room temperature sensor or the remote controller (this can be used for one heating circuit only). (CZ-RTW1 additional controller for additional circuit.)

H10 Buffer tank / Volumiser: The recommended total water capacity in the primary circuit (when all heating/cooling circuits are closed), is at least 30 litres for systems up to and including 9 kW nominal heating capacity (A7/W35), and at least 50 litres for systems with 12 and 16 kW nominal heating capacity (A7/W35).

H11 Heating/cooling circuit: If the heat pump is connected directly to the heating system, the minimum water flow rate must be ensured at all the times. For this purpose, an automatic bypass valve (recommended size: 1 inch) or a 3-way valve must be installed in the supply pipe to the room heating devices (fan coil unit, hide-away unit etc.) or a thermostat must be removed to ensure a sufficient water flow rate. For a surface-embedded heating system (e.g. underfloor heating), a safety thermostat must be provided (for heating mode) and a dew point sensor (for cooling mode).

H12 Optional PCB CZ-NS5P – needed for this scheme

H13 Mixing valve with three point control

H14 Secondary water pump: Must be chosen according to the system hydraulic performance.

H15 Bivalent heat source

H16 Solar thermal system

H17 Solar pump

H18 Swimming pool pump

H19 Heat exchanger for swimming pool (to be dimensioned appropriately)

H20 Swimming pool

H21 Expansion vessel (in fresh water supply)

H22 Sanitary facilities

H23 (only bi-bloc systems with hydromodule) Optional circulation pump with timer switch

H23 (only bi-bloc systems with All in One unit) For All in One units of the J and H generation, a safety valve (opening pressure: 8 bar) is integrated in the domestic hot water tank.

H24 Domestic hot water tank: In the case of Panasonic domestic hot water tanks, the tank temperature sensor is included in the scope of delivery. When using third party tanks, one of the following temperature sensors must be ordered separately from Panasonic: CZ-TK1 (temperature sensor installation kit for third party tanks with dip sleeve and 6 m long cable) or PAW-TS1 / PAW-TS2 (temperature sensor for third party tank with 5 or 20 m long cable).

H25 3-way changeover valve: As a 3-way valve, you can use either a Panasonic CZ-NV1, which is installed inside the hydromodule, or an external valve such as a Panasonic 3WYVLV-SI. The tank temperature sensor must be ordered separately (see explanation for H24).

Shut-off valve

Non-return valve

Safety valve

Thermostatic mixing valve

Pressure regulator

Pipes of the bivalent heat source

Pipes of the solar heat circuit

Pipes

Pipes for fresh water supply

Electric cable

Key for the electric part

E26 Main PCB: The maximum cable length for sensor inputs is 30 m. The maximum cable length for other inputs and other outputs is 50 m.
E27 2-way valve: Opened in heating mode (O+N) and closed in cooling mode (C+N).
E28 3-way valve: Opened in domestic hot water production (O+N) and closed in heating or cooling mode (C+N).
E29 Optional thermostat 1: Every heating circuit can be controlled by an optional thermostat (E29 for one heating circuit, E29 and E54 for two heating circuits), either by means of a room temperature sensor (E37 for one heating circuit, E40 and E41 for two heating circuits) or by means of the remote controller (E33, this can be used for one circuit or two circuits).
E30 Electric tank heater
E31 Control output for additional circulation pump
E32 On/off switch of the bivalent heat source or deice output (dry contact)
E33 Remote controller: The remote controller for the heat pumps of the K generation can be used as a room thermostat for two heating circuits. The maximum length of each cable is 50 m.
E34 External on/off switch (dry contact)
E35 Temperature sensor for domestic hot water tank
E36 Outdoor temperature sensor (optional)
E37 Room temperature sensor for heating zone 1 (see explanation for E29)
E38 Overload protection of the electric tank heater: If an external electric tank heater is used and is to be controlled by means of the Panasonic heat pump, a contact bridge must be placed on this input.
E39 Optional PCB CZ-NS5P: The maximum cable length for sensor inputs is 30 m. The maximum cable length for other inputs and other outputs is 50 m. If the optional supplementary PCB is installed, the room temperature sensor 1 and the extra pump control contacts on the main PCB are disabled.
E40 Room temperature sensor for heating zone 2 (see explanation for E29)
E41 Room temperature sensor for heating zone 1 (see explanation for E29)
E42 Buffer tank temperature sensor
E43 Swimming pool water temperature sensor
E44 Supply water temperature sensor for heating zone 2
E45 Supply water temperature sensor for heating zone 1
E46 Demand control by means of 0–10 Volt signal
E47 Solar temperature sensor
E48 Smart Grid signal (for functions of the intelligent power grid): The two contacts can increase the set-point for domestic hot water production and heating or cooling if there is energy production from the photovoltaic panels. The two input contacts can be also used to control a bivalent system with boiler and heat pump using an external control. The two options exclude one another.
E49 External heating/cooling switchover
E50 External compressor switch
E51 Mixing valve heating zone 2
E52 Mixing valve heating zone 1
E53 Optional thermostat 1 (see explanation for E29)
E54 Optional thermostat 2 (see explanation for E29)
E55 Swimming pool pump
E56 Solar pump
E57 Alarm output (dry contact)
E58 Pump for heating zone 1
E59 Pump for heating zone 2
E60 Indoor unit power supply (hydromodule/All in One unit)
E61 Indoor unit power supply 1 - Main power supply
E62 Indoor unit power supply 2 - Power supply for electric backup heater
E63 Indoor unit / outdoor unit connection: The power supply of the outdoor unit is provided via the connection line from the indoor unit (hydromodule/All in One unit), so no separate power supply need be provided in the outdoor unit.
E64 CZ-TAW1B is a device that can allow the remote control of the heat pump using a LAN or Wifi connection to the modem. Using this device the HP can be online on the Aquarea Smart Cloud website (https://aquarea-smart.panasonic.com).

Important: All the items mentioned on this page are only examples and can vary according to the project. Always respect the technical documentation provided by Panasonic.
Panasonic accepts liability neither directly nor indirectly, neither against users nor against any third parties, for delays, inaccuracies, errors, omissions, direct, indirect, punishable damages occurring as a result, of any kind, arising from these contents. Texts, photos and graphic representations may not be published, copied, marketed and disseminated by users and any third parties in any manner or by any method, until Panasonic itself has permitted this expressly in writing.

6 Installation

The correct installation of the devices as well as their hydraulic and electrical connections are described in this chapter.

It is meant for qualified installers and electrical professionals. It is not meant for lay persons.

Electrical and water installation work must be carried out by the corresponding professionals. A defective installation due to not paying any or scant attention to the instructions in this chapter can lead to injuries or damage.

As installer, pay attention to the following instructions:

1. Ensure that you have read and understood the installation and safety notes before you begin work.
2. Keep this installation manual safely together with the device after installation.
3. After installation, perform a test run to ensure that no malfunctioning occurs.
4. Subsequently, explain the operation, maintenance and servicing of the devices to the user according to the operating instructions. Also point out to the user that he should keep the operating instructions in a safe place.
5. If you have questions or doubts relating to the installation, contact a professional installer or the dealer.

6.1 Safety notes for installation

Pay particular attention to the following safety notes before and during installation:

WARNING

Danger to life from electric shock!

The devices are operated with 230 V or 400 V alternating current. Improper installation can present a danger to life from electric shock as well as a danger of fire occurring due to overheating.

- ► Electrical installation work must be undertaken by a trained electrician.
- ► Service and maintenance work must only be carried out by an accredited electrician or an authorised dealer.
- ► Keep children and people unfamiliar with the equipment away from any installation work.
- ► Adherence to national and local standards and provisions is to be observed when carrying out any installation work.
- ► Ensure that all cables and power connections, including those already in place, are of adequate dimensions for the electrical power of the heat pump.
- ► Only use licensed power cords for connecting to a power source. No modified cables or extension cables are to be used for connecting to the power source.
- ► The heat pumps must be duly earthed. Earthing is not to be undertaken via gas or water pipes, lightning conductors or earthing for a telephone system.
- ► Adherence is to be paid to the respective national electrical wiring regulations and safety arrangements with regard to residual current. Panasonic recommends using a residual current circuit breaker (RCCB).

CAUTION

Danger of frostbite from the skin coming into contact with the refrigerant

Direct contact of the skin with the refrigerant can cause frostbite.

- ► Work on the refrigeration circuit and in connection with the refrigerant must be carried out by a trained technician or an authorised trader holding a refrigerant handling certificate.
- ► Wear gloves when handling refrigerants (e.g. when emptying or filling the refrigeration circuit).
- ► Observe the Safety Notes in force for the relevant refrigerant (R32).

Danger of fire and explosion caused by inflammable gases

A danger of fire or explosion arises when any leakages of inflammable gases occur at the installation site of the heat pump.

- ► Do not install heat pumps at sites where inflammable gases can escape.

Danger due to toxic gases if the refrigerant comes into contact with fire

Toxic gases can be created when escaped refrigerants come into contact with fire.

For this reason, if refrigerants escape during installation or operation:

- ► Extinguish any sources of fire (if present).
- ► Thoroughly ventilate the room in which the heat pump is installed..

Danger of explosion and injury caused by pressure in the refrigeration circuit being too high

In the event of improper installation, leaks can occur at the connections of the refrigerant pipes, leading to air being sucked in while the compressor is operating. This results in increased pressure in the refrigeration circuit, leading in turn to increased risk of explosion or injury.

- ► Always use piping, flare nuts and tools, which are explicitly appropriate for R32 and follow the R32-specific safety and installation instructions as specified in the Service Manual for the relevant model.
- ► Carry out installation of the refrigerant pipes in a proper manner and check that there are no leaks in the installation before turning on the compressor.
- ► Before the refrigerant pipes are removed or work is carried out on the pipes, switch the compressor off.

ATTENTION

Danger of the devices being damaged by incorrect refrigerant

The devices must only be operated with the refrigerant described in this Manual or the respective operating instructions. The use of other refrigerants or multi-component refrigerants can lead to the devices being damaged and to safety risks. Panasonic will not accept any responsibility or liability whatsoever if incorrect refrigerants are used.

- ► Only use R32 refrigerant for Aquarea High Performance and T-CAP series models of the K Generation.
- ► Do not mix the prescribed refrigerant with refrigerants of another type or replace it with a refrigerant of another type.

Danger of other material damage to the devices, e.g. due to vibrations, water leaks or fire

- ► Any work on the water circuit must be carried out by a trained technician.
- ► All relevant European and national provisions (including EN 61770 “Electrical appliances connected to the water mains”) are to be observed in installation work for the water circuit.
- ► Adhere to the conditions prescribed for the installation site:
  - Indoor units (hydromodules or All in One units) are only to be installed in indoor areas.
  - Outdoor units are only to be installed in outdoor areas.
- ► Adhere to the prescribed sequence of installation steps.
- ► Only use parts and tools delivered with the equipment or as specified.
- ► As far as possible, avoid installation of outdoor units near the sea, in regions with a high content of sulphur or at sites where large quantities of oil (e.g. machine oil, etc.) are present, as this may result in shortened operating life.

6.2 Preparing for installation

Read the following sections carefully before you begin the installation work and follow the instructions given in them.

Requirements for installation

Ascertain that all the requirements for installation are met. This includes that the following important aspects have been clarified and determined during the planning phase (respect the references to elaborate explanations about the respective topic in this manual):

1. Determine the power demand and the refrigeration requirements for the heating system to be installed (→ *5.1 Refrigeration technology and performance criteria, p. 78*).
2. Based on the performance features of Aquarea air-to-water heat pumps, select the model suitable for the power demand (→ *4.6 Functions and technical data, p. 26*).
3. Based on the ambient conditions and the installation criteria for the various model types, determine the optimum installation location for the indoor and outdoor unit (→ *5.2 Installation criteria, p. 83*).
4. Determine the requirements for the hydraulic connection of the devices (→ *5.2.3 Hydraulics, p. 97*). Always conform to the valid legal provisions.
5. Determine the requirements for the electrical connection of the devices (→ *5.3 Electricals, p. 101*). Always conform to the valid legal provisions.

6. Ensure that the accessories supplied are fully available, e.g. based on the following table. Owing to the continuous development and improvement of the products, the kind and range of the accessories supplied can, however, change at any time. So also always check the list of the accessories supplied in the installation manual accompanying the device in question.

No.	Component	Qty.	Description	Bi-bloc systems				
				with All in One unit				with hydromodule
				–	AN	B	UK	
a	Adjustable feet	4		●	●	●	●	–
b	Reducing adapter	1		●[1]	●[1]	●[1]	●[1]	●[1]
c	Drain elbow (indoor unit)	1	for condensation hose	●	●	●	●	●
d	Packing	1	for drain elbow	●	●	●	●	●
e	Top mounting plate	1		–	–	–	–	●
f	Bottom mounting plate	1		–	–	–	–	●
g	Screw	3	to fasten the hydromodule to the bottom mounting plate	–	–	–	–	●
h	Drain elbow (outdoor unit)	1		●	●	●	●	●
i	Rubber cap	various[2]		●	●	●	●	●
j	Discharge grille	1		●[3]	●[3]	●[3]	●[3]	●[3]
k	Metal plate	2	to fasten discharge grille	●[3]	●[3]	●[3]	●[3]	●[3]
l	Screw	8	to fasten discharge grille	●[3]	●[3]	●[3]	●[3]	●[3]
m	Protective bushing	2	to protect cables (rear side)	●[4]	●[4]	–	●[4]	–
n	Ferrite Core	3	to suppress interference from power supply cables	●[5]	●[5]	–	–	●[5]
o	Band	7	for ferrite core	●[5]	●[5]	–	–	●[5]

1 For WH-ADC0309K3E5(AN/B/UK) and WH-SDC0309K*E5 only.
2 For WH-UDZ03KE5: 7 pcs. For WH-UDZ05KE5, WH-UDZ07KE5 and WH-UDZ09KE5: 3 pcs. For WH-UXZ**KE5 and WH-UXZ**KE8: 8 pcs.
3 For WH-UDZ05KE5, WH-UDZ07KE5 and WH-UDZ09KE5 only.
4 For WH-UXZ**KE5 and WH-UXZ**KE8 only.
5 For WH-UXZ**KE8 only.

Transport and handling of the devices



CAUTION

Danger of injury due to carrying of heavy loads

As the devices are very heavy, they must always be carried by at least two persons, otherwise there is a danger of injury due to overloading.

► Deploy as many persons as necessary to carry the devices in order to avoid injuries and physical overloading.

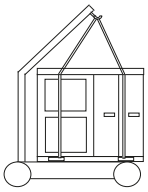
► Use mechanical hoists for loads that are too heavy to lift.

Observe the following instructions for transporting and handling the devices.

1. Transport the devices with caution, so that they are not damaged. Special caution is necessary when lowering and moving the outdoor units at the installation location.
2. Remove the packaging material only when the devices have been placed at the desired installation location.
3. Depending on the weight of the devices (→ *4.6.2.3 Technical data (bi-bloc systems), p. 36*) you will need two to four persons and/or a suitable mechanical hoist.

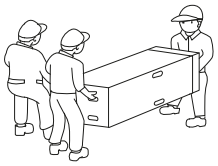
   Examples of transport:

Outdoor unit



Large, heavy devices should only be moved by means of appropriate hoists. The hoists can be attached by lugs on the base construction of the device.

All in One indoor unit



The All in One unit can be transported in a horizontal or vertical position.

If it is transported in a horizontal position, the front side of the packaging material (with the word “FRONT” printed on it) must face upwards.



If it is transported in a vertical position, grip inside the hand holes on the sides and push the device into the desired position.

4. Also align the devices absolutely horizontally when setting on an uneven surface. For this purpose, you can use the adjustable feet, for example, which are included in the scope of delivery of All in One units.

Tools needed

In general, it is advisable to use the following tools for the installation:

- Phillips head screw driver
- Spirit level
- Electric drill
- Core hole drill (ø 70 mm)
- Hexagon wrench set
- Spanner set or adjustable spanner
- Knife
- Gas leak detector
- Measuring tape
- Megohm meter
- Multimeter
- Torque wrench

Additionally, the following tools are needed for installing bi-bloc systems:

- Pipe cutter
- Reamer
- Deburrer
- Thermometer
- Vacuum pump
- Manometer station

Note

Owing to the continuous development and improvement of our products, there may be technical modifications in the future that could not yet be included in this manual. Therefore, please also read and observe the model-specific installation instructions provided with every device.

6.3 Creating a hole in the wall

ATTENTION

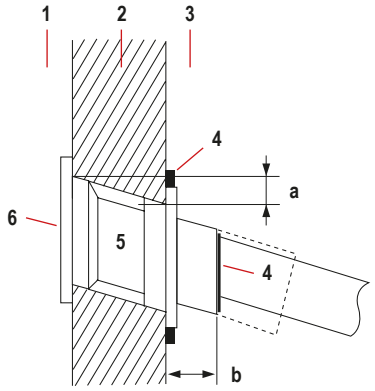
Danger of cables being chewed through by rodents in hollow walls

If wall holes exist in hollow walls, rodents could get in and chew through cables.

► In order to prevent cables being chewed through, always use a wall grommet.

Carry out the following steps to make the wall hole:

1. Ensure that the selected installation location for the indoor and outdoor unit fulfils the installation criteria (→ *5.2.2 Installation (bi-bloc systems), p. 86*).
2. Drill a wall hole of 70 mm diameter at the appropriate point. The hole must be made according to the illustration (see below) with a slope of 5 to 7 mm towards the interior of the room.
3. For hollow walls, always insert a suitable wall grommet or sleeve DN 70 (to be provided by the customer) into the wall hole. You may have to cut the sleeve so that it projects on the outside by about 15 mm.
4. Seal the outer side using a suitable sealing compound (provided by the customer) after fitting all cables.



1 Inside
2 Wall
3 Outside
4 Sealing compound
5 Sleeve for cable grommet
6 Line bushing ø 70 mm

a approx. 5 – 7 mm
b 15 mm

6.4 Setting up devices

CAUTION

Danger of injury due to carrying of heavy loads

As the devices are very heavy, overloading poses a danger of injury while lifting and carrying them.

- ► Always have the devices lifted and carried by more than one person and plan a sufficient number of persons for the installation.
- ► For very high loads, use a suitable hoist.

6.4.1 Indoor units

All in One units

Carry out the following steps to install the All in One unit:

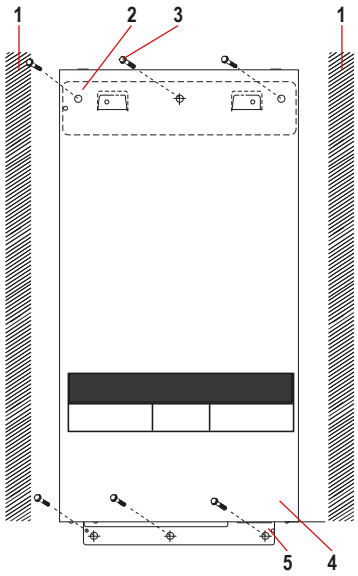
1. Carefully unpack the All in One unit at the installation location.
2. Align the device by means of the adjustable feet (use spirit level).

Hydromodules

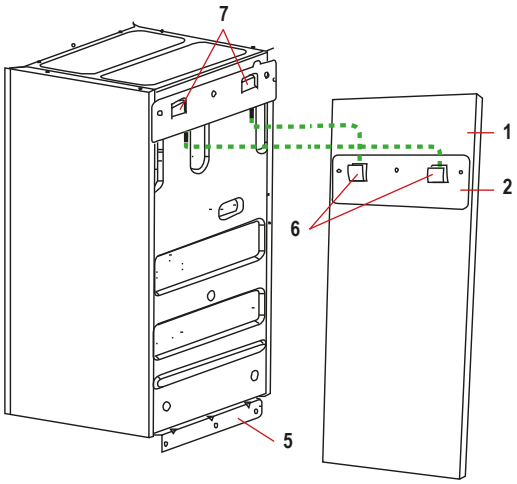
Carry out the following steps to install the hydromodule:

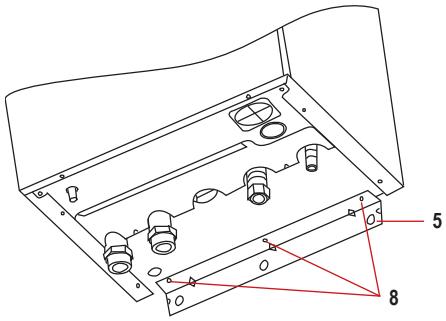
1. Exercise caution as you unpack the hydromodule at the installation site.
2. Attach the two mounting plates contained in the scope of delivery on the wall as shown in the illustration (below). For this, use six M8 hexagon screws, washers and dowels with threaded insert (all to be provided on site). Ensure horizontal alignment (use spirit level). Maintain the minimum distances from the wall and floor specified in the corresponding illustration (→ *5.2.2.6 Minimum distances (indoor units), p. 96*).
3. Have the hydromodule lifted by two persons and suspend the hydromodule by the slots on its rear side, engaging them in the hooks of the top mounting plate. Ensure that the hooks engage properly by moving them left and right.
4. In addition, attach the hydromodule by using three Phillips head screws on the bottom mounting plate.

Hydromodule K generation



1 Wall
2 Top mounting plate
3 Hexagon screw M8 with washer
4 Hydromodule
5 Bottom mounting plate
6 Hooks
7 Slots
8 Phillips head screw





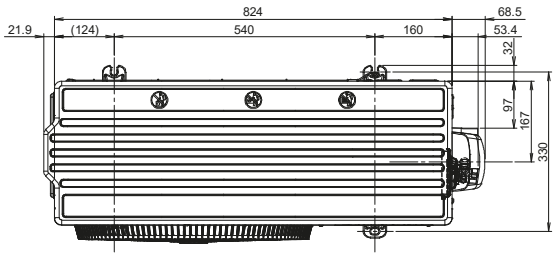
6.4.2 Outdoor units

Carry out the following steps to install the outdoor unit:

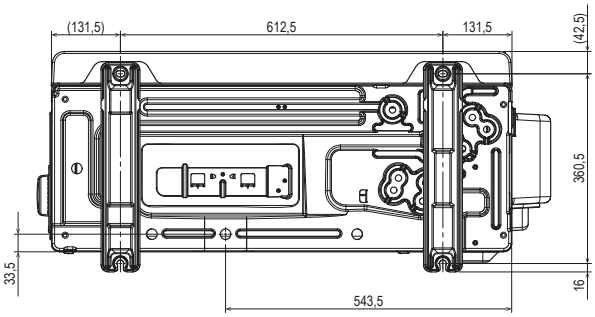
1. Exercise caution when unpacking the device at the installation site.
2. Attach the device to a concrete foundation or a strong base frame by means of four anchor bolts as shown in the illustration (see below) e.g. on the outer wall of a building. Ensure horizontal alignment of the device. Also observe the instructions in the sections on attaching the devices (→ *5.2.2.3 Securing the outdoor unit, p. 88*).

Drilling template for outdoor units

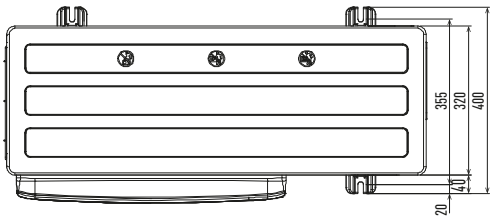
Aquarea High Performance bi-bloc outdoor unit | 3 kW
WH-UDZ03KE5



Aquarea High Performance bi-bloc outdoor unit | 5 to 9 kW
WH-UDZ05KE5 WH-UDZ07KE5 WH-UDZ09KE5



Aquarea T-CAP bi-bloc outdoor unit | 9 to 16 kW
WH-UXZ09KE5, WH-UXZ12KE5
WH-UXZ09KE8, WH-UXZ12KE8, WH-UXZ16KE8

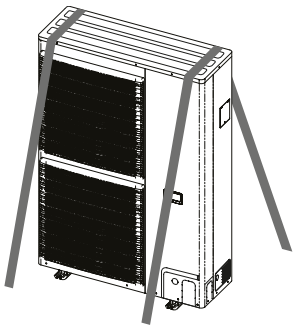


6

When fastening the outdoor unit to a base frame or a bracket on the building outer wall, vibration dampers must be mounted under the device. When fastening on a concrete foundation, it is advisable to use vibration dampers.

In the case of installation locations experiencing strong winds e.g. on building rooftops or between buildings, the outdoor unit must be additionally secured in the field to prevent tipping over (e.g. by bracing).

Bracing as support against tilting



Note: Schematic figure for explanation purposes only.

IMPORTANT

If the periods in outside temperatures below 0 °C are long, ground frost can cause the condensate to form ice. The result can be that the condensate cannot drain off and faults arise in the heat pump operation. For safe drainage of condensation water even at outside temperatures below 0 °C, a drain pipe is recommended, reaching into the frost-free area of the underground (→ *5.2.2.3 Securing the outdoor unit, p. 88*).

6.5 Opening devices

WARNING

Danger to life from electric shock

The devices are operated with 230 V or 400 V alternating current. Touching the live electrical cables can be life-threatening due to electrical shock.

► Before opening the device, make sure that the entire system is disconnected from the electric supply. Especially in case of outdoor units of bi-bloc systems, see that the electric supply of the hydromodule or All in One unit, the tank and the electrical heater is disconnected.

6.5.1 All in One units

Removing and replacing the front plate

CAUTION

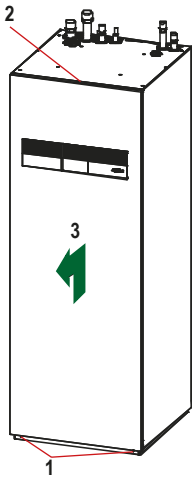
Danger of injury due to crushing

As the front plate is heavy, lifting it off poses a danger of injury by crushing of hands and fingers.

► Lift the heavy front plate with caution, possibly having two persons do it, from the hooks on the device housing.

Carry out the following steps to remove the front plate:

1. Remove the two fixing screws (**1**) on the front plate.
2. Push up the front plate to release the front plate hook (**2**) at the upper edge.
3. Lift up the front plate with both hands and remove it from the unit (**3**).
4. To place the front plate back, proceed in the reverse order. See that the hook engages correctly.

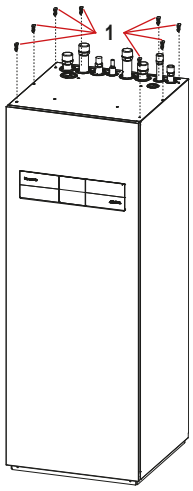


Note: Schematic figure for explanation purposes only.

Removing and replacing the top plate

Carry out the following steps to remove the top plate:

1. Remove the eight fixing screws (1) on the top plate.
2. Lift up the top plate with caution, possibly having two persons do it, so that the pipes do not get damaged, and remove it from the unit.
3. To replace the top plate, proceed in the reverse order. See that the pipes engage correctly in the apertures.

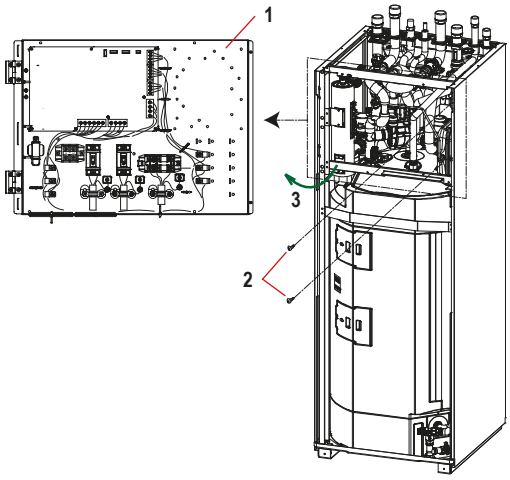


Note: Schematic figure for explanation purposes only.

Opening and reclosing the connection box

Carry out the following steps to open the cover of the connection box for the All in One unit:

1. Remove the front plate as described earlier.
2. Remove the fixing screws (2) on the cover of the connection box (1).
3. Swing the cover to the left (3).
4. To close the cover of the connection box, proceed in the reverse order.



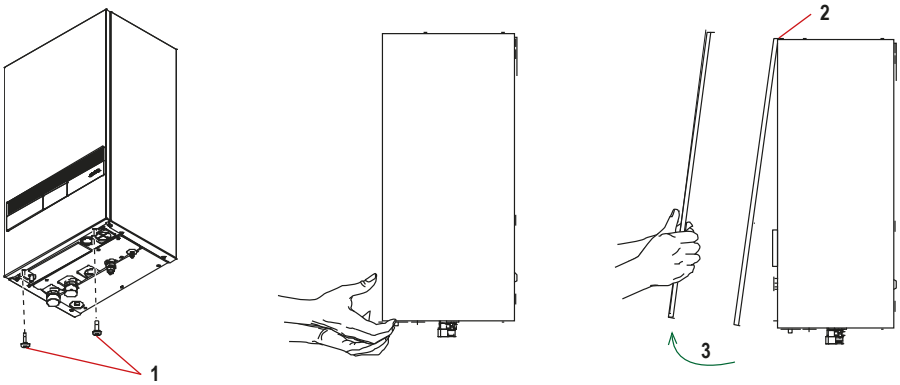
Note: Schematic figure for explanation purposes only.

6.5.2 Hydromodules

Removing and replacing the front plate

Carry out the following steps to remove the front plate:

1. Remove the fixing screws (**1**) on the front plate.
2. Exercise caution as you pull out the bottom part of the front plate towards you to release the front plate from the left and right hooks (**2**).
3. Lift up the front plate with both hands and remove it from the hooks (**3**).
4. To replace the front plate, proceed in the reverse order. See that the right and left hook engage correctly.



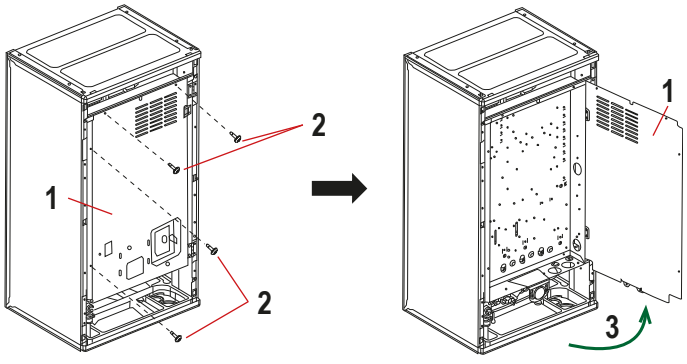
Note: Schematic figure for explanation purposes only.

Two screws at the bottom edge of the front plate

Opening and reclosing the connection box

Carry out the following steps to open the cover of the connection box for the hydromodule:

1. Remove the front plate as described earlier.
2. Remove the fixing screws (**2**) on the cover of the connection box (**1**).
3. Swing the cover to the right (**3**).
4. To close the cover of the connection box, proceed in the reverse order.



Note: Schematic figure for explanation purposes only.

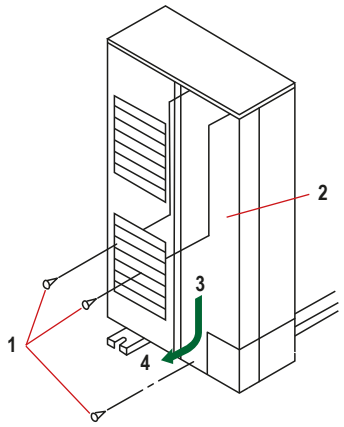
6.5.3 Outdoor units

Removing and replacing the front plate

The following description and figure refers to T-CAP outdoor units (WH-UXZ...) only. For other outdoor units proceed similarly as appropriate.

Carry out the following steps to remove the front plate of the T-CAP outdoor units (WH-UXZ...):

1. Remove the fixing screws (**1**) on the front plate (**2**).
2. Push the front plate downwards (**3**), to release the latches.
3. Then pull the front plate to yourself (**4**) to remove it from the unit.
4. To replace the front plate, proceed in the reverse order.



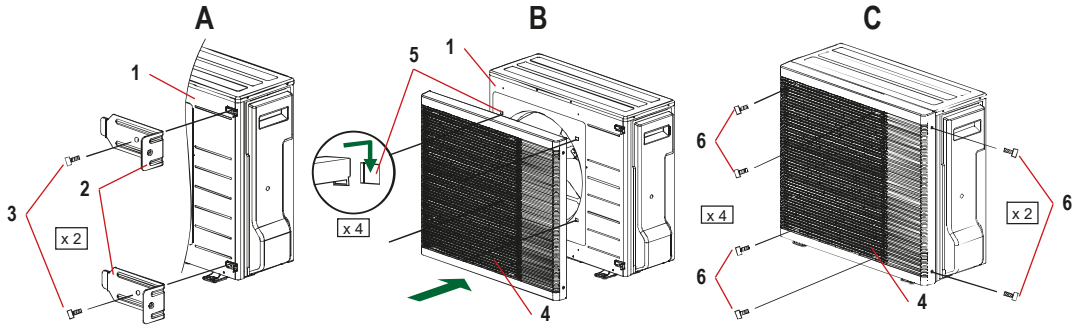
Note: Schematic figure for explanation purposes only.

Installing the discharge grille

The following description refers to outdoor units WH-UDZ05KE5, WH-UDZ07KE5 and WH-UDZ09KE5 only.

Carry out the following steps to install the discharge grille on the outdoor unit WH-UDZ05KE5, WH-UDZ07KE5 or WH-UDZ09KE5:

1. Fig. A: Hook the metal plates (2) on the cabinet front plate (1) at 2 locations and tighten them with screws (3).
2. Fig. B: Hook the discharge grille (4) to the cabinet front plate (1) at 4 locations.
3. Fig. C: Tighten the discharge grille (4) to the cabinet front plate at 6 locations with screws (6).



6.6 Connecting the refrigeration circuit

Requirements for correctly configured flare fittings

ATTENTION

Danger of leakages due to incorrect tool

Using a wrong tool, e.g. a pipe wrench, can deform or damage the flare nut. This can cause leakages.

► Use a suitable spanner or ring spanner.

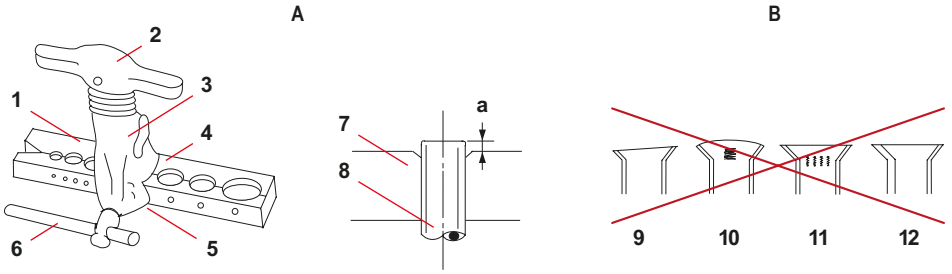
Danger of leakages caused by exceeding the tightening torque

Too high a tightening torque can cause deformation and consequently leakages.

► Observe the correct torque when tightening the flare nut (→ *Permissible tightening torques of refrigerant pipes (All in One units), p. 136*, → *Permissible tightening torques of refrigerant pipes (hydromodules), p. 136*, → *Permissible tightening torques of refrigerant pipes (outdoor units), p. 138*).

The pipes of the refrigeration circuit are connected with flare fittings. When cutting and flaring pipes, adhere to the following specifications in order to avoid leakages and malfunctions.

1. Use only copper tubes conforming to the requirements of the EN 12735-1 for refrigerant pipes used in refrigeration and air conditioning.
2. Cut the tubes to the required length using a tube cutter.
3. Remove the burrs using a reamer. Hold the tube ends downwards when deburring, so that chips will not fall into the tube.
4. Insert the flare nut onto the tube and only then begin flaring the tube ends.
5. Check the quality of the flare at the tube end: When properly flared, the internal surface of the flare will evenly shine and be of even thickness. Moreover, the surface of the flare part that comes into contact with the connection must be completely even and smooth.

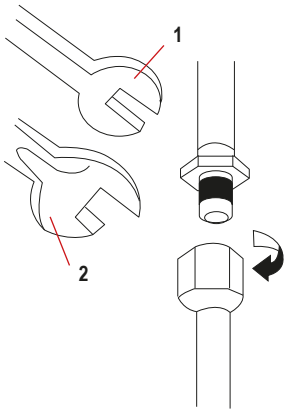


A	**Tube expander**	5	Arrow marking	**B**	**Unprofessional flaring**
1	Bar	6	Clamp handle	9	Inclined
2	Handle	7	Bar	10	Surface damaged
3	Yoke	8	Copper tube	11	Cracked
4	Core	a	0 – 0.5 mm	12	Uneven thickness

6.6.1 Connecting refrigerant pipes to the indoor unit

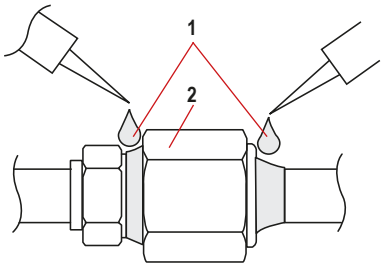
Carry out the following steps to connect refrigerant pipes to the indoor unit:

1. Determine the tube length and cut the tube to the required length using a tube cutter.
2. Remove the burr on the cut edges.
3. Insert the flare nut (which, at the time of dispatch, is screwed onto the connection nozzle of the indoor unit) onto the tube end.
4. Flare the tube ends.
5. Align the flared tube and the connecting pipe centrally and first tighten the flare nut by hand and then with a torque wrench and a spanner to counter it. Use a reducing adapter if required, and maintain the correct torques (→ *Permissible tightening torques of refrigerant pipes (All in One units), p. 136*, → *Permissible tightening torques of refrigerant pipes (hydromodules), p. 136*).



1 Spanner
2 Torque wrench

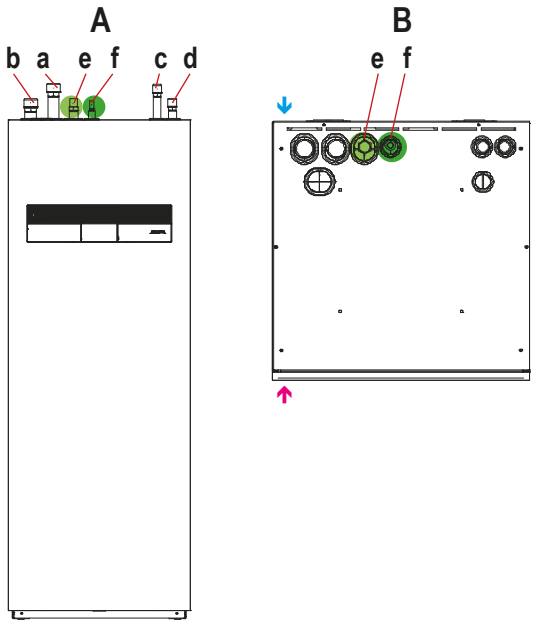
6. Route the pipes through the wall grommet to the outdoor unit.
7. Once pressure testing (→ *6.9.1 Evacuating the refrigerant circuit and pressure testing, p. 161*) and cleaning up after starting up the system is finished, seal the outside of the flare nut connections (both gas and liquid sides) with neutral cure (Alkoxy type) and ammonia-free silicone sealant and insulation material, to prevent moisture from entering the connection joint, so that gas leaks caused by freezing can be avoided. Apply sealant along the circumference of the flare nut connection following the instructions of the sealant, and allow sufficient time for the sealant to cure.



1 Sealant
2 Flare nut

All in One units

Connections of the refrigerant pipes – All in One unit | K generation | Standard configuration
WH-ADC0309K*E5, WH-ADC0912K6E5, WH-ADC0912K9E8, WH-ADC16K9E8
WH-ADC0309K*E5AN, WH-ADC0912K6E5AN, WH-ADC0912K9E8AN, WH-ADC16K9E8AN
WH-ADC0309K3E5UK, WH-ADC0912K6E5UK

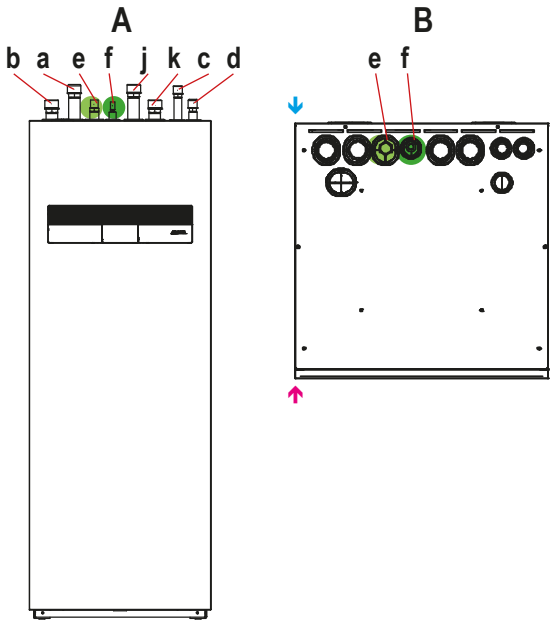


➔ Front side, ➔ Rear side

A Front view
B Top view
a Return water inlet (from space heating/cooling)
b Supply water outlet (to space heating/cooling)
c Fresh water inlet
d Supply water outlet (to hot water tank)

e Refrigerant gas line
f Refrigerant liquid line

Connections of the refrigerant pipes – All in One unit | K generation | Two-zone configuration
WH-ADC0309K3E5B



➔ Front side, ➔ Rear side

A Front view
B Top view
a Return water inlet (from space heating/cooling)
b Supply water outlet (to space heating/cooling)
c Fresh water inlet
d Supply water outlet (to hot water tank)

e Refrigerant gas line
f Refrigerant liquid line

j Zone 2 Return water inlet (from space heating/cooling)
k Zone 2 Supply water outlet (to space heating/cooling)

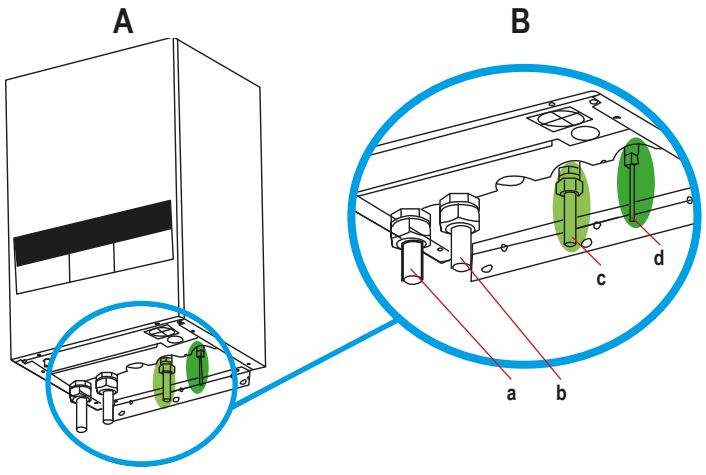
Permissible tightening torques of the refrigerant pipes – All in One units

Bi-bloc systems with All in One unit	Note	Refrigerant gas pipe		Refrigerant liquid pipe	
		Diameter mm (inches)	Torque Nm	Diameter mm (inches)	Torque Nm
High Performance | K Generation | R32					
WH-ADC0309K*E5(AN) // WH-ADC0309K3E5UK + WH-UDZ03KE5	1	12.7 (1/2)	55	6.35 (1/4)	18
WH-ADC0309K*E5(AN) // WH-ADC0309K3E5UK + WH-UDZ05KE5		15.88 (5/8)	65	6.35 (1/4)	18
WH-ADC0309K*E5(AN) // WH-ADC0309K3E5UK + WH-UDZ07KE5		15.88 (5/8)	65	6.35 (1/4)	18
WH-ADC0309K*E5(AN) // WH-ADC0309K3E5UK + WH-UDZ09KE5		15.88 (5/8)	65	6.35 (1/4)	18
WH-ADC0309K3E5B + WH-UDZ03KE5	1	12.7 (1/2)	55	6.35 (1/4)	18
WH-ADC0309K3E5B + WH-UDZ05KE5		15.88 (5/8)	65	6.35 (1/4)	18
WH-ADC0309K3E5B + WH-UDZ07KE5		15.88 (5/8)	65	6.35 (1/4)	18
WH-ADC0309K3E5B + WH-UDZ09KE5		15.88 (5/8)	65	6.35 (1/4)	18
T-CAP | K Generation | R32					
WH-ADC0912K6E5(AN) // WH-ADC0912K6E5UK + WH-UXZ09KE5		12.7 (1/2)	55	6.35 (1/4)	18
WH-ADC0912K6E5(AN) // WH-ADC0912K6E5UK + WH-UXZ12KE5		12.7 (1/2)	55	6.35 (1/4)	18
WH-ADC0912K9E8(AN) + WH-UXZ09KE8		12.7 (1/2)	55	6.35 (1/4)	18
WH-ADC0912K9E8(AN) + WH-UXZ12KE8		12.7 (1/2)	55	6.35 (1/4)	18
WH-ADC16K9E8(AN) + WH-UXZ16KE8		12.7 (1/2)	55	6.35 (1/4)	18

1 In these indoor unit/outdoor unit combinations, the reducing adapter, supplied with the All in One unit, must be installed in the refrigerant gas pipe.

Hydromodules

Connections of the refrigerant pipes – Hydromodule | K generation WH-SDC0309K*E5, WH-SXC09K*E5, WH-SXC12K6E5, WH-SXC09K*E8, WH-SXC12K9E8, WH-SXC16K9E8



A General view
B Detail bottom view
a Return water inlet (from space heating/cooling)
b Supply water outlet (to space heating/cooling)
c Refrigerant gas line
d Refrigerant liquid line

Permissible tightening torques of the refrigerant pipes – Hydromodules

Bi-bloc systems with hydromodule	Note	Refrigerant gas pipe		Refrigerant liquid pipe	
		Diameter mm (inches)	Torque Nm	Diameter mm (inches)	Torque Nm
High Performance | K Generation | R32					
WH-SDC0309K*E5 + WH-UDZ03KE5	1	12.7 (1/2)	55	6.35 (1/4)	18
WH-SDC0309K*E5 + WH-UDZ05KE5		15.88 (5/8)	65	6.35 (1/4)	18
WH-SDC0309K*E5 + WH-UDZ07KE5		15.88 (5/8)	65	6.35 (1/4)	18
WH-SDC0309K*E5 + WH-UDZ09KE5		15.88 (5/8)	65	6.35 (1/4)	18

Bi-bloc systems with hydromodule	Note	Refrigerant gas pipe		Refrigerant liquid pipe	
		Diameter mm (inches)	Torque Nm	Diameter mm (inches)	Torque Nm
T-CAP | K Generation | R32					
WH-SXC09K*E5 + WH-UXZ09KE5		12.7 (1/2)	55	6.35 (1/4)	18
WH-SXC12K6E5 + WH-UXZ12KE5		12.7 (1/2)	55	6.35 (1/4)	18
WH-SXC09K*E8 + WH-UXZ09KE8		12.7 (1/2)	55	6.35 (1/4)	18
WH-SXC12K9E8 + WH-UXZ12KE8		12.7 (1/2)	55	6.35 (1/4)	18
WH-SXC16K9E8 + WH-UXZ16KE8		12.7 (1/2)	55	6.35 (1/4)	18

1 In these indoor unit/outdoor unit combinations, the reducing adapter, supplied with the hydromodule, must be installed in the refrigerant gas pipe.

6.6.2 Connecting refrigerant pipes to the outdoor unit

WARNING

Danger to life from electric shock

The devices are operated with 230 V or 400 V alternating current. Touching the live electrical cables can be life-threatening due to electrical shock.

► Before opening the outdoor unit, make sure that the entire system (including hydromodule or All in One unit, tank and electrical heater) is disconnected from the electric supply.

IMPORTANT

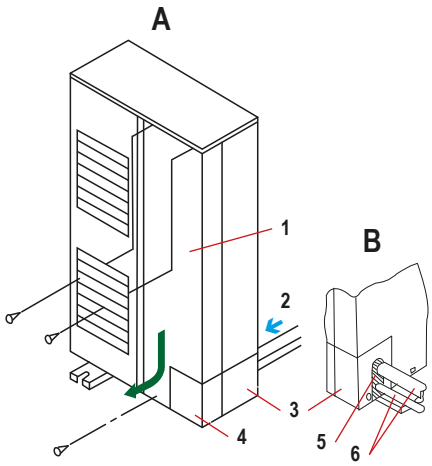
[Old text:] The pipes can be routed out of the unit in four directions: to the front, back, right and left side. Select the direction most suitable for the installation location.

The pipes can be routed out of the unit in rear direction only. Make sure that a suitable installation location has been chosen to accommodate for this circumstance.

Carry out the following steps to connect the prepared refrigerant pipes coming from the indoor unit to the outdoor unit:

1. Open the outdoor unit (→ *6.5 Opening devices, p. 129*).
2. Remove the relevant pipe panel (**3**) and provide it with suitable holes for the pipes.
3. Mount the pipe panel again so that rain will not enter the outdoor unit.
4. Align the flared tube and the connecting pipe centrally and first tighten the flare nut by hand and then with a torque wrench and a spanner to counter it. Ensure the correct torques (→ *Permissible tightening torques of refrigerant pipes (outdoor units), p. 138*).
5. Close the opening around the pipes entering the outdoor unit using thermal insulation or putty (**5**) (provided on site) to ensure that no gap is left open.

Connections of the refrigerant pipes – outdoor units



A Total view
B Rear side detail view
1 Front plate
2 Rear side of the unit
3 Rear pipe panel
4 Front pipe panel
5 Putty or heat insulation
6 Pipes protruding through the rear pipe panel

Note: Schematic figure for explanation purposes only.

Permissible tightening torques of the refrigerant pipes – Outdoor units

Outdoor units for bi-bloc systems	Refrigerant gas pipe		Refrigerant liquid pipe	
	Diameter mm (inches)	Torque Nm	Diameter mm (inches)	Torque Nm
High Performance | K Generation | R32				
WH-UDZ03KE5	12.7 (1/2)	55	6.35 (1/4)	18
WH-UDZ05KE5	15.88 (5/8)	65	6.35 (1/4)	18
WH-UDZ07KE5	15.88 (5/8)	65	6.35 (1/4)	18
WH-UDZ09KE5	15.88 (5/8)	65	6.35 (1/4)	18
T-CAP | K Generation | R32				
WH-UXZ**KE5	12.7 (1/2)	55	6.35 (1/4)	18
WH-UXZ**KE8	12.7 (1/2)	55	6.35 (1/4)	18

6.7 Connecting the water pipework

CAUTION

Danger of illnesses caused by colonies of bacteria in the water

The risk of colonies of bacteria, particularly of Legionella, in the water can be raised with an open water circuit.

► Only deploy devices in a closed water system.

ATTENTION

Danger of corrosion in open systems

Ingress of oxygen into open water systems can cause excessive corrosion of the pipes and the subsequent problems in operation.

► Install Aquarea heat pumps only as closed systems without direct contact of the heating water to the ambient air.

Danger of damage to the hydromodule and other components of the system due to improper working methods when connecting the water heating circuit

To avoid damage to the water-side system components, observe the following instructions:

► Ensure that the components installed in the water circuit can withstand high operating water pressures. Use only suitable sealants that are capable of withstanding the pressure and the temperature of the system.

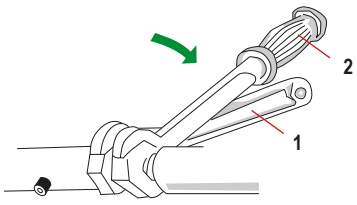
► Do not use worn out pipes.

► Block pipe ends, which are routed through a wall grommet, so that dirt does not enter the pipes.

► Before connecting the device, flush the water-side pipes to remove contaminants, because impurities can damage device components.

► Using a wrong tool, e.g. a pipe wrench, can deform or damage the connection. This can cause leakages. Therefore, use a suitable spanner or adjustable spanner.

► Too high a tightening torque can cause deformation and consequently leakages.



1 Spanner
2 Torque wrench

Therefore, only use a torque wrench to tighten and a spanner to counter it (see the illustration above).

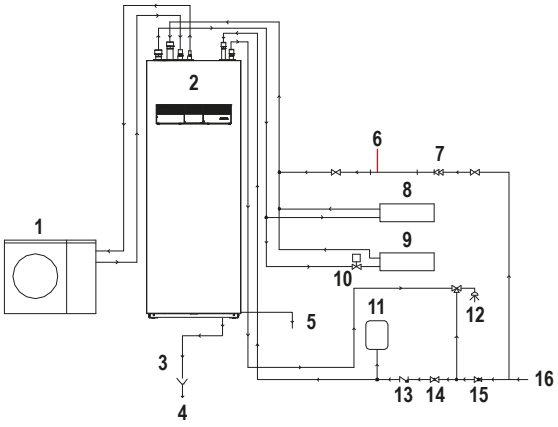
6.7.1 Connecting the heating circuit to the indoor unit

Note

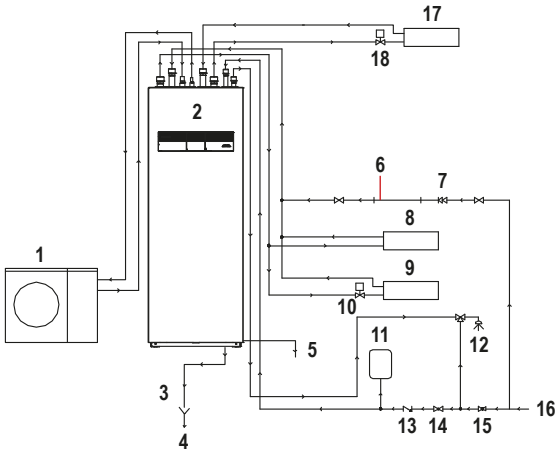
Connect the water pipes of the heating circuits based on the details given in the planning documents. Use the following Typical Piping Installation schematics or the application examples (→ *5.5 Application examples, p. 110*) as rough guideline to the installation layout.

Typical piping installation schematics

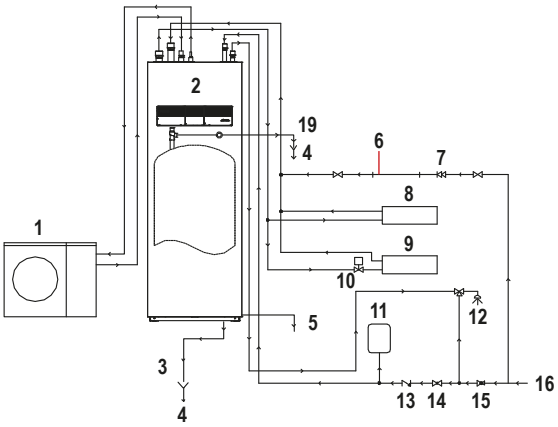
All in One units | Standard configuration (for 1 heating zone)



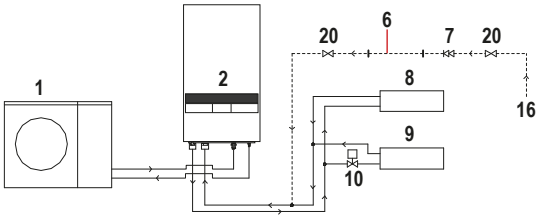
All in One unit | Two-zone configuration (for 2 heating zones) (B)



All in One units | Standard configuration (for 1 heating zone) | For UK only (UK)



Hydromodules



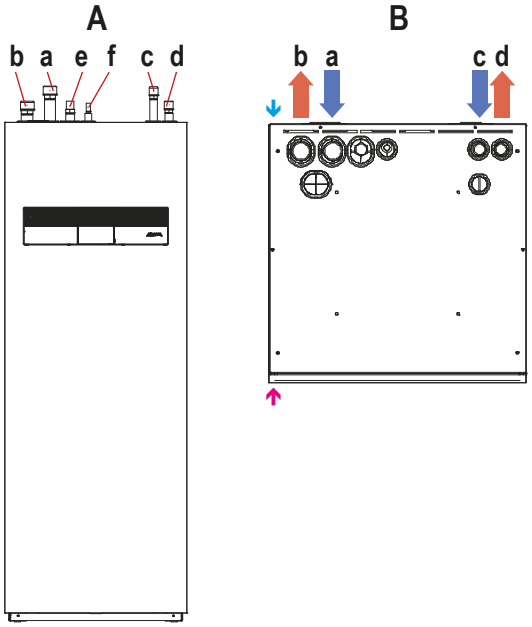
1 Outdoor unit
2 Indoor unit (All in One unit or hydromodule)
3 Tank water discharge
4 Tundish
5 Drain Water
6 Temporary connection to be removed immediately after filling
7 Double check valve assembly is acceptable in house
8 Fan Coil Unit
9 Zone 1 circuit: radiators / surface-embedded system
10 Zone 1 circuit: 2-way valve
11 Expansion vessel
12 Tab / Shower
13 Check valve
14 Shut-off valve
15 Pressure reducing valve
16 Main water supply
17 Zone 2 circuit: radiators / surface-embedded system
18 Zone 2 circuit: 2-way valve
19 Temperature & pressure relief valve drainage
20 Servicing valve

Carry out the following steps to connect the water pipes of the heating circuit to the indoor unit (hydromodule or All in One unit):

1. Install the required pipes, valves, strainers and other components according to the planning documents.
2. Connect the water circuit to the supply water outlet and return water inlet of the indoor unit.
3. Use suitable flare nuts to connect the return water inlet (marked “WATER IN”) and supply water outlet (marked “WATER OUT”). Use a torque wrench to tighten the flare nut, and apply the allowable tightening torque in each case (→ *Permissible tightening torques of water pipes (All in One units), p. 142*, → *Permissible tightening torques of the water pipes (hydromodules), p. 142*).

All in One units

Connections of the water pipes – All in One units | K generation | Standard configuration
WH-ADC0309K*E5, WH-ADC0912K6E5, WH-ADC0912K9E8, WH-ADC16K9E8
WH-ADC0309K*E5AN, WH-ADC0912K6E5AN, WH-ADC0912K9E8AN, WH-ADC16K9E8AN
WH-ADC0309K3E5UK, WH-ADC0912K6E5UK

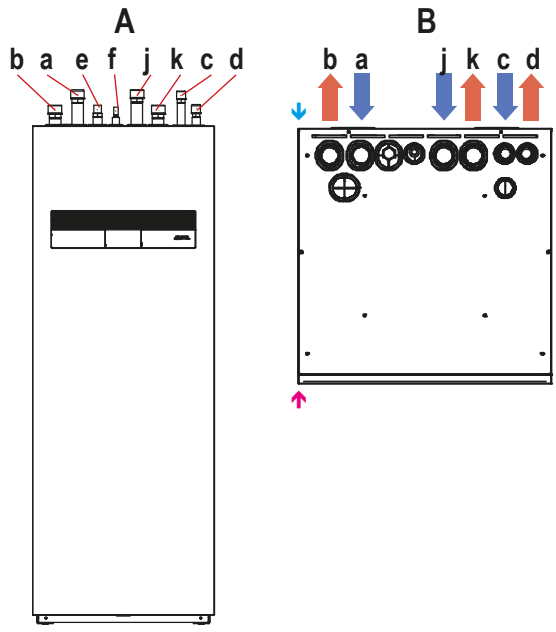


➔ Front side, ➔ Rear side

A Front view
B Top detail view
a Return water inlet (from space heating/cooling)
b Supply water outlet (to space heating/cooling)
c Fresh water inlet
d Supply water outlet (to hot water tank)

e Refrigerant gas line
f Refrigerant liquid line

Connections of the water pipes – All in One unit | K generation | Two-zone configuration
WH-ADC0309K3E5B



➔ Front side, ➔ Rear side

A Front view
B Top detail view
a Zone 1 Return water inlet (from space heating/cooling)
b Zone 1 Supply water outlet (to space heating/cooling)
c Fresh water inlet
d Supply water outlet (to hot water tank)

e Refrigerant gas line
f Refrigerant liquid line

j Zone 2 Return water inlet (from space heating/cooling)
k Zone 2 Supply water outlet (to space heating/cooling)

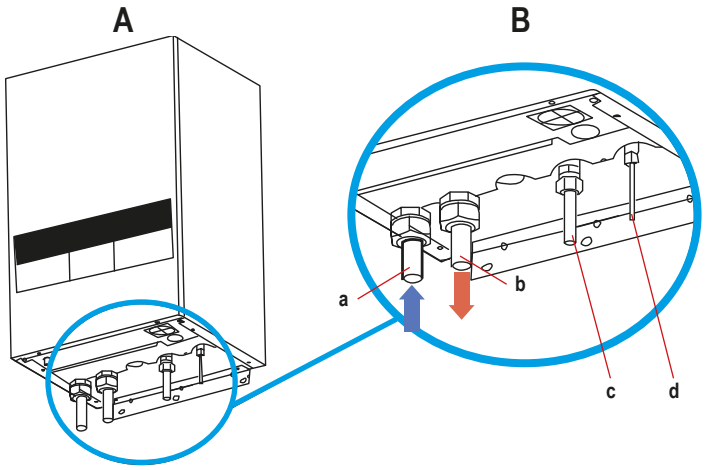
Permissible tightening torques of the water pipes – All in One units

	Connection			
	– Supply water outlet (to space heating/cooling) [1] – Return water inlet (from space heating/cooling) [1]		– Supply water outlet (to hot water tank) – Fresh water inlet	
Bi-bloc systems with All in One unit	**Flare nut size**	**Torque Nm**	**Flare nut size**	**Torque Nm**
Any type of All in One unit	RP 1¼“	117.6	RP ¾“	58.8

1) For the All in One unit in two-zone configuration (WH-ADC0309K3E5B), the specified flare nut size and torque apply to the supply and return water pipe connections for both zone 1 and zone 2.

Hydromodules

Connections of the water pipes – Hydromodules | K generation WH-SDC0309K*E5, WH-SXC09K*E5, WH-SXC12K6E5, WH-SXC09K*E8, WH-SXC12K9E8, WH-SXC16K9E8



A **General view**
B **Detail bottom view**
a Return water inlet (from space heating/cooling)
b Supply water outlet (to space heating/cooling)
c Refrigerant gas line
d Refrigerant liquid line

Permissible tightening torques of the water pipes – Hydromodules

	Connection	
	– Supply water outlet (to space heating/cooling) – Return water inlet (from space heating/cooling)	
Bi-bloc systems with hydromodule	**Flare nut size**	**Torque Nm**
Any type of hydromodule	RP 1¼“	117.6

6.7.2 Connecting the drainage pipework

On site, a drainage pipework must be connected to various drain outlets of the indoor and outdoor units. For connection to the condensation drain, a drain elbow and a packing are provided for each device. All other components, such as drain hoses and pipes, tundishes and fixing material, must be field-supplied.

IMPORTANT

When installing the drainage pipework, in addition to the safety notes applicable for the entire heating circuit, pay attention also to the following notes:

- Install the drain hoses with a constant slope and in such a way that the water outlet cannot be clogged. If drain hose is long, use a metal support fixture along the way to prevent the hose from bending.
- Install the drain hoses in a frost-free environment.

  This is particularly important in the case of outdoor units, because if the periods in outside temperatures below 0 °C are long, ground frost can cause the condensate to form ice. The result can be that the condensate cannot drain off and this will cause malfunctioning in the heat pump operation.

  For safe drainage of condensation water even at outside temperatures below 0 °C, a drain pipe is recommended, reaching into the frost-free area of the underground.
- Do not conduct the drain hoses into a sewage or cleaning connection from which ammoniac, sulphurous gases or the like can rise.

6.7.2.1 Connecting the condensation drain hose

When installing the drain hose, use commercially available drain hoses with a suitable diameter.

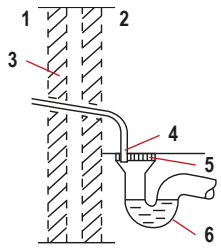
Device	Hose internal diameter	
	Condensation drain outlet including drain elbow (mm)	Safety valve drainage tap (Inch)
All in One units K Generation	17	Rc ½
Hydromodules K Generation	17	3/8
Outdoor units	17	not specified

6

Indoor units

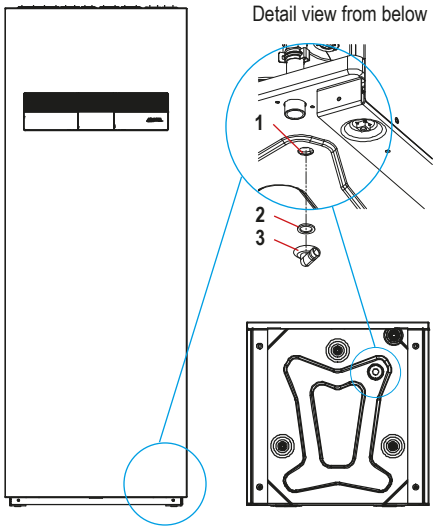
Carry out the following steps to connect the drain hose to the condensation drain outlet of the indoor unit:

1. Assemble the supplied drain elbow with packing on the condensation drain outlet on the underside of the indoor unit, as shown in the illustrations below.
2. Slide the hose onto the drain elbow.
3. Ensure that the drain hose is seated firmly. Use a hose clip to attach the hose, if necessary (to be field-supplied).
4. Lay the drain hose with a constant slope into a suitable receptacle for the condensed water (to be field-supplied) or to outdoor as illustrated.

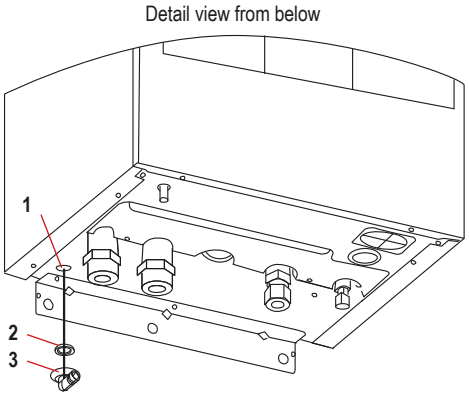


1 Indoor
2 Outdoor
3 Possible wall
4 Discharge below fixed grating
5 Fixed grating
6 Trapped gulley

All in One units



Hydromodules



1 Condensation drain outlet
2 Packing
3 Drain elbow

Note: Schematic figures for explanation purposes only.

Outdoor units

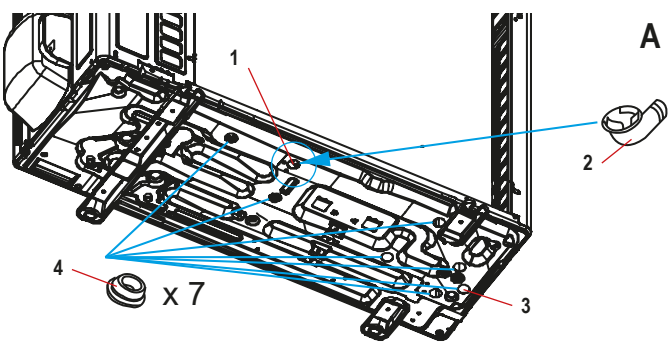
IMPORTANT

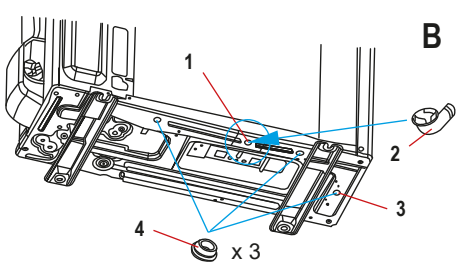
When installing the drain hose on the outdoor unit, also observe the following instructions:

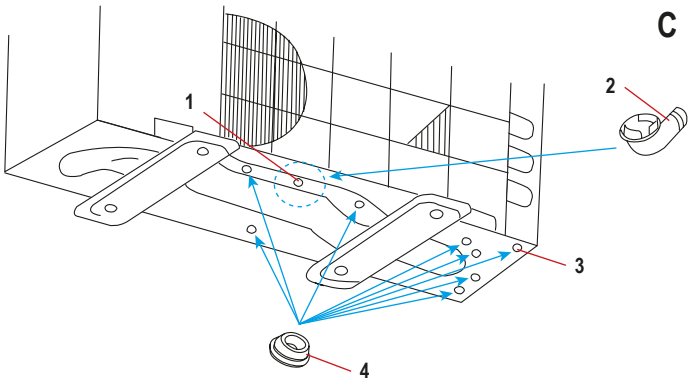
- When using the drain elbow, the outdoor unit should be mounted on a sub-base at least 50 mm in height.
- For installation of the outdoor unit on a foundation, the installation method with a strip foundation and gravel filling is recommended (*5.2.2.3 Securing the outdoor unit, p. 88*).
- For a safe drainage of condensation water, even at outside temperatures below 0 °C, a drain pipe is recommended, reaching into the frost-free area of the underground.

Carry out the following steps to connect the drain hose to the condensation outflow of the outdoor unit:

1. Assemble the supplied drain elbow with packing on the condensation drain outlet on the underside of the outdoor unit, as shown in the figures below.
2. Seal the openings on the underside of the outdoor unit using the supplied rubber sealing caps.
3. Slide the hose onto the drain elbow.
4. Ensure that the drain hose is seated firmly. Use a hose clip to attach the hose, if necessary (to be field-supplied).
5. Lay the drain hose with a constant slope. For large drain hose lengths, you may want to use a metal support (to be field-supplied) to prevent the hose from bending.







C **Detail views from below**

- **A** **WH-UDZ03KE5**
- **B** **WH-UDZ05KE5, WH-UDZ07KE5, WH-UDZ09KE5**
- **C** **WH-UXZ**KE5, WH-UXZ**KE8**
- 1 Condensation drain outlet
- 2 Drain elbow
- 3 Openings (number depending on model)
- 4 Rubber sealing caps

Note: Schematic figures for explanation purposes only.

6.7.2.2 Connecting the safety valve drainage tap

All in One units in Standard or Two-zone configurations (excluding All in One units in UK-only configuration)

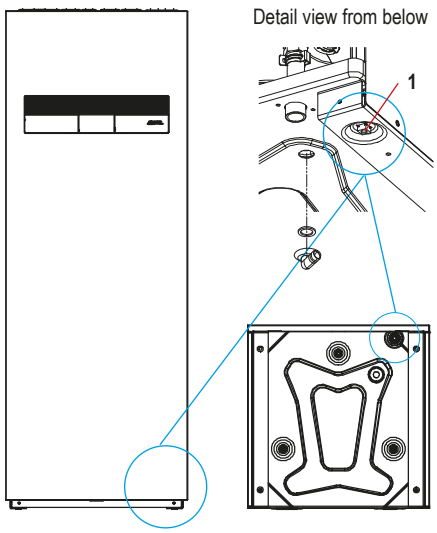
Note

Due to constructional differences, the All in One units in UK-only configuration (WH-ADC0309K3E5UK, WH-ADC0912K6E5UK) are treated in a separate paragraph below (→*Safety valve drainage tap for UK-only All in One units, p. 146*).

For the All in One units in Standard and Two-zone configurations (excluding units in UK-only configuration), a safety valve (initial pressure 8 bar) is integrated into the hot water tank. Safety valve and hot water tank have a common water drain outlet.

Carry out the following steps to connect the drain pipe to the safety valve drainage tap of the All in One units in Standard or Two-zone configuration:

1. Use a connection of the size R 1/2 inches for installing the drain pipe.
2. Lay the drain pipe with a constant slope. The drain pipe must not be longer than 2 m long and not have more than 2 bends. The end of the drain pipe must be visible and must not be near electrical components.
3. It is advisable to mount a tundish in the drain pipe, which is also visible and is not subject to freezing nor in the vicinity of electrical components.



1 Safety valve drainage tap

All in One units in UK-only configuration

Due to constructional differences including a deviating set of factory-fitted components, the All in One units in UK-only configuration (WH-ADC0309K3E5UK, WH-ADC0912K6E5UK) require a different layout of the drainage pipework compared to the other All in One units of the K generation.

This also entails that the hot water drain outlet must be connected to an individual drain pipe.

To do so, follow the same steps as for the All in One units in Standard and Two-zone configurations in the previous paragraph above (→ *Safety valve drainage tap for Standard/Two-zone All in One units, p. 145*).

The All in One units in UK-only configuration have a factory-fitted Temperature and Pressure Relief valve (T&PR valve) and an extra bushing in the rear side plate so that the discharge pipe of the T&PR valve can be routed out of the All in One unit as shown in the illustration below. A tundish must be fitted into the discharge pipe within 600 mm distance from the safety device. Due to the distance between the two safety devices, it may be necessary to fit each safety device with its own tundish before the pipework is run together to a safety discharge.

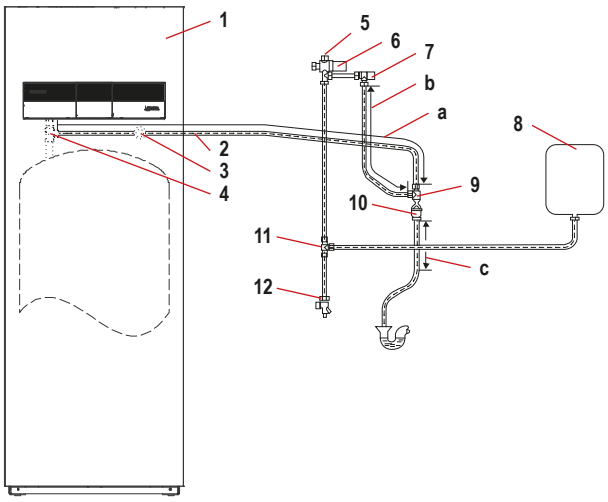
IMPORTANT

The following instructions are a requirement of UK Building Regulations and must be adhered to. For other countries, refer to local legislation. If there is any doubt about the correct installation procedure, always contact the local Panasonic technical customer service.

Carry out the following steps to connect a drain pipe to the Temperature and Pressure Relief valve as shown in the illustration below:

1. Connect the discharge pipe (Ø 15 mm) to the the factory-fitted Temperature and Pressure Relief valve and route the discharge pipe through the bushing in the rear side plate out of the All in One unit.
2. Connect the tundish, which should be fitted vertically and as close to the safety device as possible within a maximum allowable distance of 600 mm from the device. The tundish should be visible and not subject to freezing nor in the vicinity of electrical components.
3. The discharge pipe downstream from the tundish should fulfill the following requirements:
   > be made of metal,
   > be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9 m long; bends must be taken into account in calculating the flow resistance,
   > have a vertical section of pipe at least 300 mm long, below the tundish before any elbows or bends in the pipework, and
   > have visible discharges at both the tundish and the final point of discharge, which should be located in a safe place where the discharge means no harm to persons nearby.

Schematic view of the required drainage pipework for the All in One units in UK-only configuration (WH-ADC0309K3E5UK, WH-ADC0912K6E5UK)



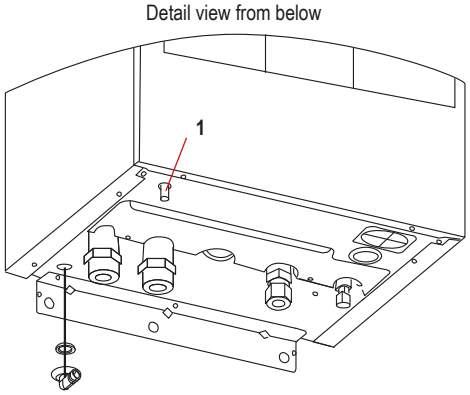
1 All in One unit in UK-only configuration
2 T&PR valve discharge pipe
3 Rear side bushing
4 Temperature and Pressure Relief valve (T&PR valve)
5 Cold water supply
6 Pressure reducing valve (field-supplied)
7 Safety valve
8 Expansion vessel (field-supplied)
9 Tee joint (field-supplied)
10 Tundish (field-supplied)
11 Tee joint (field-supplied)
12 Drain valve (field-supplied)
a Max. allowable distance between T&PR valve and tundish: 600 mm
b Max. allowable distance between safety device and tundish: 600 mm
c Min. length of vertical section of pipe down-stream from tundish before any elbows or bends in the pipework: 300 mm

Hydromodules

Carry out the following steps to connect the drain hose to the safety valve drainage tap of the hydromodule:

1. Slide the drain hose onto the safety valve drainage tap (3/8” connection) on the hydromodule.
2. Ensure that the drain hose is seated firmly. Use a hose clip to attach the hose, if necessary (to be field-supplied).
3. Lay the drain hose with a constant slope into a suitable receptacle for the condensed water (to be field-supplied) or to outdoor.

Detail view from below



1 Safety valve drainage tap

6.8 Connecting the electrical wiring

WARNING

Danger to life from electric shock!

The devices are operated with 230 V or 400 V alternating current. Improper installation can present a danger to life from electric shock as well as a danger of fire occurring due to overheating.

- ► Electrical installation work must be undertaken by a trained electrician.
- ► Ensure that you have disconnected the electricity supply before you carry out installation work. Secure the electricity supply against being switched on again unintentionally.

ATTENTION

Danger of damage due to unprofessional installation

- ► When making electrical wiring connections, respect the relevant requirements for cable type, cable cross section and recommended fuse (→ *4.6.2.3 Technical data (bi-bloc systems), p. 36*), the minimum required contact clearance and the maximum permissible cable length (if indicated) as well as the connecting conditions for the individual devices (→ *5.3 Electricals, p. 101*).
- ► Pay attention to the correct polarity while connecting the cabling. Connecting the cabling with incorrect polarity can cause electrical shocks or fire.
- ► Guide the cable through cable grommets into the device, so that the cable will not be damaged by sharp edges.
- ► Make sure that the cables do not come into contact with hot objects such as the water pipes, so that the insulation is not damaged.

IMPORTANT

When connecting electrical wiring, also respect the following specifications.

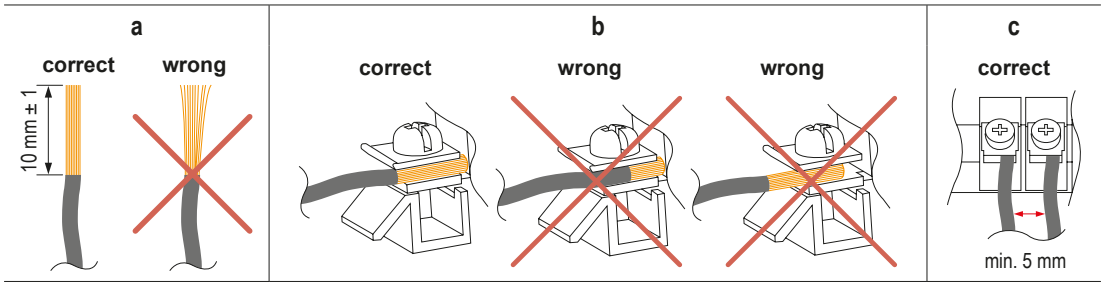
Requirements for correctly configured cable connections

1. Note the following requirements for the insulation:

a. The insulation having a length of 10 mm ±1 mm must be stripped from the wire end. See that no strand is loose and that all strands are clamped.

b. See that the stripped end of the wire is fully inserted into the terminal. Neither should the insulation be inserted in the terminal, nor should the stripped end of the wire project out from the terminal.

c. The gap between the cables must be a minimum of 5 mm.



2. When tightening the terminal screw connections, ensure using the relevant applicable tightening torques.
3. Note that, for safety reasons, the earth conductor must be longer than the other cables in case the cable slips out from the cable clamp.
4. Use separate cable grommets for power cords on the one hand and accessory cables on the other hand, to avoid disturbances in control signals.
5. Fasten the power cord by using cable clamps/strain reliefs.
6. Bundle accessory cables together using cable ties.

6.8.1 Connecting the power cord

6.8.1.1 Connecting the power cord to the indoor unit

The following method is correspondingly applicable for all indoor units (All in One units and hydromodules), but will be explained here on the basis of the example of a single-phase hydromodule of the K Generation (→ *Installation example (hydromodules), p. 150*).

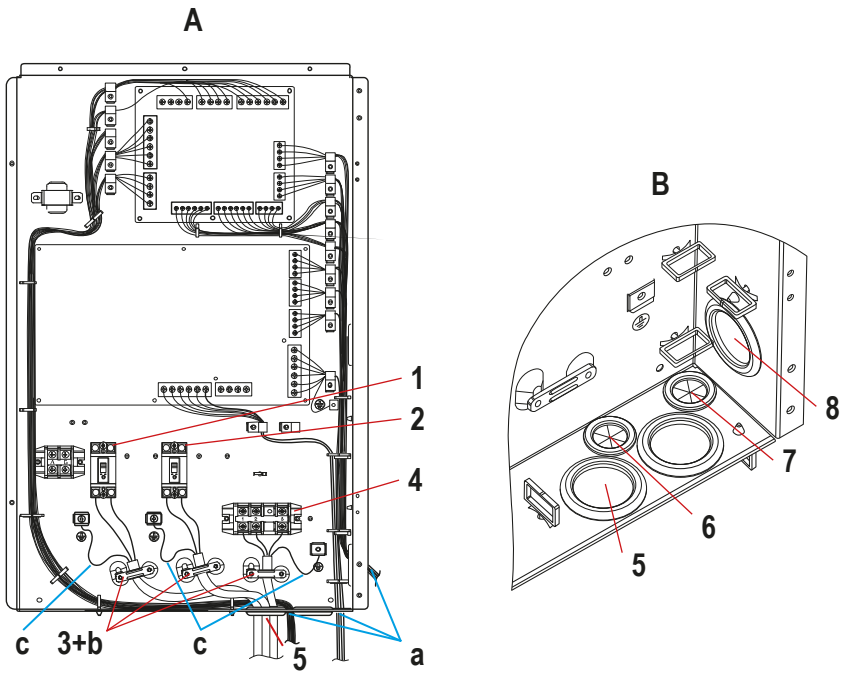
Carry out the following steps to connect the power cord to the indoor unit:

1. Open the indoor unit (→ *6.5 Opening devices, p. 129*) and the connection box.
2. Guide the cable through the cable gland (**5**, **a**) into the device.
3. Secure the cable by means of the cable clamps (strain reliefs) (**3**, **b**).
4. Connect the power cords 1 and 2 accordingly to mains connection 1 and 2 (**1**, **2**), according to the installation example below and the connection diagram following it (see below) and ensure that the earth conductor is longer than the other cables in every case (**c**).
   Applicable tightening torques are as follows:

Terminal screw connection	Tightening torque (Ncm)
M4	157 – 196
M5	196 – 245

5. Connect the indoor/outdoor unit connection cable on the indoor unit terminal (**4**) and take care to leave the earth conductor longer than the other cables (**c**). Also ensure that you connect conductors of the same cable colour to the same terminal numbers on outdoor and indoor unit.
   Applicable tightening torques are as above (→ *Permissible tightening torques for power cord connections, p. 149*).
6. Connect the other end of the power cord to the power grid via the disconnector which is absolutely required in all cases.
7. Protect the individual power supply connections with a suitably sized fuse according to the cable cross section and the maximum power consumption. Note that the contact clearance between the poles must be a minimum of 3.0 mm.

Installation example: Hydromodule WH-SDC0309K3E5

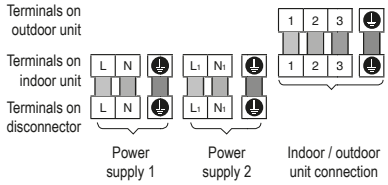
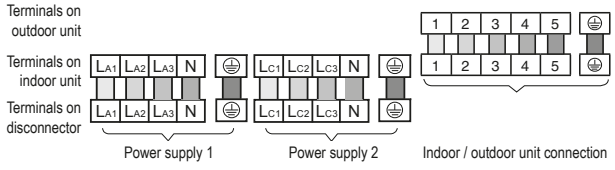


A Connection of the power cord
1 RCCB for power supply 1
2 RCCB for power supply 2
3 Cable clamps / strain reliefs
4 Terminal block for indoor / outdoor unit connection cable

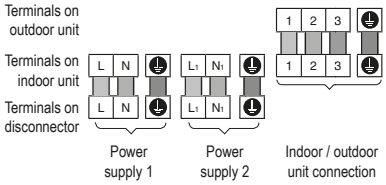
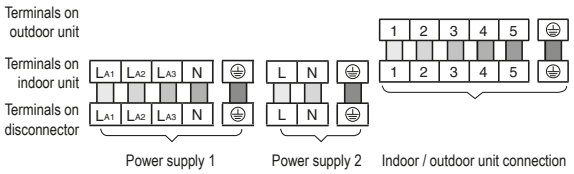
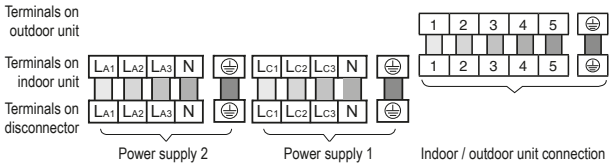
B Detailed view: Cable glands
5 Cable gland for power cord 1 and 2 and for indoor / outdoor unit connection cable
6...8 Cable glands for control wiring of optional accessories

a Use separate cable glands for power cord and accessory cables
b Fix power cord with cable clamps / strain reliefs
c Leave earth conductor longer than the other cables for safety reasons

Connection diagram – All in One units

Models	Connection diagram
WH-ADC0309K3E5(AN/B/UK) + WH-UDZ03KE5 WH-ADC0309K3E5(AN/B/UK) + WH-UDZ05KE5 WH-ADC0309K3E5(AN/B/UK) + WH-UDZ07KE5 WH-ADC0309K3E5(AN/B/UK) + WH-UDZ09KE5 WH-ADC0309K6E5(AN) + WH-UDZ03KE5 WH-ADC0309K6E5(AN) + WH-UDZ05KE5 WH-ADC0309K6E5(AN) + WH-UDZ07KE5 WH-ADC0309K6E5(AN) + WH-UDZ09KE5 WH-ADC0912K6E5(AN/UK) + WH-UXZ09KE5 WH-ADC0912K6E5(AN/UK) + WH-UXZ12KE5	
WH-ADC0912K9E8(AN) + WH-UXZ09KE8 WH-ADC0912K9E8(AN) + WH-UXZ12KE8 WH-ADC16K9E8(AN) + WH-UXZ16KE8	

Connection diagram – Hydromodules

Models	Connection diagram
WH-SDC0309K3E5 + WH-UDZ03KE5 WH-SDC0309K3E5 + WH-UDZ05KE5 WH-SDC0309K3E5 + WH-UDZ07KE5 WH-SDC0309K3E5 + WH-UDZ09KE5 WH-SDC0309K6E5 + WH-UDZ03KE5 WH-SDC0309K6E5 + WH-UDZ05KE5 WH-SDC0309K6E5 + WH-UDZ07KE5 WH-SDC0309K6E5 + WH-UDZ09KE5 WH-SXC09K3E5 + WH-UXZ09KE5 WH-SXC09K6E5 + WH-UXZ09KE5 WH-SXC12K6E5 + WH-UXZ12KE5	
WH-SXC09K3E8 + WH-UXZ09KE8	
WH-SXC09K9E8 + WH-UXZ09KE8 WH-SXC12K9E8 + WH-UXZ12KE8 WH-SXC16K9E8 + WH-UXZ16KE8	

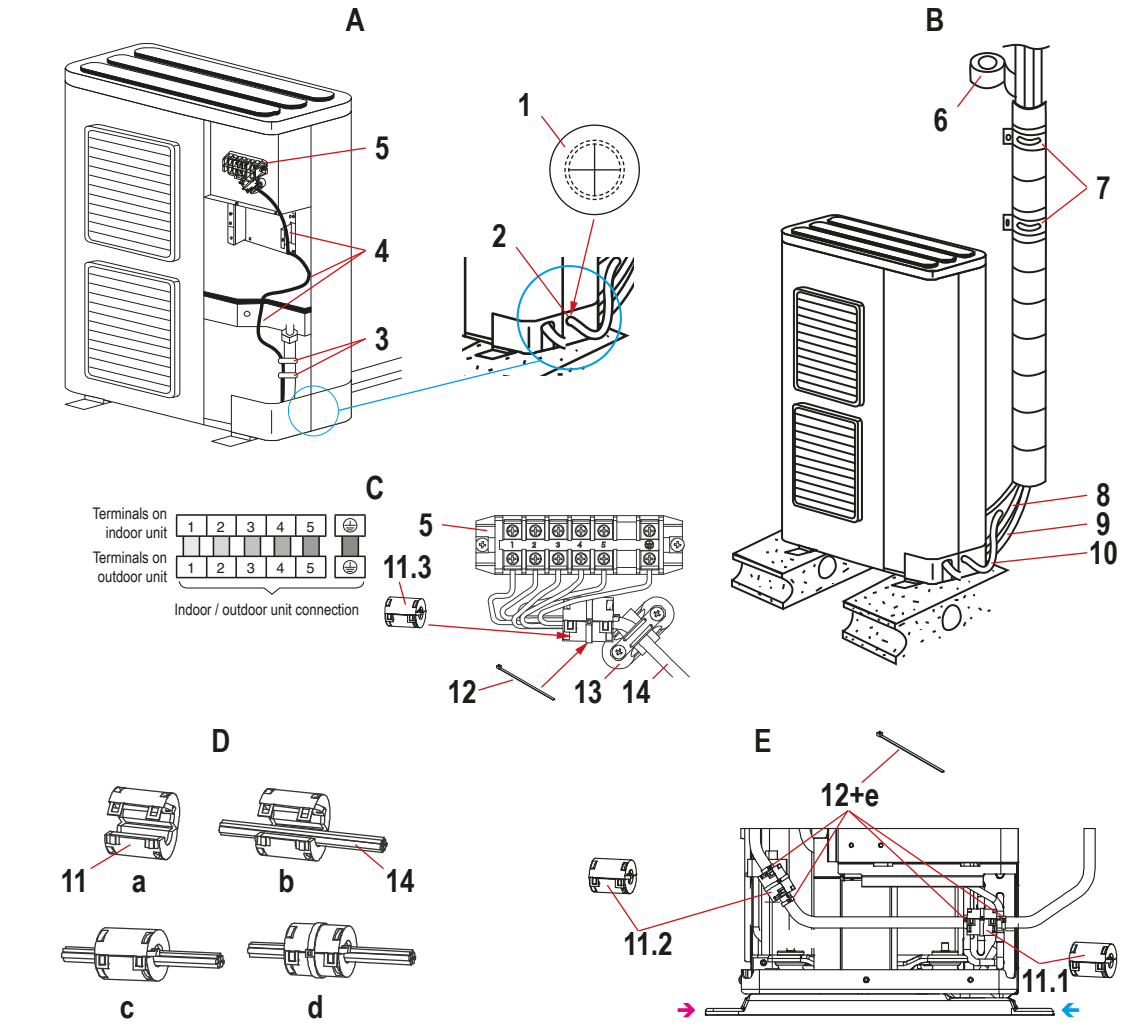
Connecting the connection cable between indoor and outdoor unit

The following method is correspondingly applicable for all outdoor units, but will be explained here on the basis of the example of a three-phase T-CAP outdoor unit of the K Generation (→ *Installation example (outdoor units), p. 152*).

Carry out the following steps to connect the connection cable to the outdoor unit:

1. Lay the connecting cable from the indoor unit to the outdoor unit through the wall grommet.
2. Open the outdoor unit (→ *6.5 Opening devices, p. 129*) and, if applicable, the connection box.
3. If several possible cable glands are present on the outdoor unit (depends on the model), select the desired cable gland, insert the rubber cable sleeve provided (**1**) and cut the cable sleeve crosswise using a knife. If not, continue with the next step.
4. Guide the cable through the cable gland (**2**) into the device.
5. For three-phase outdoor units only: Attach the ferrite cores (11), which are supplied with the outdoor unit, to the indoor/outdoor unit connection cable in three different places (11.1, 11.2, 11.3) as shown in the installation example below.
6. Fix the cable using cable ties (**3**) and cable clamps/strain reliefs (**4**).
7. Connect the connection cable to the outdoor unit terminal block (**5**) according to the following installation example (see below) and take care to leave the earth conductor longer than the other cables. Also ensure that you connect conductors of the same cable colour to the same terminal numbers on outdoor and indoor unit.
8. Wrap the tubes and cables with cable tape (**6**) and fix the cables by using fastening clamps if necessary (**7**). Alternatively, you can install the tubes and cables in a cable channel.
9. Seal the wall grommet into the building using a suitable sealing compound (to be field-supplied) after installing all cables.

Installation example: Outdoor unit WH-UDZ09KE8



➔ Front side, ➔ Rear side

A Connection of the connecting cable
1 Rubber cable sleeve (available or not, depending on model)
2 Cable gland (one or several options depending on model)
3 Cable tie
4 Cable clamp
5 Terminal block
B Insulation of the pipe and cable
6 Cable tape or cable duct
7 Fastening clamps
8 Refrigerant liquid line
9 Refrigerant gas line
10 Connecting cable between indoor and outdoor unit
C Detailed view of terminal block on outdoor unit
5 Terminal block
11.3 Ferrite core, attached inbetween terminal block and cable clamp
12 Band to tie/fix ferrite core (x7)
13 Cable clamp /strain relief
14 Indoor/outdoor unit connection cable
D Schematic view of how to attach a ferrite core
11 Ferrite core
a Open the ferrite core.
b Guide all the lead wires fully into the ferrite core.
c Close the ferrite core.
d Tie one of the supplied bands onto the centre of each ferrite core.
e Tie one of the supplied bands on each side of the ferrite core to fix it in place.
E Attachment positions for ferrite cores
11.1 Near rear side cable gland
11.2 On upward bend near the front side
11.3 Inbetween terminal block and cable clamp

6.8.2 Connecting the optional on-site accessories

6.8.2.1 Connecting accessories to the indoor unit

The following method is correspondingly applicable for all indoor units (All in One units and hydromodules), but will be explained here on the basis of the example of a single-phase hydromodule of the K Generation (→ *Installation example for accessories (hydromodules), p. 154*).

Note

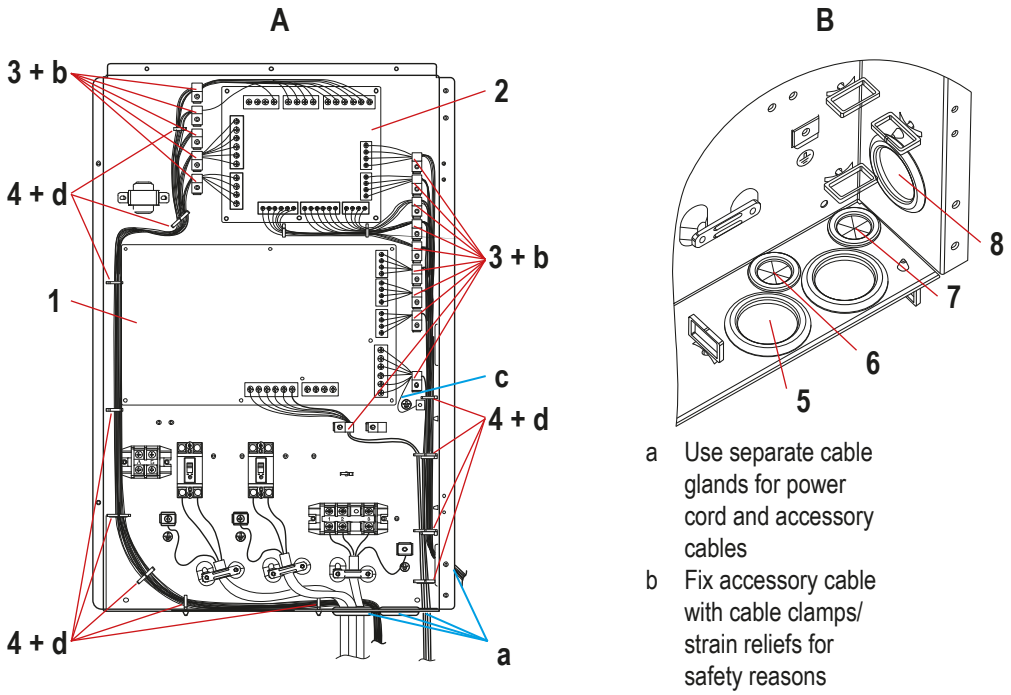
The recommended grouping of optional cables can be different for each model. Therefore, always check and follow the instructions in the service manual for the relevant model.

Carry out the following steps to connect accessory cables to the external interfaces of the indoor unit:

1. Open the indoor unit (→ *6.5 Opening devices, p. 129*) and the connection box.
2. Guide the cable through the cable glands (**6**/**7**/**8**, **a**) into the device as shown in the illustrations below.
3. Fix the cable by using cable clamps/strain reliefs (**3**, **b**) and bundle the accessory cables by means of cable ties (**4**, **d**).
4. Connect the accessory cables according to the installation example below and the subsequent brief overview of the external interfaces (→ *6.8.2.2 Brief Overview of the external interfaces, p. 156*) and take care to leave the earth conductor longer than the other cables (**c**).
   Applicable tightening torques are as follows:

Terminal screw connection on PCB	Tightening torque (Ncm)
M3	50
M4	120

Installation example for accessories: Hydromodule WH-SDC0309K3E5

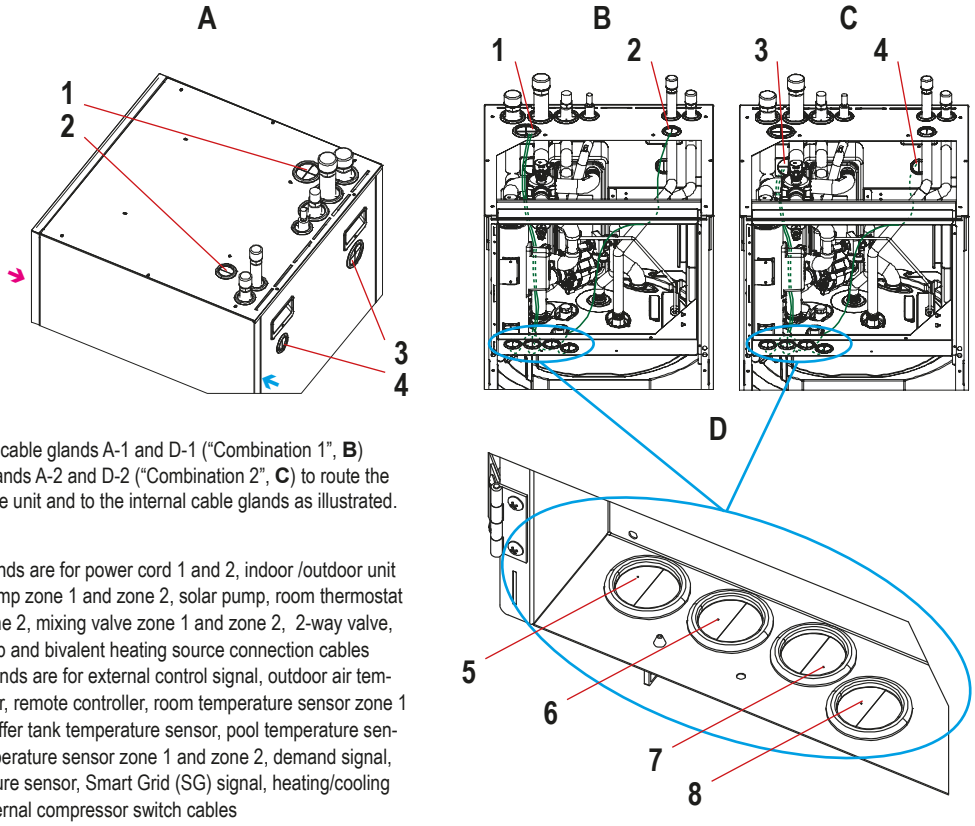


a Use separate cable glands for power cord and accessory cables
b Fix accessory cable with cable clamps/ strain reliefs for safety reasons
c Leave earth conductor longer than the other cables for safety reasons
d Bind all accessory cables together by means of cable ties

A Connection of the accessory cables
1 Main PCB
2 Optional PCB CZ-NS5P
3 Cable clamps / strain reliefs
4 Cable ties

B Detailed view: Cable glands
5 Cable gland for power cords 1 and 2 and indoor /outdoor unit connection cable
6 Cable gland for pump zone 1 and zone 2, error signal, solar pump, pool pump, room thermostat zone 2, mixing valve zone 1 and zone 2 cables
7 Cable gland for 3 way-valve, 2-way valve, room thermostat heating zone 1, electric tank heater, additional pump, bivalent heating source connection /defrost signal cables
8 Cable gland for external control signal, tank temperature sensor, outdoor air temperature sensor, tank overload protection, remote controller, buffer tank temperature sensor, room temperature sensor zone 1 and zone 2, pool temperature sensor, water temperature sensor zone 1 and zone 2, demand signal, solar temperature sensor, Smart Grid (SG) signal, heating/ cooling switch, external compressor switch cables

Installation example for accessories: All in One unit WH-ADC0912K9E8



Use EITHER top side cable glands A-1 and D-1 (“Combination 1”, **B**) OR rear side cable glands A-2 and D-2 (“Combination 2”, **C**) to route the optional cables into the unit and to the internal cable glands as illustrated.

Cable groupings

A-1 and A-2 cable glands are for power cord 1 and 2, indoor /outdoor unit connection, pump zone 1 and zone 2, solar pump, room thermostat zone 1 and zone 2, mixing valve zone 1 and zone 2, 2-way valve, additional pump and bivalent heating source connection cables

D-1 and D-2 cable glands are for external control signal, outdoor air temperature sensor, remote controller, room temperature sensor zone 1 and zone 2, buffer tank temperature sensor, pool temperature sensor, water temperature sensor zone 1 and zone 2, demand signal, solar temperature sensor, Smart Grid (SG) signal, heating/cooling switch and external compressor switch cables

➔ Front side, ➔ Rear side

A Top side view of All in One unit
1 Top side cable gland A-1
2 Top side cable gland D-1
3 Rear side cable gland A-2
4 Rear side cable gland D-2

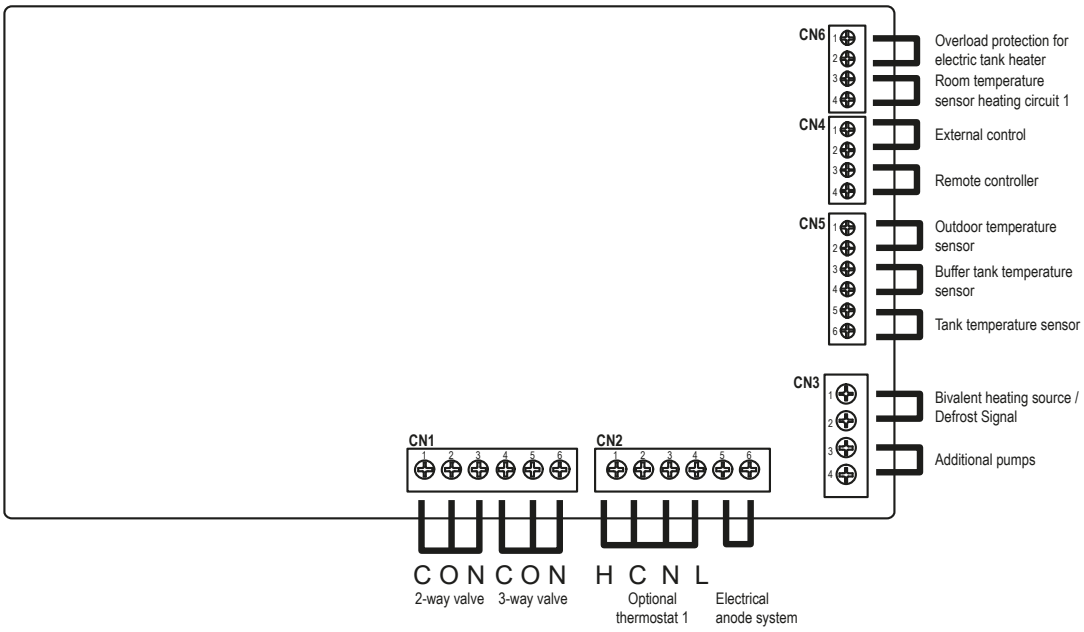
B Inside view: Top side cable routing option “Combination 1”

C Inside view: Rear side cable routing option “Combination 2”

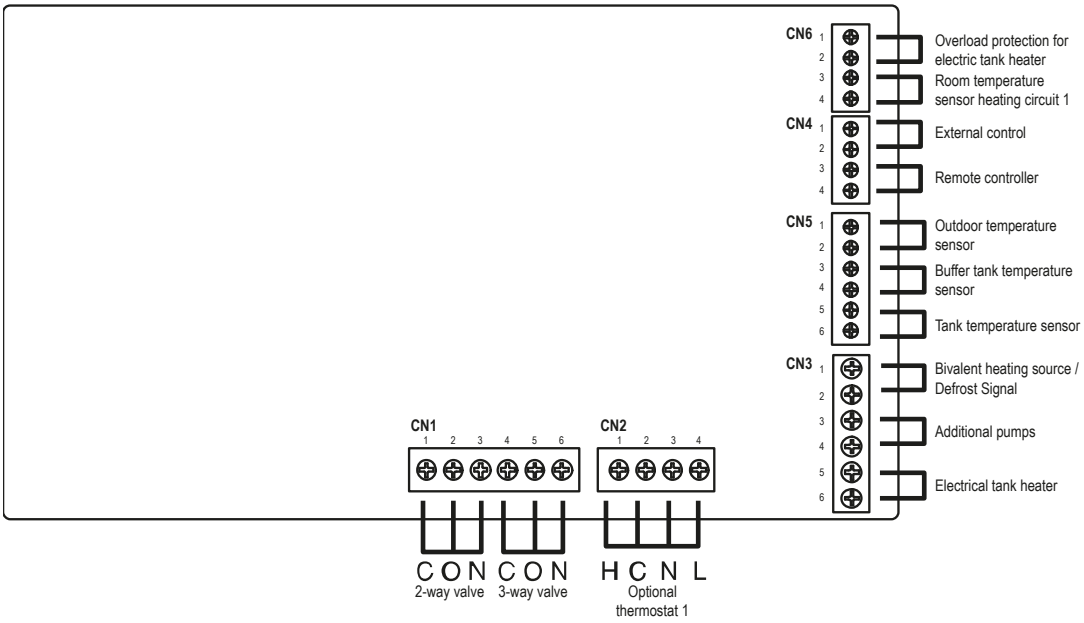
D Detail view: Internal cable glands to control board
5 Cable gland for 2-way valve, room thermostat heating zone 1, additional pump, bivalent heating source connection /defrost signal cables
6 Cable gland for power cords 1 and 2 and indoor /outdoor unit connection cable
7 Cable gland for pump zone 1 and zone 2, solar pump, error signal, pool pump, room thermostat zone 2, mixing valve zone 1 and zone 2 cables
8 Cable gland for external control signal, outdoor air temperature sensor, remote controller, buffer tank temperature sensor, room temperature sensor zone 1 and zone 2, pool temperature sensor, water temperature sensor zone 1 and zone 2, demand signal, solar temperature sensor, Smart Grid (SG) signal, heating/cooling switch, external compressor switch cables

6.8.2.2 Brief Overview of the external interfaces

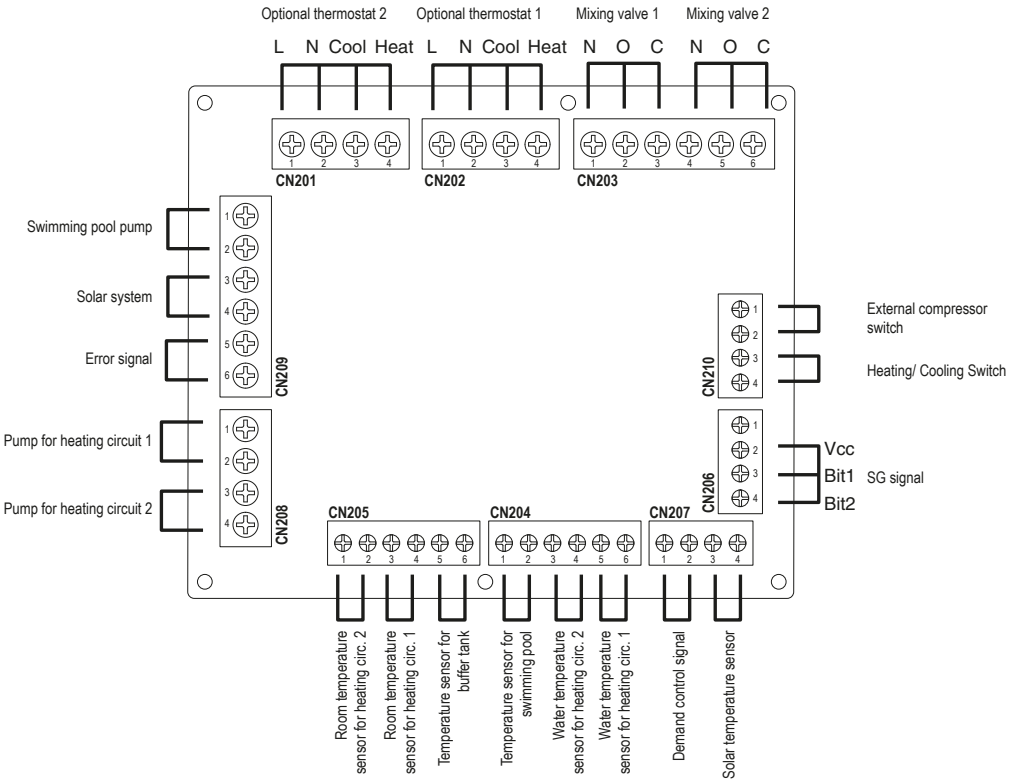
Main PCB for All in One units



Main PCB for hydromodules



Optional PCB CZ-NS5P



Note

For further information about connecting the optional on-site accessories, please refer to the following sections: → *4.7.2 External interfaces (inputs/outputs), p. 50* and → *4.8.4 Recommended on-site accessories, p. 76*.

6

6.8.3 Installing and connecting the remote controller

CAUTION

Danger of electrical shock due to unprofessional installation

Unprofessional installation of the remote controller can result in electrical shock or fire.

- ► Respect the connecting conditions for the remote controller (→ *4.7.2 External interfaces (inputs/outputs), p. 50*). Take special care to connect the remote controller not to the terminals for the power supply, but to the correct terminals.
- ► Do not install the cable of the remote controller in the direct vicinity of refrigerant or condensate pipes.

ATTENTION

Danger of damage or malfunctions due to unprofessional installation

Unprofessional installation of the remote controller can result in damage to or malfunctions in the control signals.

- ► Install the remote controller at a site where no sunshine and condensation humidity can occur, because the remote controller is not proofed against vapour or water.
- ► Mount the remote controller on as flat a site as possible, to avoid any bending and damage to the display.

IMPORTANT

Also follow the following notices to avoid faults and malfunctions of the remote controller:

- Install the cable of the remote controller separately from the cables for the power supply in order to avoid operating disruptions.
- Mount the remote controller at a distance of at least 1 m from television, radio and computer devices in order to avoid electrical interference.
- Mount the remote controller vertically on the wall at a height of 1.0 to 1.5 m above the floor in a position at which the average indoor temperature can be measured.
- To rule out faulty measurements of the indoor temperature, avoid installation locations with direct sunlight or air draughts, places where the air stream can be diverted or which are near to a heat source.
- Select an installation location at which the displays can be easily read.

In bi-bloc systems of the K Generation, the remote controller is integrated in the front plate of the indoor unit (hydromodule or All in One unit) and is hard-wired. It can, however, be dismounted and mounted separately at any desired location, e.g. even on the wall of a different room than the installation room of the indoor unit, to serve as a room thermostat.

The cable and assembly material must be field-supplied.

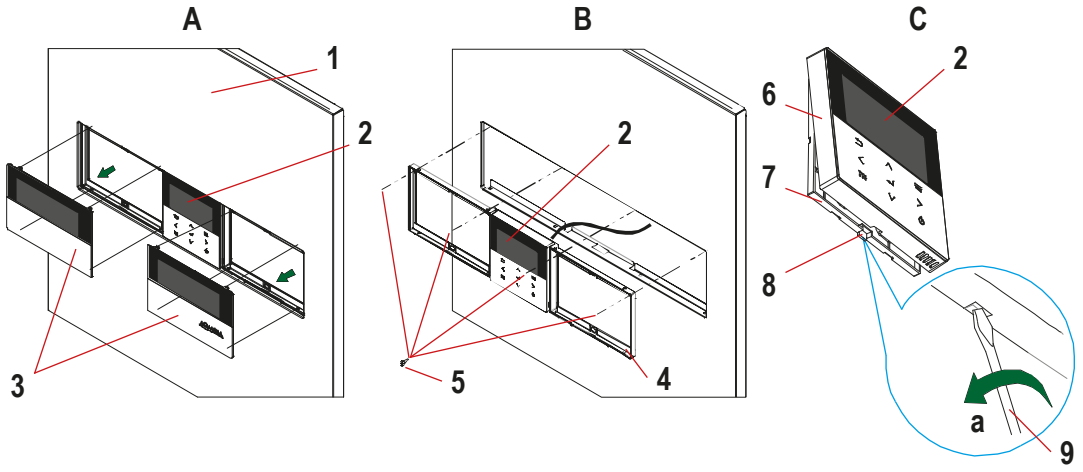
Carry out the following steps to mount the remote controller on the wall and to connect it:

1. First, dismount the remote controller from the indoor unit as follows:

a. (Fig. A) Remove the two decoration panels (3) from the indoor unit front panel (1) by gently pushing them from the back side.

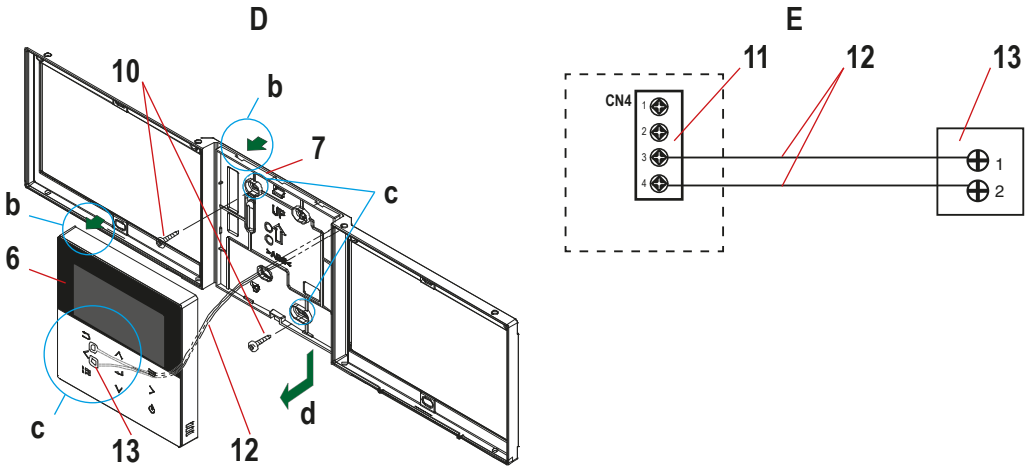
b. (Fig. B) Remove the four screws (5) and take out the holder (4) with the remote controller (2).

c. (Fig. C) Open the cabinet of the remote controller, by positioning a flat-blade screw driver (9) or a similar tool in the slot (8) at the bottom edge and turning it slightly (a).



Dismounting the remote controller
A+B Detail view of the indoor unit front plate
C Detail view of the remote controller
1 Indoor unit front plate
2 Remote controller
3 Decoration panels (on both sides of the remote controller)
4 Holder
5 Screw (x4) on the holder
6 Cabinet top part
7 Cabinet bottom part
8 Slot
9 Screw driver
a Turning the screw driver

d. (Fig. D) Unhook the claws (b) on the upper edge of the cabinet top part and pull the cabinet top part (6) gently away from the cabinet bottom part (7).
e. (Fig. D+E) Disconnect the electrical wiring of the remote controller (12) from the remote controller terminals (13) and the indoor unit terminals (11).
f. (Fig. D) Loosen the two screws (10), then slide the cabinet bottom part (7) slightly downwards (d) to unhook and remove it from the holder.



Dismounting the remote controller (continued)

D Detail view of the disassembled remote controller

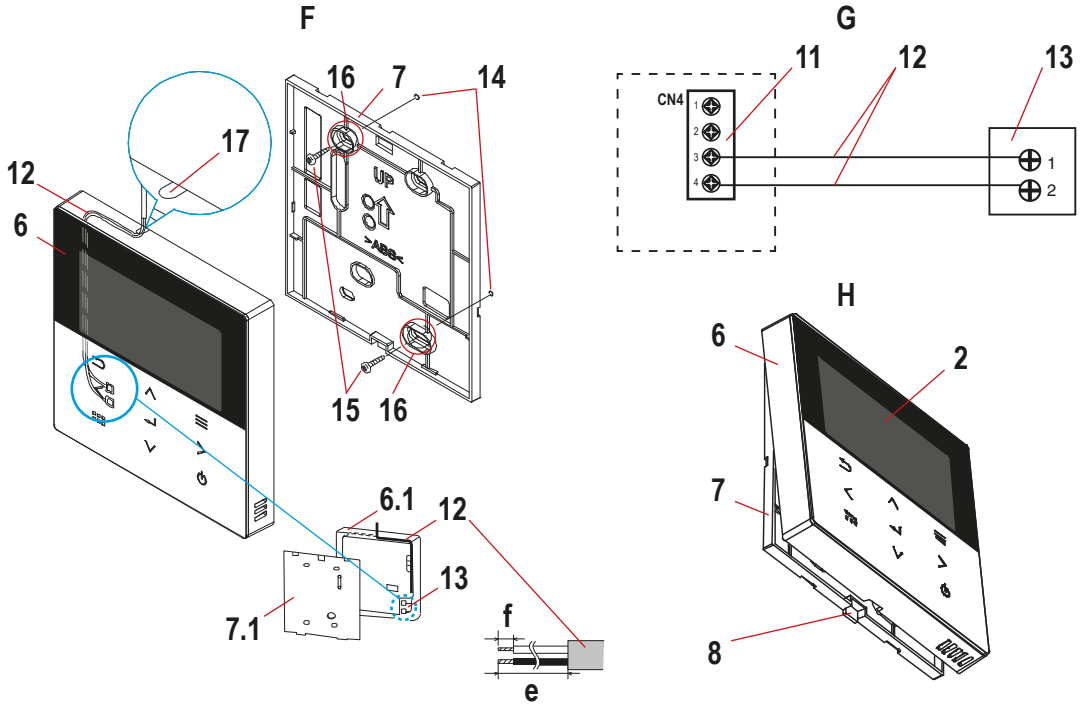
10 Screw (x2) on the cabinet bottom part
11 Terminals on indoor unit for the electrical wiring of the remote controller
12 Electrical wiring of the remote controller
13 Terminals on the remote controller
b Unhooking the claws of the cabinet top part
c Loosening the screws from the cabinet bottom part
d Sliding the cabinet bottom part downwards

E Schematic detailed representation of the terminals on the indoor unit and remote controller

11 Terminals on indoor unit for the electrical wiring of the remote controller
12 Electrical wiring of the remote controller
13 Terminals on the remote controller

2. Install a cable (to be field-supplied) that is permissible as electrical wiring of the remote controller (→ *4.7.2 External interfaces (inputs/outputs), p. 50*) from the indoor unit terminals to the installation location of the remote controller.
3. (Fig. F) Prepare the installation location of the remote controller by making two holes (14) for the screws in the wall using a screw driver.
4. Mount the cabinet bottom part (7) on the wall, by screwing two self-tapping screws (15) (to be field-supplied) into the wall through the two openings (16) of the cabinet bottom part. See that the bottom part is seated firmly.
5. Using pincer pliers, cut out the cable gland (17) at the top edge of the cabinet top part (6). Deburr the edges of the cable gland with a file so that the electrical wiring is not damaged.
6. Guide the electrical wiring of the remote controller (12) through the cable gland (17) and along the groove on the inside of the cabinet top part (14) to the remote controller terminals (13).
7. Remove approximately 180 mm (e) in length of the cable sheath and strip 6 mm (f) in length of the insulation from the wire ends and ensure that the connections of the electrical wiring point in the right direction.
8. (Fig. F+G) Connect the electrical wiring of the remote controller (12) to the remote controller terminals (13) and the indoor unit terminals (11).

9. (Fig. H) Mount the cabinet top part back on the cabinet bottom part by first aligning the two upper claws of the top part with the bottom part slots and then pressing the bottom edge of the top part carefully against the bottom part, until the bottom claw latches in the slot (8).



Mounting the remote controller

F Detail view of the disassembled remote controller

- 6 Cabinet top part
- 6.1 Cabinet top part (seen from back side)
- 7 Cabinet bottom part
- 7.1 Cabinet bottom part (seen from back side)
- 11 Terminals on indoor unit for the electrical wiring of the remote controller
- 12 Electrical wiring of the remote controller
- 13 Terminals on the remote controller
- 14 Holes in the wall (to be prepared)
- 15 Screw (x2), field supplied
- 16 Opening (x2) in cabinet bottom part
- 17 Cable gland (to be cut out)
- e 180 mm of cable sheath to be removed
- f 6 mm of wire insulation to be removed

G Schematic detailed representation of the terminals on the indoor unit and remote controller

- 11 Terminals on indoor unit for the electrical wiring of the remote controller
- 12 Electrical wiring of the remote controller
- 13 Terminals on the remote controller

H Detail view of the reassembled remote controller

- 6 Cabinet top part
- 7 Cabinet bottom part
- 8 Slot

10. Finally, replace the dismounted remote controller in the front panel of the indoor unit by the remote controller case, supplied within the scope of delivery, by carrying out the steps for dismounting the remote controller in reverse order (→ *Dismounting the remote controller, Step 1, a to f, p. 158*).

6.9 Starting up the system

Commissioning of the system covers the evacuation of the refrigerant circuit, filling the water system, the concluding inspection of the system installation, test run as well as system handover and instruction of the customer.

6.9.1 Evacuating the refrigerant circuit and carrying out a pressure test

CAUTION

Danger of injury due to unprofessional handling of refrigerants

Unprofessional handling of refrigerants leads to various dangers of injury e.g. due to freezing, fire, explosion or intoxination.

- ► Working with the refrigerant must be done by a trained skilled person or an authorised dealer with refrigerant certification.
- ► Observe all the Safety Notes in force for the refrigerant (R32).

ATTENTION

Danger of the devices being damaged by incorrect refrigerant

The use of other refrigerants or multi-component refrigerants than that indicated in this manual or the respective operating instructions can lead to damage to devices and safety risks.

- ► Only use R32 refrigerant for Aquarea High Performance and T-CAP series models of the K Generation.
- ► Do not mix the prescribed refrigerant with refrigerants of another type or replace it with a refrigerant of another type.

Danger of faults in the refrigerant circuit due to humidity and foreign gases

To avoid faults in the refrigerant circuit due to penetrating humidity or foreign gases, evacuation of the system before commissioning is mandatory.

- ► The system must be evacuated before commissioning and a pressure test be conducted.
- ► If the length of the refrigerant pipes is greater than the pre-filled pipe length of the device (→ *4.6.2.3 Technical data (bi-bloc systems), S. 36*), the indicated quantity of additional refrigerant must be added.

Endangerment of the environment due to leaking refrigerant

To keep the endangerment of the environment to a minimum, no refrigerant must be emitted to the environment when working on the refrigerant circuit.

- ► While working on the refrigerant circuit, take suitable measures to ensure that no refrigerant is emitted to the environment.
- ► Remove the refrigerant present in the system by means of a suction station and dispose of it professionally according to the provisions in force.

Carry out the following steps to evacuate the system:

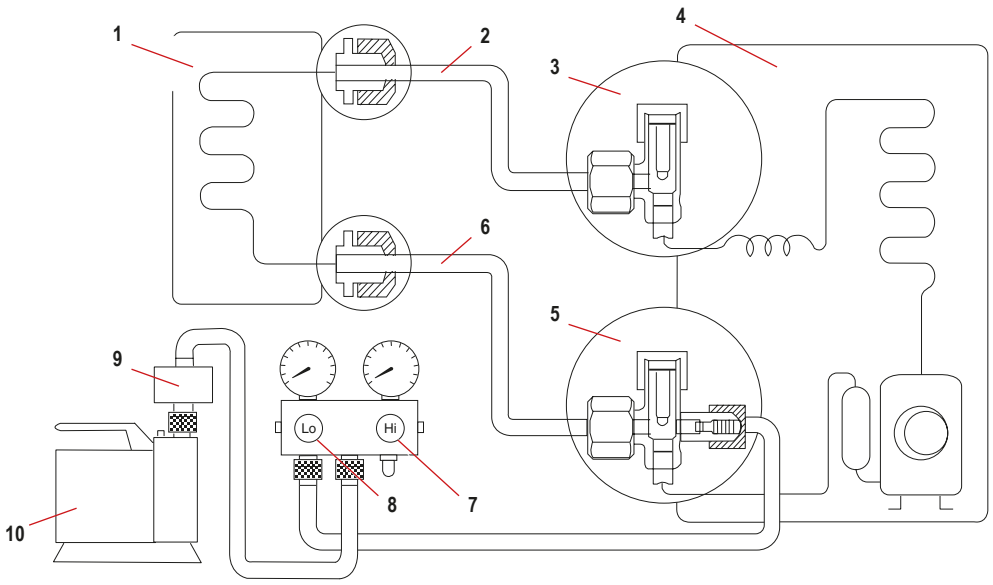
1. Connect the filling hose to the low pressure side of the manometer station and to the service port of the 3-way valve, as shown in the illustration (see below). See that the end of the filling hose with the pin is connected to the service port.
2. Connect the central hose of the manometer station to a vacuum pump with a non-return valve or to a vacuum pump with adapter.
3. Switch on the vacuum pump until the pressure has dropped to a measured value of -1 bar (-0.1 MPa). Evacuate the system for about 10 minutes. Then close the valve on the low pressure side of the manometer station and switch off the vacuum pump.
4. Remove the vacuum pump from the centre hose and connect the centre hose to a cylinder of any applicable inert gas as test gas.
5. Charge test gas into the system and wait until the pressure within the system reaches a minimum pressure of 10.4 barg (1.04 MPa).
6. Wait at least 10 minutes and monitor the pressure reading on the gauges, to check if the measured pressure value remains constant.

Yes: In this case you can assume that the refrigerant circuit is tight and go directly to step 8.

No: In this case, there is presumably still a leakage in the refrigerant circuit. Remove the leakage by performing step 7.

7. If the manometer display does not remain constant, search for any leaks using an appropriate leak detector for the test gas and repair all leaks found. Then repeat evacuation (steps 2 to 3) and the inert gas leak test (steps 4 to 6) again, until the refrigerant circuit is definitely tight.
8. Once the refrigerant circuit is definitely tight, recover the test gas from the system and repeat evacuation (steps 2 to 3) again, and then proceed to step 9.
9. If the manometer display shows -1 bar (-0.1 MPa) for 10 minutes, loosen the hose from the vacuum pump and the service port of the 3-way valve.
10. Tighten the valve cap on the service port of the 3-way valve by means of a torque wrench with a torque of 18 Nm.
11. Remove the valve caps on the valve spindles of the 2-way and 3-way valves.
12. Open both valves completely by using a hexagonal spanner so that the refrigerant streams into the system. Check that the refrigerant quantity is sufficient, otherwise top up with the required refrigerant quantity (→ *4.6.2.3 Technical data (bi-bloc systems), p. 36*).
13. Screw the valve caps back onto the valve spindles of the 2-way and 3-way valves.
14. Examine the connections for leakage.

Schematic representation of system evacuation



1 Indoor unit
2 Refrigerant liquid pipe
3 2-way valve, closed
4 Outdoor unit
5 3-way valve, closed
6 Refrigerant discharge pipe
7 Manometer low-pressure side: CLOSED
8 Manometer high-pressure side: OPEN
9 Adapter of the vacuum pump
10 Vacuum pump

6.9.2 Filling and venting the water system

6.9.2.1 Filling the hot water tank

Note

The following method describes exclusively how the Panasonic All in One units are filled.

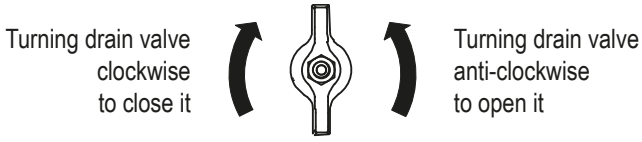
When commissioning bi-bloc systems with hydromodule, which are used in combination with hot water tanks from third party suppliers, follow the installation instructions of the third party supplier,

which is supplied with the tank, when filling the hot water tank . In such a case, continue with section → *6.9.2.2 Filling the heating or cooling circuit, p. 163*.

When commissioning bi-bloc systems with hydromodule which are used without hot water tanks, you can skip this section. In this case, too, continue with section → *6.9.2.2 Filling the heating or cooling circuit, p. 163*.

Perform the following steps to fill the hot water tank of the All in One unit:

1. Set the drain valve on the discharge tap of the hot water tank (→ *4.6.2.1 Components (bi-bloc systems), p. 27*) to the closed position.

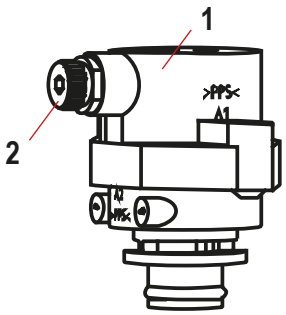


2. Open all hot water taps in the heating system (water and shower taps)
3. Fill the hot water tank through the fresh water inlet (→ *4.6.2.1 Components (bi-bloc systems), p. 27*). After 20 to 40 minutes, water should come out of the hot water taps. If this does not happen, please contact your Panasonic dealer.
4. Check whether there are any leakages in the pipe connections, and repair them if necessary.
5. Set the drain valve on the discharge tap of the hot water tank to the open position for 10 seconds to release air from this pipe, then set the drain valve back to the closed position.
6. Turn the knob on the safety release valve (→ *4.6.2.1 Components (bi-bloc systems), p. 27*) slightly anti-clockwise and hold it for 10 seconds to relase ar from this pipe, then turn the knob back to its original position.

6.9.2.2 Filling the heating or cooling circuit

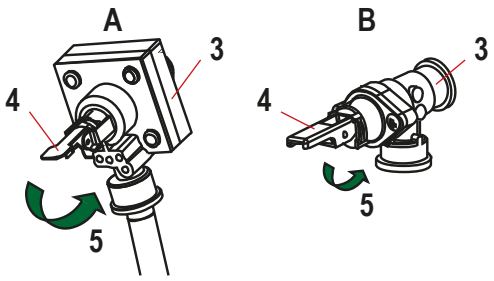
Perform the following steps to fill and vent the heating or cooling circuit:

1. Open the air purge valve (**1**), by turning the valve cap (**2**) of the air purge valve one full turn in an anti-clockwise direction (→ *4.6.2.1 Components (bi-bloc systems), p. 27*).



1 Air purge valve
2 Valve cap

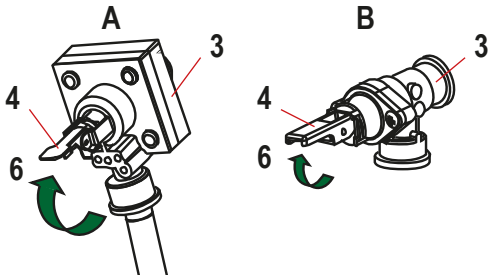
2. Make sure that the lever (4) of the pressure relief valve (3), located in the indoor unit (→ *4.6.2.1 Components (bi-bloc systems), p. 27*) is in downward position (5 – closed), so that the valve is closed.



3 Pressure relief valve (can be of type A or B)
4 Lever
5 Setting lever to the downwards/closed position

3. Turn up all thermostat valves of the heating system and possibly all other stop valves.
4. Connect a filling hose, which has been vacuumed as far as possible, to the water return of the system (→ *4.6.2.1 Components (bi-bloc systems), S. 27*).
5. Fill water (with pressure of more than 1 bar (0.1 MPa) until water flows through the discharge hose of the pressure relief valve.
6. Vent the system as follows:

a. Set the lever (**4**) of the pressure relief valve (**3**) to the horizontal position (**6** – open). The enclosed air can now escape audibly (hissing sounds).



3 Pressure relief valve (can be of type A or B)
4 Lever
6 Setting lever to the horizontal/open position

b. After a few seconds, set the lever of the pressure relief valve back to the home position (closed).
c. Repeat the sequence until there are no audible sounds of escaping air.
7. Top up the fluid if necessary.
8. Check whether there are any leakages in the pipe connections, and repair them if necessary.

6.9.3 Checking the system

WARNING

Danger to life from electric shock!

The devices are operated with 230 V or 400 V alternating current. Improper installation can present a danger to life from electric shock as well as a danger of fire occurring due to overheating.

► Ensure that you have disconnected the power supply before you carry out installation work. Secure the electricity supply against being switched on again unintentionally.

Note

Instructions for operating the devices using the remote controller are given in the operating instructions of the respective devices.

Carry out the following steps to check the completely installed system, with the power supply switched off:

1. Check if the refrigerant circuit is tight in the indoor and outdoor unit. Deficiencies and leakages must be repaired.
2. Check whether all electrical cable installations have been carried out correctly and all connections are firm. Deficiencies, if any, must be repaired.
3. Check whether all pipes have been properly installed and are tight and whether the water system is properly filled with water and vented. Deficiencies and leakages must be repaired.

4. Check the water pressure in the system by means of a manometer (→ *7.1 Checking the water pressure, p. 166*).
5. Check the functioning of the pressure relief valve (→ *7.2 Checking the pressure relief valve, p. 167*).
6. Check the initial pressure of the expansion vessel.

   Observe the specifications for the dimensioning of the expansion vessel (→ *5.2.8 Expansion vessel, p. 98*) and of the total water volume (→ *5.2.4 Hydraulic integration, p. 97*).
7. Check the functioning of the RCCB (→ *7.5 Checking the RCCB, p. 168*).
8. Once you have concluded all checks with positive results, perform a test run to ensure that no malfunctioning will occur after commissioning.

6.9.4 Carrying out a test run

Note

Instructions for operating the devices using the remote controller are given in the operating instructions of the respective devices.

Carry out the following steps to perform a test run of the system:

1. Switch on the power supply.
2. Switch on the residual current circuit breaker (RCCB) of the indoor unit and use the remote controller to switch on the heat pump (to do so, follow the instructions given in the operating instructions of the respective device).
3. Check the water pressure in the system again by means of a manometer.

   Under normal operating conditions, the measured value of the manometer should be between 0.5 and 3 bar (0.05 and 0.3 MPa).

   If necessary, adjust the rotational speed level of the circulation pump such that the water pressure is in the normal operating range (to do so, follow the instructions given in the operating instructions of the respective device).

   If the pressure does not reach the normal operating range by setting the rotation speed level, please contact your Panasonic dealer.
4. Check whether the water flow rate lies within the model-specific limits (→ *4.6.2.3 Technical data (bi-bloc systems), p. 36*, → *5.2.3 Hydraulics, p. 97*).

   If necessary, adjust the water flow rate and/or the maximum rotational speed of the circulation pump with the pump control (to do so, follow the instructions given in the operating instructions of the respective device).
5. Reset the overload protection if necessary (→ *7.7 Resetting the thermostatic overload protection, p. 169*).
6. Switch off the heat pump again to terminate the test run.
7. Clean the magnetic water filter set – and in case of the two-zone All in One unit (WH-ADC0309K3E5B) also the strainers of the water filter set – immediately thereafter (→ *7.4 Cleaning the water filters, p. 167*).
8. Once you have concluded the test run with positive results, you can program the device for the desired operation on the basis of the operating instructions of the respective device.
9. Thereafter, perform the handover of the system to the customer and his instruction in the operation of the device.

6.9.5 Carrying out the system handover and instruction

Carry out the following steps for system handover and instruction:

1. Fill in the commissioning report. Make sure again that all installation and commissioning work has been carried out fully and correctly.
2. Hand over to the customer all documents and instruct him to keep the documents safe. Explain to him the operation based on the operating instructions of the respective device and sign the instructions report and acceptance certification jointly with the customer.

7 Maintenance

In order to ensure optimal performance of the devices, inspections need to be conducted at regular intervals by an authorised specialist installer of the devices, the functioning of the RCCB, the electrical wiring and the piping. This maintenance work should be conducted by authorised Customer Services staff. Please contact your Panasonic dealer for maintenance inspections to be carried out.

The following types of maintenance work should be carried out annually:

- Checking the water pressure
- Checking the pressure relief valve
- Conducting visual checks on the PCBs and terminals
- Cleaning the water filters
- Checking the RCCB
- Checking the air purge valve and venting the system

WARNING

Danger to life from electric shock!

The devices are operated with 230 V or 400 V alternating current. Touching the live electrical cables can be life-threatening due to electrical shock.

► Service and maintenance work must only be carried out by an accredited electrician or an authorised dealer.

► Before commencing any maintenance work, ensure that the electricity supply is switched off and is secured against being turned on by mistake.

► Before opening the device, make sure that the entire system is disconnected from the electric supply. Especially in case of outdoor units of bi-bloc systems, see that the electric supply of the hydromodule or All in One unit, the tank and the electrical heater is disconnected.

7.1 Checking the water pressure

Carry out the following steps:

1. While the unit is switched on and running, press the Main menu button (☰) on the remote controller (→ *4.7.1.1 Design and functions of the remote controller, p. 45*) and scroll to “System check”, then press the Confirmation key (↵) and scroll to “System information”, finally press the Confirmation key again and scroll to “Water pressure”. Check the system pressure, which is stated on the display.

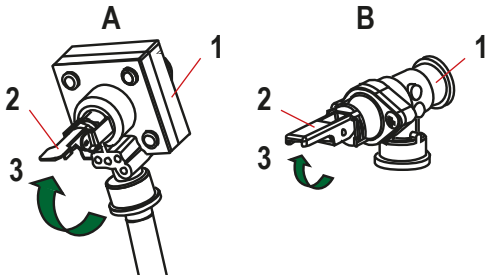
   The water pressure should not fall below 0.5 bar (0.05 MPa). Under normal operating conditions, the water pressure should be between 0.5 and 3.0 bar (0.05 and 0.3 MPa).

2. If the system pressure is below the target pressure, top up the fluid (→ *6.9.2 Filling and venting the water system, p. 162*).

7.2 Checking the pressure relief valve

Carry out the following steps:

1. Open the indoor and outdoor unit (→ *6.5 Opening devices, p. 129*) and set the lever (2) of the pressure relief valve (1) located in the indoor unit (→ *4.6.2.1 Components (bi-bloc systems), p. 27*) to the horizontal position (**3** – open).



1 Pressure relief valve (can be of type A or B)
2 Lever
3 Setting lever to the horizontal/open position

   If you do not hear a clacking sound (due to water drainage), contact an authorised dealer.
2. After a few seconds, set the lever of the pressure relief valve back to the home position (closed).
3. In case the water keep on draining out from the All in One unit, switch off the system, and then contact your local authorized dealer.

7.3 Conducting visual checks on the PCBs and terminals

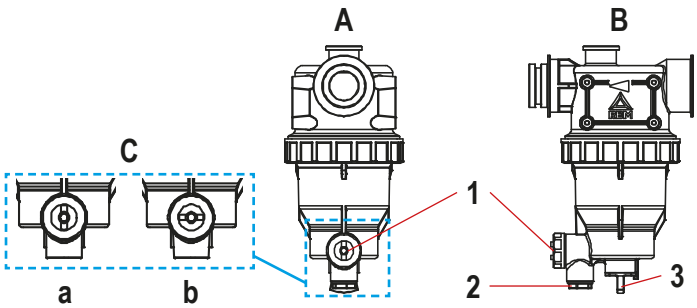
Carry out the following steps:

1. Carry out a visual inspection of the PCBs and terminals for loose connections, damaged cable insulation etc.
2. Repair any deficiencies and defects.

7.4 Cleaning the water filters

Carry out the following steps for the magnetic water filter set, which is included in all the All in One units of the K generation:

1. Turn the power supply off.
2. Place a container below the magnetic water filter set.
3. Turn the magnet bar at the bottom of the magnetic water filter set to remove it.
4. Use an Allen key (8 mm), to remove the cap of the discharge port.
5. Use another Allen key (4 mm), to open the service valve and to release the dirty water from the discharge port into the container. Close the service valve when the container is full to avoid spillage in the tank unit. Dispose of the dirty water.
6. Reinstall the cap of the discharge port and magnet bar.
7. Recharge the space heating / cooling circuit with water if necessary.
8. Turn the power supply on.



Magnetic water filter set

A Front view
B Right side view
1 Service valve
2 Discharge port
3 Magnet bar

C Detail view of service valve
a Service valve open
b Service valve closed

7

Carry out the following steps for the additional water filter set of the two-zone All in One unit (WH-ADC0309K3E5B):

1. Turn the power supply off.
2. Close the shut-off valve before and after the strainer.
3. Place a container below the magnetic water filter set.
4. Set the lever of the pressure relief valve to the horizontal/open position so that the water pressure drops to below 0.5 bar (0.05 MPa) and drain the water from the space heating / cooling circuit.
5. Open the strainer using a spanner. Remove the inserted straining element and ensure that the meshes of the straining element are not damaged.
6. Rinse out the straining element with tap water. Remove any stubborn dirt using a soft brush.
7. Replace the straining element in the strainer and close the strainer using the spanner.
8. Open the shut-off valves again.
9. Recharge the space heating / cooling circuit with water.
10. Turn the power supply on.

7.5 Checking the residual current circuit breaker (RCCB)



WARNING 

Danger to life from electric shock!

Life-threatening voltage levels are present in the device.

► Take care not to touch any live device parts. Only touch the buttons of the residual current circuit breaker (RCCB).

Carry out the following steps:

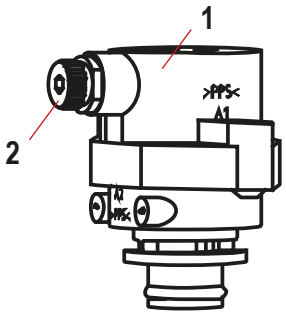
1. Make sure that the RCCB is set to ON.
2. Switch the electricity supply of the indoor unit on.
3. Press the TEST button on the RCCB.

   If the RCCB is working correctly, the lever must turn downwards to the OFF (“0”) position. If this is not the case, contact an authorised dealer.
4. Interrupt the electricity supply of the indoor unit again.
5. Set the lever of the RCCB to ON again.
6. Switch the electricity supply of the indoor unit off again.

7.6 Checking the air purge valve and venting the system

Carry out the following steps:

1. Open the air purge valve (**1**), by turning the valve cap (**2**) of the air purge valve one full turn in an anti-clockwise direction (→ *4.6.2.1 Components (bi-bloc systems), p. 27*).



1 Air purge valve
2 Valve cap

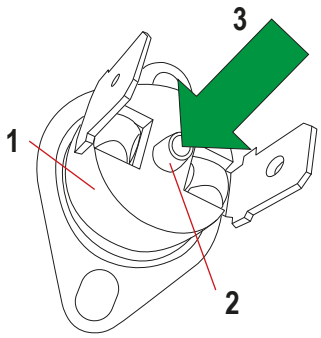
   Air should now be heard escaping.
2. Repeat the sequence until there are no audible sounds of escaping air.
3. Close the air purge valve again by turning in a clockwise direction.

7.7 Resetting the thermostatic overload protection

The overload protection (→ *4.6.2.1 Components (bi-bloc systems), p. 27*) protects the system against overheating the water.

If the thermostatic overload protection is triggered due to the water temperature being too high, carry out the following steps in order to reset it:

1. Remove the overload protection cover.
2. Using a test pin, lightly press the button (**2**) in the centre in order to reset the thermostatic overload protection.



1 Overload protection
2 Button
3 Pressing

3. Resecure the cover again afterwards.

7.8 Carrying out maintenance work on the refrigerant circuit

CAUTION

Danger of injury due to unprofessional handling of refrigerants

Unprofessional handling of refrigerants leads to various dangers of injury such as freezing, fire and the danger of explosions and the danger of intoxination.

- ► Working with the refrigerant must be done by a trained skilled person or an authorised dealer with refrigerant certification.
- ► Observe all the Safety Notes in force for the respective refrigerant (R32).
- ► Before commencing work on the refrigerant circuit, the refrigerant must always be pumped down first.

Note

Instructions for switching on the pump-down operation as well as for operating the devices can be found in the operating instructions for the respective device.

Carry out the following steps:

1. Switch the device to pump-down operating mode on the remote controller. To do so, follow the instructions given in the operating instructions of the respective device.
2. Operate the system in pump-down mode for 10 to 15 minutes (or for 1 to 2 minutes, if the ambient temperature is below 10 °C), in order to pump the refrigerant out of the pipes.
3. Close the 2-way valve fully after the time stated.
4. Close the 3-way valve fully after a further 3 minutes.
5. Stop the pump-down mode on the remote controller. To do so, follow the instructions given in the operating instructions of the respective device.
6. Carry out the required maintenance work on the refrigerant pipes. When doing this, adhere to the Safety Notes and instructions regarding connecting the refrigerant circuit (→ *6.6 Connecting the refrigeration circuit, p. 133*).
7. Start the system up again after the work has been completed (→ *6.9 Starting up the system, p. 160*). When doing this, pay particular attention to the Safety Notes and instructions regarding evacuating the refrigerant circuit (→ *6.9.1 Evacuating the refrigerant circuit and pressure testing, p. 161*).

8 Appendix

8.1 Extract from the operating instructions (K Generation)

IMPORTANT

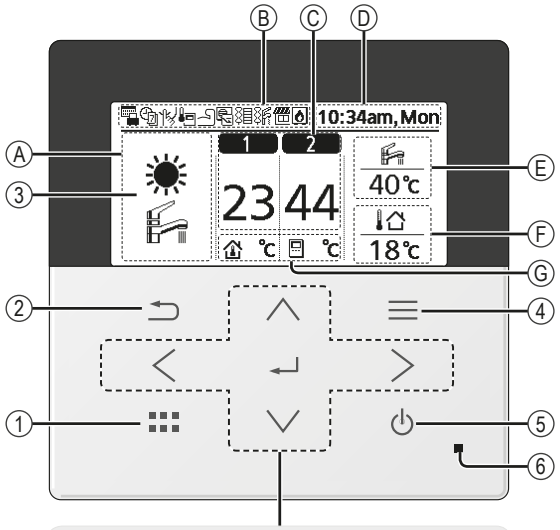
As it is not possible to cover the operating instructions for all models within the scope of this manual, only the operation instructions for bi-bloc systems with All in One unit in two zone configuration are given as an extract from the manual on the following pages to serve as an example.

However, not all functions stated here will be available for all models. Therefore, in order to be sure about the valid functions of each model, it is absolutely mandatory to refer to the operating instructions or service manual for the relevant model when operating the device.

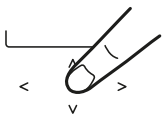
Remote Controller buttons and display

The LCD display as shown in this manual are for instructional purpose only, and may differ from the actual unit.

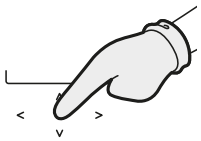
Buttons / Indicator	
①	**Quick Menu button**
②	**Back button** Returns to the previous screen
③	**LCD Display** (Actual - Dark background with white icons)
④	**Main Menu button** For function setup
⑤	**ON/OFF button** Starts/Stops operation
⑥	**Operation indicator** Illuminates during operation, blinks during alarm.



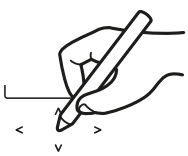
Press centre



No glove



No pen



Cross key buttons
Selects an item.

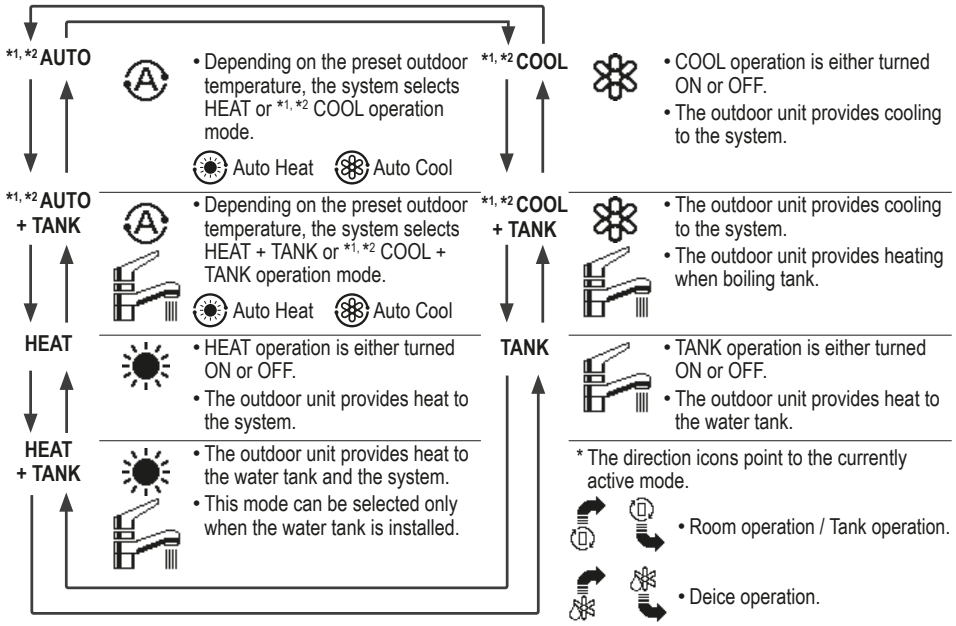
Up
Left
Right
Down

Enter button
Fixes the selected content.

Remote Controller buttons and display

Display

Ⓐ **Mode selection**



Ⓑ **Operation icons**

The status of operation is displayed.
Icon will not display (under operation OFF screen) whenever operation is OFF except weekly timer.

- Holiday operation status
- Weekly Timer operation status
- Quiet operation status
- Zone:Room Thermostat →Internal sensor status
- Powerful operation status
- Demand Control or SG ready or SHP status
- Room Heater status
- Tank Heater status
- Solar status
- Bivalent status (Boiler)

Ⓒ **Temperature of each zone**

Ⓓ **Time and day**

Ⓔ **Water Tank temperature**

Ⓕ **Outdoor temperature**

Ⓖ **Sensor type/Set temperature type icons**

- Water Temperature →Compensation curve
- Water Temperature →Direct
- Pool only
- Room Thermostat →External
- Room Thermostat →Internal
- Room Thermistor

*1 The system is locked to operate without COOL mode. It can be unlocked only by authorised installers or our authorised service partners.
*2 Only displayed when COOL mode is unlocked (This means when COOL mode is available).

8

Initialization

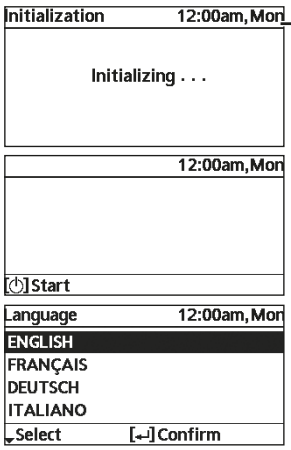
Before starting to install the various menu settings, please initiate the Remote Controller by selecting the language of operation and installing the date and time correctly.
When power is turned on for the first time, it becomes the setting screen automatically. It can also be set from personal setting of the menu.

Selecting the language

Wait while the display is initializing.
When initializing screen ends, it turns to normal screen.
When any button is pressed, language setting screen appears.

① **Scroll with ∨ and ∧ to select the language.**

② **Press ↵ to confirm the selection.**



LCD blinking

Setting the clock

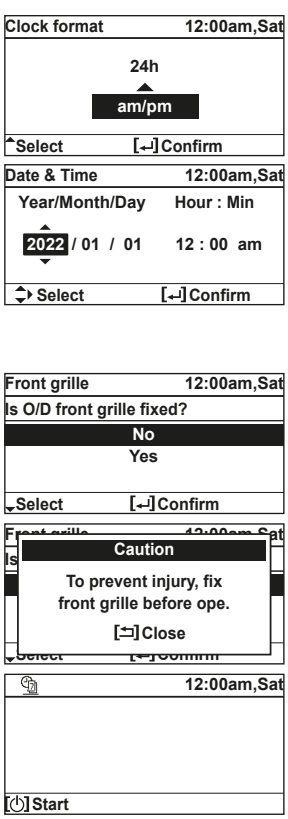
① **Select with ∨ or ∧ how to display the time, either 24h or am/pm format (for example, 15:00 or 3:00 pm).**

② **Press ↵ to confirm the selection.**

③ **Use ∨ and ∧ to select year, month, day, hour and minutes. (Select and move with > and press ↵ to confirm.)**

④ **Once the time is set, time and day will appear on the display even if the Remote Controller is turned OFF.**

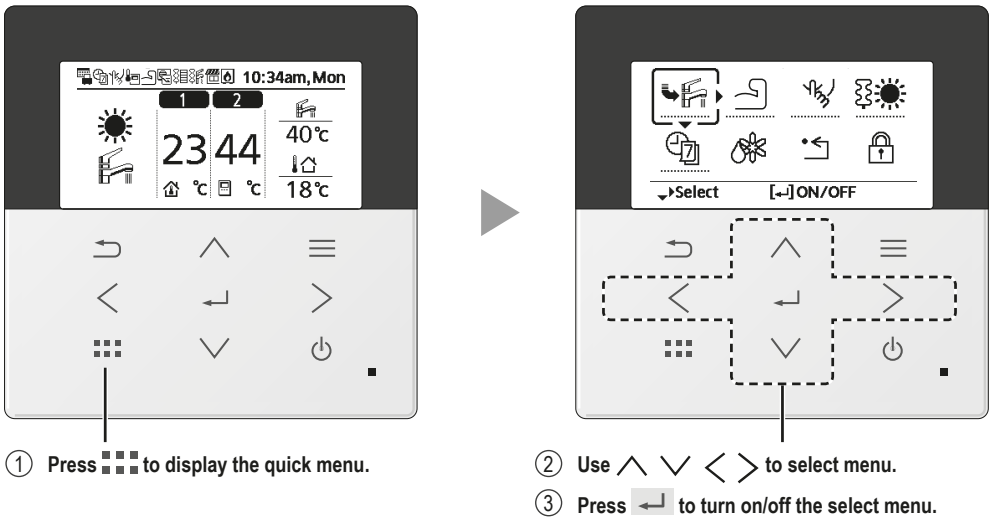
⑤ **Final precaution step to check and confirm whether outdoor front grille is fixed before operating the unit for safety purpose.**
Select Yes if outdoor front grille is already fixed. Then it will proceed to main screen.
Select No if outdoor front grille is not yet fixed. A caution message will pop up to remind on the installation.



8

Quick Menu

After the initial settings have been completed, you can select a quick menu from the following options and edit the setting.



① Press ⋮⋮⋮ to display the quick menu.

② Use ∧ ∨ < > to select menu.

③ Press ↵ to turn on/off the select menu.

Quick Menu

Force DHW	Powerful	Quiet	Force Heater
Weekly Timer	Force Defrost	Error Reset	R/C Lock

Select	[↵] ON/OFF	Select each setting and confirm the setting according to the instructions displayed at the bottom of the screen. (The icons refer to each selection key.)

To return to the Main Screen,

Press ⋮⋮⋮ or ↩ .

Menus For user

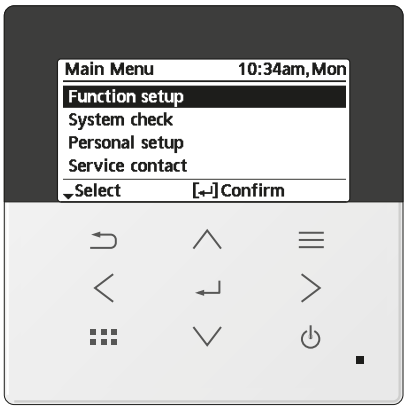
Select menus and determine settings according to the system available in the household. All initial settings must be done by an authorised dealer or a specialist. It is recommended that all alterations of the initial settings are also done by an authorised dealer or a specialist.

- After initial installation, you may manually adjust the settings.
- The initial setting remains active until the user changes it.
- The Remote Controller can be used for multiple installations.
- Ensure the operation indicator is OFF before setting.
- The system may not work properly if set wrongly. Please consult an authorised dealer.

To display <Main Menu>: ☰

To select menu: ∧ ∨ < >

To confirm the selected content: ↵



Menu	Default Setting	Setting Options / Display
1 Function setup		
1.1 > Weekly timer		
Once the weekly timer is set up, User can edit from Quick Menu. To set up to 6 patterns of operation on a daily basis. • Disabled if Heat-Cool SW is select "Yes" or if Force Heater is on.	**Timer setup** Select day of the week and set the patterns needed (Time / Operation ON/OFF / Mode)	Weekly timer 10:34am,Mon Sun Mon Tue Wed Thu Fri Sat 1. 8:00am ON 40℃ 2. 12:00pm ON 24/28℃ 40℃ 3. 1:00pm ON 12/10℃ Day Pattern [↵]Edit
	Timer copy Select day of the week	
1.2 > Holiday timer		
To save energy, a holiday period may be set to either turn OFF the system or lower the temperature during the period.	OFF	ON OFF
	> ON	
	Holiday start and end. Date and time	Holiday: End 10:34am,Mon Year/Month/Day Hour : Min 2022 / 01 / 01 10 : 00 am Select [↵]Confirm
	OFF or lowered temperature	
• Weekly timer setting may be temporarily disabled during Holiday timer setting but it will be restored once the Holiday timer is completed.		
1.3 > Quiet timer		
To operate quietly during the preset period. 6 patterns may be set. Level 0 means the mode is off.	Time to start Quiet : Date and time	Quiet 10:34am,Mon Pattern Time Level 1 8:00am 0 2 5:00pm 1 3 11:00pm 3 Select [↵]Edit
	Level of quietness: 0 ~ 3	

8

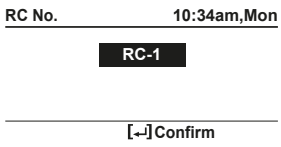
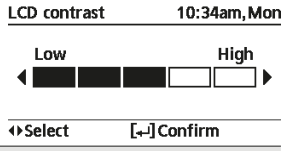
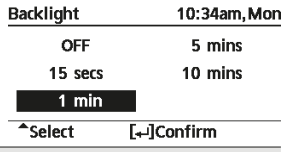
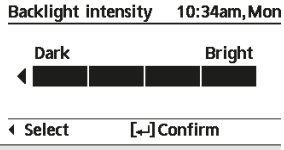
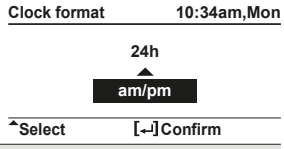
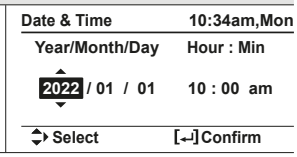
Menu	Default Setting	Setting Options / Display
1.4 > Quiet priority		
• To select priority during Quiet mode between Sound and Capacity. • If Sound priority is selected, unit will operate in quiet condition only. • If Capacity priority is selected, unit will operate in quiet condition but it will prioritize on providing required capacity at the same time.	Sound	Sound Capacity
1.5 > Room heater		
To set the room heater ON or OFF.	OFF	ON OFF
1.6 > Tank heater		
To set the tank heater ON or OFF.	OFF	ON OFF
1.7 > Sterilization		
To set the auto sterilization ON or OFF.	ON	ON OFF
• Do not use the system during sterilization in order to prevent scalding with hot water, or overheating of shower. • Ask an authorised dealer to determine the level of sterilization function field settings according to the local laws and regulations.		
1.8 > DHW mode (Domestic Hot Water)		
To set the DHW mode to Standard or Smart. • Standard mode have faster DHW Tank heat up time. Meanwhile Smart mode take longer time to heat up DHW time with lower energy consumption.	Standard	Standard Smart
To set the tank sensor to Top or Center. • Selection of the tank sensor to top slow down the start of boiling up the tank and reduce power consumption. Please change this selection to “Center” when the hot water becomes insufficient.	Top	Top Center

Menus For user

Menu	Default Setting	Setting Options / Display
2 System check		
2.1 > Energy monitor		
Present or historical chart of energy consumption, generation or COP.	**Present** Select and retrieve **Historical chart** Select and retrieve	Total consumption (1year) 0.0 kWh 1year 1 2 3 4 5 6 7 8 9 10 11 12 Mth Jan, 2022: 0.0 kWh Approx. Month Mode
• COP= Coefficient of Performance. • For historical chart, the period is selected from 1 day/1 week/1year. • Energy consumption (kWh) of heating, *1, *2 cooling, tank and total may be retrieved. • The total power consumption is an estimated value based on AC 230 V and may differ from value measured by precise equipment.		
2.2 > System information		
Shows all system information in each area.	**Actual system information of 9 items: Inlet / Outlet / Zone 1 / Zone 2 / Tank / Pool / COMP frequency / Pump flowrate / Water pressure** Select and retrieve	System information 10:34am,Mon 1. Inlet : 0℃ 2. Outlet : 0℃ 3. Zone 1 : 0℃ 4. Zone 2 : 0℃ Page
2.3 > Error history		
• Refer to Troubleshooting for error codes. • The most recent error code is displayed at the top.	Select and retrieve	Error history 10:34am,Mon 1. -- 2. -- 3. -- 4. -- [↵] Clear history
2.4 > Compressor		
Shows the compressor performance.	Select and retrieve	Compressor 10:34am,Mon 1. Current frequency : 0 Hz 2. (OFF-ON) counter : 0 3. Total ON time : 0 h [⮌] Back
2.5 > Heater		
Total hours of ON time for Room heater/Tank heater.	Select and retrieve	Heater 10:34am,Mon Total ON time : 0h : 0h [⮌] Back

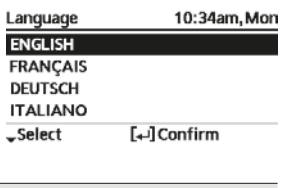
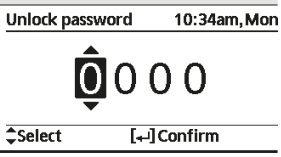
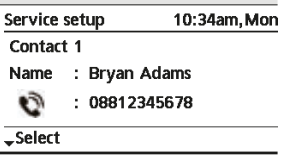
*1 The system is locked to operate without COOL mode. It can be unlocked only by authorised installers or our authorised service partners.
*2 Only displayed when COOL mode is unlocked (This means when COOL mode is available).

8

Menu	Default Setting	Setting Options / Display
3 Personal setup		
3.1 > Remote control No.		
• To display remote control number of a particular remote controller so that installer and end user are well informed. • Main remote controller is displayed as RC-1. Second remote controller is displayed as RC-2.	Select and retrieve	
3.2 > Touch sound		
Turns the operation sound ON/ OFF.	ON	
3.3 > LCD contrast		
Sets the screen contrast.	3	
3.4 > Backlight		
Sets the duration of screen backlight.	1 min	
3.5 > Backlight intensity		
Sets screen backlight brightness.	4	
3.6 > Clock format		
Sets the type of clock display.	am/pm	
3.7 > Date & Time		
Sets the present date and time.	Year / Month / Day / Hour / Min	

8

Menus For user

Menu	Default Setting	Setting Options / Display
3.8 > Language Sets the display language for the top screen.	ENGLISH / FRANÇAIS / DEUTSCH / ITALIANO / ESPAÑOL / DANISH / SWEDISH / NORWEGIAN / POLISH / CZECH / NEDERLANDS / TÜRKÇE / SUOMI / MAGYAR / SLOVENŠČINA / HRVATSKI / LIETUVIŲ / PORTUGUÊS / БЪЛГАРСКИ / EESTI / LATVIEŠU / ROMÂNĂ / SHQIP / SLOVENČINA / МАКЕДОНСКИ / УКРАЇНСЬКА / ΕΛΛΗΝΙΚΑ	
3.9 > Unlock password 4 digit password for all the settings.	0000	
4 Service contact **4.1 > Contact 1 / Contact 2** Preset contact number for installer.	Select and retrieve	

8

Menus For installer

Menu	Default Setting	Setting Options / Display
5 Installer setup > System setup		
5.1 > Optional PCB connectivity		
To connect to the external PCB required for servicing.	No	Yes ▲ No

• If the external PCB is connected (optional), the system will have following additional functions:
① Control over 2 zones (including the swimming pool and the function to heat water in it).
② Solar function (the solar thermal panels connected to either the DHW (Domestic Hot Water) Tank or the Buffer Tank.
• DHW is not applicable for WH-ADC *models.
③ External compressor switch.
④ External error signal.
⑤ SG ready control.
⑥ Demand control.
⑦ Heat-Cool SW

5.2 > Zone & Sensor		
To select the sensors and to select either 1 zone or 2 zone system.	**Zone** • After selecting 1 or 2 zone system, proceed to the selection of room or swimming pool. • If the swimming pool is selected, the temperature must be selected for △T temperature between 0°C ~ 10 °C.	Zone & Sensor 10:34am,Mon Zone 1 Zone system 2 Zones system ▼Select [↵]Confirm
	Sensor * For room thermostat, there is a further selection of external or internal. • If select internal, there is a further selection of RC-1 or RC-2 (only available when Zone selection is 1 zone system). Select RC-1 if main remote controller's thermistor is to be used for room temperature control and vice versa.	Zone & Sensor 10:34am,Mon Sensor Water temperature Room thermostat Room thermistor ▼Select [↵]Confirm
5.3 > Heater capacity		
To reduce the heater power if unnecessary.* 3 kW / 6 kW / 9 kW * Options of kW vary depending on the model.		Heater capacity 10:34am,Mon 3 kW [↵]Confirm
5.4 > Anti freezing		
To activate or deactivate the water freeze prevention when the system is OFF	Yes	Yes ▼ No

8

Menus For installer

Menu	Default Setting	Setting Options / Display
5.5 > DHW capacity		
To select tank heating capacity to variable or standard. Variable capacity heat up tank with fast mode and keep the tank temperature with efficient mode. While standard capacity heat up tank with rated heating capacity.	Variable	Variable Standard
5.6 > Base pan heater		
To select whether or not optional base pan heater is connected. * Type A - The base pan heater activates only during deice operation. * Type B - The base pan heater activates when outdoor ambient temperature is 5 °C or lower.	No	Yes No
	> Yes	
	A	Set base pan heater type*. Base pan heater type 10:34am, Mon A B Select [↵] Confirm
5.7 > Alternative outdoor sensor		
To select an alternative outdoor sensor.	No	Yes No
5.8 > External SW		
	No	Yes No
5.9 > External error signal		
	No	Yes No
5.10 > Demand control		
	No	Yes No
5.11 > SG ready		
	No	Yes No
	> Yes	
	120 %	Capacity (1) & (2) of DHW (in %), Heat (in %) and Cool (in °C) SG ready 10:34am, Mon Capacity [1-0]: DHW Range: (50%~150%) Steps: ±5% 120 % Select [↵] Confirm
5.12 > External compressor SW		
	No	Yes No

8

Menu	Default Setting	Setting Options / Display
5.13 > Circulation liquid		
To select whether to circulate water or glycol in the system.	Water	Circulation liquid 10:34am,Mon **Water** Glycol Select [↵] Confirm
5.14 > Heat-Cool SW		
	No	Yes **No**
5.15 > Force heater		
To turn on Force heater either manually (by default) or automatically.	Manual	Force heater 10:34am,Mon Auto **Manual** Select [↵] Confirm
5.16 > Force defrost		
If auto selection is set, outdoor unit will start defrost operation if long heating hour operate during low outdoor temperature.	Manual	Auto **Manual**
5.17 > Defrost signal		
To turn on defrost signal to stop fan coil during defrost operation. (If defrost signal set to yes, bivalent function will not available to use)	No	Yes **No**
5.18 > Pump flowrate		
To set variable flow pump control or fix pump duty control.	△T	**ΔT** Max. Duty
5.19 > DHW Defrost		
Allow system to run defrost by using hot water instead of room unit for better room comfort.	Yes	**Yes** No
5.20 > Heating control		
To select unit operation condition whether to achieve set temperature faster or to save energy.	Comfort	**Comfort** Efficiency

8

Menus For installer

Menu	Default Setting	Setting Options / Display
5.21 > External meter		
To set which external meter to be used depends on meter connection. There are generation meters and various types of electricity meters. For generation meters, there are two connection systems :- a) One generation meter system : Heat-cool meter only b) Two generation meter system : Heat-cool meter and Tank meter	Heat-cool meter : No * Tank meter : No Elec. meter HP : No Elec. meter 1 (PV) : No Elec. meter 2 (Building) : No Elec. meter 3 (Reserve) : No * Only available when Heat-cool meter select Yes	External meter 10:34am,Mon Heat-Cool meter Tank meter Elec. meter HP Elec. meter 1 (PV) Select [↵] Confirm External meter 10:34am,Mon Elec. meter HP Elec. meter 1 (PV) Elec. meter 2 (Building) Elec. meter 3 (Reserve) Select [↵] Confirm
	> Heat-cool meter	
	- Set Heat-cool meter to Yes when this generation meter is connected. - It is to measure energy generation of heat pump unit during heating, cooling and DHW operation (one generation meter system) or during heating and cooling only (two generation meter system).	Yes No
	> Tank meter	
	- Set Tank meter to Yes when this generation meter is connected. - It is to measure energy generation of heat pump unit during DHW operation. * Only available to select when Heat-cool meter is set to Yes. Only set Tank meter to Yes when the connection is two generation meter system.	Yes No
	> Elec. meter HP	
	- Set Elec. meter HP to Yes when this electricity meter is connected. - It is to measure energy consumption of heat pump unit.	Yes No
	> Elec. meter 1 (PV)	
	- Set Elec. meter 1 (PV) to Yes when this electricity meter is connected. - It is to measure energy generation of solar system. * This data will be displayed only on Cloud system.	Yes No
	> Elec. meter 2 (Building)	
	- Set Elec. meter 2 (Building) to Yes when this electricity meter is connected. - It is to measure energy consumption of the building. * This data will be displayed only on Cloud system.	Yes No

8

Menu	Default Setting	Setting Options / Display
	> Elec. meter 3 (Reserve)	
	- Set Elec. meter 3 (Reserve) to Yes when this electricity meter is connected. - It is to measure energy consumption * This data will be displayed only on Cloud system.	Yes ▲ No
5.22 > Electrical anode		
To enable or disable operation of electrical anode.		Yes ▲ No

(NOTE) : If [Approx.] is shown on Energy Monitor display, data displayed on the remote controller is obtained through heat pump's internal calculation.
If [Approx.] is NOT shown on Energy Monitor display, data** displayed on the remote controller is obtained by External Meters.
Data stored on the Aquarea unit can be mixed between internal calculation and External Meters.
**In order to know the exact consumption or generation, please use as reference always the External Meters' data.

Remark : Elec. stands for "Electricity"
HP stands for "Heat pump"

Menus For installer

Menu	Default Setting	Setting Options / Display
6 Installer setup > Operation setup		
To access to the four major functions or modes.	4 main modes Heat / *1, *2 Cool / *1, *2 Auto / Tank	Operation setup 10:34am,Mon Heat Cool Auto Tank Select [↵] Confirm
6.1 > Heat		
To set various water & ambient temperatures for heating.	Water temp. for heating ON / Outdoor temp. for heating OFF / △T for heating ON / Heater ON/OFF	Operation setup 10:34am,Mon Heat Water temp. for heating ON Outdoor temp. for heating OFF ΔT for heating ON Select [↵] Confirm
> Water temp. for heating ON		
Compensation curve	Heating ON temperatures in compensation curve or direct input.	Operation setup 10:34am,Mon Heat ON: Water temp. Compensation curve Direct Select [↵] Confirm
> Water temp. for heating ON > Compensation curve		
X axis: -5 °C, 15 °C Y axis: 55 °C, 35 °C	Input the 4 temperature points (2 on horizontal X axis, 2 on vertical Y axis).	Heat ON: Water temp.:Zone1 55℃ 60 35℃ 20 -20 -5℃ 15℃ 15 Select [↵] Confirm
• Temperature range: X axis: -20 °C ~ 15 °C, Y axis: See below • Temperature range for the Y axis input: 1. WH-UD model: 20 °C ~ 60 °C 2. WH-UH model & Back up heater is enabled: 25 °C ~ 65 °C 3. WH-UH model & Back up heater is disabled: 35 °C ~ 65 °C 4. WH-UX model: 20 °C ~ 60 °C • If 2 zone system is selected, the 4 temperature points must also be input for Zone 2. • "Zone 1" and "Zone 2" will not appear on the display if only 1 zone system.		
> Water temp. for heating ON > Direct		
35 °C	Temperature for heating ON	Operation setup 10:34am,Mon Heat ON: Water temp.:Zone2 Range: (20℃~60℃) Steps: ±1℃ 35 ℃ Select [↵] Confirm
• Min. ~ Max. range is conditional as follows: 1. WH-UD model: 20 °C ~ 60 °C 2. WH-UH model & Back up heater is enabled: 25 °C ~ 65 °C 3. WH-UH model & Back up heater is disabled: 35 °C ~ 65 °C 4. WH-UX model: 20 °C ~ 60 °C • If 2 zone system is selected, temperature set point must input for Zone 2. • "Zone 1" and "Zone 2" will not appear on the display if only 1 zone system.		

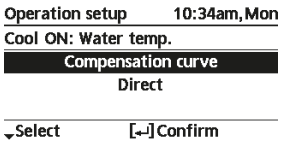
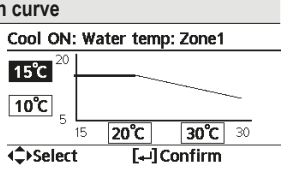
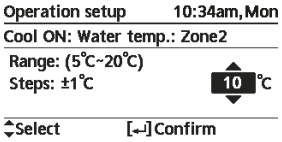
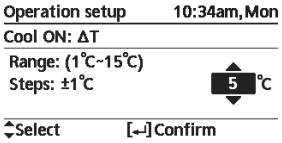
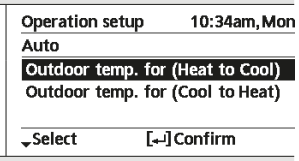
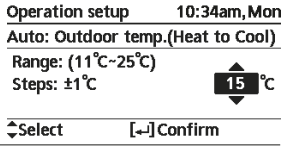
*1 The system is locked to operate without COOL mode. It can be unlocked only by authorised installers or our authorised service partners.
*2 Only displayed when COOL mode is unlocked (This means when COOL mode is available).

8

Menu	Default Setting	Setting Options / Display
	> Outdoor temp. for heating OFF	
	24 °C	Temperature for heating OFF Operation setup 10:34am,Mon Heat OFF: Outdoor temp. Range: (5℃~35℃) Steps: ±1℃ 24 ℃ Select [↵]Confirm
	> △T for heating ON	
	5 °C	Set △T for heating ON. * This setting will not available to set when pump flowrate set to Max. duty. Operation setup 10:34am,Mon Heat ON: ΔT Range: (1℃~15℃) Steps: ±1℃ 5 ℃ Select [↵]Confirm
	> Heater ON/OFF	
	> Heater ON/OFF > Outdoor temp. for heater ON	
	0 °C	Temperature for heater ON Operation setup 10:34am,Mon Heater ON: Outdoor temp. Range: (-20℃~15℃) Steps: ±1℃ 0 ℃ Select [↵]Confirm
	> Heater ON/OFF > Delay time for heater ON	
	0:30 min	Delay time for heater to turn on Operation setup 10:34am,Mon Heater ON: Delay time Range: (0:10~1:00) Steps: ±0:10 0:30 Select [↵]Confirm
	> Heater ON/OFF > Water temperature for heater ON	
	-4 °C	Setting of water temperature to turn on from water set temperature. Operation setup 10:34am,Mon Heater ON: ΔT of target Temp. Range: (-10℃~-2℃) Steps: ±1℃ -4 ℃ Select [↵]Confirm
	> Heater ON/OFF > Water temperature for heater OFF	
	-2 °C	Setting of water temperature to turn off from water set temperature. Operation setup 10:34am,Mon Heater OFF: ΔT of target Temp. Range: (-8℃~0℃) Steps: ±1℃ -2 ℃ Select [↵]Confirm
6.2	**> *1, *2 Cool**	
To set various water & ambient temperatures for cooling.	Water temperatures for cooling ON and △T for cooling ON.	Operation setup 10:34am,Mon Cool Water temp. for cooling ON ΔT for cooling ON Select [↵]Confirm

*1 The system is locked to operate without COOL mode. It can be unlocked only by authorised installers or our authorised service partners.
*2 Only displayed when COOL mode is unlocked (This means when COOL mode is available).

Menus For installer

Menu	Default Setting	Setting Options / Display
	> Water temp. for cooling ON	
	Compensation curve	Cooling ON temperatures in compensation curve or direct input. 
	> Water temp. for cooling ON > Compensation curve	
	X axis: 20 °C, 30 °C Y axis: 15 °C, 10 °C	Input the 4 temperature points (2 on horizontal X axis, 2 on vertical Y axis) 
	• If 2 zone system is selected, the 4 temperature points must also be input for Zone 2. • "Zone 1" and "Zone 2" will not appear on the display if only 1 zone system.	
	> Water temp. for cooling ON > Direct	
	10 °C	Set temperature for Cooling ON 
	• If 2 zone system is selected, temperature set point must input for Zone 2. • "Zone 1" and "Zone 2" will not appear on the display if only 1 zone system.	
	> △T for cooling ON	
	5 °C	Set △T for cooling ON * This setting will not available to set when pump flowrate set to Max. duty. 
6.3	**> *1, *2 Auto**	
Automatic switch from Heat to Cool or Cool to Heat.	Outdoor temperatures for switching from Heat to Cool or Cool to Heat. Outdoor temp. for (Heat to Cool) / Outdoor temp. for (Cool to Heat)	
	> Outdoor temp. for (Heat to Cool)	
	15 °C	Set outdoor temperature for switching from Heat to Cool. 

*1 The system is locked to operate without COOL mode. It can be unlocked only by authorised installers or our authorised service partners.
*2 Only displayed when COOL mode is unlocked (This means when COOL mode is available).

8

Menu	Default Setting	Setting Options / Display
	› Outdoor temp. for (Cool to Heat)	
	10 °C	Set outdoor temperature for switching from Cool to Heat.
		Operation setup 10:34am,Mon Auto: Outdoor temp.(Cool to Heat) Range: (5℃~14℃) Steps: ±1℃ 10 ℃ Select [↵]Confirm
6.4 › Tank Setting functions for the tank.	Floor operation time (max) / Tank heat up time (max) / Tank re-heat temp. / Sterilization	Operation setup 10:34am,Mon Tank Floor operation time (max) Tank heat up time (max) Tank re-heat temp. Select [↵]Confirm
	• The display will show 3 functions at a time.	
	› Floor operation time (max)	
	8:00	Maximum time for floor operation (in hours and minutes)
		Operation setup 10:34am,Mon Tank: Floor ope. time (max) Range: (0:30~10:00) Steps: ±0:30 8:00 Select [↵]Confirm
	› Tank heat up time (max)	
	1:00	Maximum time for heating the tank (in hours and minutes)
		Operation setup 10:34am,Mon Tank: Heat up time (max) Range: (0:05~4:00) Steps: ±0:05 1:00 Select [↵]Confirm
	› Tank re-heat temp.	
	-8 °C	Set temperature to perform reboil of tank water.
		Operation setup 10:34am,Mon Tank: Re-heat temp. Range: (-12℃~-2℃) Steps: ±1℃ -8 ℃ Select [↵]Confirm
	› Sterilization	
	Monday	Sterilization may be set for 1 or more days of the week. Sun / Mon / Tue / Wed / Thu / Fri / Sat
		Operation setup 10:34am,Mon Sterilization: Day Sun Mon Tue Wed Thu Fri Sat — ✓ — — — — — Day ☑/☐ [↵]Confirm
	› Sterilization: Time	
	12:00	Time of the selected day(s) of the week to sterilize the tank 0:00 ~ 23:59
		Operation setup 10:34am,Mon Sterilization: Time 12 : 00 pm Select [↵]Confirm

Menus For installer

Menu	Default Setting	Setting Options / Display
	> Sterilization: Boiling temp.	
	65 °C	Set boiling temperatures for sterilize the tank.
	> Sterilization: Ope. time (max)	
	0:10	Set sterilizing time (in hours and minutes)
7 Installer setup > Service setup		
7.1 > Pump maximum speed		
To set the maximum speed of the pump.	Setting the flow rate, max. duty and operation ON/OFF of the pump. Flow rate: XX:X L/min Max. Duty: 0x40 ~ 0xFE, Pump: ON/OFF/Air Purge	
7.2 > Pump down		
To set the pump down operation.	**Pump down operation** ON	
7.3 > Dry concrete		
To dry the concrete (floor, walls, etc.) during construction. Do not use this menu for any other purposes and in period other than during construction	Edit to set the temperature of dry concrete. ON / Edit	
	> Edit	
	Stages: 1 Temperature: 25 °C	Heating temperature for drying the concrete. Select the desired stages: 1 ~ 10, range: 1 ~ 99
	> ON	
	Confirm the setting temperatures of dry concrete for each stage.	

Menu	Default Setting	Setting Options / Display
7.4 > Service contact		
To set up to 2 contact names and numbers for the User.	Service engineer's name and contact number. Contact 1 / Contact 2	Service setup 10:34am, Mon Service contact: Contact 1 Contact 2 ▼Select [↵]Confirm
	> Contact 1 / Contact 2	
	Contact name or number. Name / phone icon	Service contact 10:34am, Mon Contact 1 Name : Bryan Adams : 08812345678 ▼Select [↵]Edit
	Input name and number Contact name: alphabet a ~ z. Contact number: 1 ~ 9	Contact-1 ABC/abc 0-9/Other ABCDEFGHIJKLMNOPQR Space STUVWXYZ abcdefghi BS jklmnopqrstuvwxyz Conf ◀▼▶Select [↵]Enter Number: 1 2 3 (4 5 6) 7 8 9 - BS * 0 # _ Conf ◀▼▶Select [↵]Enter
8 Installer setup > Remote control setup		
• To select whether to use one remote controller or two remote controllers. • Select Single when one remote controller is connected. Select Dual when two remote controllers are connected. Second remote controller can be used for zone 2 room temperature control.	Single	Selection of one or two remote controllers. → Single / Dual
		When Dual is selected, Main remote controller (RC-1) will start to communicate with second remote controller (RC-2) and display "RC-1 & RC-2 sync. in progress". They are ready to be used after this pop up screen disappears. → RC-1 & RC-2 sync. in progress!
		When both remote controllers have communication failure, it will display "Communication with RC-2 failed". → Communication with RC-2 failed! [⮌]Close

8

Cleaning instructions

To ensure optimal performance of the system, cleaning has to be carried out at regular intervals.
Consult an authorised dealer.

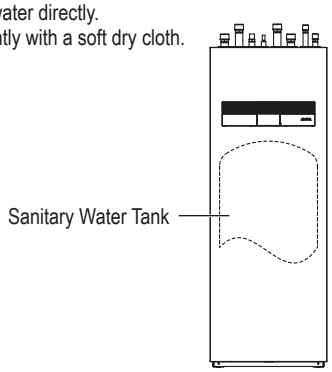
- **Disconnect the power supply before cleaning.**
- Do not use benzine, thinner or scouring powder.
- Use only soap (≃ pH7) or neutral household detergent.
- Do not use water hotter than 40 °C.

Regular Checks

Indoor unit

- Do not splash water directly.

Wipe the unit gently with a soft dry cloth.



Water pressure check

- Ensure that the water pressure is between 0.5 bar and 3.0 bar.
- In case the water pressure is out of the above range, consult an authorised dealer.
- Water pressure can be checked through following method:-
  Go to System check > System information > Water pressure

Safety relief valve

WH-ADC Hot water heater has two safety valves, one for the (TANK) and one for the (CIRCUIT).

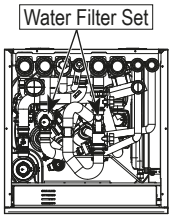
- The TANK's safety relief valve sometimes releases a little water after hot water usage. This is because the cold water, which enters the water heater, expands when heated, causing the pressure to rise and the safety valve to open.
- The CIRCUIT's safety relief valve must be completely closed and must not normally release any water.
- The functioning of the safety relief valve should be checked regularly. You can find the safety valve behind the inspection cover on the front.

Perform the checks as follows:

1. Open the valve.
2. Check that water flows through the valve.
3. Close the valve.
4. Check the system pressure, top up if required.

Water filter

- Clean the water filter at least once a year. Failure to do so may cause the filter to clog up, which may lead to system breakdown. Consult an authorised dealer.
- Please also remove dust on the magnet.



Outdoor unit

- Do not obstruct the air inlet and outlet vents. Failure to do so may result in low performance or system breakdown. Remove any obstruction to assure the ventilation.
- When it snows, clean and remove snow around the outdoor unit to prevent the air inlet and outlet vents from being covered with snow.

Tips: For extended non-use

- The water inside the Tank should be drained.
- Disconnect the power supply.

Info: Non serviceable criteria

Disconnect the power supply
then please consult an authorised dealer under the following conditions:

- Abnormal noise during operation.
- Water/foreign particles have entered the Remote Controller.
- Water leaks from the indoor unit.
- Circuit breaker switches off frequently.
- Power cord becomes excessively warm.

8

Maintenance

FILLING THE CIRCUIT SYSTEM

If the pressure is too low in the CIRCUIT system, it needs to be topped up. See the Installer Manual for more information.

VENTING THE CIRCUIT SYSTEM

In event of repeated filling of the CIRCUIT system, or if bubbling sounds are heard from the indoor module, the system may need venting. This is done as follows:

1. Turn off the power supply to the indoor module.
2. Vent the indoor module via the vent valves and the rest of the climate system via the relevant vent valves.
3. Keep topping up and venting until all air has been removed and the pressure is correct.

The climate system may require topping up after venting.

User

- In order to ensure optimal performance of the units, user may inspect and clear any obstruction on the air inlet and outlet vents of the outdoor unit.
- Users should not try to service or replace parts of the unit.
- Contact authorised dealer for scheduled inspection.

Dealer

- In order to ensure safety and optimal performance of the units, seasonal inspections on the units, functional check of RCCB/ELCB, field wiring and piping have to be carried out at regular intervals by authorised dealer.
- Specific to the Sanitary Water Tank, it is important to service the Water Filter Set periodically.

Troubleshooting

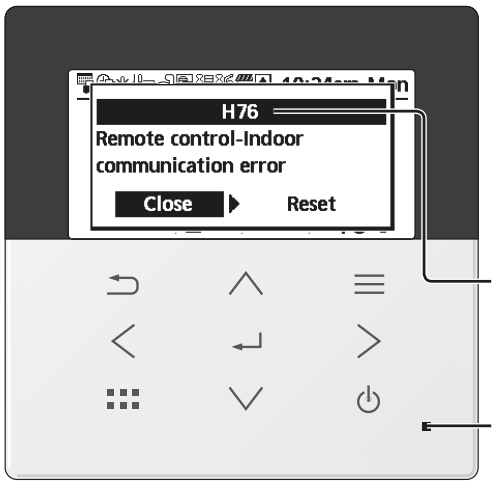
The following symptoms do not indicate malfunction.

Symptom	Cause
Water flowing sound during operation.	• Refrigerant flow inside the unit.
Operation is delayed a few minutes after restarting.	• The delay is a protection for the compressor.
Outdoor unit emits water/steam.	• Condensation or evaporation occurring in the pipes.
Steam comes out of the outdoor unit in the heating mode.	• It is caused by defrost operation in the heat exchanger.
Outdoor unit does not operate.	• It is caused by the protection control of the system when outdoor temperature is out of the operating range.
System operation switches off.	• It is caused by the protection control of the system. When the water inlet temperature is lower than 10 °C, the compressor stops and the backup heater power turns on.
System is hard to heat up.	• When the panel and the floor are heated simultaneously, warm water temperature may decrease, which may reduce the heating ability of the system. • When the outdoor air temperature is low, the system may need longer time to heat up. • Discharge outlet or intake inlet in the outdoor unit is blocked by some obstacle, such as a pile of snow. • When the preset water outlet temperature is low, the system may need longer time to heat up.
System does not heat up instantly.	• System will take some time to heat up the water if it starts to operate at cold water temperature.
Backup heater is automatically turned ON when it is disabled.	• It is caused by the protection control of the indoor unit heat exchanger.
Operation starts automatically when the timer is not set.	• Sterilization timer has been set.
Loud refrigerant noise continues for several minutes.	• It is caused by protection control during deice operation at outdoor ambient temperature lower than -10 °C.
*1, *2 COOL mode is unavailable.	• System has locked to operate in HEAT mode only.

Check the following before calling for servicing.

Symptom	Check
Operation in HEAT/*1, *2 COOL mode is not working efficiently.	• Set the temperature correctly. • Close the panel heater/cooler valve. • Clear any obstruction in the air inlet and air outlet vents of the outdoor unit.
Noisy during operation.	• Outdoor unit or indoor unit has been installed at an incline. • Close the cover properly.
System does not work.	• Circuit breaker has tripped/activated.
Operation LED is not lit or nothing is displayed on the Remote Controller.	• Power supply is working correctly, or a power failure has occurred.

*1 The system is locked to operate without COOL mode. It can be unlocked only by authorised installers or our authorised service partners.
*2 Only displayed when COOL mode is unlocked (This means when COOL mode is available).



Below is a list of error codes that may appear on the display when there is some trouble with the system setting or operation.

When the display shows an error code as indicated below, contact the number registered in the Remote Controller or a nearest authorised installer.

All switches are disabled except < > and ↵ .

Error No.	Error explanation
H12	Capacity mismatch
H15	Compressor sensor error
H20	Pump error
H21	Water pressure error
H22	Tank sensor 2 error
H23	Refrigerant sensor error
H27	Service valve error
H28	Solar sensor error
H31	Pool sensor error
H36	Buffer tank sensor error
H38	Brand mismatch error
H42	Low pressure protection
H43	Zone 1 sensor error
H44	Zone 2 sensor error
H62	Water flow error
H63	Low pressure sensor error
H64	High pressure sensor error
H65	Deice water circulation error
H67	External thermistor 1 error
H68	External thermistor 2 error
H70	Back-up heater OLP error
H72	Tank sensor 1 error
H74	PCB communication error
H75	Low water temp protection
H76	RC-1 & Indoor communication error RC-1 & RC-2 communication error
H90	Indoor-Outdoor communication error
H91	Tank heater OLP error
H95	Voltage connection error
H98	High pressure protection
H99	Indoor freeze prevention

Error No.	Error explanation
F12	Pressure switch activated
F14	Poor compressor rotation
F15	Fan motor lock error
F16	Current protection
F20	Compressor overload protection
F22	Transistor module overload protection
F23	DC peak
F24	Refrigerant cycle error
F25	*1, *2 Cool / heat cycle error
F27	Pressure switch error
F29	Low discharge super heat
F30	Water outlet sensor 2 error
F32	RC-1's internal thermostat error RC-2's internal thermostat error
F34	Indoor water heat exchanger leak
F35	External meter communication error
F36	Outdoor ambient sensor error
F37	Water inlet sensor error
F40	Outdoor discharge sensor error
F41	Power factor correction error
F42	Outdoor heat exchanger sensor error
F43	Outdoor defrost sensor error
F45	Water outlet sensor error
F46	Current transformer disconnection
F48	Evaporator outlet sensor error
F49	Bypass outlet sensor error
F50	Water inlet 2 sensor error
F51	Economizer outlet sensor error
F52	Bypass inlet sensor error
F95	*1, *2 Cooling high pressure error

* Some error code may not be applicable to your model. Consult authorised dealer for clarification.

*1 The system is locked to operate without COOL mode. It can be unlocked only by authorised installers or our authorised service partners.
*2 Only displayed when COOL mode is unlocked (This means when COOL mode is available).

Notes

· This document is valid from February 2025. · We reserve the right to make technical changes without notice. · No guarantee for completeness and accuracy of the information.
· The printed colours of the equipment may differ from the actual device colours. · Copying in full or in parts is prohibited.

Panasonic®

www.aircon.panasonic.eu