Panasonic

Panasonic Aquarea air-to-water heat pumps

Planning and installation manual

for split systems and compact systems

heating & cooling solutions

AQUAREA

Notes:

Panasonic Aquarea air-to-water heat pumps

Planning and installation manual

for split systems and compact systems

Translation of the Installation and Commissioning Instructions (English)

Version of the documentation: 01/2018

Table of Contents

Panasonic

1 Range of Aquarea heat pump models

				3 kW	5 kW	7 kW	9 kW	12 kW	16 kW			
Combined Hydro-module	LT		Single-phase	WH-ADC0309H3E5 WH-ADC0309H3E5B WH-UD03HE5-1 (B1)	WH-ADC0309H3E5 WH-ADC0309H3E5B WH-UD05HE5-1 (B1)	WH-ADC0309H3E5 WH-ADC0309H3E5B WH-UD07HE5-1 (B2)	WH-ADC0309H3E5 WH-ADC0309H3E5B WH-UD09HE5-1 (B2)	WH-ADC1216H6E5 WH-UD12HE5 (B3)	WH-ADC1216H6E5 WH-UD16HE5 (B3)	Single-phase		LT	Combined Hydro-module
			Three-phase				WH-ADC0916H9E8 WH-UD09HE8 (B3)	WH-ADC0916H9E8 WH-UD12HE8 (B3)	WH-ADC0916H9E8 WH-UD16HE8 (B3)	Three-phase			
	T-CAP		Single-phase				WH-ADC1216H6E5 WH-UX09HE5 (B3)	WH-ADC1216H6E5 WH-UX12HE5 (B3)		Single-phase		T-CAP	
			Three-phase				WH-ADC0916H9E8 WH-UX09HE8 (B3) WH-UQ09HE8 (B10)	WH-ADC0916H9E8 WH-UX12HE8 (B3) WH-UQ12HE8 (B10)	WH-ADC0916H9E8 WH-UX16HE8 (B3) WH-UQ16HE8 (B10)	Three-phase			
Split	LT		Single-phase	WH-SDC03H3E5-1 WH-UD03HE5-1 (B4)	WH-SDC05H3E5-1 WH-UD05HE5-1 (B4)	WH-SDC07H3E5-1 WH-UD07HE5-1 (B5)	WH-SDC09H3E5-1 WH-UD09HE5-1 (B5)	WH-SDC12H6E5 WH-UD12HE5 (B6)	WH-SDC16H6E5 WH-UD16HE5 (B6)	Single-phase		LT	Split
			Three-phase				WH-SDC09H3E8 WH-UD09HE8 (B6)	WH-SDC12H9E8 WH-UD12HE8 (B6)	WH-SDC16H9E8 WH-UD16HE8 (B6)	Three-phase			
	T-CAP		Single-phase				WH-SXC09H3E5 WH-UX09HE5 (B6)	WH-SXC12H6E5 WH-UX12HE5 (B6)		Three-phase		T-CAP	
			Three-phase				WH-SXC09H3E8 WH-UX09HE8 (B6) WH-SQC09H3E8 WH-UQ09HE8 (B7)	WH-SXC12H9E8 WH-UX12HE8 (B6) WH-SQC12H9E8 WH-UQ12HE8 (B7)	WH-SXC16H9E8 WH-UX16HE8 (B6) WH-SQC16H9E8 WH-UQ16HE8 (B7)				
	HT		Single-phase				WH-SHF09F3E5 WH-UH09FE5 (B6)	WH-SHF12F6E5 WH-UH12FE5 (B6)		Single-phase		HT	
			Three-phase				WH-SHF09F3E8 WH-UH09FE8 (B6)	WH-SHF12F9E8 WH-UH12FE8 (B6)		Three-phase			
Compact	LT		Single-phase		WH-MDC05H3E5 (B8)	WH-MDC07H3E5 (B8)	WH-MDC09H3E5 (B8)			Single-phase		LT	Compact
	T-CAP		Single-phase				WH-MXC09H3E5 (B9)	WH-MXC12H6E5 (B9)		Single-phase		T-CAP	
			Three-phase				WH-MXC09H3E8 (B9)	WH-MXC12H9E8 (B9)	WH-MXC16H9E8 (B9)	Three-phase			
	HT		Single-phase				WH-MHF09G3E5 (B9)	WH-MHF12G6E5 (B9)		Single-phase		HT	
			Three-phase				WH-MHF09G3E8 (B9)	WH-MHF12G9E8 (B9)		Three-phase			

Heating / Cooling / Preparation of warm water for drinking purposes

Panasonic Range of Aquarea heat pump models

2 General

About this manual

This Manual describes the planning, design, installation and commissioning 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 cooling, hydraulic and electrical components
- Commissioning

You will also find in Chapter 7 - Servicing - a description of the key servicing jobs and in the Appendix an overview of the error codes, operating instructions for the models of the H Generation and various types of document templates (e.g. protocols for commissioning and familiarisation).

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 heat pump systems are covered in this Manual: Compact systems, split systems and systems with combined hydro-module. 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 heating rooms and preparing hot water and represent complete, high-quality heating systems. If required, they can be combined with hot water tanks, solar thermal or photovoltaic systems and/or further electric-, oil- or gas-powered heat sources.

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

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.

Information related to safety

Information related to safety warns the user about dangers and provides instructions for the safe and proper use of the product. The following Warning Notices and symbols are used in this Manual:

WARNING

This signal word warns of a hazard which can lead to death or severe injury.

► Follow the Warning Notices given in order to prevent this.

CAUTION

This signal word warns of a hazard which may result in slight or moderate injury.

► Follow the Warning Notices given in order to prevent this.

CAUTION

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

► Follow the Warning Notices given 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 notice
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 Notices

3.1 General Safety Notices 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 superheat.

- ► 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 regulations 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 protection switch (FI protection switch).

CAUTION

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

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

- ► Work on the cooling circuit and in connection with the coolant must be carried out by a trained technician or an authorised trader holding a coolant certificate.
- ► Wear gloves when handling coolants (e.g. when emptying or filling the cooling circuit).
- ► Observe the Safety Notices in force for the respective coolant (R410A or R407C).

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 coolant comes into contact with fire

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

For this reason, if coolants 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 coolant circuit being too high

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

► Carry out installation of the coolant pipes in a proper manner and check that there are no leaks in the installation before turning on the compressor.

► Before the coolant 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 Notices relating to preventing material damage

CAUTION

Danger of the devices being damaged by incorrect coolant

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

► Only use coolant Type R410A for the Aquarea LT and T-CAP series and only Type R407C coolant for the Aquarea HT series.

► Do not mix the prescribed coolant with coolants of another type or replace it with a coolant 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 (hydro-modules or combined hydro-modules) are only to be installed in indoor areas.
- Outdoor units and compact devices 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 and compact devices 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 Notices and information in the operating instructions for the respective devices and the information contained in this Manual.

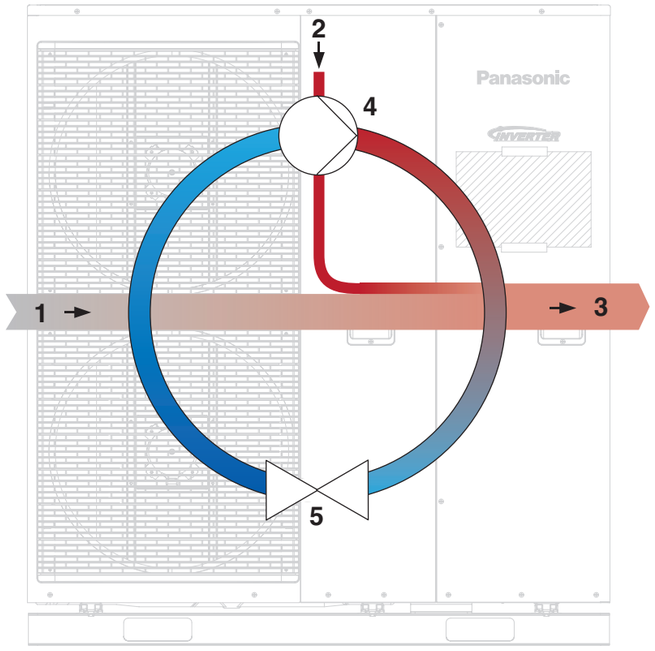
4 Product Description

4.1 Operating Principle

Pleasant indoor temperatures just above 20 °C are needed to ensure living comfort. This temperature does not differ much from the outside temperature over most of the year.

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 E-heating element.

Functioning principle of an air-to-water heat pump



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

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

- In the evaporator (**1**), the coolant 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 coolant is sharply increased, and the temperature also rises. This step takes place with supply of electrical energy (**2**).
- In the condenser (**3**), gaseous coolant 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 coolant 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 cooling machine. Aquarea heat pumps can thus also be used for room cooling.

Coefficient of Performance and Performance Number

The COP (coefficient of performance) 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 = 4.74 (A7 / W35)

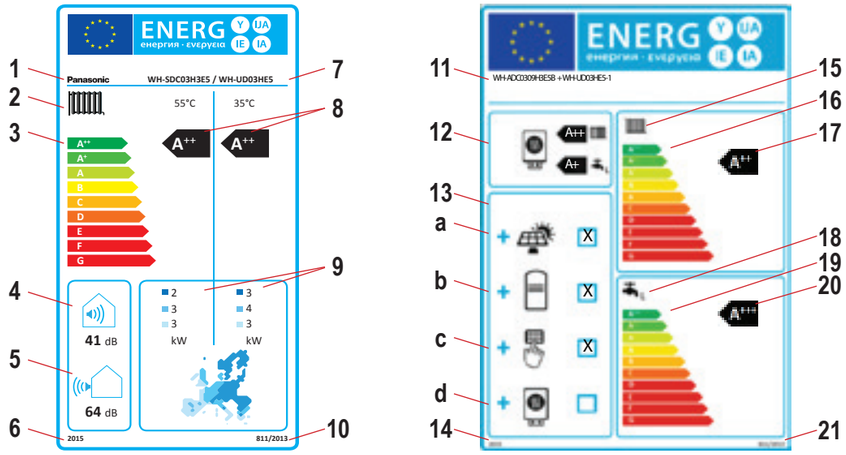
At an outside temperature of 7 °C, the air-to-water heat pump generates hot water at 35 °C with a COP of 4.74. Thus, it is possible to generate 4.74 kilowatt hours of heat from one kilowatt hour of power.

The performance number, which represents the ratio of the emitted heat to the consumed quantity of power over a certain period, is more meaningful than the COP. The annual performance number (JAZ) is the ratio of the generated heat to the needed quantity of power over the period of one year. It is recorded by means of meters for power and amount of heat and takes all operating states of the heat pump systems into consideration.

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.

EC Eco-Design Directive

The eco-design directive 2009/125/EG provides the framework for establishing the determination of the EC-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 during its total life cycle. The eco-design directive must be implemented in every EC member state into national law (e.g. in Germany by the Energy consumption relevant products act (EVPG 2008) or in Austria by the Eco-design Ordinance (ODV 2007)).



Example of Product Energy label (left)

1 Manufacturer
2 Room heating function
3 Energy efficiency class scale A++ to G
4 Sound power level in inside rooms
5 Sound power level in outdoor area
6 Year of validity of the ordinance
7 Product name
8 Energy efficiency class for room heating function at 55 °C/ 35 °C, inflow temp.
9 Heating capacity (kW)
10 Directive number

Example of Composite Energy Label (right)

11 Product name
12 Composite system
13 Combination options:
a Solar system
b Hot water tank
c Control
d Additional heat source (e.g. boiler)
14 Year of validity of the ordinance
15 Room heating function
16 Energy efficiency class scale for room heating function (A+++ to G)
17 Energy efficiency class scale for room heating function
18 Hot water preparation function with indication of the bleed profile (3XS to 4XL)
19 Energy efficiency class scale for hot water preparation function (A+++ to G)
20 Energy efficiency class scale for hot water preparation function
21 Directive number

According to this eco-design directive (or ErP directive - Energy related products), among other apparatus, (e.g. boilers and heat pumps), 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 product combinations (e.g. heat sources plus controls) must be characterised with a product or composite energy efficiency label. Energy efficiency is calculated according to uniform criteria and indicated on the label as energy efficiency class (A++(+) to G).

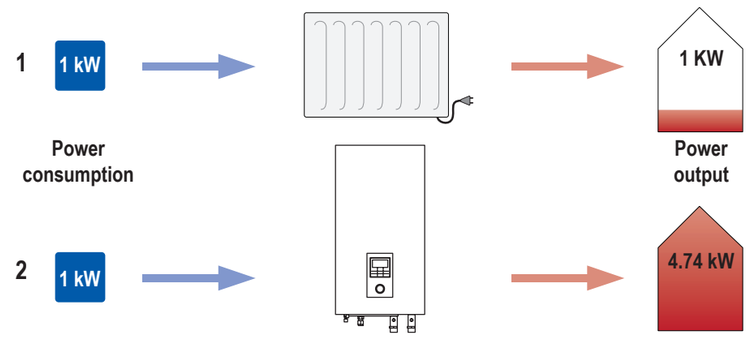
Economical and Environment-Friendly

More than 75% of the end energy utilisation in the household is used for heating and hot water provision. 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 75% cost-free ambient heat can be used. Only the remaining component of 25% power needs to be sourced for the operation of the heat pumps. In comparison with a purely power heating, the power sourcing is thus reduced to a quarter 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



As against heating systems using 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. This in turn helps increase comfort and efficiency.

Finally, Aquarea heat pumps will eventually be state-promoted through market incentive attraction programmes with direct investment cost allowances. A promotion is linked to certain conditions, which are to be observed during planning and installation. Promotions through market incentive programmes are accordingly linked mostly to minimum annual performance numbers, which must be verifiable through counters for annual amounts of heat and power. Similarly, a hydraulic alignment and the adjustment of the heating level are required. Details are given in the respective current European and national promotion directives.

Note

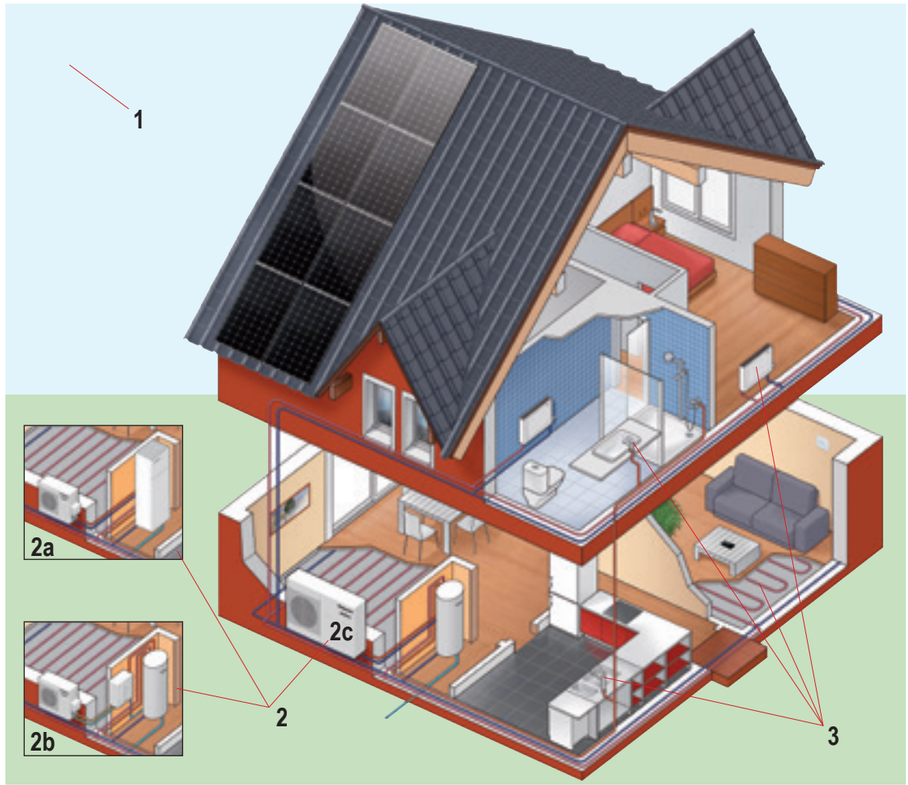
With the Aquarea Designer, Panasonic offers a cost-free programme for heat pump dimensioning, which can be used for calculating the annual performance number (see the section “Panasonic Aquarea Designer” in the planning chapter).

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: Combination Hydro-module (2a), Split system (2b) or compact system (2c)
3 Heat use: Hot water preparation / Heating / Cooling

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 three different model series. This makes it possible to offer the best possible solution to address individual heat supply requirements for buildings:

Aquarea LT:
Ideal for low temperature heaters or floor heating; it can also be used for radiators.

Aquarea T-CAP:
For applications where the nominal power 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.

Aquarea HT:
For high temperature heaters (e.g. radiators during building restoration), because Aquarea HT provides a water supply at a temperature of 65 °C without any support from other heating systems, even at outside temperatures of -15 °C.

All series - except the HT series - have a cooling function. Moreover, the Aquarea heat pump (all series) can be used as a compact system in a device or as a split system in two devices (outdoor unit and hydro-module) (→ *4.5 Model types, p. 25*).

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 performance number 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 E-heating elements is often accepted. As an alternative to an E-heating element, 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**:
  An energy (power) source is used in various heat sources (electrical heat pump + E-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 energy source (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 energy source. 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 E-heating element is operated mono-energetically, the E-heating element 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 water inflow temperatures of over 80 °C, the maximum water inflow temperature of the Aquarea heat pump is limited to 55 °C (Aquarea LT), 60 °C (Aquarea T-CAP) or 65 °C (Aquarea HT). This must be taken into consideration during the planning of the heating circuits. Surface heaters and underfloor heating that have a water inflow temperature of up to 35 °C and a spread 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 E-heating element 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 water inflow 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 Preparation of hot water

The Aquarea heat pump can similarly prepare hot water, and this is integrated in the controls. It switches to this operating mode when necessary and systematically actuates the tank for the hot water preparation through a 3-way valve.

For reasons of efficiency, the hot water temperature is set below 60 °C in the 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; this multiplies particularly well in the range between 30 and 50 °C.

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

Aquarea heat pumps can be easily combined without a problem with solar systems, which can take over hot water provision 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.

CAUTION

Danger of damage to water tank due to inadequate water quality

If the contents of chloride and sulphate contents 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 drinking water directives 98/83/EC.

4.4.3 Cooling

The cooling mode is switched on manually through the operating panel or 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 period or automatically using the defined temperature threshold.

Room cooling is possible through surface heaters such as floor and wall heaters, 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 heaters, due to which the water inflow temperature measured through the dew point sensor rises due to return mixing, or the cooling mode may need to be switched off. Fan coils can be operated with much lower water inflow temperatures, compared to the use of surface heaters 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.

CAUTION

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

In the cooling mode, a 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.

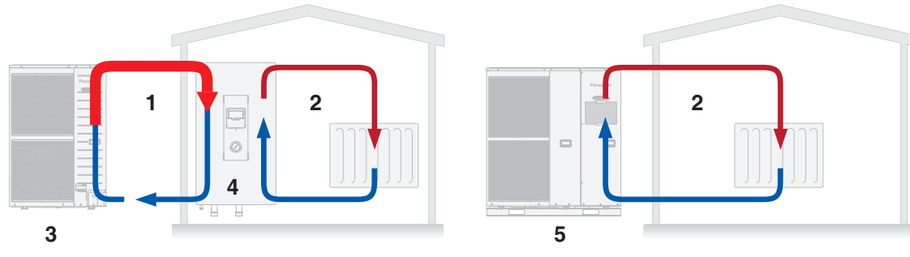
► Alternatively, the condensate that forms can be safely diverted.

► In addition, insulate the pipelines concerned to prevent diffusion.

4.5 Model types

4.5.1 Split system and compact system

Difference between split system (left) and compact system (right)



1 Refrigerant circuit
2 Heating circuit (water)
3 Outdoor unit
4 Hydro-module or combination hydro-module
5 Compact device

Split system

The split system consists of an outdoor unit installed in the open air and an indoor unit, the hydro-module or combination hydro-module, which is usually housed in the boiler room or in another frost-free room. In this model, the two devices are linked through coolant pipes, so there is no danger of freezing. The heat pump is operated through the operating panel on the indoor unit.

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

Compact system

The compact system consists of only one device that is set up outdoors. No coolant pipes are needed for the installation; only the heating system needs to be connected to it. Compact systems are easier to install, but need more space. Moreover, the heating water needs to be guided out from the building envelope and can freeze in the event of power failure or if the electricity supply is cut off by the network operator.

The heat pump is operated by using the wired remote controller, which is placed in the building and is linked to the compact device with a max. 15 meter long cable.

CAUTION

Danger of water pipes freezing in outside temperatures below 0 °C

If the heating circuit in the compact system is filled with water and the outside temperature falls below 0 °C, the risk exists in the compact system that the water pipes may freeze. This can cause a lot of damage to the device.

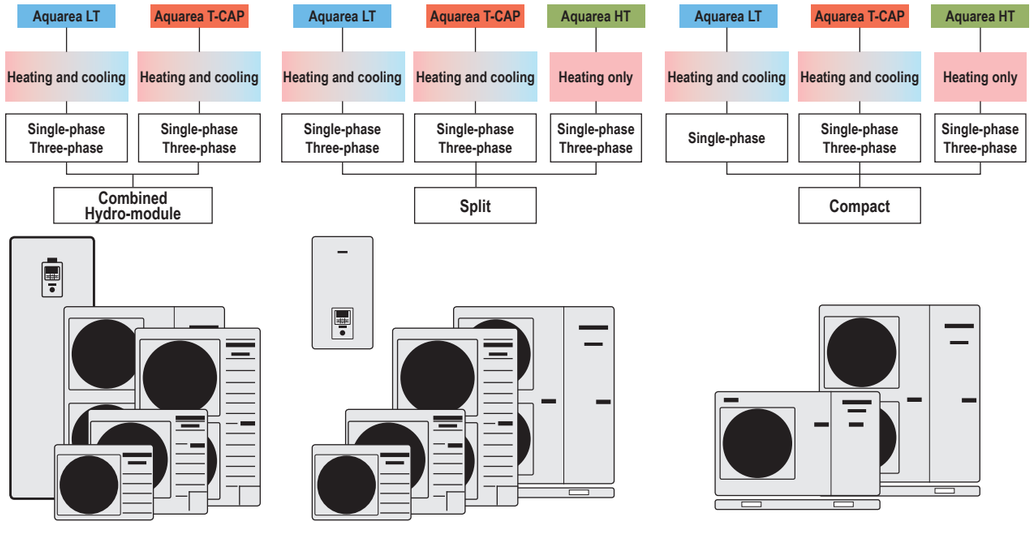
The client should therefore ensure the absence of frost by taking **one** of the following measures:

- ► Operate the heating circuit using a food-safe antifreeze mixture (propylene glycol).
- ► Provide an additional cabinet heating in the compact device, to prevent the heating circuit from freezing up.
- ► Empty the heating circuit by using a built-in device (manually or automatically) before freezing starts.

4.5.2 Series

The Aquarea heat pump system has three different series that are in turn available in multiple model variants. This is intended to offer the best possible solution to address individual heat supply and air-conditioning requirements for buildings using Aquarea heat pumps.

Overview representation of series and model variants



In all, the following features occur in various combinations:

- “Heating and cooling” or “Heating only”
- Nominal heating power (3, 5, 7, 9, 12 or 16 kW)
- Power E-heating element heat pump (3, 6 or 9 kW)
- Electrical connection (single phase or three phase)

With the large number of different model variants, which is an expression of 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. Seen from outside, the devices look almost the same except for the notable differences as in compact and split systems or combination hydro-module and can therefore be described together in respect of many planning-relevant properties. The relevant differences, even those between different product generations, will be pointed out at the appropriate point.

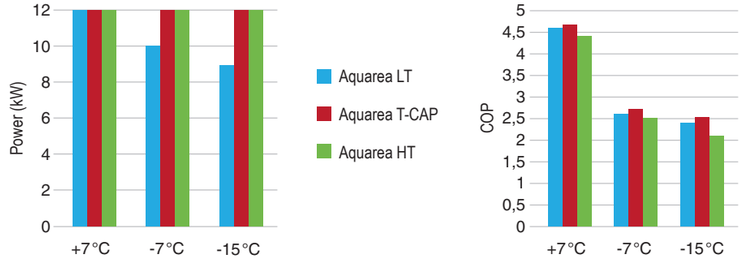
The Aquarea heat pump models are configured in terms of their properties such that a suitable model is available for all typical applications. All model variants are listed with their characteristic properties and functions are listed in the model overview at the beginning of this manual (→ *1 Model range, p. 8*).

As the overview table shows, the available models differ in their appearance mainly in the compact system and split system, where the devices are fitted with one or two fans, depending on the nominal power.

The Aquarea series are distinguished by their maximum water inflow temperature and performance stability at very low outside temperatures as follows:

	Maximum water inflow temperature	Performance at very low outside temperatures
Aquarea LT	55 °C	Heating capacity drops
Aquarea T-CAP	60 °C	Heating capacity constant up to -20 °C at 35 °C water inflow temperature
Aquarea HT	65 °C	Heating capacity constant up to -15 °C at 35 °C water inflow temperature

The illustration below shows the thermal output and COP of the Aquarea series LT, T-CAP and HT with 12 kW for different outside temperatures and a water inflow or return temperature of 35 °C or 30 °C.



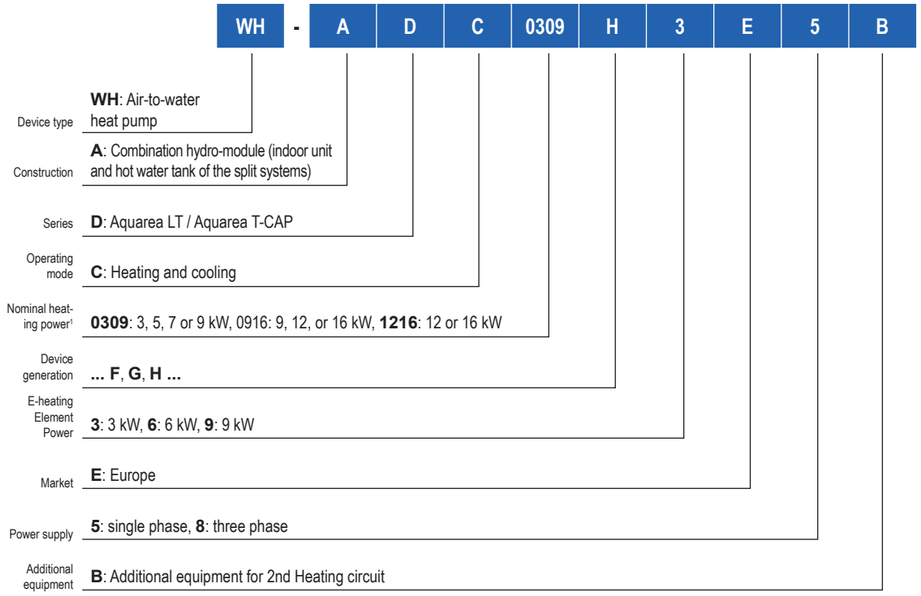
4.5.3 Type key

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

Example

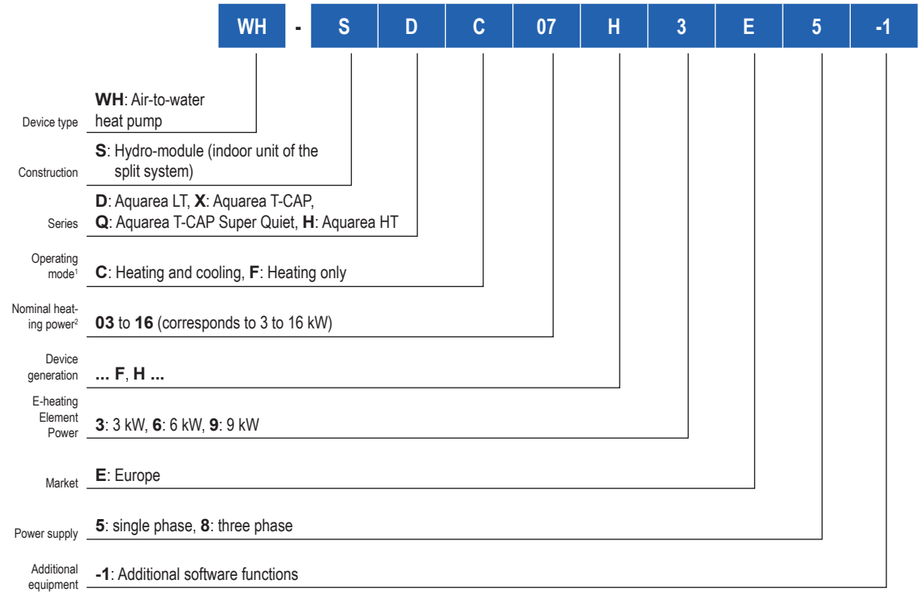
WH-MDC05H3E5 is a compact heat pump unit (M) of the series LT (D) with cooling function (C), a nominal power of 5 kW (05) of the generation H (H) for the European market (E) with a single phase power supply (5).

Type key combination hydro-module (Split systems)



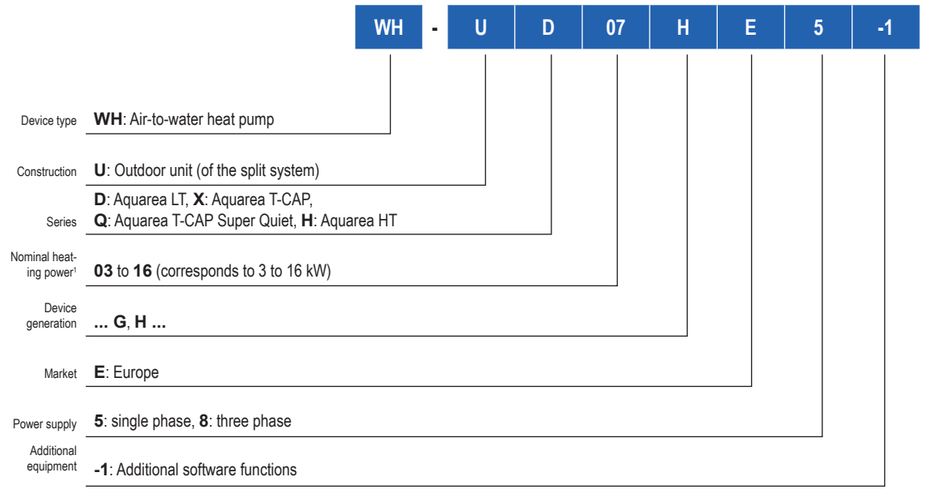
1 The available performance classes differ according to the series. An overview of the performance classes for the individual series is given in the model range (→ *1 Model range, p. 8*).

Type key hydro-module (Split systems)



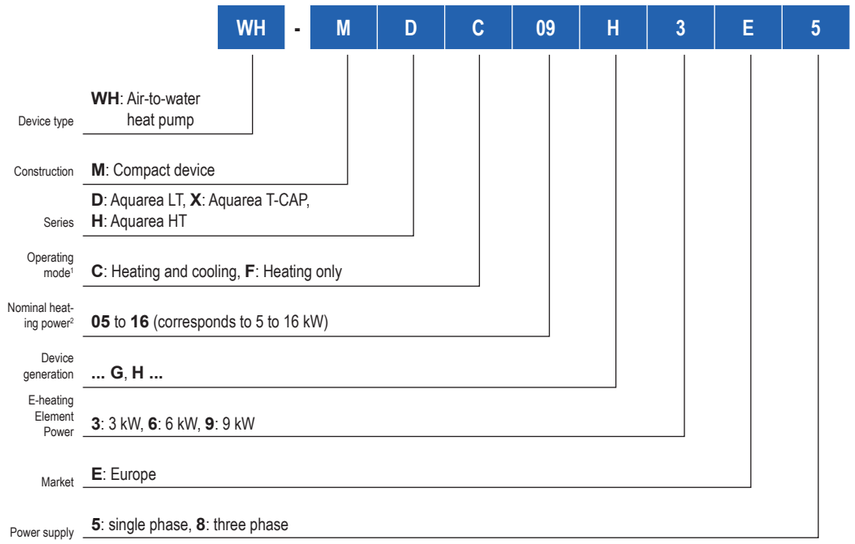
1 The devices of the Aquarea HT series can only be used for heating mode and have no cooling function.
2 The available performance classes differ according to the series. An overview of the performance classes for the individual series is given in the model range (→ *1 Model range, p. 8*).

Type key outdoor unit (Split systems)



1 The available performance classes differ according to the series. An overview of the performance classes for the individual series is given in the model range (→ *1 Model range, p. 8*).

Type key for Compact Devices



1 The devices of the Aquarea HT series can only be used for heating mode and have no cooling function.
2 The available performance classes differ according to the series. An overview of the performance classes for the individual series is given in the model range (→ *1 Model range, p. 8*).

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 5.0 for the single phase 3-kW split system and 3-kW combination hydro-module (both LT, H-Generation) or 5.08 for the single-phase 5-kW compact system (LT) for A7 / W35
- Inverter technology allows a metered and controllable power output of the device and thus contributes to energy savings with
- environmentally compatible coolant (R410A for Aquarea LT and T-CAP as well as R407C for Aquarea HT)
- All devices are fitted with a high-efficiency pump.

High Comfort

- Optimum control
- Models available for heating mode as well as heating and cooling mode (series Aquarea HT is only available for the heating mode)
- Optimised performance in relation to the return temperature
- Integrated control of the hot water tank and heating
- 24-hours timer with mode control

Easy operation

- Operation and control for split systems with hydro-module or combination hydro-module and for compact systems in the building
- Easy programming via the operator panel
- For safety reasons, the hydro-modules, combination hydro-modules and compact devices are fitted with FI protection switches.

Easy Maintenance and Assembly

Split system

- Compact design
- Easy control of the water pressure by using the manometer in the front panel of the hydro-module or combination hydro-module
- Hydro-module, combination hydro-module and outdoor unit are easy to open
- Factory piped in combination hydro-modules are easy to connect
- Flexible assembly due to long pipelines
- Up to 30 metres with a height difference up to 20 metres (depending on model)
- The pipe connections to the outdoor units can be made in four directions (front, rear, side, below).

Compact system

- No appreciable space requirement in the building, no coolant connections
- Easy opening of the device for maintenance work

Operating limits Split and Compact Systems

		Water inflow temperature (°C)	Outside temperature (°C)
Cooling mode[1]	Maximum	20	43
	Minimum	5	16
Heating mode	Maximum	LT: 55 / T-CAP: 60 / HT: 65	35
	Minimum	25	–20[2]

1 Only valid for models with cooling mode
2 At outside temperatures below the stated value, the heating capacity drops distinctly. This can cause switch-off of the unit due to its internal safety functions.

4.6.2 Split system

The Aquarea split system consists of the hydro-module or combination hydro-module (in the building) and an outdoor unit. Both units of the split system are configured such that they are mutually matched to one another as a model i.e. the models of the outdoor unit cannot be combined arbitrarily with the different hydro-module models. A suitable Aquarea split system model consisting of hydro-module and outdoor unit is available for all typical applications.

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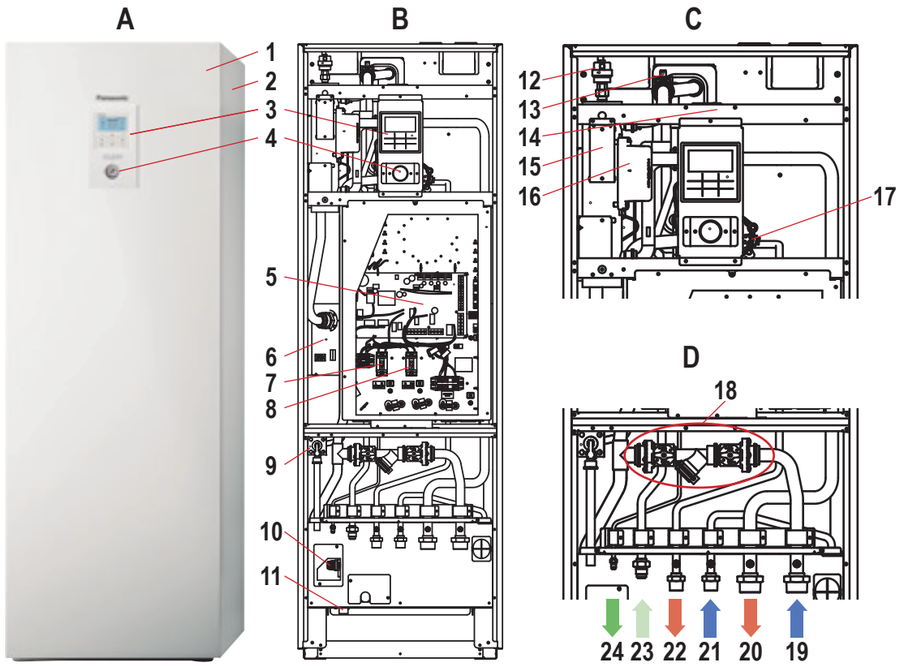
4.6.2.1 Components

Combination Hydro-module H generation - Standard Version



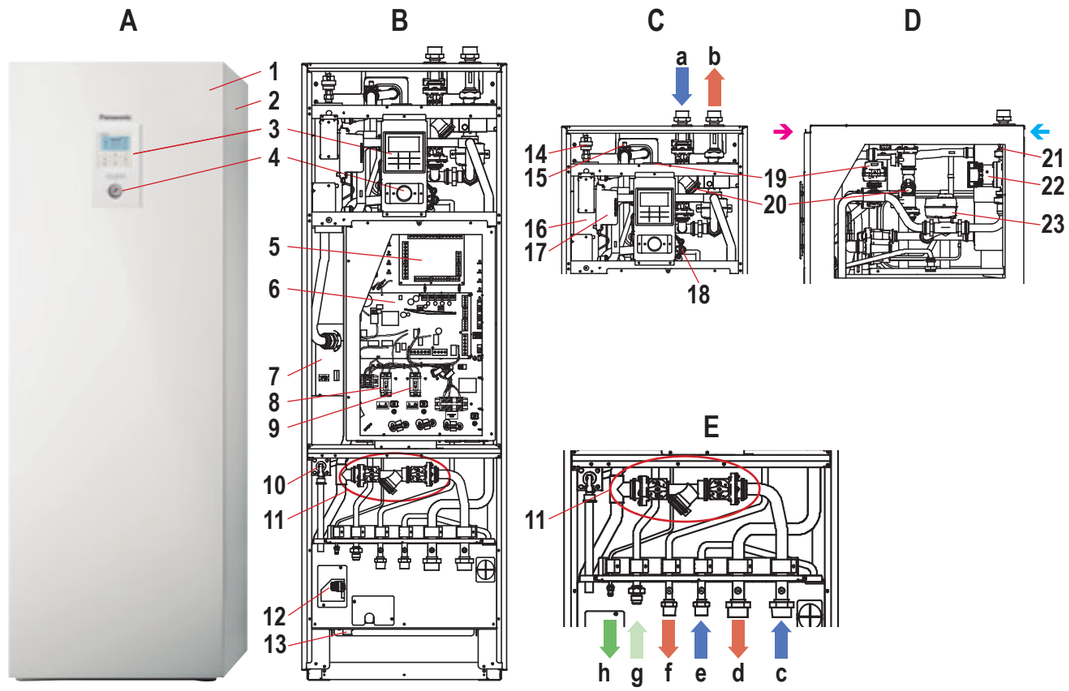
A Exterior view
1 Front panel
2 Side panel
3 Operating unit
4 Manometer

B Internal view from front
5 Main PCB
6 Hot water tank temperature sensor (not visible)
7 FI protection switch (electricity supply)
8 FI protection switch (E-heating element heat pump)
9 Pressure relief valve
10 Safety valve
11 Hot water discharge nozzle

C Detailed view “Upper section”
12 Quick vent valve
13 Vortex volume flow meter
14 3-way-valve (not visible)
15 E-heating element heat pump
16 Overload protection (x 2)
17 Circulating water pump

D Detail view “Lower section” (Line connections)
18 Dirt catcher with 2 stop valves
19 Water return
20 Water inflow heating
21 Fresh water
22 Water inflow hot water
23 Refrigerant - hot gas line
24 Refrigerant fluid line

Combination Hydro-module H generation - Configuration “B” (for second heating circuit)



A Exterior view
1 Front panel
2 Side panel
3 Operating unit
4 Manometer

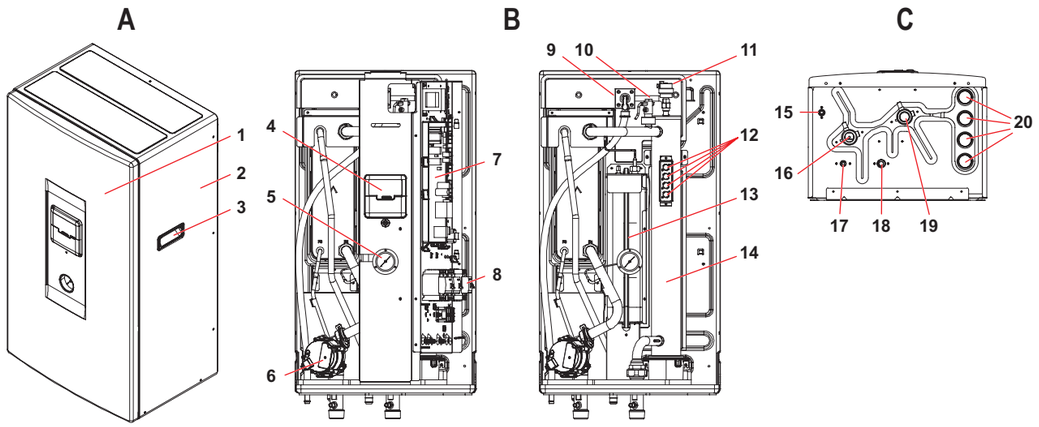
B Internal view from front
5 Additional PCB CZ-NS4P (integrated)
6 Main PCB
7 Hot water tank temperature sensor (not visible)
8 FI protection switch (electricity supply)
9 FI protection switch (E-heating element heat pump)
10 Pressure relief valve
11 Dirt catcher with 2 stop valves (1st heating circuit)
12 Security valve
13 Runoff socket hot water tank

C Detailed view “Upper section” from the front
a Water return (2nd heating circuit)
b Water inflow heating (2nd heating circuit)
14 Quick vent valve
15 Vortex volume flow meter
16 E-heating element heat pump
17 Overload protection (x 2)
18 Circulating water pump (1st heating circuit)

D Detail view “Top section” from right
➔ Front side
← Rear side
19 3-way valve (1st heating circuit)
20 Dirt catcher with 2 shut-off valves (2nd heating circuit)
21 Water temperature sensor (2nd heating circuit)
22 Water circulation pump (2nd heating circuit)
23 3-way valve (2nd heating circuit)

E Detail view “Bottom section” (Cable connections)
c Water return (1st heating circuit)
b Water inflow heating (1st heating circuit)
e Fresh water
f Water inflow hot water
g Refrigerant - hot gas line
h Refrigerant fluid line

Hydro-module F Generation - Only for HT series

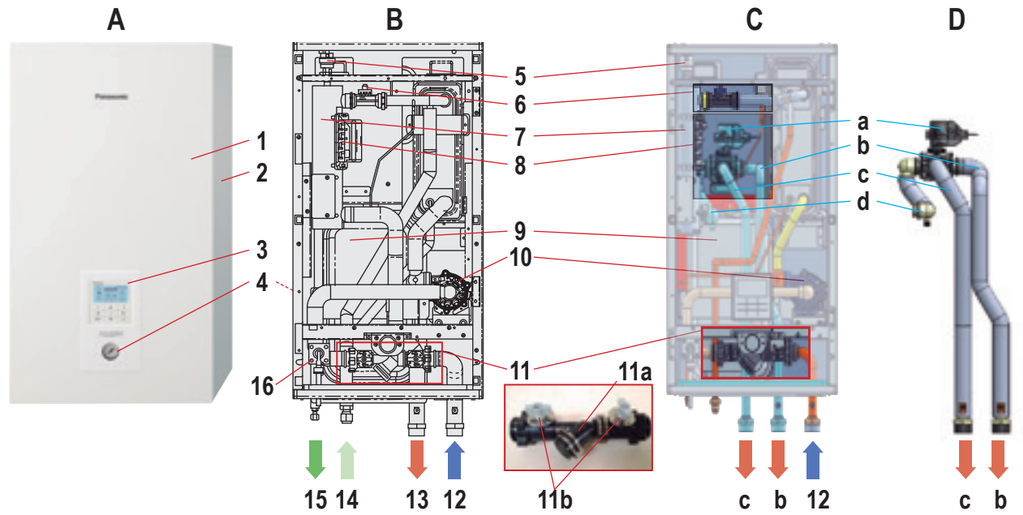


A Exterior view
1 Front panel
2 Side panel
3 Handle

B Internal view from front
4 Operating unit
5 Manometer
6 Circulating water pump
7 Electronic PCB
8 FI protection switch
9 Safety valve
10 Flow monitor
11 Quick vent valve
12 Overload protection
13 10 litre expansion vessel
14 E-heating element heat pump

C View from below
15 Water discharge
16 Water return
17 Refrigerant fluid line
18 Refrigerant - hot gas line
19 Water inflow
20 Cable glands

Hydro-module H-Generation



A Exterior view
1 Front panel
2 Side panel
3 Operating unit
4 Manometer

B Internal view from front
5 Quick vent valve
6 Vortex volume flow meter
7 E-heating element heat pump
8 Overload protection (x 2)
9 10 litre expansion vessel
10 Circulating water pump
11 Dirt catcher with 2 stop valves (integrated)
11a Dirt catcher
11b Stop valve (x 2)
12 Water return
13 Water inflow heating
14 Refrigerant hot gas line
15 Refrigerant fluid line
16 Safety valve

C Detail view from front with installed 3-way reversal valve set CZ-NV1 (optional)
and
D Detail view 3-way reversal valve set CZ-NV1 (optional)
a 3 Way valve (optional for hot water preparation)
b Water inflow heating
c Domestic hot water tank water inflow
b Common water inflow

4.6.2.2 Dimensions

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

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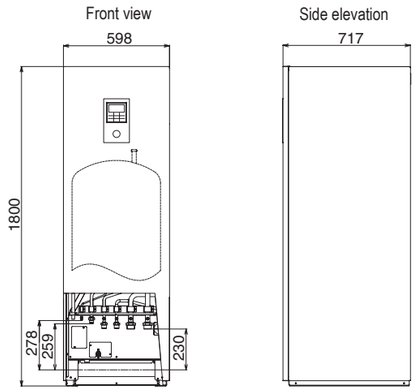
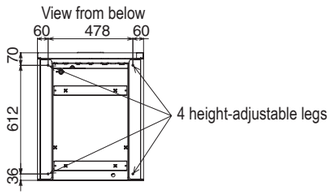
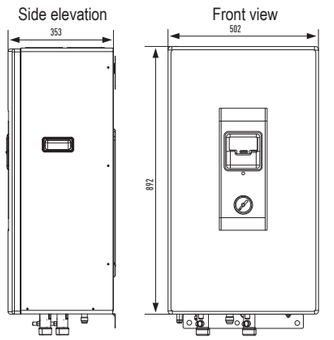
Indoor units

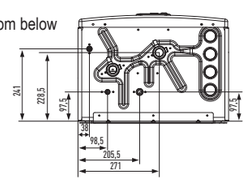
Combination Hydro-module H-Generation



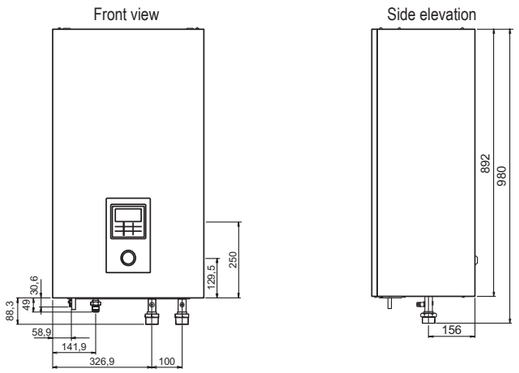


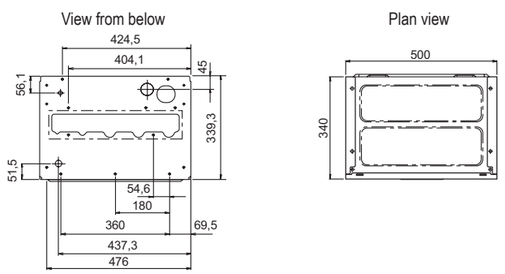
Hydro-module F-Generation





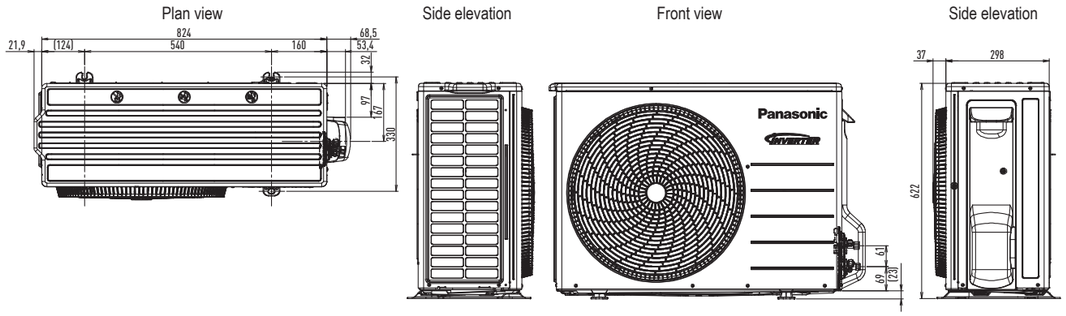
Hydro-module H-Generation





Outdoor units

Outdoor unit for models B1 and B4



Outdoor unit for models B2 and B5

Outdoor unit for models B3 and B6

Outdoor unit for models B7 and B10

4.6.2.3 Technical Data

Split systems with combination Hydro-module / LT series / H Generation

LT series			Single-phase (230 V / 50 Hz), Heating and Cooling					
Combined Hydro-module			WH-ADC0309H3E5 WH-ADC0309H3E5B [1]				WH-ADC1216H6E5	
Outdoor unit			**WH-UD03HE5-1**	**WH-UD05HE5-1**	**WH-UD07HE5-1**	**WH-UD09HE5-1**	**WH-UD12HE5**	**WH-UD16HE5**
Set (Combination Hydro-module + outdoor unit)			**KIT-ADC03H3E5(B)**	**KIT-ADC05H3E5(B)**	**KIT-ADC07H3E5(B)**	**KIT-ADC09H3E5(B)**	**KIT-ADC12HE5**	**KIT-ADC16HE5**
Model			**B1**	**B1**	**B2**	**B2**	**B3**	**B3**
Heating capacity at +7 °C (A7/W35)		kW	3.20	5.00	7.00	9.00	12.00	16.00
COP at +7 °C (A7/W35)			5.00	4.63	4.46	4.13	4.74	4.28
Heating capacity at +2 °C (A2/W35)		kW	3.20	4.20	6.55	6.70	11.40	13.00
COP at +2 °C (A2/W35)			3.56	3.11	3.34	3.13	3.44	3.28
Heating capacity at -7 °C (A-7/W35)		kW	3.20	4.20	5.15	5.90	10.00	11.40
COP at -7 °C (A-7/W35)			2.69	2.59	2.68	2.52	2.73	2.68
Energy efficiency class[2] at 35 / 55 °C			A+++* / A++	A+++* / A++	A+++* / A++	A+++* / A++	A++ / A++	A++ / A++
Composite Energy efficiency class[3] at 35 / 55 °C			A+++* / A++	A+++* / A++	A+++* / A++	A+++* / A++	A+++* / A++	A+++* / A++
Cooling capacity at 35 °C (A35/W7)		kW	3.20	4.50	6.00	7.00	10.00	12.20
EER at 35 °C (A35/W7)			3.08	2.69	2.63	2.43	2.81	2.56
Combined Hydro-module								
Sound pressure level	Heating / Cooling	dB(A)	28 / 28	28 / 28	28 / 28	28 / 28	33 / 33	33 / 33
Dimensions	H x L x W	mm	1,800 x 598 x 717	1,800 x 598 x 717	1,800 x 598 x 717	1,800 x 598 x 717	1,800 x 598 x 717	1,800 x 598 x 717
Weight		kg	135	135	135	135	137	137
Water-side connection		mm	28	28	28	28	28	28
High efficiency pump	Rotation speed stages		Variable	Variable	Variable	Variable	Variable	Variable
	Power consumption (min./ max.)	W	30 / 120	30 / 120	30 / 120	30 / 120	36 / 152	36 / 152
Water flow rate (A7/W35)		l/min	9.2	14.3	20.1	25.8	34.4	45,9
Power of E-heating element		kW	3	3	3	3	6	6
Power consumption	Heating / Cooling	kW	0.64 / 1.04	1.08 / 1.67	1.57 / 2.28	2.18 / 2.88	2.53 / 3.56	3.74 / 4.76
Operating and start up current	Heating / Cooling	A	3.0 / 4.8	5.0 / 7.6	7.2 / 10.3	10.0 / 13.0	11.5 / 16.0	16.9 / 21.3
Max. power consumption on network connection 1 / 2		A	12.0 / 13.0	12.0 / 13.0	21.0 / 13.0	22.9 / 13.0	24.0 / 26.0	26.0 / 26.0
Recommended fuse for network connection 1 / 2		A	15 / 15	15 / 15	30 / 15	30 / 15	30 / 30	30 / 30
Recommended cable cross section for network connection 1 / 2		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	3 x 4.0 / 3 x 4.0	3 x 4.0 / 3 x 4.0
Domestic hot water tank								
Tank volume		l	185	185	185	185	185	185
Max. water temperature		°C	65	65	65	65	65	65
Energy efficiency class[4] at 55 °C			A	A	A	A	A	A
Material of the tank interior			Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Outdoor unit								
Sound pressure level	Heating / Cooling	dB(A)	48 / 47	49 / 48	50 / 48	51 / 50	52 / 50	55 / 54
Dimensions	H x L x W	mm	622 x 824 x 298	622 x 824 x 298	795 x 900 x 320	795 x 900 x 320	1,340 x 900 x 320	1,340 x 900 x 320
Weight		kg	39	39	66	66	101	101
Line diameter	Fluid line	mm (inches)	6.35 (1/4)	6.35 (1/4)	6.35 (1/4)	6.35 (1/4)	9.52 (3/8)	9.52 (3/8)
	Gas line	mm (inches)	12.7 (1/2)	12.7 (1/2)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)
Pre-filled refrigerant (R410A) / CO_2-equivalent		kg / t CO_2-Equ.	1.20 / 2.506	1.20 / 2.506	1.45 / 3.028	1.45 / 3.028	2.55 / 5.324	2.55 / 5.324
Connection distance		m	3 – 15	3 – 15	3 – 30	3 – 30	3 – 30	3 – 30
Nominal connection distance		m	7	7	7	7	7	7
Pre-filled connection distance		m	10	10	10	10	10	10
Additional coolant fill-up quantity (R410A)		g/m	20	20	30	30	50	50
Max. height difference IU/OU		m	5	5	20	20	20	20
Operating range	Outside temperature (H / K)	°C	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43
	Water outlet temperature (H / K)	°C	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20

The COP details relate to 230 V in conformance with the EC Directives 2003/32/EC. Power details in conformance with EN 14511.

The information about the energy efficiency classes is based on the official ErP specifications (EU Ordinance No. 811/2013, EN 14511 and EN 14825) for heat pumps, which have been in force since 26. September 2015. The efficiency classes marked with an asterisk (*) correspond to the new A+++ class to be introduced from September 2019. Other ErP relevant information is included in the respective product data sheets.

Authorised Service Partners or installation companies can activate the cooling function via a special setting.

1 Models with “B” at the end of the model denomination have an additional circulation pump as well as a mixing valve for direct connection of a second controlled heating circuit. Moreover, the additional PCB CZ-NS4P is included in the scope of delivery.

2 Energy efficiency class scale from A++ to G.

3 Energy efficiency class including controller Energy efficiency class scale from A+++ to D.

4 Energy efficiency class scale from A to G.

Split systems with combination hydro-module / LT series / H Generation (contd.)

LT series			Three-phase (400 V / 50 Hz), heating and cooling		
Combined Hydro-module			WH-ADC0916H9E8		
Outdoor unit			**WH-UD09HE8**	**WH-UD12HE8**	**WH-UD16HE8**
Set (Combination Hydro-module + outdoor unit)			**KIT-ADC9HE8**	**KIT-ADC12HE8**	**KIT-ADC16HE8**
Model			**B3**	**B3**	**B3**
Heating capacity at +7 °C (A7/W35)		kW	9.00	12.00	16.00
COP at +7 °C (A7/W35)			4.84	4.74	4.28
Heating capacity at +2 °C (A2/W35)		kW	9.00	11.40	13.00
COP at +2 °C (A2/W35)			3.59	3.44	3.28
Heating capacity at -7 °C (A-7/W35)		kW	9.00	10.00	11.40
COP at -7 °C (A-7/W35)			2.85	2.73	2.57
Energy efficiency class[1] at 35 / 55 °C			A+++ / A++	A+++ / A++	A+++ / A++
Composite energy efficiency class[2] at 35 / 55 °C			A+++* / A++	A+++* / A++	A+++* / A++
Cooling capacity at 35 °C (A35/W7)		kW	7.00	10.00	12.20
EER at 35 °C (A35/W7)			3.17	2.85	2.56
Combined Hydro-module					
Sound pressure level	Heating / Cooling	dB(A)	33 / 33	33 / 33	33 / 33
Dimensions	H x L x W	mm	1,800 x 598 x 717	1,800 x 598 x 717	1,800 x 598 x 717
Weight		kg	139	139	139
Water-side connection		mm	28	28	28
High efficiency pump	Rotation speed stages		Variable	Variable	Variable
	Power consumption (min./ max.)	W	36 / 152	36 / 152	36 / 152
Water flow rate (A7/W35)		l/min	25.8	34.4	45,9
Power of E-heating element		kW	9	9	9
Power consumption	Heating / Cooling	kW	1.86 / 2.21	2.53 / 3.51	3.74 / 4.76
Operating and start up current	Heating / Cooling	A	2.8 / 3.4	3.8 / 5.3	5.7 / 7.1
Max. power consumption on network connection 1 / 2		A	7.5 / 13.0	8.8 / 13.0	9.9 / 13.0
Recommended fuse for network connection 1 / 2		A	16 / 16	16 / 16	16 / 16
Recommended cable cross section for network connection 1 / 2		mm²	5 x 1.5 / 5 x 1.5	5 x 1.5 / 5 x 1.5	5 x 1.5 / 5 x 1.5
Domestic hot water tank					
Tank volume		l	185	185	185
Max. water temperature		°C	65	65	65
Energy efficiency class[3] at 55 °C			A	A	A
Material of the tank interior			Stainless steel	Stainless steel	Stainless steel
Outdoor unit					
Sound pressure level	Heating / Cooling	dB(A)	51 / 49	52 / 50	55 / 54
Dimensions	H x L x W	mm	1,340 x 900 x 320	1,340 x 900 x 320	1,340 x 900 x 320
Weight		kg	108	108	108
Line diameter	Fluid line	mm (inches)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
	Gas line	mm (inches)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)
Pre-filled refrigerant (R410A) / CO_2-equivalent		kg / t CO_2-Equ.	2.55 / 5.324	2.55 / 5.324	2.55 / 5.324
Connection distance		m	3 – 30	3 – 30	3 – 30
Nominal connection distance		m	7	7	7
Pre-filled connection distance		m	10	10	10
Additional coolant fill-up quantity (R410A)		g/m	50	50	50
Max. height difference IU/OU		m	20	20	20
Operating range	Outside temperature (H / K)	°C	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43
	Water outlet temperature (H / K)	°C	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20

The COP details relate to 230 V in conformance with the EC Directives 2003/32/EC. Power details in conformance with EN 14511.

The information about the energy efficiency classes is based on the official ErP specifications (EU Ordinance No. 811/2013, EN 14511 and EN 14825) for heat pumps, which have been in force since 26. September 2015. The efficiency classes marked with an asterisk (*) correspond to the new A+++ class to be introduced from September 2019. Other ErP relevant information is included in the respective product data sheets.

Authorised Service Partners or installation companies can activate the cooling function via a special setting.

1 Energy efficiency class scale from A++ to G.

2 Energy efficiency class including controller. Energy efficiency class scale from A+++ to D.

3 Energy efficiency class scale from A to G.

Split systems with combination hydro-module / T-CAP model series / H Generation / Standard

T-CAP model series			Single-phase (230 V / 50 Hz), Heating and Cooling		Three-phase (400 V / 50 Hz), heating and cooling		
Combined Hydro-module			WH-ADC1216H6E5		WH-ADC0916H9E8		
Outdoor unit			**WH-UX09HE5**	**WH-UX12HE5**	**WH-UX09HE8**	**WH-UX12HE8**	**WH-UX16HE8**
Set (Combination Hydro-module + outdoor unit)			**KIT-AXC9HE5**	**KIT-AXC12HE5**	**KIT-AXC9HE8**	**KIT-AXC12HE8**	**KIT-AXC16HE8**
Model			**B3**	**B3**	**B3**	**B3**	**B3**
Heating capacity at +7 °C (A7/W35)		kW	9.00	12.00	9.00	12.00	16.00
COP at +7 °C (A7/W35)			4.84	4.74	4.84	4.74	4.28
Heating capacity at +2 °C (A2/W35)		kW	9.00	12.00	9.00	12.00	16.00
COP at +2 °C (A2/W35)			3.59	3.44	3.59	3.44	3.10
Heating capacity at -7 °C (A-7/W35)		kW	9.00	12.00	9.00	12.00	16.00
COP at -7 °C (A-7/W35)			2.85	2.72	2.85	2.72	2.49
Energy efficiency class[1] at 35 / 55 °C			A+++* / A++	A+++* / A++	A+++* / A++	A+++* / A++	A+++* / A++
Composite energy efficiency class[2] at 35 / 55 °C			A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
Cooling capacity at 35 °C (A35/W7)		kW	7.00	10.00	7.00	10.00	12.20
EER at 35 °C (A35/W7)			3.17	2.81	3.17	2.81	2.56
Combined Hydro-module							
Sound pressure level	Heating / Cooling	dB(A)	33 / 33	33 / 33	33 / 33	33 / 33	33 / 33
Dimensions	H x L x W	mm	1,800 x 598 x 717	1,800 x 598 x 717	1,800 x 598 x 717	1,800 x 598 x 717	1,800 x 598 x 717
Weight		kg	137	137	139	139	139
Water-side connection		mm	28	28	28	28	28
High efficiency pump	Rotation speed stages		Variable	Variable	Variable	Variable	Variable
	Power consumption (min./ max.)	W	36 / 152	36 / 152	36 / 152	36 / 152	36 / 152
Water flow rate (A7/W35)		l/min	25.8	34.4	25.8	34.4	45,9
Power of E-heating element		kW	6	6	9	9	9
Power consumption	Heating / Cooling	kW	1.86 / 2.21	2.53 / 3.56	1.86 / 2.21	2.53 / 3.56	3.71 / 4.76
Operating and start up current	Heating / Cooling	A	8.6 / 10.2	11.7 / 16.5	2.8 / 3.4	3.9 / 5.4	5.7 / 7.2
Max. power consumption on network connection 1 / 2		A	25.0 / 26.0	29.0 / 26.0	10.4 / 13.0	11.9 / 13.0	15.5 / 13.0
Recommended fuse for network connection 1 / 2		A	30 / 30	30 / 30	16 / 16	16 / 16	16 / 16
Recommended cable cross section for network connection 1 / 2		mm²	3 x 4.0 / 3 x 4.0	3 x 4.0 / 3 x 4.0	5 x 1.5 / 5 x 1.5	5 x 1.5 / 5 x 1.5	5 x 1.5 / 5 x 1.5
Domestic hot water tank							
Tank volume		l	185	185	185	185	185
Max. water temperature		°C	65	65	65	65	65
Energy efficiency class[3] at 55 °C			A	A	A	A	A
Material of the tank interior			Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Outdoor unit							
Sound pressure level	Heating / Cooling	dB(A)	51 / 49	52 / 50	51 / 49	52 / 50	55 / 54
Dimensions	H x L x W	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
Weight		kg	101	101	109	109	119
Line diameter	Fluid line	mm (inches)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
	Gas line	mm (inches)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)
Pre-filled refrigerant (R410A) / CO_2-equivalent		kg / t CO_2-Equ.	2.85 / 5.951	2.85 / 5.951	2.85 / 5.951	2.85 / 5.951	2.9 / 6.055
Connection distance		m	3 – 30	3 – 30	3 – 30	3 – 30	3 – 30
Nominal connection distance		m	7	7	7	7	7
Pre-filled connection distance		m	10	10	10	10	10
Additional coolant fill-up quantity (R410A)		g/m	50	50	50	50	50
Max. height difference IU/OU		m	20	20	20	20	20
Operating range	Outside temperature (H / K)	°C	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43
	Water outlet temperature (H / K)	°C	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20

The COP details relate to 230 V in conformance with the EC Directives 2003/32/EC. Power details in conformance with EN 14511.

The information about the energy efficiency classes is based on the official ErP specifications (EU Ordinance No. 811/2013, EN 14511 and EN 14825) for heat pumps, which have been in force since 26. September 2015. The efficiency classes marked with an asterisk (*) correspond to the new A+++ class to be introduced starting in September 2019. Other ErP relevant information is included in the respective product data sheets.

Authorised Service Partners or installation companies can activate the cooling function via a special setting.

1 Energy efficiency class scale from A++ to G.

2 Energy efficiency class including controller. Energy efficiency class scale from A+++ to D.

3 Energy efficiency class scale from A to G.

Split Systems with Combination Hydro-Module / T-CAP Model series / H Generation / SQ Version

T-CAP model series			Three-phase (400 V / 50 Hz), heating and cooling		
Combined Hydro-module			WH-ADC0916H9E8		
Outdoor unit			**WH-UQ09HE8**	**WH-UQ12HE8**	**WH-UQ16HE8**
Set (Combination Hydro-module + outdoor unit)			**KIT-AQC9HE8**	**KIT-AQC12HE8**	**KIT-AQC16HE8**
Model			**B10**	**B10**	**B10**
Heating capacity at +7 °C (A7/W35)		kW	9.00	12.00	16.00
COP at +7 °C (A7/W35)			4.84	4.74	4.28
Heating capacity at +2 °C (A2/W35)		kW	9.00	12.00	16.00
COP at +2 °C (A2/W35)			3.59	3.44	3.10
Heating capacity at -7 °C (A-7/W35)		kW	9.00	12.00	16.00
COP at -7 °C (A-7/W35)			2.85	2.72	2.49
Energy efficiency class[1] at 35 / 55 °C			A+++ / A++	A+++ / A++	A+++ / A++
Composite energy efficiency class[2] at 35 / 55 °C			A+++ / A++	A+++ / A++	A+++ / A++
Cooling capacity at 35 °C (A35/W7)		kW	7.00	10.00	12.20
EER at 35 °C (A35/W7)			3.17	2.81	2.56
Combined Hydro-module					
Sound pressure level	Heating / Cooling	dB(A)	33 / 33	33 / 33	33 / 33
Dimensions	H x L x W	mm	1,800 x 598 x 717	1,800 x 598 x 717	1,800 x 598 x 717
Weight		kg	139	139	139
Water-side connection		mm	28	28	28
High efficiency pump	Rotation speed stages		Variable	Variable	Variable
	Power consumption (min./ max.)	W	36 / 152	36 / 152	36 / 152
Water flow rate (A7/W35)		l/min	25.8	34.4	45,9
Power of E-heating element		kW	9	9	9
Power consumption	Heating / Cooling	kW	1.86 / 2.21	2.53 / 3.56	3.71 / 4.76
Operating and start up current	Heating / Cooling	A	2.8 / 3.4	3.9 / 5.4	5.7 / 7.2
Max. power consumption on network connection 1 / 2		A	10.4 / 13.0	11.9 / 13.0	15.5 / 13.0
Recommended fuse for network connection 1 / 2		A	16 / 16	16 / 16	16 / 16
Recommended cable cross section for network connection 1 / 2		mm²	5 x 1.5 / 5 x 1.5	5 x 1.5 / 5 x 1.5	5 x 1.5 / 5 x 1.5
Domestic hot water tank					
Tank volume		l	185	185	185
Max. water temperature		°C	65	65	65
Energy efficiency class[3] at 55 °C			A	A	A
Material of the tank interior			Stainless steel	Stainless steel	Stainless steel
Outdoor unit					
Sound pressure level	Heating / Cooling	dB(A)	47 / 48	48 / 49	51 / 53
Dimensions	H x L x W	mm	1,410 x 1,283 x 320	1,410 x 1,283 x 320	1,410 x 1,283 x 320
Weight		kg	151	151	161
Line diameter	Fluid line	mm (inches)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
	Gas line	mm (inches)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)
Pre-filled refrigerant (R410A) / CO_2-equivalent		kg / t CO_2-Equ.	2.85 / 5.951	2.85 / 5.951	2.99 / 6.243
Connection distance		m	3 – 30	3 – 30	3 – 30
Nominal connection distance		m	5	5	5
Pre-filled connection distance		m	10	10	10
Additional coolant fill-up quantity (R410A)		g/m	50	50	50
Max. height difference IU/OU		m	20	20	20
Operating range	Outside temperature (H / K)	°C	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43
	Water outlet temperature (H / K)	°C	20 to 60 / 5 to 20	25 to 60 / 5 to 20	25 to 60 / 5 to 20

The COP details relate to 230 V in conformance with the EC Directives 2003/32/EC. Power details in conformance with EN 14511.

The information about the energy efficiency classes is based on the official ErP specifications (EU Ordinance No. 811/2013, EN 14511 and EN 14825) for heat pumps, which have been in force since 26. September 2015. The efficiency classes marked with an asterisk (*) correspond to the new A+++ class to be introduced starting in September 2019. Other ErP relevant information is included in the respective product data sheets.

Authorised Service Partners or installation companies can activate the cooling function via a special setting.

1 Energy efficiency class scale from A++ to G.

2 Energy efficiency class including controller. Energy efficiency class scale from A+++ to D.

3 Energy efficiency class scale from A to G.

Split systems with hydro-module / LT series / H Generation

LT series			Single-phase (230 V / 50 Hz), Heating and Cooling					
Hydro-module			**WH-SDC03H3E5-1**	**WH-SDC05H3E5-1**	**WH-SDC07H3E5-1**	**WH-SDC09H3E5-1**	**WH-SDC12H6E5**	**WH-SDC16H6E5**
Outdoor unit			**WH-UD03HE5-1**	**WH-UD05HE5-1**	**WH-UD07HE5-1**	**WH-UD09HE5-1**	**WH-UD12HE5**	**WH-UD16HE5**
Set (hydro-module + outdoor unit)			**KIT-WC03H3E5-1**	**KIT-WC05H3E5-1**	**KIT-WC07H3E5-1**	**KIT-WC09H3E5-1**	**KIT-WC12H6E5**	**KIT-WC16H6E5**
Model			**B4**	**B4**	**B5**	**B5**	**B6**	**B6**
Heating capacity at +7 °C (A7/W35)		kW	3.20	5.00	7.00	9.00	12.0	16.00
COP at +7 °C (A7/W35)			5.00	4.63	4.46	4.13	4.74	4.28
Heating capacity at +2 °C (A2/W35)		kW	3.20	4.20	6.55	6.70	11.40	13.00
COP at +2 °C (A2/W35)			3.56	3.11	3.34	3.13	3.44	3.28
Heating capacity at -7 °C (A–7/W35)		kW	3.20	4.20	5.15	5.90	10.00	11.40
COP at -7 °C (A–7/W35)			2.69	2.59	2.68	2.52	2.73	2.68
Cooling capacity at 35 °C (A35/W7)		kW	3.20	4.50	6.00	7.00	10.00	12.20
EER at 35 °C (A35/W7)			3.08	2.69	2.63	2.43	2.81	2.56
Energy efficiency class[1] at 35 / 55 °C			A+++*/ A++	A+++*/ A++	A+++*/ A++	A+++*/ A++	A+++ / A++	A+++ / A++
Composite energy efficiency class[2] at 35 / 55 °C			A++++ / A+++	A++++ / A+++	A++++ / A+++	A++++ / A+++	A++++ / A+++	A++++ / A+++
Hydro-module								
Sound pressure level	Heating / Cooling	dB(A)	28 / 28	28 / 28	30 / 30	30 / 30	33 / 33	33 / 33
Dimensions	H x L x W	mm	892 x 500 x 340	892 x 500 x 340	892 x 500 x 340	892 x 500 x 340	892 x 502 x 353	892 x 502 x 353
Weight		kg	44	44	44	44	45	46
Water-side connection		mm	28	28	28	28	28	28
High efficiency pump	Rotation speed stages		Variable	Variable	Variable	Variable	Variable	Variable
	Power consumption (min./ max.)	W	30 / 100	33 / 106	34 / 114	40 / 120	34 / 110	30 / 105
Water flow rate (A7/W35)		l/min	9.2	14.3	20.1	25.8	34.4	45,9
Power of E-heating element		kW	3	3	3	3	6	6
Power consumption	Heating / Cooling	kW	0.64 / 1.04	1.08 / 1.67	1.57 / 2.28	2.18 / 2.88	2.53 / 3.56	3.07 / 4.36
Operating and start up current	Heating / Cooling	A	3.0 / 4.8	5.0 / 7.6	7.2 / 10.3	10.0 / 13.0	11.5 / 16.0	13.9 / 19.5
Max. power consumption on network connection 1 / 2		A	11.0 / 13.0	12.0 / 13.0	21.0 / 13.0	22.9 / 13.0	24.0 / 26.0	25.0 / 26.0
Recommended fuse for network connection 1 / 2		A	15 / 30	15 / 30	15 / 30	15 / 30	30 / 30	30 / 30
Recommended cable cross section for network connection 1 / 2		mm²	3 x 1.5 / 3 x 1.5	3 x 1.5 / 3 x 1.5	3 x 1.5 / 3 x 1.5	3 x 1.5 / 3 x 1.5	3 x 4.0 or 6.0 / 3 x 4.0	3 x 4.0 or 6.0 / 3 x 4.0
Outdoor unit								
Sound pressure level	Heating / Cooling	dB(A)	47 / 47	48 / 48	50 / 48	51 / 50	52 / 50	55 / 54
Dimensions	H x L x W	mm	622 x 824 x 298	622 x 824 x 298	795 x 900 x 320	795 x 900 x 320	1,340 x 900 x 320	1,340 x 900 x 320
Weight		kg	39	39	66	66	101	101
Line diameter	Fluid line	mm (inches)	6.35 (1/4)	6.35 (1/4)	6.35 (1/4)	6.35 (1/4)	9.52 (3/8)	9.52 (3/8)
	Gas line	mm (inches)	12.7 (1/2)	12.7 (1/2)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)
Pre-filled refrigerant (R410A) / CO_2-equivalent		kg / t CO_2-Equ.	1.20 / 2.506	1.20 / 2.506	1.45 / 3.028	1.45 / 3.028	2.55 / 5.324	2.55 / 5.324
Connection distance		m	3 – 15	3 – 15	3 – 30	3 – 30	3 – 30	3 – 30
Nominal connection distance		m	7	7	7	7	7	7
Pre-filled connection distance		m	10	10	10	10	10	10
Additional coolant fill-up quantity (R410A)		g/m	20	20	30	30	50	50
Max. height difference IU/OU		m	5	5	20	20	20	20
Operating range	Outside temperature (H / K)	°C	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43
	Water outlet temperature (H / K)	°C	20 to 55 / 5 to 20	20 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20

The COP details relate to 230 V in conformance with the EC Directives 2003/32/EC. Power details in conformance with EN 14511.

The information about the energy efficiency classes is based on the official ErP specifications (EU Ordinance No. 811/2013, EN 14511 and EN 14825) for heat pumps, which have been in force since 26. September 2015. The efficiency classes marked with an asterisk (*) correspond to the new A+++ class to be introduced starting in September 2019. Other ErP relevant information is included in the respective product data sheets.

Authorised Service Partners or installation companies can activate the cooling function via a special setting.

1 Energy efficiency class scale from A++ to G.

2 Energy efficiency class including controller. Energy efficiency class scale from A+++ to D.

Split Systems with Hydro-Module / LT Series / H Generation (contd.)

LT series			Three-phase (400 V / 50 Hz), heating and cooling		
Hydro-module			**WH-SDC09H3E8**	**WH-SDC12H9E8**	**WH-SDC16H9E8**
Outdoor unit			**WH-UD09HE8**	**WH-UD12HE8**	**WH-UD16HE8**
Set (hydro-module + outdoor unit)			**KIT-WC09H3E8**	**KIT-WC12H9E8**	**KIT-WC16H9E8**
Model			**B6**	**B6**	**B6**
Heating capacity at +7 °C (A7/W35)		kW	9.00	12.00	16.00
COP at +7 °C (A7/W35)			4.84	4.14	4.28
Heating capacity at +2 °C (A2/W35)		kW	9.00	11.40	13.00
COP at +2 °C (A2/W35)			3.59	3.44	3.28
Heating capacity at -7 °C (A–7/W35)		kW	9.00	10.00	11.40
COP at -7 °C (A–7/W35)			2.85	2.73	2.68
Cooling capacity at 35 °C (A35/W7)		kW	7.00	10.00	12.20
EER at 35 °C (A35/W7)			3.17	2.81	2.56
Energy efficiency class[1] at 35 / 55 °C			A+++ / A++	A+++ / A++	A+++ / A++
Hydro-module					
Sound pressure level	Heating / Cooling	dB(A)	28 / 28	28 / 28	28 / 28
Dimensions	H x L x W	mm	892 x 500 x 340	892 x 500 x 340	892 x 500 x 340
Weight		kg	44	44	44
Water-side connection		mm	28	28	28
High efficiency pump	Rotation speed stages		Variable	Variable	Variable
	Power consumption (min./ max.)	W	32 / 102	34 / 110	30 / 105
Water flow rate (A7/W35)		l/min	25.8	34.4	45,9
Power of E-heating element		kW	3	3	3
Power consumption	Heating / Cooling	kW	1.86 / 2.21	2.53 / 3.51	3.07 / 4.36
Operating and start up current	Heating / Cooling	A	2.8 / 3.4	3.8 / 5.3	4.7 / 6.5
Max. power consumption on network connection 1 / 2		A	11.8 / 13.0	8.8 / 13.0	9.4 / 13.0
Recommended fuse for network connection 1 / 2		A	15 / 30	15 / 30	15 / 30
Recommended cable cross section for network connection 1 / 2		mm²	3 x 1.5 / 3 x 1.5	3 x 1.5 / 3 x 1.5	3 x 1.5 / 3 x 1.5
Outdoor unit					
Sound pressure level	Heating / Cooling	dB(A)	51 / 49	52 / 50	55 / 54
Dimensions	H x L x W	mm	1,340 x 900 x 320	1,340 x 900 x 320	1,340 x 900 x 320
Weight		kg	108	108	108
Line diameter	Fluid line	mm (inches)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
	Gas line	mm (inches)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)
Pre-filled refrigerant (R410A) / CO_2-equivalent		kg / t CO_2-Equ.	2.55 / 5.324	2.55 / 5.324	2.55 / 5.324
Connection distance		m	3 – 30	3 – 30	3 – 30
Nominal connection distance		m	7	7	7
Pre-filled connection distance		m	10	10	10
Additional coolant fill-up quantity (R410A)		g/m	50	50	50
Max. height difference IU/OU		m	20	20	20
Operating range	Outside temperature (H / K)	°C	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43
	Water outlet temperature (H / K)	°C	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20

The COP details relate to 230 V in conformance with the EC Directives 2003/32/EC. Power details in conformance with EN 14511.

The information about the energy efficiency classes is based on the official ErP specifications (EU Ordinance No. 811/2013, EN 14511 and EN 14825) for heat pumps, which have been in force since 26. September 2015. The efficiency classes marked with an asterisk (*) correspond to the new A+++ class to be introduced starting in September 2019. Other ErP relevant information is included in the respective product data sheets.

Authorised Service Partners or installation companies can activate the cooling function via a special setting.

1 Energy efficiency class scale from A++ to G.

Split systems with hydro-module / T-CAP model series / H Generation / Standard

T-CAP model series			Single-phase (230 V / 50 Hz), Heating and Cooling		Three-phase (400 V / 50 Hz), heating and cooling		
Hydro-module			**WH-SXC09H3E5**	**WH-SXC12H6E5**	**WH-SXC09H3E8**	**WH-SXC12H9E8**	**WH-SXC16H9E8**
Outdoor unit			**WH-UX09HE5**	**WH-UX12HE5**	**WH-UX09HE8**	**WH-UX12HE8**	**WH-UX16HE8**
Set (hydro-module + outdoor unit)			**KIT-WXC09H3E5**	**KIT-WXC12H6E5**	**KIT-WXC09H3E8**	**KIT-WXC12H9E8**	**KIT-WXC16H9E8**
Model			**B6**	**B6**	**B6**	**B6**	**B6**
Heating capacity at +7 °C (A7/W35)		kW	9.00	12.00	9.00	12.00	16.00
COP at +7 °C (A7/W35)			4.84	4.74	4.84	4.74	4.28
Heating capacity at +2 °C (A2/W35)		kW	9.00	12.00	9.00	12.00	16.00
COP at +2 °C (A2/W35)			3.59	3.44	3.59	3.44	3.10
Heating capacity at -7 °C (A–7/W35)		kW	9.00	12.00	9.00	12.00	16.00
COP at -7 °C (A–7/W35)			2.85	2.72	2.85	2.72	2.49
Cooling capacity at 35 °C (A35/W7)		kW	7.00	10.00	7.00	10.00	12.20
EER (energy efficiency ratio) at 35 °C (A35/W7)			3.17	2.81	3.17	2.81	2.57
Energy efficiency class[1] at 35 / 55 °C			A+++ / A+++	A+++ / A+++	A+++ / A+++	A+++ / A+++	A+++ / A+++
Hydro-module							
Dimensions	H x L x W	mm	892 x 502 x 353	892 x 502 x 353	892 x 502 x 353	892 x 502 x 353	892 x 502 x 353
Weight		kg	44	45	45	46	52
Water-side connection		mm	28	28	28	28	28
High efficiency pump	Rotation speed stages		Variable	Variable	Variable	Variable	Variable
	Power consumption (min./ max.)	W	32 / 102	34 / 110	32 / 102	34 / 110	30 / 105
Water flow rate (A7/W35)		l/min	25.8	34.4	25.8	34.4	45.9
Power of E-heating element		kW	3	6	3	9	9
Power consumption	Heating / Cooling	kW	1.86 / 2.21	2.53 / 3.56	1.86 / 2.21	2.53 / 3.56	3.74 / 4.76
Operating and start up current	Heating / Cooling	A	8.6 / 10.2	11.7 / 16.5	2.8 / 3.4	3.9 / 5.4	5.7 / 7.2
Max. power consumption on network connection 1 / 2		A	25.0 / 13.0	29.0 / 26.0	14.7 / 13.0	11.9 / 13.0	15.5 / 13.0
Recommended fuse for network connection 1 / 2		A	30 / 30	30 / 30	16 / 16	16 / 16	16 / 16
Recommended cable cross section for network connection 1 / 2		mm²	3 x 4.0 or 6.0 / 3 x 4.0	3 x 4.0 or 6.0 / 3 x 4.0	5 x 1.5 / 3 x 1.5	5 x 1.5 / 5 x 1.5	5 x 1.5 / 5 x 1.5
Outdoor unit							
Sound pressure level	Heating / Cooling	dB(A)	51 / 49	52 / 50	51 / 49	52 / 50	55 / 54
Dimensions	H x L x W	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
Weight		kg	101	101	109	109	119
Line diameter	Fluid line	mm (inches)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
	Gas line	mm (inches)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)
Pre-filled refrigerant (R410A) / CO_2-equivalent		kg / t CO_2-Equ.	2.85 / 5.951	2.85 / 5.951	2.85 / 5.951	2.85 / 5.951	2.90 / 6.243
Connection distance		m	3 – 30	3 – 30	3 – 30	3 – 30	3 – 30
Nominal connection distance		m	7	7	7	7	7
Pre-filled connection distance		m	10	10	10	10	10
Additional coolant fill-up quantity (R410A)		g/m	50	50	50	50	50
Max. height difference IU/OU		m	20	20	20	20	20
Operating range	Outside temperature (H / K)	°C	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35
	Water outlet temperature (H / K)	°C	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 60 / 5 to 20	25 to 60 / 5 to 20	25 to 60 / 5 to 20

The COP details relate to 230 V in conformance with the EC Directives 2003/32/EC. Power details in conformance with EN 14511.

The information about the energy efficiency classes is based on the official ErP specifications (EU Ordinance No. 811/2013, EN 14511 and EN 14825) for heat pumps, which have been in force since 26. September 2015. The efficiency classes marked with an asterisk (*) correspond to the new A+++ class to be introduced starting in September 2019. Other ErP relevant information is included in the respective product data sheets.

Authorised Service Partners or installation companies can activate the cooling function via a special setting.

1 Energy efficiency class scale from A++ to G.

Split systems with hydro-module / T-CAP model series / H Generation / SQ version

T-CAP model series			Three-phase (400 V / 50 Hz), heating and cooling, noise-proofed version		
Hydro-module			**WH-SQC09H3E8**	**WH-SQC12H9E8**	**WH-SQC16H9E8**
Outdoor unit			**WH-UQ09HE8**	**WH-UQ12HE8**	**WH-UQ16HE8**
Set (hydro-module + outdoor unit)			**KIT-WQC09H3E8**	**KIT-WQC12H9E8**	**KIT-WQC16H9E8**
Model			**B7**	**B7**	**B7**
Heating capacity at +7 °C (A7/W35)		kW	9.00	12.00	16.00
COP at +7 °C (A7/W35)			4.84	4.14	4.28
Heating capacity at +2 °C (A2/W35)		kW	9.00	11.40	13.00
COP at +2 °C (A2/W35)			3.59	3.44	3.28
Heating capacity at -7 °C (A–7/W35)		kW	9.00	10.00	11.40
COP at -7 °C (A–7/W35)			2.85	2.73	2.68
Cooling capacity at 35 °C (A35/W7)		kW	7.00	10.00	12.20
EER (energy efficiency ratio) at 35 °C (A35/W7)			3.17	2.81	2.56
Energy efficiency class[1] at 35 / 55 °C			A+++ / A+++	A+++ / A+++	A+++ / A+++
Hydro-module					
Sound pressure level	Heating / Cooling	dB(A)	33 / 33	33 / 33	33 / 33
Dimensions	H x L x W	mm	892 x 500 x 340	892 x 500 x 340	892 x 500 x 340
Weight		kg	43	44	45
Water-side connection		mm	28	28	28
High efficiency pump	Rotation speed stages		Variable	Variable	Variable
	Power consumption (min./ max.)	W	32 / 102	34 / 110	30 / 105
Water flow rate (A7/W35)		l/min	25.8	34.4	45,9
Power of E-heating element		kW	3	9	9
Power consumption	Heating / Cooling	kW	1.86 / 2.21	2.53 / 3.56	3.74 / 4.76
Operating and start up current	Heating / Cooling	A	2.8 / 3.4	3.9 / 5.4	5.7 / 7.2
Max. power consumption on network connection 1 / 2		A	14.7 / 13.0	11.9 / 13.0	15.5 / 13.0
Recommended fuse for network connection 1 / 2		A	16 / 16	16 / 16	16 / 16
Recommended cable cross section for network connection 1 / 2		mm²	5 x 1.5 / 3 x 1.5	5 x 1.5 / 5 x 1.5	5 x 1.5 / 5 x 1.5
Outdoor unit					
Sound pressure level	Heating / Cooling	dB(A)	47 / 48	48 / 49	51 / 53
Dimensions	H x L x W	mm	1,410 x 1,283 x 320	1,410 x 1,283 x 320	1,410 x 1,283 x 320
Weight		kg	151	151	161
Line diameter	Fluid line	mm (inches)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
	Gas line	mm (inches)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)
Pre-filled refrigerant (R410A) / CO_2-equivalent		kg / t CO_2-Equ.	2.85 / 5.951	2.85 / 5.951	2.99 / 6.243
Connection distance		m	3 – 30	3 – 30	3 – 30
Nominal connection distance		m	5	5	5
Pre-filled connection distance		m	10	10	10
Additional coolant fill-up quantity (R410A)		g/m	50	50	50
Max. height difference IU/OU		m	20	20	20
Operating range	Outside temperature (H / K)	°C	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43
	Water outlet temperature (H / K)	°C	20 to 60 / 5 to 20	25 to 60 / 5 to 20	25 to 60 / 5 to 20

The COP details relate to 230 V in conformance with the EC Directives 2003/32/EC. Power details in conformance with EN 14511.

The information about the energy efficiency classes is based on the official ErP specifications (EU Ordinance No. 811/2013, EN 14511 and EN 14825) for heat pumps, which have been in force since 26. September 2015. Other ErP relevant information is included in the respective product data sheets.

Authorised Service Partners or installation companies can activate the cooling function via a special setting.

1 Energy efficiency class scale from A++ to G.

Split systems with hydro-module / HT series / F Generation

HT series			Single phase (230 V / 50 Hz), heating only		Three-phase (400 V / 50 Hz), heating only	
Hydro-module			**WH-SHF09F3E5**	**WH-SHF12F6E5**	**WH-SHF09F3E8**	**WH-SHF12F9E8**
Outdoor unit			**WH-UH09FE5**	**WH-UH12FE5**	**WH-UH09FE8**	**WH-UH12FE8**
Set (hydro-module + outdoor unit)			**KIT-WHF09F3E5**	**KIT-WHF12F6E5**	**KIT-WHF09F3E8**	**KIT-WHF12F9E8**
Model			**B6**	**B6**	**B6**	**B6**
Heating capacity at +7 °C (A7/W35)		kW	9.00	12.00	9.00	12.00
COP at +7 °C (A7/W35)			4.64	4.46	4.64	4.46
Heating capacity at +2 °C (A2/W35)		kW	9.00	12.00	9.00	12.00
COP at +2 °C (A2/W35)			3.45	3.26	3.45	3.26
Heating capacity at -7 °C (A–7/W35)		kW	9.00	12.00	9.00	12.00
COP at -7 °C (A–7/W35)			2.74	2.52	2.74	2.52
Heating capacity at +7 °C (A7/W65)		kW	9.00	12.00	9.00	12.00
COP at +7 °C (A7/W65)			2.27	2.22	2.27	2.22
Heating capacity at +2 °C (A2/W65)		kW	9.00	10.30	9.00	10.30
COP at +2 °C (A2/W65)			1.89	1.84	1.89	1.84
Heating capacity at -7 °C (A–7/W65)		kW	8.90	9.60	8.90	9.60
COP at -7 °C (A–7/W65)			1.63	1.62	1.63	1.62
Energy efficiency class[1] at 35 / 55 °C			A+++ / A+++	A+++ / A+++	A+++ * / A+++	A+++ * / A+++
Hydro-module						
Sound pressure level		dB(A)	33	33	33	33
Dimensions	H x L x W	mm	892 x 502 x 353	892 x 502 x 353	892 x 502 x 353	892 x 502 x 353
Weight		kg	46	47	47	48
Water-side connection		mm	28	28	28	28
High efficiency pump	Rotation speed stages		7	7	7	7
	Power consumption (min./ max.)	W	38 / 100	40 / 106	38 / 100	40 / 106
Water flow rate (A7/W35)		l/min	25.8	34.4	25.8	34.4
Power of E-heating element		kW	3	6	3	9
Power consumption		kW	1.94	2.69	1.94	2.69
Operating and start up current		A	9.3	12.9	3.0	4.2
Max. power consumption on network connection 1 / 2		A	28.5 / 13.0	29.0 / 26.0	14.5 / 13.0	10.8 / 13.0
Recommended fuse for network connection 1 / 2		A	30 / 30	30 / 30	30 / 16	30 / 16
Recommended cable cross section for network connection 1 / 2		mm²	3 x 4.0 or 6.0 / 3 x 4.0	3 x 4.0 or 6.0 / 3 x 4.0	5 x 1.5 / 3 x 1.5	5 x 1.5 / 5 x 1.5
Outdoor unit						
Sound pressure level		dB(A)	51	52	51	52
Dimensions	H x L x W	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
Weight		kg	104	104	110	110
Line diameter	Fluid line	mm (inches)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
	Gas line	mm (inches)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)
Pre-filled refrigerant (R407C) / CO_2-equivalent		kg / t CO_2-Equ.	2.90 / 5.145	2.90 / 5.145	2.90 / 5.145	2.90 / 5.145
Connection distance		m	3 – 30	3 – 30	3 – 30	3 – 30
Nominal connection distance		m	7	7	7	7
Pre-filled connection distance		m	10	10	10	10
Additional coolant fill-up quantity (R407C)		g/m	70	70	70	70
Max. height difference IU/OU		m	20	20	20	20
Operating range	Outside temperature	°C	-20 to 35	-20 to 35	-20 to 35	-20 to 35
	Water outlet temperature	°C	25 to 60	25 to 60	25 to 60	25 to 60

The COP details relate to 230 V in conformance with the EC Directives 2003/32/EC. Power details in conformance with EN 14511.

The information about the energy efficiency classes is based on the official ErP specifications (EU Ordinance No. 811/2013, EN 14511 and EN 14825) for heat pumps, which have been in force since 26. September 2015. The efficiency classes marked with an asterisk (*) correspond to the new A+++ class to be introduced starting in September 2019. Other ErP relevant information is included in the respective product data sheets.

1 Energy efficiency class scale from A++ to G.

4.6.3 Compact system

The compact system consists of a device that is installed in the external area and can be connected directly to the heating circuit. The operation is effected via wired remote controller inside the building.

CAUTION

Danger of water pipes freezing in outside temperatures below 0 °C

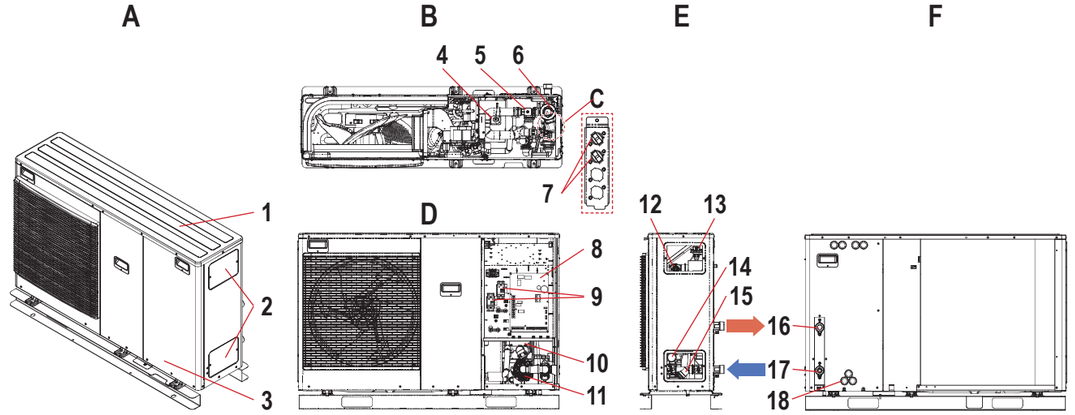
If the heating circuit in the compact system is filled with water and the outside temperature falls below 0 °C, the risk exists in the compact system that the water pipes may freeze. This can cause a lot of damage to the device.

The client should therefore ensure the absence of frost by taking **one** of the following measures:

- ► Operate the heating circuit using a food-safe antifreeze mixture (propylene glycol).
- ► Provide an additional cabinet heating in the compact device, to prevent the heating circuit from freezing up.
- ► Empty the heating circuit by using a built-in device (manually or automatically) before freezing starts.

4.6.3.1 Components

Compact system - Model B8



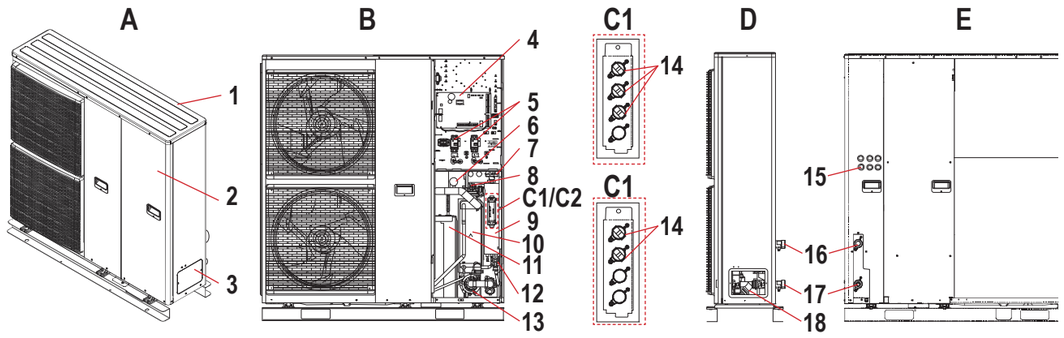
A Exterior view
1 Upper device panelling
2 Valve covers
3 Front panel

B Top view (with opened device panelling)
and
C Detailed view of overload protection
4 6 litre expansion vessel
5 Flow monitor
6 E-heating element heat pump
7 Overload protection (x 2)

D Front view (with opened front panel)
8 Electronic PCB
9 FI protection switch
10 Heat exchanger
11 Circulating water pump

E Side elevation
and
F Rear view
12 Safety valve (only visible without cover)
13 Quick vent valve (only visible without cover)
14 Manometer (only visible without cover)
15 Dirt catcher with 2 stop valves (only visible without cover)
16 Water inflow
17 Water return
18 Cable glands

Compact system - Model B9



A Exterior view
1 Upper device panelling
2 Front panel
3 Valve cover

B Front view (with opened front panel)
4 Electronic PCB
5 FI protection switch
6 Manometer
7 Quick vent valve
8 Flow monitor
9 E-heating element heat pump
10 Heat exchanger
11 10-litre expansion vessel (not visible)
12 Pressure relief valve
13 Circulating water pump

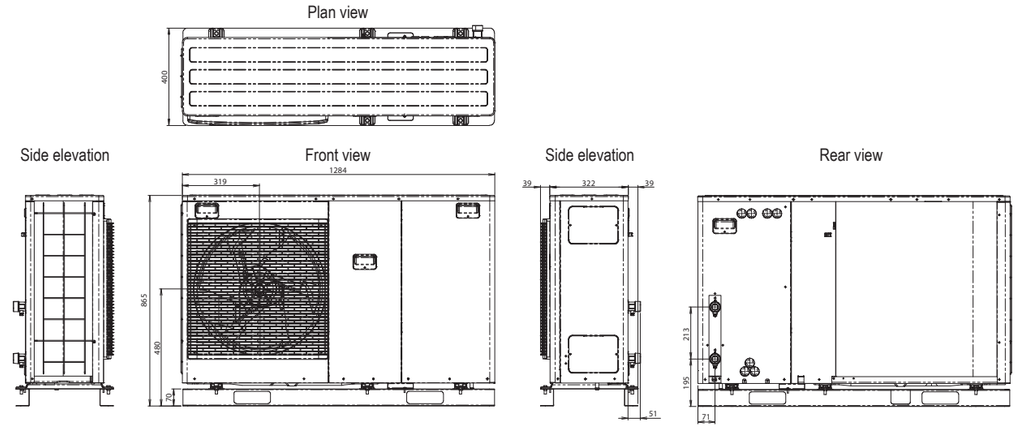
C1 Detail view for 3-phase models
C2 Detail view for 1-phase models
14 Overload protection

D Side elevation
E Rear view
15 Cable glands (x 6)
16 Water inflow
17 Water return
18 Dirt catcher

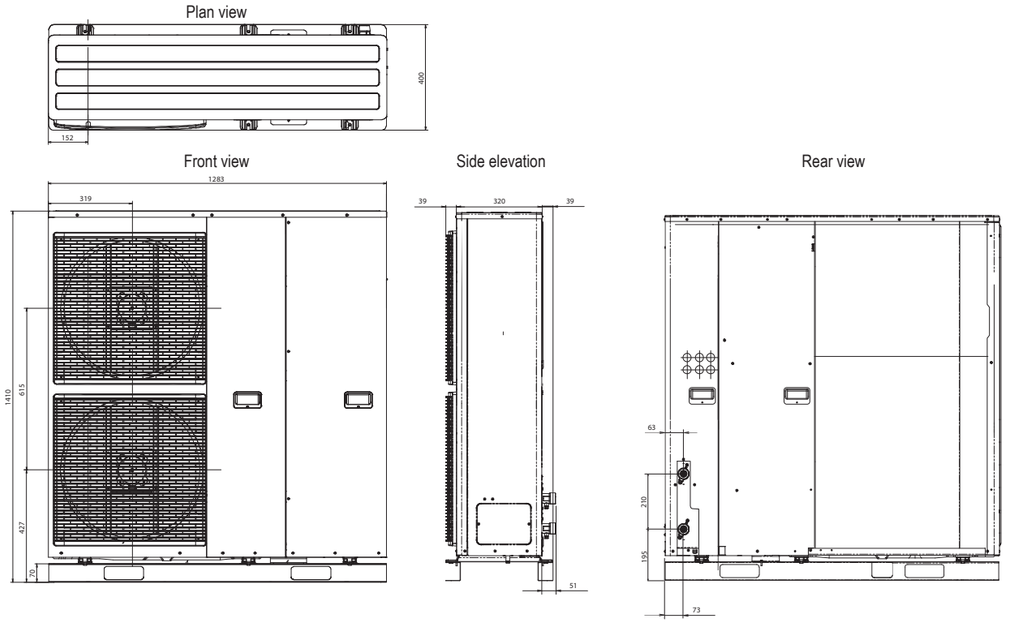
4.6.3.2 Dimensions

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

Compact system - Model B8



Compact system - Model B9



4.6.3.3 Technical Data

Compact system / LT series / H generation

LT series			Single-phase (230 V / 50 Hz), Heating and Cooling		
Compact device			**WH-MDC05H3E5**	**WH-MDC07H3E5**	**WH-MDC09H3E5**
Model			**B8**	**B8**	**B8**
Heating capacity at +7 °C (A7/W35)		kW	5.00	7.00	9.00
COP at +7 °C (A7/W35)			5.08	4.46	4.15
Heating capacity at +2 °C (A2/W35)		kW	4.80	5.00	7.45
COP at +2 °C (A2/W35)			3.75	3.45	3.14
Heating capacity at -7 °C (A–7/W35)		kW	4.50	5.15	7.70
COP at -7 °C (A–7/W35)			2.98	2.68	2.12
Energy efficiency class[1] at 35 / 55 °C			A+++ * / A++	A+++ * / A++	A+++ * / A+++
Cooling capacity at 35 °C (A35/W7)		kW	4.50	5.50	7.00
EER (energy efficiency ratio) at 35 °C (A35/W7)			3.33	2.74	2.44
Sound pressure level	Heating / Cooling	dB(A)	49 / 47	49 / 47	51 / 49
Sound power (A7/W55)	Heating / Cooling	dB(A)	65 / 65	65 / 65	69 / 67
Dimensions	H x L x W	mm	865 x 1,283 x 320	865 x 1,283 x 320	865 x 1,283 x 320
Weight		kg	107	112	112
Water-side connection		mm	28	28	28
High efficiency pump	Rotation speed stages		Variable	Variable	Variable
	Power consumption (min./ max.)	W	34 / 96	36 / 100	39 / 108
Water flow rate (A7/W35)		l/min	14.3	17.2	25.8
Power of E-heating element		kW	3	3	3
Power consumption	Heating / Cooling	kW	0.985 / 1.35	1.34 / 2.01	2.17 / 2.87
Operating and start up current	Heating / Cooling	A	4.5 / 6.1	6.1 / 9.3	9.9 / 13.0
Max. power consumption on network connection 1 / 2		A	19.5 / 13.0	20.5 / 13.0	22.9 / 13.0
Recommended fuse for network connection 1 / 2		A	30 / 15	30 / 15	30 / 16
Recommended cable cross section for network connection 1 / 2		mm²	3 x 4.0 or 6.0 / 3 x 4.0	3 x 4.0 or 6.0 / 3 x 4.0	3 x 4.0 or 6.0 / 3 x 4.0
Pre-filled refrigerant (R410A) / CO_2-equivalent		kg / t CO_2-Equ.	1.42 / –	1.42 / –	1.42 / –
Operating range	Outside temperature (H / K)	°C	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43
	Water outlet temperature (H / K)	°C	20 to 55 / 5 to 20	20 to 55 / 5 to 20	20 to 55 / 5 to 20

The COP details relate to 230 V in conformance with the EC Directives 2003/32/EC. Power details in conformance with EN 14511.

The information about the energy efficiency classes is based on the official ErP specifications (EU Ordinance No. 811/2013, EN 14511 and EN 14825) for heat pumps, which have been in force since 26. September 2015. The efficiency classes marked with an asterisk (*) correspond to the new A+++ class to be introduced starting in September 2019. Other ErP relevant information is included in the respective product data sheets.

Authorised Service Partners or installation companies can activate the cooling function via a special setting.

1 Energy efficiency class scale from A++ to G.

Compact system / T-CAP model series / H Generation

T-CAP model series			Single-phase (230 V / 50 Hz), Heating and Cooling		Three-phase (400 V / 50 Hz), heating and cooling		
Compact device			**WH-MXC09H3E5**	**WH-MXC12H6E5**	**WH-MXC09H3E8**	**WH-MXC12H9E8**	**WH-MXC16H9E8**
Model			**B9**	**B9**	**B9**	**B9**	**B9**
Heating capacity at +7 °C (A7/W35)		kW	9.00	12.00	9.00	12.00	16.00
COP at +7 °C (A7/W35)			4.84	4.74	4.84	4.74	4.28
Heating capacity at +2 °C (A2/W35)		kW	9.00	12.00	9.00	12.00	16.00
COP at +2 °C (A2/W35)			3.59	3.44	3.59	3.44	3.10
Heating capacity at -7 °C (A–7/W35)		kW	9.00	12.00	9.00	12.00	16.00
COP at -7 °C (A–7/W35)			2.85	2.72	2.85	2.72	2.49
Energy efficiency class[1] at 35 / 55 °C			A+++ / A++	A+++ / A++	A+++ * / A++	A+++ * / A+++	A+++ * / A++
Cooling capacity at 35 °C (A35/W7)		kW	7.00	10.00	7.00	10.00	12.20
EER (energy efficiency ratio) at 35 °C (A35/W7)			3.17	2.81	3.17	2.81	2.56
Sound pressure level	Heating / Cooling	dB(A)	51 / 49	52 / 50	51 / 49	52 / 50	55 / 54
Sound power (A7/W55)	Heating / Cooling	dB(A)	68 / 67	69 / 68	68 / 67	69 / 68	72 / 72
Dimensions	H x L x W	mm	1,410 x 1,283 x 320	1,410 x 1,283 x 320	1,410 x 1,283 x 320	1,410 x 1,283 x 320	1,410 x 1,283 x 320
Weight		kg	148	148	155	155	168
Water-side connection		mm	28	28	28	28	28
High efficiency pump	Rotation speed stages		Variable	Variable	Variable	Variable	Variable
	Power consumption (min./ max.)	W	32 / 102	34 / 110	32 / 102	34 / 110	38 / 120
Water flow rate (A7/W35)		l/min	25.8	34.4	25.8	34.4	45,9
Power of E-heating element		kW	3	6	3	9	9
Power consumption	Heating / Cooling	kW	1.86 / 2.21	2.53 / 3.56	1.86 / 2.21	2.53 3.56	3.74 / 4.76
Operating and start up current	Heating / Cooling	A	8.6 / 10.2	11.7 / 16.5	2.8 / 3.4	3.8 / 5.3	5.7 / 7.2
Max. power consumption on network connection 1 / 2		A	25.0 / 13.0	29.0 / 26.0	14.7 / 13.0	11.9 / 13.0	15.5 / 13.0
Recommended fuse for network connection 1 / 2		A	30 / 30	30 / 30	16 / 16	16 / 16	16 / 16
Recommended cable cross section for network connection 1 / 2		mm²	3 x 4.0 or 6.0 / 3 x 4.0	3 x 4.0 or 6.0 / 3 x 4.0	5 x 1.5 / 3 x 1.5	5 x 1.5 / 5 x 1.5	5 x 1.5 / 5 x 1.5
Pre-filled refrigerant (R410A) / CO_2-equivalent		kg / t CO_2-Equ.	2.3 / 4.802	2.3 / 4.802	2.3 / 4.802	2.3 / 4.802	2.35 / 4.907
Operating range	Outside temperature (H / K)	°C	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43
	Water outlet temperature (H / K)	°C	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20	25 to 55 / 5 to 20

The COP details relate to 230 V in conformance with the EC Directives 2003/32/EC. Power details in conformance with EN 14511.

The information about the energy efficiency classes is based on the official ErP specifications (EU Ordinance No. 811/2013, EN 14511 and EN 14825) for heat pumps, which have been in force since 26. September 2015. The efficiency classes marked with an asterisk (*) correspond to the new A+++ class to be introduced starting in September 2019. Other ErP relevant information is included in the respective product data sheets.

Authorised Service Partners or installation companies can activate the cooling function via a special setting.

1 Energy efficiency class scale from A++ to G.

All data is provisional.

Compact system / HT series / G Generation

HT series			Single-phase (230 V / 50 Hz), Heating and Cooling		Three-phase (400 V / 50 Hz), heating	
Compact device			**WH-MHF09G3E5**	**WH-MHF12G6E5**	**WH-MHF09G3E8**	**WH-MHF12G9E8**
Model			**B9**	**B9**	**B9**	**B9**
Heating capacity at +7 °C (A7/W35)		kW	9.00	12.00	9.00	12.00
COP at +7 °C (A7/W35)			4.64	4.46	4.64	4.46
Heating capacity at +2 °C (A2/W35)		kW	9.00	12.00	9.00	12.00
COP at +2 °C (A2/W35)			3.45	3.26	3.45	3.26
Heating capacity at -7 °C (A–7/W35)		kW	9.00	12.00	9.00	12.00
COP at -7 °C (A–7/W35)			2.74	2.52	2.14	2.52
Heating capacity at +7 °C (A7/W65)		kW	9.00	12.00	9.00	12.00
COP at +7 °C (A7/W65)			2.27	2.22	2.29	2.22
Heating capacity at +2 °C (A2/W65)		kW	9.00	10.30	9.00	10.30
COP at +2 °C (A2/W65)			1.89	1.84	1.89	1.84
Heating capacity at -7 °C (A–7/W65)		kW	8.90	9.60	8.90	9.60
COP at -7 °C (A–7/W65)			1.63	1.62	1.63	1.62
Energy efficiency class[1] at 35 / 55 °C			A+++ / A+++	A+++ / A+++	A+++* / A+++	A+++* / A+++
Sound pressure level		dB(A)	51	52	51	52
Sound power (A7/W55)		dB(A)	68	69	68	69
Dimensions	H x L x W	mm	1,410 x 1,283 x 320	1,410 x 1,283 x 320	1,410 x 1,283 x 320	1,410 x 1,283 x 320
Weight		kg	151	151	162	162
Water-side connection		mm	28	28	28	28
High efficiency pump	Rotation speed stages		7	7	7	7
	Power consumption (min./ max.)	W	—	—	—	—
Water flow rate (A7/W35)		l/min	25.8	34.4	25.8	34.4
Power of E-heating element		kW	3	6	3	9
Power consumption		kW	1.94	2.69	1.94	2.69
Operating and start up current		A	9.3	12.8	3.0	4.1
Max. power consumption on network connection 1 / 2		A	28.5 / 13.0	29.0 / 26.0	14.5 / 13.0	10.8 / 13.0
Recommended fuse for network connection 1 / 2		A	30 / 30	30 / 30	16 / 16	16 / 16
Recommended cable cross section for network connection 1 / 2		mm²	3 x 4.0 or 6.0 / 3 x 4.0	3 x 4.0 or 6.0 / 3 x 4.0	5 x 1.5 / 3 x 1.5	5 x 1.5 / 5 x 1.5
Pre-filled refrigerant (R410A) / CO_2-equivalent		kg / t CO_2-Equ.	1.92 / 3.406	1.92 / 3.406	–	–
Operating range	Outside temperature (H / K)	°C	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43	-20 to 35 / 16 to 43
	Water outlet temperature (H / K)	°C	25 to 60 / 5 to 20	25 to 60 / 5 to 20	25 to 60 / 5 to 20	25 to 60 / 5 to 20

The COP details relate to 230 V in conformance with the EC Directives 2003/32/EC. Power details in conformance with EN 14511.

The information about the energy efficiency classes is based on the official ErP specifications (EU Ordinance No. 811/2013, EN 14511 and EN 14825) for heat pumps, which have been in force since 26. September 2015. The efficiency classes marked with an asterisk (*) correspond to the new A+++ class to be introduced starting in September 2019. Other ErP relevant information is included in the respective product data sheets.

1 Energy efficiency class scale from A++ to G.

4.7 Control

4.7.1 Operating unit

The Aquarea heat pumps can be operated and programmed through the operating unit included in the scope of delivery. The operating unit has a display for the important operating parameters and various operating keys 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 operating unit 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 (in-/outputs), p. 59*, → *4.6.3.3 Accessories, p. 50*, → *6.8.2 Connecting the optional on-site accessories, p. 180*).

In the case of split systems, the operating unit is integrated into the hydro-module or combination hydro-module, but can be removed from the device to another room for separate installation. In the case of compact systems, the operating unit is always installed separately in the building. The method for installing the operating unit is identical in both cases (→ *6.8.3 Assembling and connecting the operating unit, p. 186*).

Depending on the device generation (F, G, H...), the heat pumps are equipped with various operating units that provide different functions.

4.7.1.1 Operating unit for F- and G-Generation models

The operating unit is in the scope of delivery of the following models:

Split systems		Compact systems	
HT	WH-SHF09F3E5 + WH-UH09FE5	HT	WH-MHF09G3E5‘
	WH-SHF12F6E5 + WH-UH12FE5		WH-MHF12G6E5
	WH-SHF09F3E8 + WH-UH09FE8		WH-MHF09G3E8
	WH-SHF12F9E8 + WH-UH12FE8		WH-MHF12G9E8

Note

An overview of the structure and functions of the operating unit for the models of the F and G generations is given in the planning handbook for split systems or compact systems from 2014.

Detailed information about the regulation functions is also given in the operating instructions and in the service manual of the device in question.

4.7.1.2 Operating unit for H-Generation models

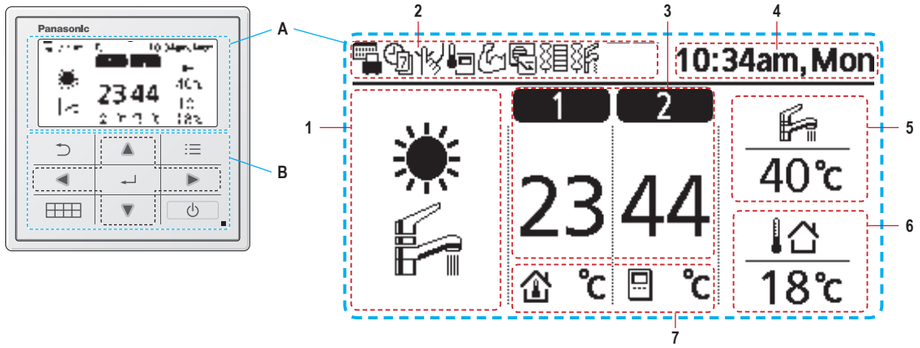
The operating unit is in the scope of delivery of the following models:

Split systems with combination hydro-module		Split systems with hydro-module		Compact systems	
LT	WH-ADC0309H3E5(B) + WH-UD03HE5-1	LT	WH-SDC03H3E5-1 + WH-UD03HE5-1	LT	WH-MDC05H3E5
	WH-ADC0309H3E5(B) + WH-UD05HE5-1		WH-SDC05H3E5-1 + WH-UD05HE5-1		WH-MDC07H3E5
	WH-ADC0309H3E5(B) + WH-UD07HE5-1		WH-SDC07H3E5-1 + WH-UD07HE5-1		WH-MDC09H3E5
	WH-ADC0309H3E5(B) + WH-UD09HE5-1		WH-SDC09H3E5-1 + WH-UD09HE5-1	T-CAP	WH-MXC09H3E5
	WH-ADC1216H6E5 + WH-UD12HE5		WH-SDC12H6E5 + WH-UD12HE5		WH-MXC12H6E5
	WH-ADC1216H6E5 + WH-UD16HE5		WH-SDC16H6E5 + WH-UD16HE5		WH-MXC09H3E8
	WH-ADC0916H9E8 + WH-UD09HE8		WH-SDC09H3E8 + WH-UD09HE8		WH-MXC12H9E8
	WH-ADC0916H9E8 + WH-UD12HE8		WH-SDC12H9E8 + WH-UD12HE8		WH-MXC16H9E8
	WH-ADC0916H9E8 + WH-UD16HE8		WH-SDC16H9E8 + WH-UD16HE8		
T-CAP	WH-ADC1216H6E5 + WH-UX09HE5	T-CAP	WH-SXC09H3E5 + WH-UX09HE5		
	WH-ADC1216H6E5 + WH-UX12HE5		WH-SXC12H6E5 + WH-UX12HE5		
	WH-ADC0916H9E8 + WH-UX09HE8		WH-SXC09H3E8 + WH-UX09HE8		
	WH-ADC0916H9E8 + WH-UX12HE8		WH-SXC12H9E8 + WH-UX12HE8		
	WH-ADC0916H9E8 + WH-UX16HE8		WH-SXC16H9E8 + WH-UX16HE8		
	WH-ADC0916H9E8 + WH-UQ09HE8		WH-SQC09H3E8 + WH-UQ09HE8		
	WH-ADC0916H9E8 + WH-UQ12HE8		WH-SQC12H9E8 + WH-UQ12HE8		
	WH-ADC0916H9E8 + WH-UQ16HE8		WH-SQC16H9E8 + WH-UQ16HE8		

IMPORTANT

The same operating unit is used for all models of the H-generation, but not all functions of the operating unit are directly available for all models. For example, the domestic hot water mode is directly available in the split systems with combination hydro-module and internal domestic hot water tank, while this function is only available in split systems with standard hydro-module and external domestic hot water tank after the external domestic water temperature sensor is installed, electrically connected and enabled via the operating unit.

Design and Functions of the Operating Unit



Basic Functions

A Display
Graphic, background-illuminated LCD display with easily understandable symbols as well as plain text menu displays in 10 different user languages.

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

- Heating
- Cooling
- Auto
- Auto heating
- Auto cooling
- Preparation of hot water
- Heat pump in operation

2 Operating Symbols
Display of the currently set function:

- Holiday mode
- Weekly timer
- Quiet mode
- Operation with operating unit as room thermostat
- Power mode
- Power control
- Electric heating element heating
- Electric heating element hot water
- 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.

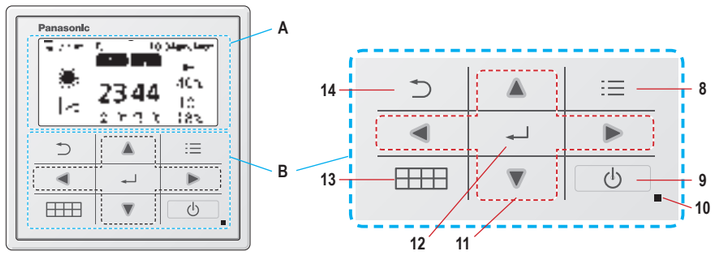
4 Duration
Display of the current clock time and the day of the week

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 sensor and current temperatures

- Internal room thermostat
- Inflow temperature according to heating level
- External room thermostat
- Inflow temperature → Directly set
- Swimming pool temperature set



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

8 Main menu button
Calling up 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 Operating display ■
Lights up during operation and flashes if there is a fault.

11 Navigation keys (arrow keys) ▲ On ▼ Off ◄ Left ► Right
Selecting a menu element or entering a value

12 Confirmation Key
Confirming the selected setting of the selected value

13 Quick menu button
Calling up the Quick Menus with the following options:

- Manual preparation of hot water
- Power mode
- Quiet mode
- Emergency heating mode
- Weekly timer
- Manual defrost mode
- Fault acknowledgement
- Locking the operating unit

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 emergency heating mode is switched 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.

E-heating element Heater
Enabling of the E-heating element for the heating mode

E-Heating element hot water
Enabling of the E-heating element for the 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.

Hot water mode
Selection of the desired hot water mode (standard/ intelligent) In the standard mode, the fill time for the hot water tank is shorter, but the energy consumption is lower in the Intelligent mode. Only available if the hot water tank is activated.

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

E-heating Element Power
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)

Frost protection
Activating or deactivating the Frost Protection function with the device switched off.

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

Alternative outside 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 hot water tank, if the heat pump capacity is not sufficient at lower outside temperatures. The bivalent function can be operated in alternating 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 expanded parallel mode (heat pump is operated and heating boiler is activated for buffer tank and/or hot water, depending on the setting options activated for switching behaviour).

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

Max. pumping revolution speed (pump control)
Setting of volume flow, maximum value and switching on / off of the pump.

Pumping out
Switching on the pumping-out operating mode

Screed drying
Setting and switching on screed drying function of drying screed and walls (exclusively during the construction phase).

System Monitoring

Energy monitor
Display of a diagram with current or recorded data 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.

Water Temperature
Display of the various actual water temperatures for return, feed, heatC. 1, heatC. 2, hot water tank and swimming pool.

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

Compressor
Display of technical data for compressor mode, e.g. current rotational speed, number of starts and total operating time.

E-heating element
Display of the operating hours of the booster heater/ heating for the hot water tank.

Note

Detailed information about the regulation functions is given in the operating instructions (→ *8.1 Extract from the operating instructions (H-Generation), p. 203*) and in the Service manual of the device concerned.

Additional Functions of the Operating Unit on connecting the additional PCB CZ-NS4P

The installation of the optional additional PCB CZ-NS4P (→ *4.7.2 External interfaces (in-/outputs), p. 59*) 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.

Regulation of 2 heating circuits (including swimming pool heating)
Selection of the number of heating circuits. After the system has been selected with two heating circuits, information is to be provided as to whether the respective heating circuit is being used for room 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 external switching off of 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 operating unit of the heat pump.

Integration of a Solar Station
Selection of the buffer tank or of the hot water tank for the solar connection 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 connection is activated.

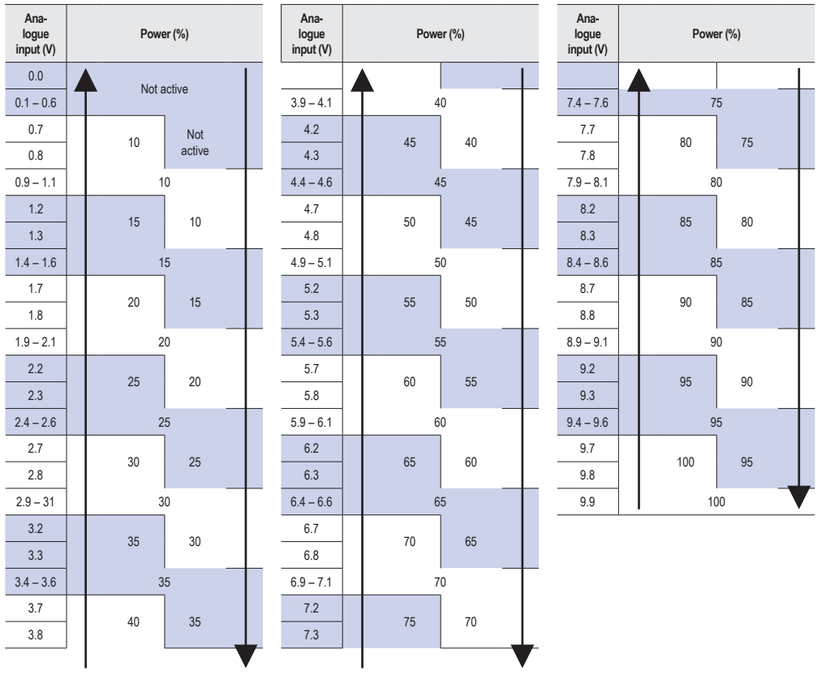
External error report
Dry contact for outputting an error message signal (if contact closed) to an external display unit. Even if the fault has been acknowledged through the external display, the error message signal remains internally active.

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 E-heating element are switched off.	1	0
2	Automatic operation Heat pump runs in normal mode	0	0
3	Increased operating: Power setting 1 (in %) for heating and domestic water	0	1
4	Maximum operation: Power setting 2 (in %) for heating and domestic water	1	1

The function must be enabled through the operating unit of the heat pump. Moreover, especially the power settings 1 and 2 should be configured via the operating unit.

Power control
Limiting the operating current according to the current power requirement 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:



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 operating unit of the heat pump.

4.7.2 External interfaces (in-/outputs)

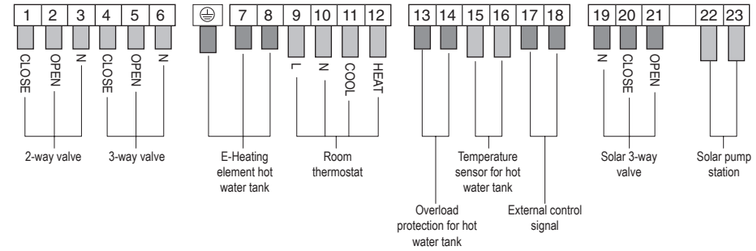
The Aquarea heat pumps offer the option of connecting useful accessories through external interfaces, such as an external room thermostat or integrating the heat pump in a GLT system.

4.7.2.1 External interfaces for F- and G-Generation models

The overview of external interfaces is valid for the following models:

Split systems		Compact systems	
HT	WH-SHF09F3E5 + WH-UH09FE5	HT	WH-MHF09G3E5‘
	WH-SHF12F6E5 + WH-UH12FE5		WH-MHF12G6E5
	WH-SHF09F3E8 + WH-UH09FE8		WH-MHF09G3E8
	WH-SHF12F9E8 + WH-UH12FE8		WH-MHF12G9E8

Overview of the External Interfaces



Terminals	Connection	Function	Condition	Cable cross section
1 to 3	2-way valve	Output for actuation of the 2-way valve (e.g. for floor heating, cooling)		3 × min. 0.5 mm²
4 to 6	3-way valve	Output for actuation of the 3-way valve (e.g. for heating, domestic hot water tank)		3 × min. 0.5 mm²
Earth to 8	E-Heating element hot water tank	Output for on/off switch of the E-heating element hot water tank	The maximum power output of the E-heating element hot water tank should be maximum 3 kW.	3 × min. 1.5 mm²
9 to 12	Room thermostat	Input for room thermostat signals		4, or 3 × min. 0.5 mm²
13 to 14	Overload protection for domestic hot water tank	Input for overload protection of the domestic hot water tank	The terminals 13/14 must be used if overload protection is not used for the hot water tank.	2 × min. 0.5 mm²
15 to 16	Temperature sensor of the hot water tank	Input for temperature sensor of the domestic hot water tank		2 × min. 0.5 mm²
17 to 18	Ext. control signal	Input for the external control signal	These two terminals are bridged at the time of dispatch. Connection: 1-pin (min. 3 mm contact distance)	2 × min. 0.5 mm²
19 to 21	Solar 3-way valve	Output for actuation of the solar 3-way valve		3 × min. 0.5 mm²
22 to 23	Solar pump station	Input of the ON signal of solar pump 2 (230 V AC)	Use additional PCB CZ-NS1P, CZ-NS2P or CZ-NS3P.	2 × min. 0.5 mm²

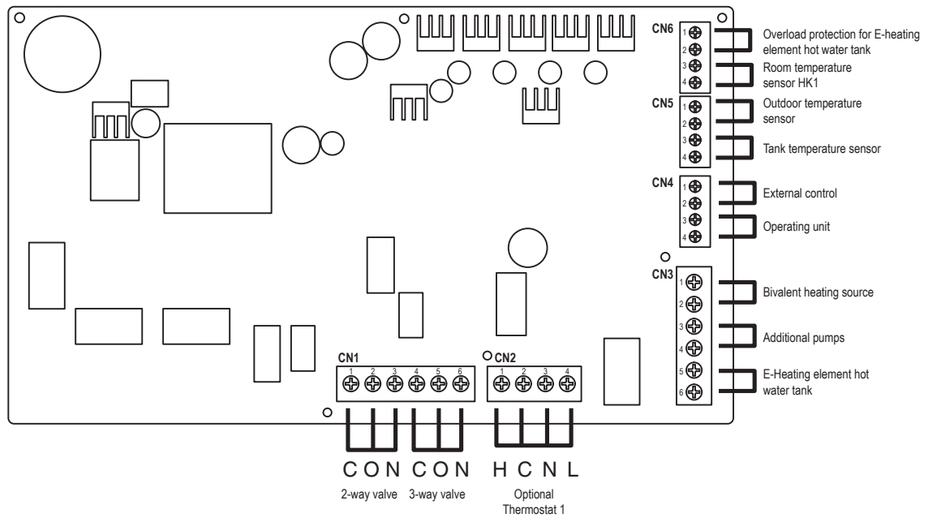
4.7.2.2 External interfaces for H-Generation models

The overview of external interfaces is valid for the following models:

Split systems with combination hydro-module		Split systems with hydro-module		Compact systems	
LT	WH-ADC0309H3E5(B) + WH-UD03HE5-1	LT	WH-SDC03H3E5-1 + WH-UD03HE5-1	LT	WH-MDC05H3E5
	WH-ADC0309H3E5(B) + WH-UD05HE5-1		WH-SDC05H3E5-1 + WH-UD05HE5-1		WH-MDC07H3E5
	WH-ADC0309H3E5(B) + WH-UD07HE5-1		WH-SDC07H3E5-1 + WH-UD07HE5-1		WH-MDC09H3E5
	WH-ADC0309H3E5(B) + WH-UD09HE5-1		WH-SDC09H3E5-1 + WH-UD09HE5-1	T-CAP	WH-MXC09H3E5
	WH-ADC1216H6E5 + WH-UD12HE5		WH-SDC12H6E5 + WH-UD12HE5		WH-MXC12H6E5
	WH-ADC1216H6E5 + WH-UD16HE5		WH-SDC16H6E5 + WH-UD16HE5		WH-MXC09H3E8
	WH-ADC0916H9E8 + WH-UD09HE8		WH-SDC09H3E8 + WH-UD09HE8		WH-MXC12H9E8
	WH-ADC0916H9E8 + WH-UD12HE8		WH-SDC12H9E8 + WH-UD12HE8		WH-MXC16H9E8
	WH-ADC0916H9E8 + WH-UD16HE8		WH-SDC16H9E8 + WH-UD16HE8		
T-CAP	WH-ADC1216H6E5 + WH-UX09HE5	T-CAP	WH-SXC09H3E5 + WH-UX09HE5		
	WH-ADC1216H6E5 + WH-UX12HE5		WH-SXC12H6E5 + WH-UX12HE5		
	WH-ADC0916H9E8 + WH-UX09HE8		WH-SXC09H3E8 + WH-UX09HE8		
	WH-ADC0916H9E8 + WH-UX12HE8		WH-SXC12H9E8 + WH-UX12HE8		
	WH-ADC0916H9E8 + WH-UX16HE8		WH-SXC16H9E8 + WH-UX16HE8		
	WH-ADC0916H9E8 + WH-UQ09HE8		WH-SQC09H3E8 + WH-UQ09HE8		
	WH-ADC0916H9E8 + WH-UQ12HE8		WH-SQC12H9E8 + WH-UQ12HE8		
	WH-ADC0916H9E8 + WH-UQ16HE8		WH-SQC16H9E8 + WH-UQ16HE8		

Main PCB

Overview of the External Interfaces



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, 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, N = Neutral, O = Open, C = Closed = Direction	Maximum total cable length: 50 m	3 × min. 1.5 mm²
CN2 1 to 4	Optional Thermostat 1	Heating / cooling requirement of thermostats. L N = 230 V AC, H = Heating, C = Cooling	Only functions if the additional PCB CZ-NS4P is not connected. Maximum total cable length: 50 m	3 or 4 × min. 0.5 mm²
CN3 1 to 2	Bivalent heating source	Allows connection of a second heating source for bivalent operating mode. Dry contact	System setting needed. Maximum total cable length: 50 m	2 × min. 0.5 mm²
CN3 3 to 4	Additional pumps	Support of the pumps integrated in the in-door unit, if their capacity is not sufficient. 230 V AC	Maximum total cable length: 50 m	2 × min. 1.5 mm²
CN3 5 to 6	E-Heating element hot water tank	Power supply for E-heating element of the hot water tank 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	Operating unit	Integrated in front covers and connected in the case of split systems, loosely placed there in the case of compact systems.	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	Tank temperature sensor		Use components according to the Panasonic specifications. Maximum total cable length: 30 m	2 × min. 0.3 mm²
CN6 1 to 2	Overload protection for E-heating element hot water tank	Allows connection of the overload protection for the E-heating element 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
CN5 3 to 4	Room temperature sensor PAW-A2W-TSRT for heat C. 1	For measurement of the indoor tempera-ture in another room as well as at the installation location of the indoor unit	Only functions if the additional PCB CZ-NS4P 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

E-heating element of the domestic hot water tank

- The maximum power output of the hot water tank E-heating element should be maximum 3 kW.
- The cable of the hot water tank E-heating element 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:

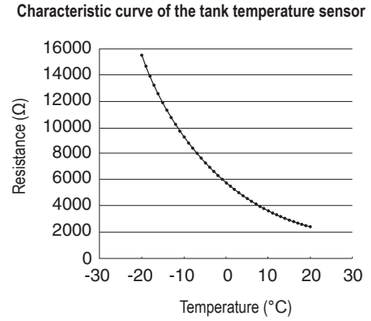
- The connecting cable of the bivalent heat source must be 2 x min. 0.5 mm² and conform to the code 60245 IEC 57 or higher.
- Maximum total cable length: 50 m

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.



- 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 heatC. 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:

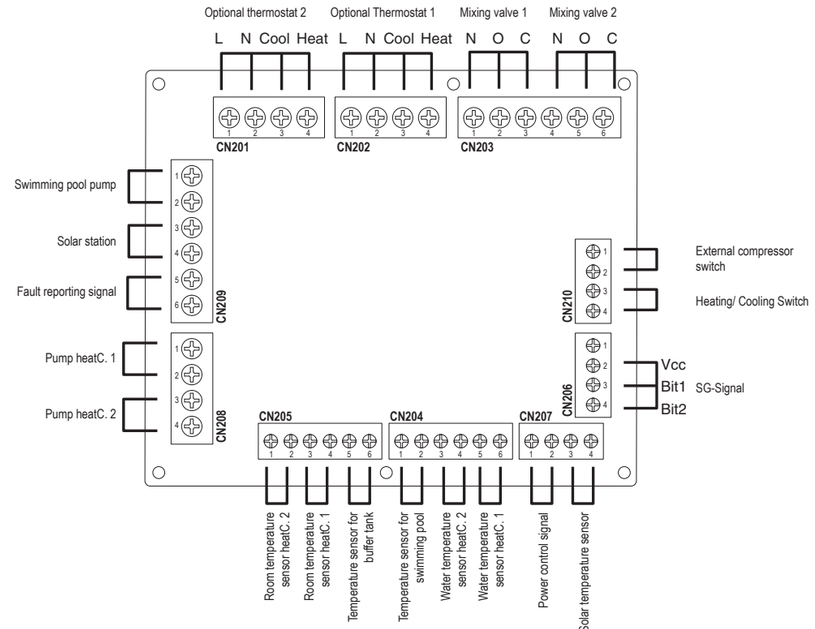
- The cable of the outdoor temperature sensor must be 2 x min. 0.3 mm² and have a double insulated PVC- or rubber-jacket cable.
- Maximum total cable length: 30 m

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

Additional PCB CZ-NS4P

Overview of the External Interfaces



Terminals	Connection	Function	Condition	Cable cross section
CN201 1 to 4	Optional thermostat 2	Heating / cooling requirement of thermostats. 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, 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	Infeed temperature sensor heatC. 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	Infeed temperature sensor heatC. 1 PAW-A2W-TSHC			
CN205 1 to 2	Room temperature sensor heatC. 2 PAW-A2W-TSRT		Maximum total cable length: 30 m	2 × min. 0.3 mm²
CN205 3 to 4	Room temperature sensor heatC. 1 PAW-A2W-TSRT			

Terminals	Connection	Function	Condition	Cable cross section
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
CN207 1 to 2	Power 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 heatC. 1	230 V AC, <500 W	Maximum total cable length: 50 m	2 × min. 1.5 mm²
CN208 3 to 4	Pump heatC. 2			
CN209 1 to 2	Swimming pool pump	230 V AC	Maximum total cable length: 50 m	2 × min. 1.5 mm²
CN209 3 to 4	Solar station	230 V AC	Maximum total cable length: 50 m	2 × min. 1.5 mm²
CN209 5 to 6	Fault reporting 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 additional PCB. The temperatures in the two heating circuits are controlled mutually independently by the operating unit.

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 station:

- The cable of the solar station 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 Station:

- The cables of the temperature sensors for the buffer tank, the swimming pool and the solar station 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

Inflow temperature sensor for heating circuits 1 and 2:

- The cables of the inflow 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

Power control signal:

- The cable of the power 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 tank

4.8.1.1 Product features

The hot water tank is for preparation and intermediate storage of the hot water. Besides the heat from the Aquarea heat pump, solar heat can also be stored in an intermediate storage by integrating a solar system and used. An E-heating element with a power of, say, 3 kW additionally ensures maximum comfort, even at very low outside temperatures, and can also be used for sterilisation.

Panasonic offers various storage models in different sizes for easy hot water preparation for different requirements.

The scope of delivery for the various storage types includes the following:

- E-heating element
- Safety valve, provided loose (only stainless steel hot water tank only)
- Dip sensor with sleeve and 20 m cable
- Protective anode (enamel-steel hot water tank only)
- Thermostatic overload protection
- Adjustable legs
- Insulation in polyurethane foam
- 3-way switchover valve set PAW-3WYVLV-SI or CZ-NV1 available as optional accessory.

Observe the respective installation instructions enclosed when installing the hot water tank. Other accessories are also mentioned in it, which are needed for the installation of the tank in the heating system and must be provided by the client.

Standard hot water tank (stainless steel)

PAW-TD20C1E5 / PAW-TD30C1E5

The standard hot water tanks are compact tanks in stainless steel, which guarantee a high life cycle. They are available in two sizes with 200 and 300 litre capacities. Both these models with energy efficiency class A need no protective anode and are maintenance-free.

PAW-TD20C1E5

PAW-TD30C1E5

High performance hot water tank (enamelled)

PAW-TG20C1E3STD-1 / PAW-TG30C1E3STD-1 / PAW-TG40C1E3STD-1

The enamelled high performance hot water tanks, with their generously dimensioned heating surfaces, are optimally suited for increasing the transfer performance for combination with Aquarea heat pumps. Use of an E-heating element as flange installation heater in the lower tank area.

PAW-TG20C1E3STD-1 PAW-TG30C1E3STD-1 PAW-TG40C1E3STD-1

Other characteristics:

- Operating temperature: max. 95 °C
- Two sensor sleeves on the top side of the tank for temperature measurement in the upper and lower tank area
- High quality dial thermometer

PAW-TG30C2E3STD-1

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

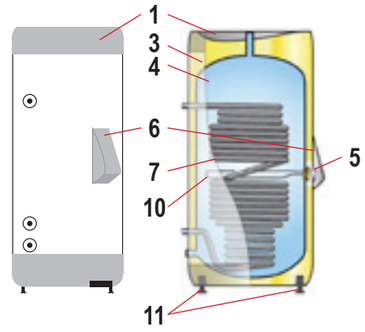
PAW-TG30C2E3STD-1

4.8.1.2 Components

	Component	PAW-TD20C1E5	PAW-TD30C1E5	PAW-TG20C1 E3STD-1	PAW-TG30C1 E3STD-1	PAW-TG40C1 E3STD-1	PAW-TG30C2 E3STD-1
1	Lid	●	●	●	●	●	●
2	Protective anode	X	X	●	●	●	●
3	Heat insulation	●	●	●	●	●	●
4	Hot water tank	●	●	●	●	●	●
5	Thermometer	●	●	●	●	●	●
6	Connection box	○	○	○	○	○	○
7	Heat exchanger (WT) 1	●	●	●	●	●	●
8	Heat exchanger (WT) 2	X	X	X	X	X	●
9	Cover E-Heating element hot water tank	X	X	●	●	●	●
10	E-Heating element hot water tank	●	●	●	●	●	●
11	Adjustable leg	● (x4)	● (x4)	● (x4)	● (x4)	● (x4)	● (x4)

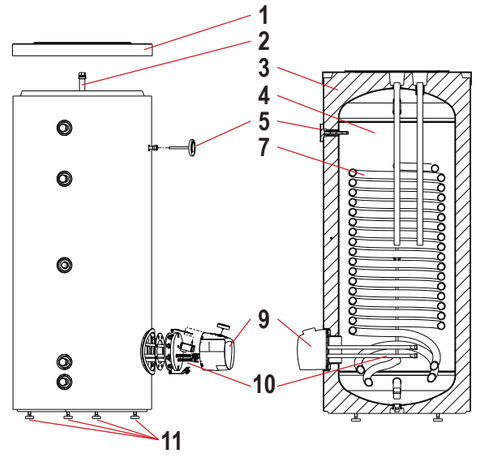
X component not present; ○ Component present, but not shown; ● Component available present and shown

PAW-TD20C1E5 / PAW-TD30C1E5



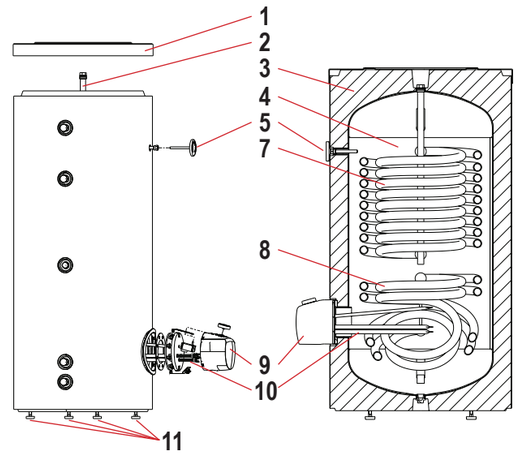
1 Lid
2 –
3 Heat insulation
4 Hot water tank
5 Thermometer
6 ○ Connection box (rear cover)
7 Heat exchanger
8 –
9 –
10 E-heating element hot water tank
11 Adjustable leg (total 4)

PAW-TG20C1E3STD-1 / PAW-TG30C1E3STD-1 / PAW-TG40C1E3STD-1



1 Lid
2 Protective anode
3 Heat insulation
4 Hot water tank
5 Thermometer
6 ○ Connection box
7 Heat exchanger
8 –
9 Cover E-Heating element hot water tank
10 E-heating element hot water tank
11 Adjustable leg (x4)

PAW-TG30C2E3STD-1



1 Lid
2 Protective anode
3 Heat insulation
4 Hot water tank
5 Thermometer
6 Connection box
7 Heat exchanger (WT) 1
8 Heat exchanger (WT) 2
9 Cover E-Heating element hot water tank
10 E-heating element hot water tank
11 Adjustable leg (x4)

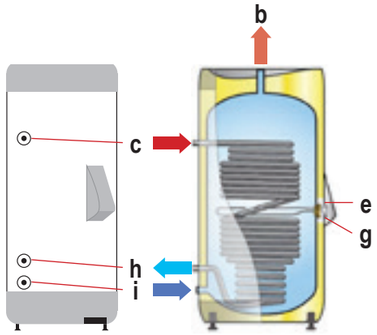
4.8.1.3 Connections

	Connection	PAW-TD20C1E5	PAW-TD30C1E5	PAW-TG20C1 E3STD-1	PAW-TG30C1 E3STD-1	PAW-TG40C1 E3STD-1	PAW-TG30C2 E3STD-1
a	Protective anode connection	X	X	–	–	–	–
b	Hot water outlet	G 3/4“	G 3/4“	G 3/4"	G 1"	G 1"	G 1"
c_1	Inflow from the heat pump (WT 1)	G 3/4“	G 3/4“	G 1"	G 1"	G 5/4"	G 5/4"
c_2	Inflow from the heat pump (WT 2)	X	X	X	X	X	G 5/4"
d	Circulation connection	–	–	G 3/4"	G 3/4"	G 3/4"	G 3/4"
e	Hot water temperature sensor	–	–	–	–	–	–
f	Solar sensor	–	–	–	–	–	–
g	Connection E-Heating element hot water tank	–	–	–	–	–	–
h_1	Return to the heat pump (WT 1)	G 3/4“	G 3/4“	G 1"	G 1"	G 5/4"	G 5/4"
h_2	Return to the heat pump (WT 2)	X	X	X	X	X	G 5/4"
i	Domestic cold water entry	G 3/4“	G 3/4“	G 3/4"	G 1"	G 1"	G 1"

X = Component not available

Unit: Inches (")

PAW-TD20C1E5 / PAW-TD30C1E5

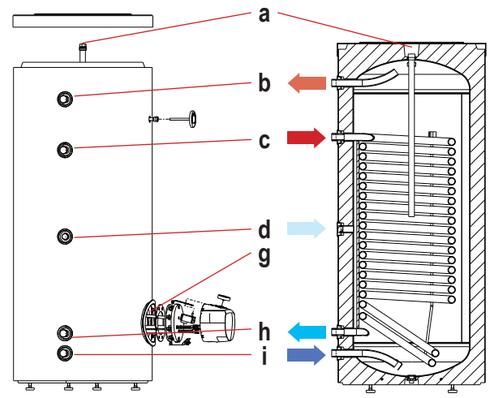


	Connection	PAW-TD20C1E5	PAW-TD30C1E5
a	Protective anode connection	X	X
b	Hot water outlet	G 3/4“	G 3/4“
c_1	Inflow from the heat pump (WT 1)	G 3/4“	G 3/4“
c_2	Inflow from the heat pump (WT 2)	X	X
d	Circulation connection	–	–
e	Hot water temperature sensor	–	–
f	Solar sensor	–	–
g	Connection E-Heating element hot water tank	–	–
h_1	Return to the heat pump (WT 1)	G 3/4“	G 3/4“
h_2	Return to the heat pump (WT 2)	X	X
i	Domestic cold water entry	G 3/4“	G 3/4“

X = Component not available

Unit: Inches (")

PAW-TG20C1E3STD-1 / PAW-TG30C1E3STD-1 / PAW-TG40C1E3STD-1

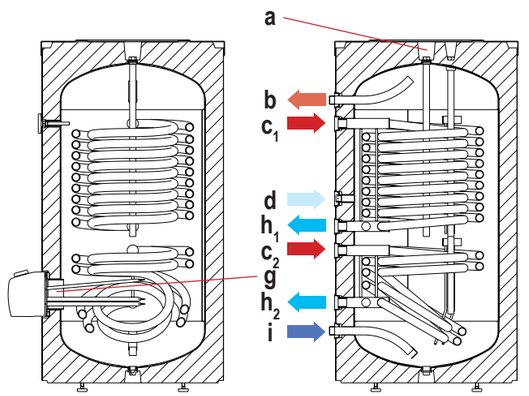


	Connection	PAW-TG20C1 E3STD-1	PAW-TG30C1 E3STD-1	PAW-TG40C1 E3STD-1
a	Protective anode connection	–	–	–
b	Hot water outlet	G 3/4"	G 1"	G 1"
c_1	Inflow from the heat pump (WT 1)	G 1"	G 1"	G 5/4"
c_2	Inflow from the heat pump (WT 2)	X	X	X
d	Circulation connection	G 3/4"	G 3/4"	G 3/4"
e	Hot water temperature sensor	–	–	–
f	Solar sensor	–	–	–
g	Connection E-Heating element hot water tank	–	–	–
h_1	Return to the heat pump (WT 1)	G 1"	G 1"	G 5/4"
h_2	Return to the heat pump (WT 2)	X	X	X
i	Domestic cold water entry	G 3/4"	G 1"	G 1"

X = Component not available

Unit: Inches (")

PAW-TG30C2E3STD-1



	Connection	PAW-TG30C2 E3STD-1
a	Protective anode connection	–
b	Hot water outlet	G 1"
c_1	Inflow from the heat pump (WT 1)	G 5/4"
c_2	Inflow from the heat pump (WT 2)	G 5/4"
d	Circulation connection	G 3/4"
e	Hot water temperature sensor	–
f	Solar sensor	–
g	Connection E-Heating element hot water tank	–
h_1	Return to the heat pump (WT 1)	–
h_2	Return to the heat pump (WT 2)	G 5/4"
i	Domestic cold water entry	G 1"

X = Component not available

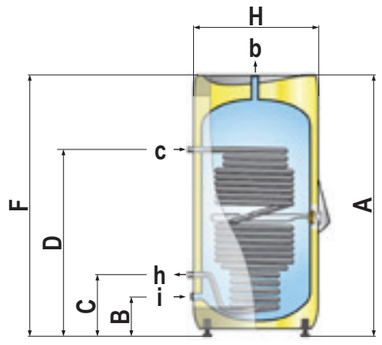
Unit: Inches (")

4.8.1.4 Dimensions

Dimensions	PAW-TD20C1E5	PAW-TD30C1E5	PAW-TG20C1 E3STD-1	PAW-TG30C1 E3STD-1	PAW-TG40C1 E3STD-1	PAW-TG30C2 E3STD-1
A	1,265	1,745	1,535	1,590	1,920	1,450
B	157	157	180	175	250	250
C	268	268	300	270	370	370
D	678	868	880	890	1,070	740
E	–	–	780	740	990	800
F	1,265	1,265	1,355	1,410	1,675	1,205
G	–	–	365	320	400	400
H (Ø)	595	595	580	680	760	760
K	–	–	–	–	–	225
L	–	–	–	–	–	425

Unit: mm

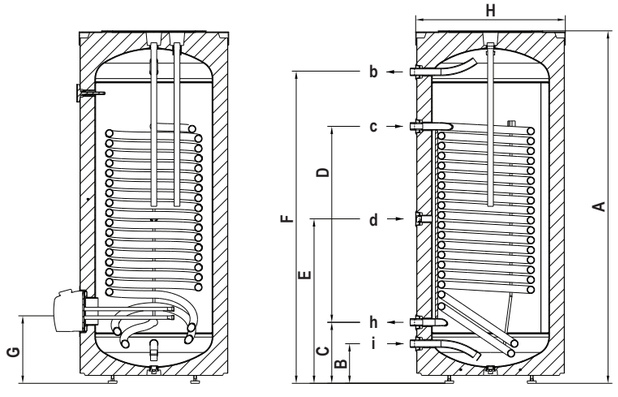
PAW-TD20C1E5 / PAW-TD30C1E5



Dimensions	PAW-TD20C1E5	PAW-TD30C1E5
A	1,265	1,745
B	157	157
C	268	268
D	678	868
F	1,265	1,265
H (Ø)	595	595

Unit: mm

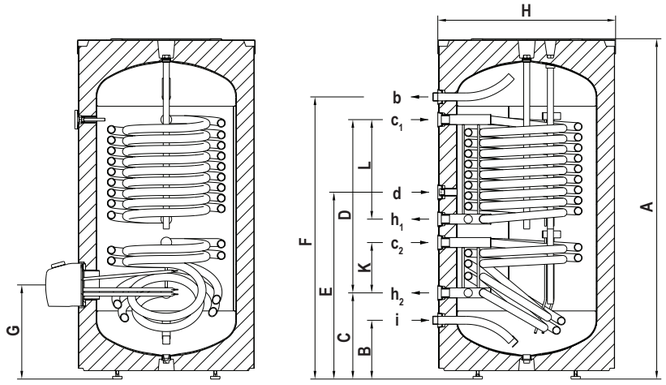
PAW-TG20C1E3STD-1 / PAW-TG30C1E3STD-1 / PAW-TG40C1E3STD-1



Dimensions	PAW-TG20C1 E3STD-1	PAW-TG30C1 E3STD-1	PAW-TG40C1 E3STD-1
A	1,535	1,590	1,920
B	180	175	250
C	300	270	370
D	880	890	1,070
E	780	740	990
F	1,355	1,410	1,675
G	365	320	400
H (Ø)	580	680	760

Unit: mm

PAW-TG30C2E3STD-1



Dimensions	PAW-TG30C2E3STD-1
A	1,450
B	250
C	370
D	740
E	800
F	1,205
G	400
H (Ø)	760
K	225
L	425

Unit: mm

4.8.1.5 Technical Data

Domestic hot water tank		Standard hot water tank (stainless steel)		High performance hot water tank (enamelled)			Domestic hot water tank (enamelled) with 2 heat exchangers (bivalent: Solar + HP)
Model		PAW-TD20C1E5[1]	PAW-TD30C1E5[1]	PAW-TG20C1E3STD-1	PAW-TG30C1E3STD-1	PAW-TG40C1E3STD-1	PAW-TG30C2E3STD-1
Tank volume	l	192	280	185	285	396	284
Max. water temperature	°C	75	75	95	95	95	95
Dimensions Height / Diameter	mm	1265 / 595	1,745 / 595	1,535 / 580	1,590 / 680	1,950 / 750	1,300 / 750
Weight (net / incl. water filling)	kg	53 / –	65 /	97 / 282	140 / 425	171 / 567	134 / 418
Pivot measurement	mm	NA	NA	1,641	1,729	2,089	1,501
Colour		white	white	White aluminium	White aluminium	White aluminium	White aluminium
Power of E-heating element	kW	1.5	1.5	3	3	3	3
Power supply	V	230	230	230	230	230	230
Material of the tank interior		Stainless steel	Stainless steel	Enamelled	Enamelled	Enamelled	Enamelled
Heat exchanger surface	m²	1.8	1.8	2.0	2.5	6.1	2.4 (for WP) + +1 (for solar or burner)
Standby loss at 65 °C[2]	kWh/24 h	0.99	1.13	1.6	2.1	1.7	1.6
Connection for circulation line (3/4")		NA	NA	Yes	Yes	Yes	Yes
Charging time	Rating	★★★★	★★★★	★★★☆	★★★☆	★★★☆	★★★☆
Energy losses	Rating	★★★★	★★★★	★★★☆	★★★☆	★★★☆	★★★☆
Heat loss	W	64	83	70,8	88.8	71.9	68
Energy efficiency class[3]		A	A	C	C	B	B
Guarantee		2 years	2 years	2 years	2 years	2 years	2 years
Maintenance required		no	no	Annual	Annual	Annual	Annual

1 thermostat included in the scope of delivery

2 Insulation tested according to EN 12897

3 Energy efficiency class scale from A to G.

4.8.2 Aquarea Tank

CAUTION

Danger of damage to heating system due to corrosion in buffer tank due to inadequate water quality

When using Aquarea tanks, take the following into consideration, in addition to the above-mentioned requirements for water quality.

- ► Ensure that the European and national requirements regarding heating water quality are met.
- ► In particular, ensure that the following values are not exceeded: Chlorine 100 mg/l, calcium 100 mg/l, iron / manganese 0.5 mg/l.

4.8.2.1 Product features

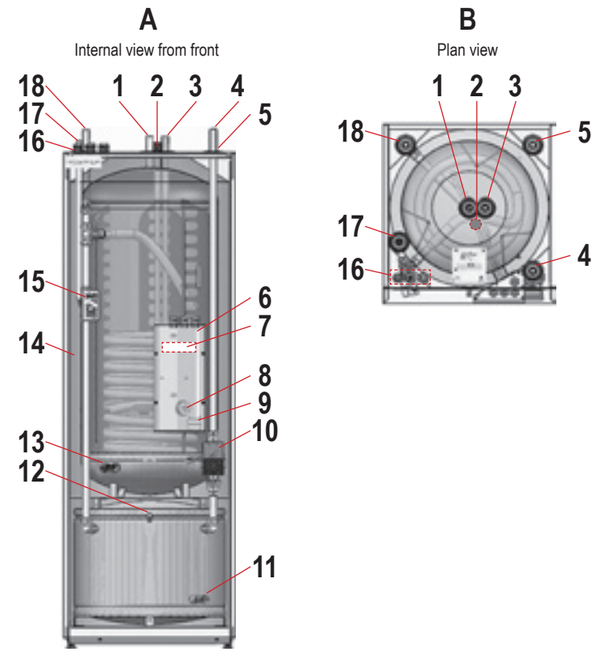
The Aquarea tank is a high-performance, and modern tank, which was developed especially for the requirements of the Aquarea heat pumps. The hot water tank with a volume of 185 litres is located in the upper area of the tank and a smaller buffer tank with a volume of 80 litres in the lower area. This makes the Aquarea tank ideal for domestic water heating and heating usable in single family houses. The complete model ensures very low standby losses and quick assembly due to the pre-installed assembly groups such as 3-way valve or E-Heating element hot water tank (with safety thermostat and fault reporting contact)

The use of the Aquarea tank helps implement multiple functions efficiently and easily, such as:

- Domestic water heating
- Hydraulic disconnection of heat pumps and heat consumer circuit
- Ensuring minimum volume in the heating system
- Buffer function for optimum operation of the Aquarea heat pumps

Note the respective installation instructions enclosed when installing the Aquarea tank. Other accessories are also mentioned in it, which are needed for the installation of the hot water-/ buffer tank combination in the heating system and must be provided by the client.

4.8.2.2 Components, connections and dimensions



1 Hot water outlet
2 Protective anode
3 Domestic cold water connection
4 Heating circuit inflow
5 Heating circuit return (only seen in plan view)
6 Connection box
7 Connection terminal block (3-way valve, heating circuit pump, E-heating element hot water tank and temperature sensor)
8 E-heating element hot water tank (3 kW)
9 Overheat protection
10 Heating circuit pump (High efficiency pump)
11 Draining valve of the buffer tank
12 Bleeder valve
13 Draining valve of the hot water tank
14 Tank insulation (Polyurethane, 50 mm)
15 3-way-valve
16 3 x cable gland
17 Inflow from the heat pump
18 Return to the heat pump

4.8.2.3 Technical Data

General data			PAW-TD20B8E3-1
Dimensions of cabinet (H x L x W)		mm	1,770 × 640 × 690
Empty weight		kg	150
Tube connections		mm	Ø 22
Standby loss at 65 °C (according to EN 12897)		kWh / 24 h	1.3
Power supply		V / Ph / Hz	230 / 1 / 50
High efficiency pump	Rotation speed stages		continuous (800 to 4250 RPM (min^{-1})
	Pressure loss (min./max.)	kPa	5 / 6
	Power consumption (min./max.)	W	3 / 45
Domestic hot water tank			
Hot water tank volume		l	185
Max. operating pressure		bar	8
Max. operating temperature		°C	90
Container wall	Material		Steel (S275JR, enamelled)
Heat exchanger surface		m²	2.1
E-Heating element hot water tank		kW	3
Heat insulation	Material		Polyurethane, 50 mm
Heat loss		W	53
Energy efficiency class[1]			B
Buffer tank			
Buffer tank volume		l	80
Max. operating pressure		bar	6.0
Max. operating temperature		°C	80
Container wall	Material		Steel (S235JR)
Heat insulation	Material		Polyurethane, 40 mm
Heat loss		W	46
Energy efficiency class[1]			B

1 Energy efficiency class scale from A+ to F-.

4.8.3 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 (in-/outputs), p. 59*) and connection conditions when connecting the accessories.

Overview of the specifications of the recommended on-site accessories

No.	Component	Quantity	Description	Model	Power supply	Make	Split systems with combination hydro-module: H-Generation: Standard version	Split systems with combination hydro-module: H-Generation: Version "B"[3]	Split systems with combination hydro-module: with hydro-module: F-Generation	Split systems with combination hydro-module: with hydro-module: H-Generation	Compact systems: G-Generation	Compact systems: H-Generation
A	2-way valve set	1	Electrical motor actuator	SFA21/18	230 V AC	Siemens	●[2]	●[2]	●[2]	●[2]	●[2]	●[2]
			2-way valve	VVI46/25	–							
B	3-way valve set	2	Electrical motor actuator	SFA21/18	230 V AC	Siemens	●	●	●	●	●	●
			3-way valve	VXI46/25	–							
C	Room thermostat	1	Analogue	RAA20	230 V AC	Siemens	●	●	●	●	●	●
			Programmable	REV200								
D	Room thermostat	1	Wired	PAW-A2W-RTWIRED	230 V AC	1	●	●	●	●	●	●
			Wireless	PAW-A2W-RTWIRELESS	230 V AC	1						
E	Mixing valve	1	–	167032	230 V AC	Caleffi	●	3	●	●	●	●
F	Pump	1	–	Yonos 25/6	230 V AC	Wilo	●	3		●		
G	Temperature sensor for buffer tank	1	–	PAW-A2W-TSBU	–	1	●	3		●		
H	Outdoor temperature sensor	1	–	PAW-A2W-TSOD	–	1	●	3		●		
I	Inflow temperature sensor for heating circuit	1	–	PAW-A2W-TSHC	–	1	●	3		●		
J	Room temperature sensor	1	–	PAW-A2W-TSRT	–	1	●	3		●		
K	Solar sensor	1	–	PAW-A2W-TSSO	–	1	●	3		●		
L	Cabinet heating for outdoor/ compact devices	1	Only for models with 3 or 5 kW	CZ-NE2P			●	●		●		●
M	Cabinet heating for outdoor/ compact devices	1	For all models after the F-Generation with > 5 kW	CZ-NE3P			●	●	●	●	●	●
N	Additional PCB for expanded controller functionality	1	–	CZ-NS4P			●	●		●		●
O	Interface for the control over the Internet via Aquarea Smart Cloud	1	–	CZ-TAW1			●	●		●		●

1 To be sourced through Panasonic
2 Only for unlocked cooling mode
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 provisions, 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 listing of the individual steps given below also points to the corresponding sections in which the concrete planning steps are described:

1. Cooling technique and performance criteria (→ *5.1, p. 79*)
   > Establishment of standard outside temperature θe and standard heating load (→ *5.1.1, p. 79*)
   > Establishment of the hot water requirement (→ *5.1.2, p. 81*)
   > Establishment of the heating surface temperature (→ *5.1.3, p. 82*)
   > Operating mode and establishment of the bivalence point (→ *5.1.4, p. 82*)
   > Establishment of the line correction factor for split systems (→ *5.1.5, p. 83*)
   > Example: Calculation of the total heat performance required (→ *5.1.6, p. 83*)
   > Cooling (→ *5.1.7, p. 86*)
2. Installation criteria (→ *5.2, p. 87*)
   > Acoustics (→ *5.2.1, p. 87*)
   > Installation of a split system (→ *5.2.2, p. 90*)
   > Installation of a Compact system (→ *5.2.3, p. 96*)
3. Hydraulics (→ *5.3, p. 100*)
4. Electricals (→ *5.4, p. 105*)
5. Heating and cooling capacities depending on water flow and outside temperature (→ *5.5, p. 116*)
6. Examples of use (→ *5.6, p. 126*)

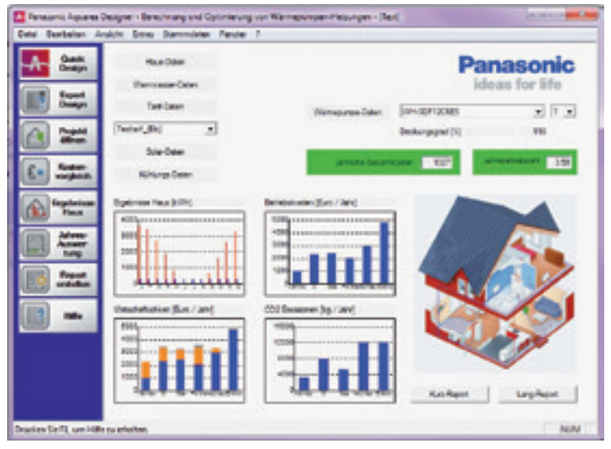
Planning with Panasonic Aquarea Designer

For easy and quick calculation as well as optimisation of heating systems with heat pump, Panasonic offers the Aquarea Designer as a free download from www.PanasonicProClub.com.

The programme 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 system consumption number and the annual performance number
- Cost comparison
- Quick Design or Expert Design as well as short report and long report possible

View of the starting interface of Panasonic Aquarea Designer



5.1 Cooling technique and performance criteria

5.1.1 Establishment of standard outside temperature and standard heating load

The heating load of a building is determined according to DIN EN 12831 “”Heating Systems in Buildings - Method for calculating the standard heating load” and the possible valid national appendices and is seen in the planning documents for new buildings. The standard heating load is calculated for the standard outside temperature θe. The standard 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 standard outside temperature is therefore suitable as the design point for the heat pump.

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

Location	Outside temperature θe (°C)	Annual average of the outside temperature (°C)
Aachen	-12	8.1
Berlin	-14	9.5
Bremerhaven	-10	9.0
Chemnitz	-14	7.9
Dortmund	-12	8.1
Eisenach	-16	8.8
Frankfurt / Main	-12	10.2
Frankfurt / Oder	-16	9.5
Hamburg-Fuhlsbüttel	-12	8.5
Hannover	-14	8.5
Kassel	-12	8.8
Königstein, Taunus	-12	6.3

Location	Outside temperature θe (°C)	Annual average of the outside temperature (°C)
Constance	-12	7.9
Magdeburg	-14	9.5
Mannheim	-12	10.2
Munich	-16	7.9
Münster (Westphalia)	-12	8.1
Nuremberg	-16	7.9
Passau	-14	7.9
Remscheid	-12	6.8
Rostock-Warnemünde	-10	8.4
Saarbrücken	-12	6.8
Stuttgart	-12	10.2
Ulm / Donau	-14	7.9

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 protection requirements. Due to this fact, the performances per square metre of residential area stated in the table below can be used.

Example of Germany: Typical values for the specific heat requirement of residential buildings for rough determination of the heating 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 living area of 120 m², the required heating load thus calculated is 9.6 kW (80 W/m²).

The standard outside temperature for the residential house can be read from the table of the standard 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 heating 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 Establishment of the hot water requirement

The drinking water requirement can only be estimated based on the following table for various comfort expectations.

Example of Germany: Typical hot water requirement per person for a single and two family house 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 hot water requirement can be very different. It is advisable to select the size of the hot water tank according to the hot water requirement. Note that the hot water flow rate 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 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 hot water requirement has the highest influence on the degree of coverage of solar systems for hot water preparation. A proven ratio between tank volume and collector area is between 50 to 80 litres per square metre of collector area.

Hot water circulation increases the heat requirement for the hot water preparation and can be up to 100% of the heat requirement for hot water preparation 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 Defining the Heating Surface Temperature

The temperature of the heating surfaces in the design for normal outside temperature should not be taken as higher than 55 °C. Surface heating with inflow temperatures of 35 °C and radiators with an inflow temperature of 45 °C are recommended. When replacing heat sources with burners in existing buildings for an Aquarea heat pump, reduce the inflow temperature as much as possible by using additional heat insulation and restoration measures. Conventional heat sources with burners are operated with inflow temperatures up to 75 °C. By adapting proper restoration 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 inflow temperature.

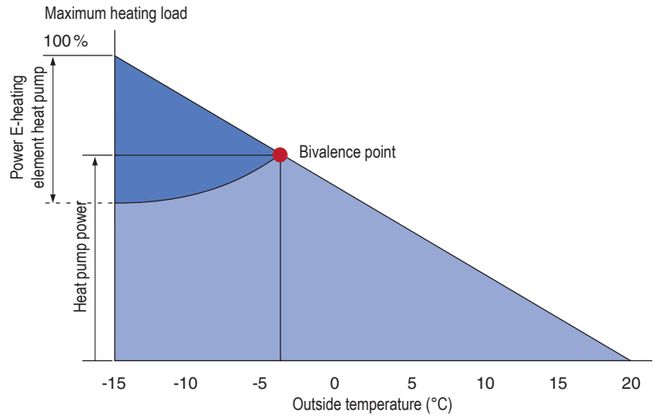
If it is not possible to reduce the inflow temperature, the Aquarea HT series can also supply at inflow temperatures up to 65 °C.

5.1.4 Operating mode and establishment of the bivalence point

First, the desired operating mode of the heat pump must be defined (→ *4.3.2 Operating mode, p. 22*). In order not to over-dimension the heat pump and to save on costs, a bivalent mode is preferred. Another heat source is hooked up below a defined outside temperature and the associated heating capacity. This heat source can be integrated externally (e.g. a boiler or fireplace) or internally through the E-heating element of the heat pump. If this is a heat source that uses power for heat production, it is a mono-energetic operation.

The bivalent mode only supports the air-to-water heat pump if the outside temperatures are very low. As this is the case only for a few days a year, the generated heat of the E-heating element only amounts to a few percent of the totally generated amount of heat.

Bivalent parallel operating mode (mono-energetic) via the internal E-heating element heat pump



IMPORTANT

The bivalence point is defined individually for each building (→ *5.1.6 Example: Calculation of the total heat capacity required, p. 83*). Due to the inverter technology, Aquarea heat pumps can work efficiently even below the nominal capacity, without clocking.

5.1.5 Establishment of the pipeline correction factor for split systems

The performance of the split systems with hydro-module or combination hydro-module falls in proportion to the increase in length of the coolant pipeline. Depending on the nominal capacity of the heat pump, the change in 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).

Pipeline correction factors for split systems up to 7 kW nominal capacity

Length of coolant pipeline (single)	up to 10 m	up to 20 m	up to 30 m
Pipeline correction factor	1.0	0.95	0.90

Pipeline correction factors for split systems above 9 kW nominal capacity

Length of coolant pipeline (single)	up to 7 m	up to 10 m	up to 20 m	up to 30 m
Pipeline correction factor	1.0	0.95	0.90	0.85

5.1.6 Example: Calculation of the total heat capacity required

The main requirements for the air-to-water heat pump are defined through the standard heating load and the standard outside temperature. Moreover, however, the Energy Supply Company will have to take into account the hot water preparation and possible locking times. The connection distances of the connection pipelines between outdoor unit and hydro-module or combination hydro-module or between compact device and building are to be respected, because long

pipelines lead to a lower heating capacity. And not the least, besides the heat pump power, its water inflow temperature at standard outside temperature is also decisive for the correct choice of the heat pump.

On the other hand, Aquarea heat pumps have an internal E-heating element, which can additionally provide the heat supply at very low outside temperatures.

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

1. Standard outside temperature
2. Standard heating load
3. Tank charging (time required for hot water preparation with the heat pump)
4. Possible EVU locking period (e.g. 1 x per day for 2 hours)
5. Pipeline correction factor

$$\text{Heating capacity} \geq \frac{\text{Standard heating load x 24 h}}{\text{(24 h - tank charging - EVU locking period) x pipeline correction factor}}$$

IMPORTANT

In new buildings, a building drying up generally takes place in the initial two years after occupation, when the humidity from the building phase escapes from the building; during this time the heat requirement is higher than after the phase of building drying. This increased heat requirement can be covered by the internal E-heating element heat pump.

Example

- Residential house in Frankfurt/Main with a heating load of 9.6 kW for a standard outside temperature of θe = -12 °C
- Hot water preparation for four persons with standard 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 the hot water preparation, a heat pump with a heating capacity of 9.6 kW would need 7.2 kWh / 9.6 kW = 0.75 h operation. Rounding off, this gives a take charging of 1 hour (1 h).
- The line correction factor is yielded on the basis of a connection distance of 15 m (single length) as the mean value of 0.95 and 0.90 for a line correction factor = 0.93

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

The additional consideration of a EVU locking time of 2 hrs per day results in:

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

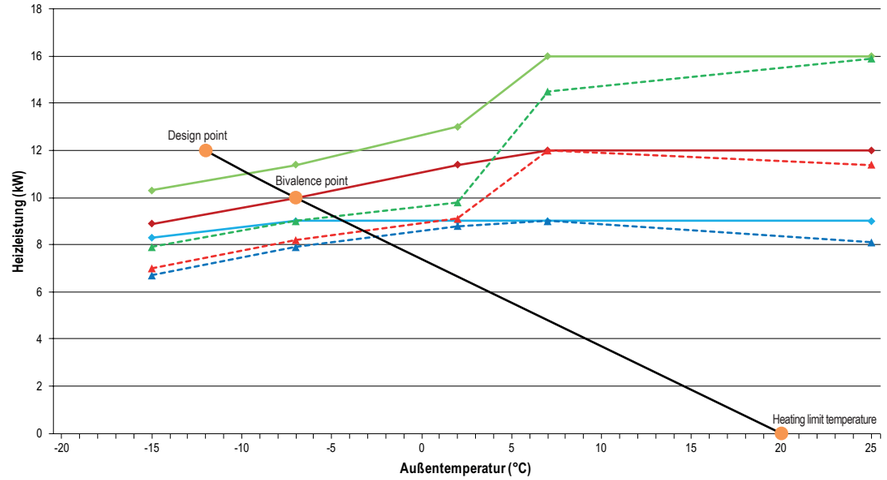
The calculated total heating capacity must be generated with simultaneous maintenance of the required water inflow temperature of 35 °C for underfloor heating.

IMPORTANT

The determination of the total heating load shown 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.

The figure below shows the characteristics for a selection of split systems of the Aquarea LT series with different heating capacity. By plotting the design point (total heating capacity = 12 kW at θe = -12 °C) and the point after which there is no heating requirement (heating limit temperature, in this case 20 °C) and the connection of the two points, it is possible to determine the bivalence point.

Performance characteristic of a selection of Aquarea split systems



Inflow temperature 35 °C
- WH-SDC09H3E8 + WH-UD09HE8
- WH-SDC12H9E8 + WH-UD12HE8
- WH-SDC16H9E8 + WH-UD16HE8

Inflow temperature 55 °C
- WH-SDC09H3E8 + WH-UD09HE8
- WH-SDC12H9E8 + WH-UD12HE8
- WH-SDC16H9E8 + WH-UD16HE8

For a monovalent operating mode of the heat pump, the determined heating capacity of 12 kW itself could not be generated with a 16 kW Aquarea heat pump of the LT series. For reasons of economy and because very low outside temperatures only occur on scattered occasional days in the year, the heat pump is designed as a bivalent heating system. As the second heat source, which is used as a booster heater, consists of an internal E-heating element heat pump, the heat pump is operated mono-energetically. Below the outside temperature of the bivalence point of -7 °C, the remaining heating capacity is generated by the E-heating heat pump element. Up to an outside temperature, the Aquarea heat pump runs in the monovalent mode.

The following heat pumps of the Aquarea LT series can be considered for the split systems due to the intersection with the performance characteristic at -7 °C and a water inflow temperature of 35 °C.

- WH-SDC12H9E8 + WH-UD12HE8 (three- phase)
- WH-SDC16H9E8 + WH-UD16HE8 (three- phase)

5.1.7 Cooling

Aquarea heat pump models with cooling function are switched over manually from heating mode to the cooling mode and must be switched back to the heating mode after completing the cooling period.

CAUTION

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

In the cooling mode, a 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 diverted.
- ► In addition, insulate the pipelines concerned to prevent diffusion.

5.1.7.1 Cooling with Underfloor Heating

Underfloor heating is generally suitable for the cooling mode, however cannot be operated with very low water inflow temperatures, because the level of comfort drops, and the danger of falling below the dew point arises. In general, therefore, the surface temperature is limited to at least 20 °C. If the spread of the water inflow and water return temperature is from 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 tube diameter of the underfloor heating as well as the floor covering. In the case of a tiled floor, the heat transfer is distinctly better than, say, with a carpeted floor, which directly affects the cooling capacity.

Based on the system limits of cooling capacity of underfloor heating, room cooling cannot be regulated to a fixed indoor temperature. At least the water inflow temperature must be set that prevents falling below the dew point.

5.1.7.2 Cooling with fan coils

Fan coils can be operated with very much lower water inflow temperatures than underfloor heating. Correspondingly, fan coils allow you to achieve higher cooling capacity than underfloor heating and also greater comfort due to the type of room climate control. Due to the low water inflow temperatures, a diffusion-proof insulation of the pipeline as well as connection of the condensate discharge to the house drainage system or discharge of the water condensation to outside must be considered when using fan coils for room cooling.

5.2 Installation criteria

5.2.1 Acoustics

5.2.1.1 Sound pressure level

Sound is produced if air is set in vibration. This vibration widens as a pressure wave in the air and this way reaches from emission source to the ear drum of the human ear (immission sort). 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
Press air 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. 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 to take into account other factors such as sounds containing pitch in a rating level, are decisive for maintaining the limit values. This must not exceed the valid immission guide values for immission types outside buildings (example of Germany: Technical instructions for protection against noise) (TA noise)).

Example of Germany: Immission Guide Values according to TA Noise

Industrial Areas	During day and night	70 dB(A)
Commercial areas	Days	65 dB(A)
	Nights	50 dB(A)
Business zones	Days	60 dB(A)
	Nights	45 dB(A)
General residential zones	Days	55 dB(A)
	Nights	40 dB(A)
Purely residential areas	Days	50 dB(A)
	Nights	35 dB(A)
Spa areas, hospitals	Days	45 dB(A)
	Nights	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 crossed over short sound peaks.

The measurable sound pressure level depends on the distance to the sound source and falls 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 concrete case.

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.

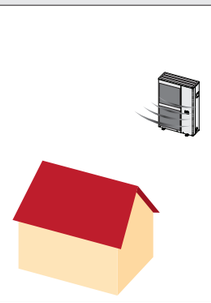
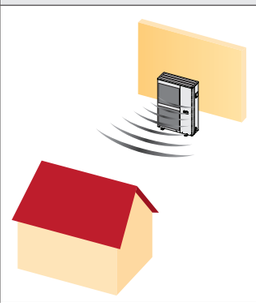
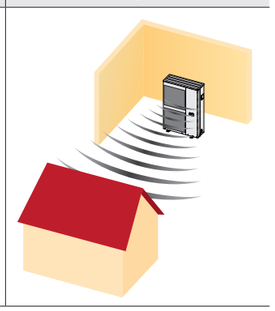
- Shadows cast by obstacles such as buildings, walls or land formations
- Reflection on sonically hard surfaces such as walls, glass facades, buildings or asphalted floors as well as stone flooring
- Absorption of the sound, for example by grass, bark mulch, leaves or freshly fallen snow
- Wind can strengthen 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 room	In quarter room	In one-eighth room
Q=	2	4	8
Arrangement			

Example

The outdoor unit WH-UD12HE5 of a split system has a sound power level of 67 dB(A) and is set up such that the sound can propagate in the quarter room (Q = 4). The sound pressure level at 10 m distance is then:

$$L_{Aeq}(10\,m) = 67\,dB(A) + 10 \times \log \left(\frac{4}{4 \times \pi \times 10^2} \right) = 42\,dB(A)$$

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

$$L_{Aeq}(20\,m) = 67\,dB(A) + 10 \times \log \left(\frac{4}{4 \times \pi \times 20^2} \right) = 36\,dB(A)$$

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 Technical data (split systems), p. 16*, → *4.6.3.3 Technical data (compact systems), p. 50*).

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
5	-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 sonically hard 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 or compact device 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 Setting up Split System

The split system consists of an outdoor unit and a hydro-module or combination hydro-module. Depending on the power 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 hydro-module or combination hydro-module when using the split system:

- If the length of the coolant pipelines is greater than the pre-filled connection distance of the device (depending on the model 10, 15 or 30 m; → *4 Technical data (split systems), p. 16*), the quantity of additional coolant stated in the technical data should be added.
- The maximum length of the coolant pipelines between hydro-module and outdoor unit is 15 or 30 m, depending on the model (→ *4 Technical data (split systems), p. 16*). The value should not fall below this.
- The minimum length of the coolant pipelines between hydro-module and outdoor unit is 3 m and not less than that.
- The maximum difference in height between hydro-module and outdoor unit is 20 or 30 m (→ *4.6.3.3 Technical data (compact systems), p. 50*), depending on the model. The value should not fall below this.
- The wall thickness of the copper tubes for the coolant pipelines must be more than 0.8 mm.

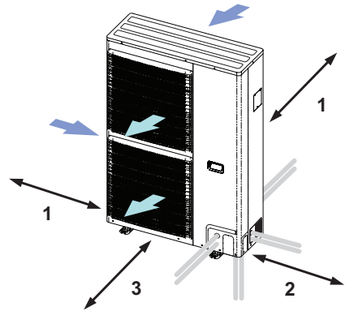
5.2.2.1 Assembly conditions for outdoor units

The assembly conditions for the outdoor unit are as follows:

- The outdoor unit has only been developed for outdoor installation and must not be installed indoors.
- For condensation water drainage in defrosting 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. 92*).
- Maintain the minimum distances (→ *5.2.2.2 Minimum distances for outdoor units, p. 91*).
- 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 on the facing air (→ *5.2.2.3 Securing the outdoor unit, p. 92*).
- The operating sound of the outdoor unit must not cause any stress to the user or to neighbours. Air-to-water heat pumps may in certain countries or regions, require permission. All provisions regarding noise valid at the location must be taken into account (→ *5.2.1 Acoustics, p. 87*).
- In addition, use vibration-damping rubber buffers for isolation.
- If installing outdoor units 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, its operating life may be shortened.
- The outdoor unit is to be installed on a concrete foundation or a stable ground frame e.g. on the outer wall of a building, aligned horizontally 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 the side of the building to prevent tipping over (e.g. by bracing).

5.2.2.2 Minimum distances for outdoor units

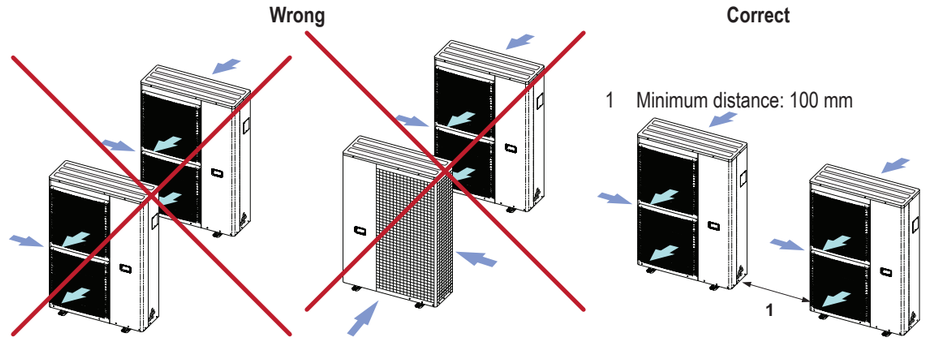
Minimum distance of the outdoor unit to the neighbouring walls and objects, showing air flow direction



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

Notice:
The coolant pipeline connections can be made in four directions (front, rear, side, below).

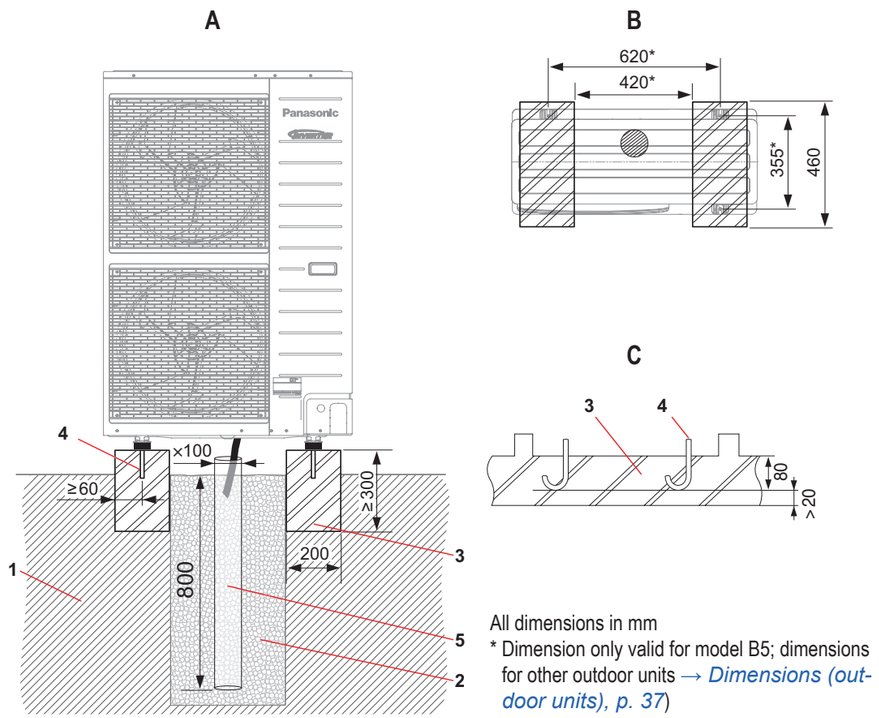
Correct arrangement of multiple outdoor units with representation of the air flow direction



5.2.2.3 Securing the outdoor unit

The outdoor unit must be mounted on a flat, horizontal and solid surface. Take the weight of the water into consideration, too, besides the weight of the device. You need four M12 anchor bolts, with a tensile force of more than 15,000 N.

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



All dimensions in mm
* Dimension only valid for model B5; dimensions for other outdoor units → *Dimensions (outdoor units), p. 37*)

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

B Plan view

C Detailed view Anchoring in the floor plate

5.2.2.4 Installation space requirements for the indoor unit

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

- Hydro-modules or combination hydro-modules (only for split system).
- Lines and wall bushings should be arranged functionally and using the shortest path (electrical cables, coolant and heating water pipelines).
- Tank (hot water tank as well as possibly buffer tank)

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

Available space of the installation space

In split systems, the coolant is partly in the building, which must be taken into consideration with respect to the minimum available space. If no special machine space is available according to EN 378 - Part 1, the minimum required space of the installation space (V_{min}) according to EN 378 – Part 1) is calculated for heat pumps as follows:

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

Where:

G = Coolant filling quantity in kg

c = practical limit in kg / m³
(for R410A is c = 0.44 kg / m³; for R407C is c = 0.31 kg / m³)

CAUTION

Danger of the devices being damaged by incorrect coolant

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

► For the Aquarea LT and T-CAP series, only use coolant of the type R410A and for the Aquarea HT series only coolant of the type R407C.

► Do not mix the prescribed coolant with coolants of another type or replace it with a coolant of another type.

IMPORTANT

The coolant and the coolant filling quantity differ for the individual models and are also dependent on the additional coolant filling, which goes over the pre-filled connection distance. Details to be taken from the technical data (→ *4 Technical data (split systems), p. 16*, → *4.6.3.3 Technical data (compact systems), p. 50*).

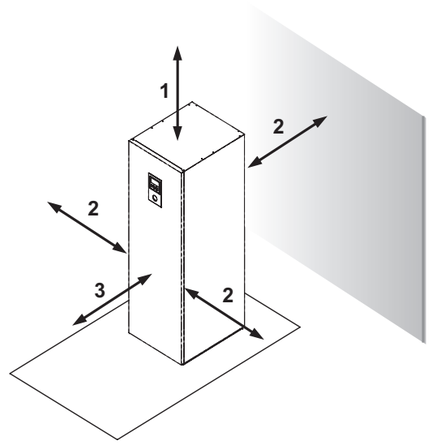
5.2.2.5 Assembly conditions for hydro-modules and combination hydro-modules

The assembly conditions for the hydro-module or combination hydro-module are as follows:

- The hydro-module is only developed for indoor installation and may not be installed outdoors.
- The installation space must be dry and frost-free and the installation location easily accessible for maintenance work.
- Cables, pipelines and wall bushings should be arranged functionally and using the shortest path (electrical cables, coolant and heating water pipelines).
- Ensure good air circulation in the installation room.
- There must not be any heat or vapour sources near the hydro-module. Even laundries or other rooms with high humidity are not suitable, because high humidity causes rusting and can damage the device.
- The condensation from the condensation drain of the hydro-module should be able to run without obstacles, because incorrect draining can cause damage.
- Development of noise in the room should be taken into account (→ *5.2.1 Acoustics, p. 87*).
- Do not mount the device near the door.
- Maintain the minimum distances (→ *5.2.2.6 Minimum distances for hydro-modules and combination hydro-modules, p. 95*).
- The hydro-module must be installed vertically on the wall, where the wall should be strong and solid, so that no vibration occurs.
- 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 hydro-modules and combination hydro-modules

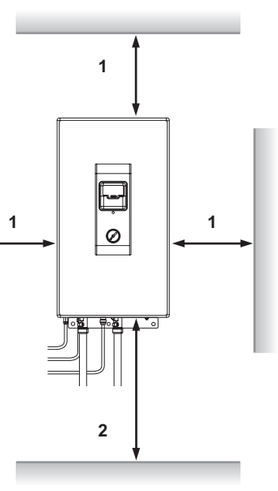
Combination Hydro-module H-Generation



Minimum distances combination hydro-module H-Generation

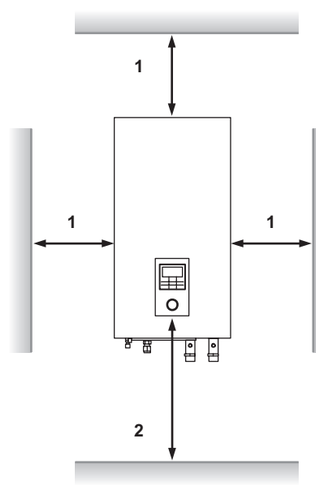
1 Minimum distance: 300 mm
2 Minimum distance: 100 mm
3 Minimum distance: 700 mm

Hydro-module F-Generation



Minimum distances hydro-module F-Generation
1 Minimum distance: 300 mm
2 Minimum distance: 600 mm

Hydro-module H-Generation



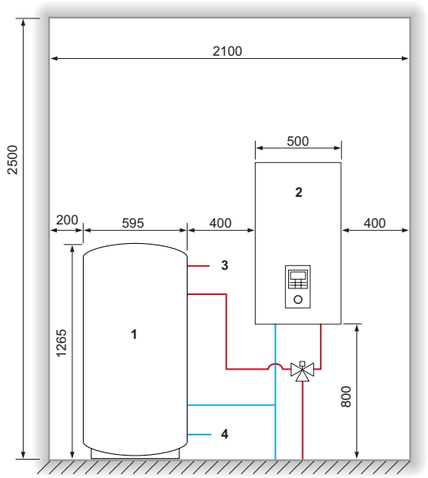
Minimum distances hydro-module H Generation
1 Minimum distance: 100 mm
2 Minimum distance: 800 mm

IMPORTANT

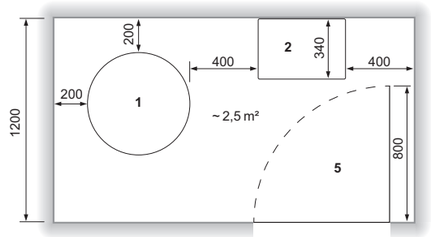
As the compressor is in the outdoor unit of the split system, only the operation of the circulation pump in the hydro-module or combination hydro-module needs to be taken into consideration as the cause for the development of operating noises.

Example of an installation room with hydro-module and hot water tank PAW-TD20C1E5

Front view



Plan view



1 Domestic hot water tank
2 Hydro-module
3 Hot water outlet
4 Domestic cold water entry
5 Door to the installation room

IMPORTANT

Due to the available space of about 6.25 m³, the installation space in this example is only suitable for single- phase devices of the Aquarea LT series of up to 9 kW. The use of devices with a larger quantity of coolant will exceed the practical limit c (for R410A, c = 0.44 kg/ m³ and for R407C, c = 0.31 kg/ m³).

5.2.3 Setting up the Compact system

The compact system consists of a device, which has one or two fans, depending on the output and model. So the devices differ according to the output (→ *1 Model range, p. 8*).

In the case of water pipelines of a compact device to a building, these are hot water pipelines that are routed directly in contact with the outdoor air. As the water lines can freeze at outside temperatures below 0 °C, they must be insulated according to the locally valid European, national and regional specifications and guidelines.

Example of Germany: The lines are to be insulated according to the current energy saving ordinance (EnEV 2014) with double the minimum thickness according to annexure 5, table 1, lines 1 to 4, but not less than 40 mm, relating to a thermal conductivity of 0.035.(m x K).

CAUTION

Danger of water pipes freezing in outside temperatures below 0 °C

If the heating circuit in the compact system is filled with water and the outside temperature falls below 0 °C, the risk exists in the compact system that the water pipes may freeze. This can cause a lot of damage to the device.

The client should therefore ensure the absence of frost by taking **one** of the following measures:

- ► Operate the heating circuit using a food-safe antifreeze mixture (propylene glycol).
- ► Provide an additional cabinet heating in the compact device, to prevent the heating circuit from freezing up.
- ► Empty the heating circuit by using a built-in device (manually or automatically) before freezing starts.

Note

Example of Germany: Details about preventing freezing of water-bearing pipelines and the heat and cold protection are according to the VDI Guidelines VDI 2055 or VDI 2069.

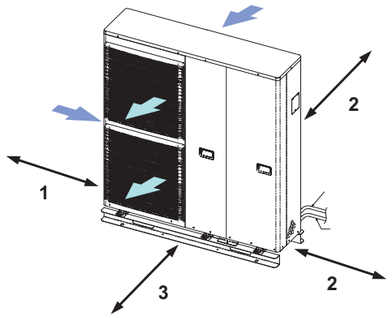
5.2.3.1 Assembly conditions for the compact device

The assembly conditions for the compact device are as follows:

- The compact device has only been developed for outdoor installation and must not be installed indoors.
- For condensation water drainage in defrosting mode, drainage is recommended via a drain pipe to the frost-free ground with gravel fill (→ *5.2.3.3 Securing the compact device, p. 99*).
- It should be possible to smoothly divert the condensate from the device.
- Maintain the minimum distances (→ *5.2.3.2 Minimum distances for compact device, p. 98*).
- The heat emission of the compact device 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 compact devices (e.g. in case of heat pump cascades), avoid air flow short-circuiting on the side of air (→ *5.2.3.3 Securing the compact device, p. 99*).
- The operating sound of the compact device must not cause any stress to the user or to neighbours. Air-to-water heat pumps may in certain countries or regions require permission. All provisions regarding noise valid at the location must be taken into account (→ *5.2.1 Acoustics, p. 87*).
- In addition, use vibration- damping rubber buffers for isolation.
- If installing the compact device 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, its operating life may be shortened.
- In the case of installation locations experiencing strong winds e.g. on building rooftops or between buildings, the compact device must be additionally secured to the side of the building to prevent tipping over (e.g. by bracing).

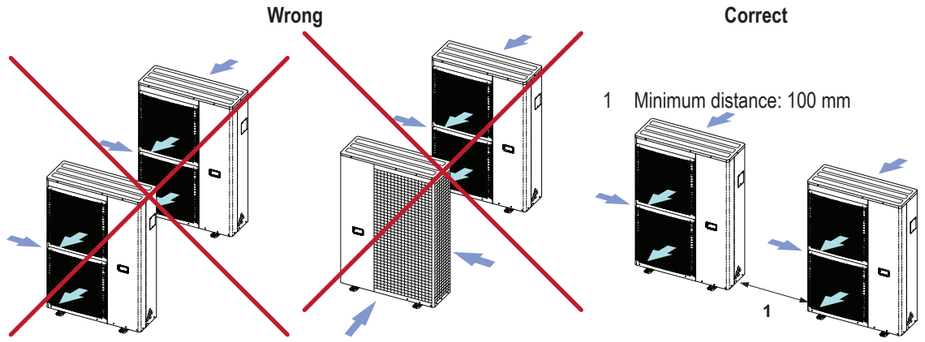
5.2.3.2 Minimum distances for compact device

Minimum distance of the compact device to the neighbouring walls and objects, showing air flow direction



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

Correct arrangement of multiple compact devices with representation of the air flow direction

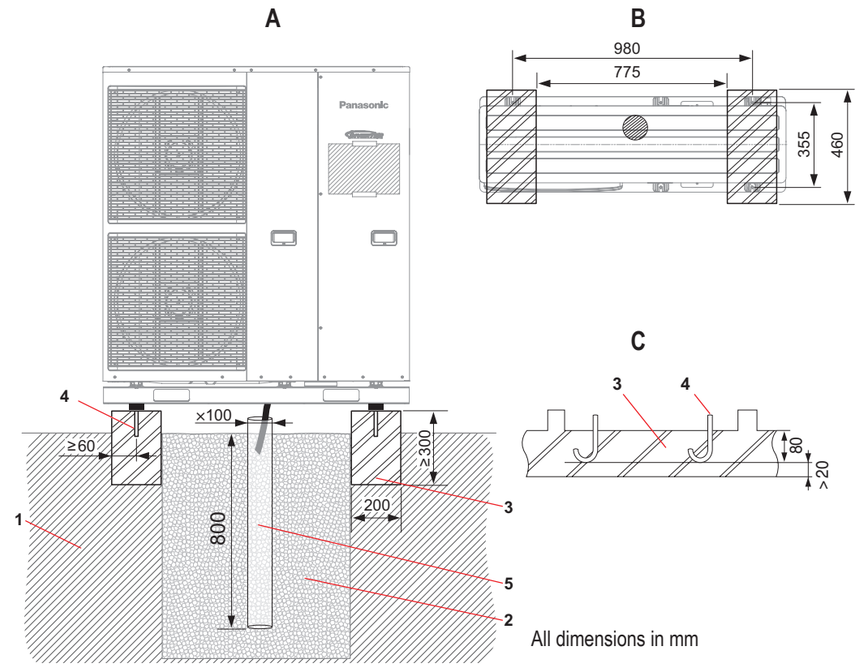


1 Minimum distance: 100 mm

5.2.3.3 Securing the compact device

The compact device must be mounted on a flat, horizontal and solid surface. Take the weight of the water into consideration, too, besides the weight of the device. You need four M12 anchor bolts, with a tensile force of more than 15,000 N.

Minimum requirements for anchoring the compact device on the floor over a foundation (A and B) or directly in the floor plate (C)



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

B Plan view
C Detailed view Anchoring in the floor plate

5.3 Hydraulics

5.3.1 Hydraulic integration

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

In general, a hydraulic disconnection of heat pump circuit and heat consumer circuit is always advisable if other volumetric flows must be provided 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 disconnection is necessary.

If, besides the integrated water circulation pump, one or more water circulation pumps are required for the respective heating circuits, hydraulic disconnection of the heat pump circuit and of the heat consumer circuit through a buffer tank or a hydraulic shunt must be effected.

For integrating without hydraulic disconnection, it must be ensured that the minimum flow rate of the respective heat pump (→ *4 Technical data (split systems), p. 16*, → *4.6.3.3 Technical data (compact systems), p. 50*) is maintained at all times. Automatically regulating mixer or thermostat valves can ensure that the hot water circulation is throttled so strictly that the flow rate falls below the minimum. To rule this out, Panasonic recommends always installing heat transfer systems without hydraulic disconnection with an overflow valve between heating flow and return. 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.

Magnetic filter

Panasonic recommends installing a magnetic filter that is to be installed for protection of the heat pump on site before the connection of the water inlet (water return) on the heat pump.

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, say, by using a buffer or an additional vessel.

5.3.2 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 mixer, valves and counters for the amount of heat such that the nominal throughput is matched to the nominal flow rate of the heat pump system.

Respecting the Nominal Flow Rate

Heat pumps work for efficient heat generation with a dispersion between inflow and return of about 5 K. This distinguishes them from heat sources with burners, which can work without any problem with a dispersion between inflow and return of about 10 or 20 K. The effect of the low temperature dispersion of heat pumps is that the flow rate of heat pumps for the transport of the same thermal output must tend to be higher than for heat sources with burners. The nominal flow rate and the resulting resistance of the pipe network must therefore be given special attention at the time of planning.

Respecting the Nominal Tube Width

The pressure gradient in the pipeline rises exponentially with the flow rate. This means that doubling the flow rate causes the pressure gradient to increase by a factor of 4. Decisive for it is the flow speed in the tube that depends on the flow rate and inner diameter.

As an alternative to a tube network calculation, the pressure gradient can be determined in tube sections through nomograms. 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 gradient per metre should be about 0.1 kPa/m.

Based on these criteria, the required nominal tube width can be read off from the copper tube nomogram. To determine the pipe network resistance of a whole line section, the pressure gradient per metre must be multiplied by the length of the respective section and the pressure gradient of the sections added. The total resistance of a section is obtained as the total of the pressure gradient of the sections 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 nominal flow rate. If the pipe network resistance is too high, the device's internal water circulation pump cannot achieve the nominal flow rate. The heat pump regulation registers a shortfall of the minimum circulation quantity and switches to Fault.

5.3.3 Hydraulic Balancing

The hydraulic balancing of the heat transfer system is the correct setting of the set flow rate of sections through regulating valves. This prevents individual building areas being excessively overheated, while other areas remain cold with lower flow. The 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. A hydraulic balancing must therefore also to be performed for the financial promotion of heat pumps.

5.3.4 Special points related to cooling

Hydraulically, a heat pump system with cooling does not differ from a purely heating system. You however need the generated amount of heat of the heat pump system to calculate the annual performance number, which is why you have to use what are called “climate counters” to correctly determine the amount of heat which record the amount of heat as well as the amount of cold.

5.3.5 Expansion vessel

The Aquarea heat pumps have an integral expansion vessel with a model-specific volume of 6 or 10 litres (see table) 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.

Model-specific limit values for the integrated expansion vessel

		WH-MDC05H3E5 WH-MDC07H3E5 WH-MDC09H3E5	All other models
Expansion vessel volume	l	6	10
Initial pressure	bar	1	1
Total water quantity in the heating system (max.)	l	150	200
Static height	m	7	7
Pressure stage safety valve (max.)	bar	3	3

In case the total quantity of water is greater than 150 or 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)
Sample volume	V_V	(Volume of the water trap)
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 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 trap 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 and an allowance 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 - Planning of Hot Water - Heating Systems” The manufacturer’s design programs for expansion vessels can generally be used for the design, depending on the local requirements. They also determine the required initial pressures to be set on the expansion vessel.

5.3.6 Heating water quality

CAUTION

Danger of damage to pipelines due to corrosion

In the case of open water systems, the oxygen entry can cause excessive corrosion of the pipelines 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, respect the corresponding European and national requirements (example of Germany: Guideline VDI 2035 “Avoiding damage in hot water heating systems - Stone formation in drinking water heating and hot water heating systems”). Furthermore, the heating system is to be thoroughly purged before filling with heating water.

5.3.7 Use of Buffer Tanks

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

- Bridging cut-off times by the Energy Supply Company (EVU)
- Hydraulic disconnection of the heat pump circuit of heat transfer system.
- Extension of the heat pump run time for avoiding the frequent switching on/off (cycling) that reduces the system efficiency.

With their inverter technology, the Aquarea heat pumps control the system performance according to the heat requirement and can therefore also be operated with buffer tanks efficiently and save on space. To bridge over the cut-off times by the Energy Supply Company, heat transfer systems can provide adequate intermediate storage with greater tank capacity such as floor heating.

5.4 Electricals

5.4.1 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 superheat.

- ► 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 protection switch (FI protection switch).

CAUTION

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 Technical data (split systems), p. 16*, → *4.6.3.3 Technical data (compact systems), p. 50*), the minimum required contact distance (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 separator. The separator must have a contact distance of minimum 3.0 mm.
- ► For the protection fuse of the network 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.

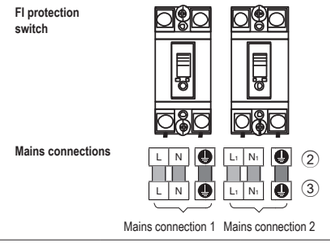
In general, the Aquarea heat pumps are differentiated by the connection in single-phase and three-phase devices. Depending on the nominal heating capacity and the power of the internal E heating elements, the individual models further differ in the type of the mains connections.

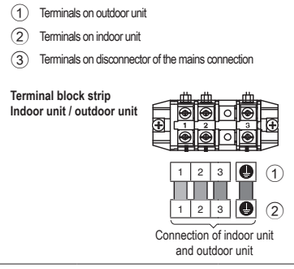
In the compact system, the network connection is made directly on the compact device. In the case of split system, the mains connection is on the indoor unit, that is on hydro-module or combination hydro-module, where the electricity supply of the outdoor unit is made through an additional connecting cable between indoor unit and outdoor unit.

An overview of the said differences is shown in the following tables. The connecting conditions for the individual devices are explained in the annexure. The required cross sections are given in the technical specifications (→ *4 Technical data (split systems), p. 16*, → *4.6.3.3 Technical data (compact systems), p. 50*).

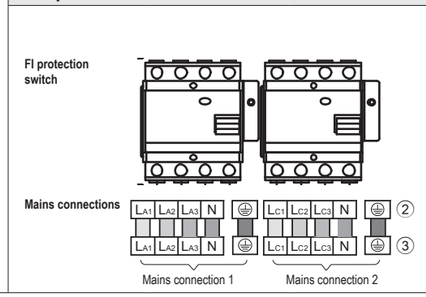
Split systems with combination hydro-module

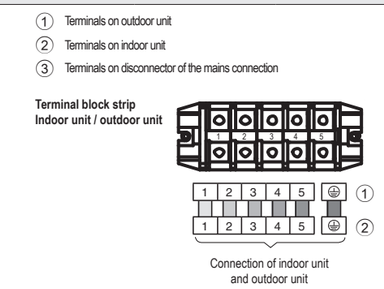
Models	Mains connection 1			Mains connection 2		
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Phases	Max. current consumption (A)	Max. power consumption (kW)
WH-ADC0309H3E5(B) + WH-UD03HE5-1	1	12.0	2.59	1	13.0	3.0
WH-ADC0309H3E5(B) + WH-UD05HE5-1	1	12.0	2.59	1	13.0	3.0
WH-ADC0309H3E5(B) + WH-UD07HE5-1	1	21.0	4.59	1	13.0	3.0
WH-ADC0309H3E5(B) + WH-UD09HE5-1	1	22.9	5.0	1	13.0	3.0
WH-ADC1216H6E5 + WH-UD12HE5	1	24.0	5.3	1	26.0	6.0
WH-ADC1216H6E5 + WH-UD16HE5	1	26.0	5.74	1	26.0	6.0
WH-ADC1216H6E5 + WH-UX09HE5	1	25.0	5.41	1	26.0	6.0
WH-ADC1216H6E5 + WH-UX12HE5	1	29.0	6.27	1	26.0	6.0
	FI protection switch and mains connections			**Indoor unit /outdoor unit connection**		





Models	Mains connection 1			Mains connection 2		
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Phases	Max. current consumption (A)	Max. power consumption (kW)
WH-ADC0916H9E8 + WH-UD09HE8	3	7.5	4.94	3	13.0	9.0
WH-ADC0916H9E8 + WH-UD12HE8	3	8.8	5.85	3	13.0	9.0
WH-ADC0916H9E8 + WH-UD16HE8	3	9.9	6.59	3	13.0	9.0
WH-ADC0916H9E8 + WH-UX09HE8	3	10.4	6.85	3	13.0	9.0
WH-ADC0916H9E8 + WH-UX12HE8	3	11.9	7.91	3	13.0	9.0
WH-ADC0916H9E8 + WH-UX16HE8	3	15.5	10.27	3	13.0	9.0
WH-ADC0916H9E8 + WH-UQ09HE8	3	–	–	3	–	–
WH-ADC0916H9E8 + WH-UQ12HE8	3	–	–	3	–	–
WH-ADC0916H9E8 + WH-UQ16HE8	3	–	–	3	–	–
	FI protection switch and mains connections			**Indoor unit /outdoor unit connection**		





Connection conditions

- For the connection to the electricity supply, use an approved power cord with polychloroprene material, symbol 60245 IEC 57 or higher, for mains connection 1 and mains connection 2.
- An approved flexible cable with polychloroprene material, symbol 60245 IEC 57 is to be used as the connecting cable between indoor and outdoor units

For combination hydro-module with the outdoor unit UD03HE5-1 or UD05HE5-1:

- Mains supply 1 of this device fulfils EN/ IEC 61000-3-2.
- Mains supply 1 of this device fulfils EN/ IEC 61000-3-3 and can be connected to the current supply grid.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-2.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-11. A suitable voltage source is to be connected. Its maximum allowed system impedance at the interface is Z_{max} = 0.445 Ω. Connect to the EVU to ensure that the mains supply 2 is only connected to a grid with the maximum of this impedance.

For combination hydro-module with the outdoor unit UD07HE5-1 or UD09HE5-1:

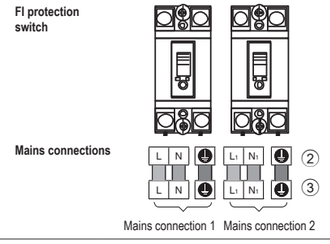
- Mains supply 1 of this device fulfils IEC610000-3-12, provided that the short-circuit power S_k at the transfer point of the energy provider is greater than or equal to 400.00 kW. The installer or operator of the device is, therefore, responsible for ensuring, in case a consultation with the EVU is needed, that the device is only connected, if the short-circuit power S_k is greater than or equal to 400.00 kW.
- Mains supply 1 of the device fulfils ICE/ EN 61000-3-11 and is to be connected to a suitable voltage source, which has a current rating ≥100 A per phase. Connect to the EVU to ensure that the current rating at the transfer point is sufficient for the device.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-11. A suitable voltage source is to be connected. Its maximum allowed system impedance at the interface is Z_{max} = 0.445 Ω. Connect to the EVU to ensure that the mains supply 2 is only connected to a grid with the maximum of this impedance.

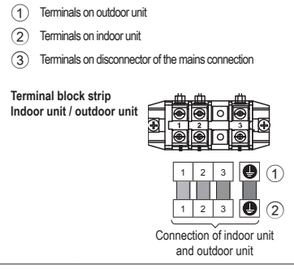
For combination hydro-modules with other outdoor units:

- NA

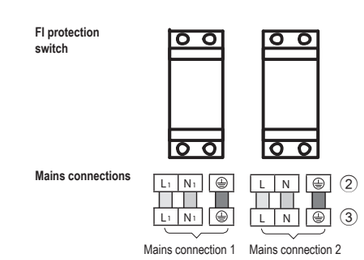
Split systems with hydro-module

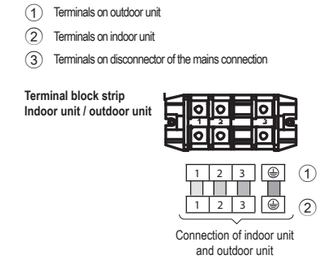
Models	Mains connection 1			Mains connection 2		
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Phases	Max. current consumption (A)	Max. power consumption (kW)
WH-SDC03H3E5-1 + WH-UD03HE5-1	1	11.0	2.35	1	13.0	3.0
WH-SDC05H3E5-1 + WH-UD05HE5-1	1	12.0	2.59	1	13.0	3.0
WH-SDC07H3E5-1 + WH-UD07HE5-1	1	21.0	4.59	1	13.0	3.0
WH-SDC09H3E5-1 + WH-UD09HE5-1	1	22.9	5.01	1	13.0	3.0
	FI protection switch and mains connections			**Indoor unit /outdoor unit connection**		



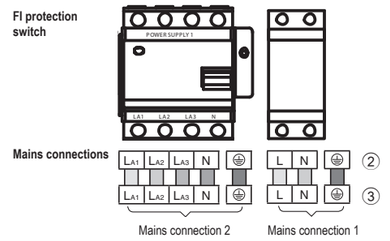


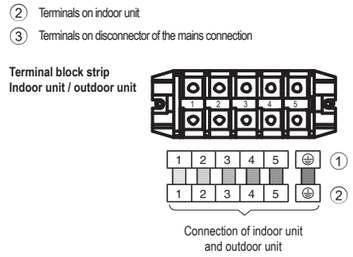
Models	Mains connection 1			Mains connection 2		
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Phases	Max. current consumption (A)	Max. power consumption (kW)
WH-SDC12H6E5 + WH-UD12HE5	1	24.0	5.3	1	26.0	6.0
WH-SDC16H6E5 + WH-UD16HE5	1	26.0	5.74	1	26.0	6.0
WH-SXC09H3E5 + WH-UX09HE5	1	25.0	5.4	1	13.0	3.0
WH-SXC12H6E5 + WH-UX12HE5	1	29.0	6.27	1	26.0	6.0
WH-SHF09F3E5 + WH-UH09FE5	1	28.5	6.09	1	13.0	3.0
WH-SHF12F6E5 + WH-UH12FE5	1	29.0	6.2	1	26.0	6.0
	FI protection switch and mains connections			**Indoor unit /outdoor unit connection**		



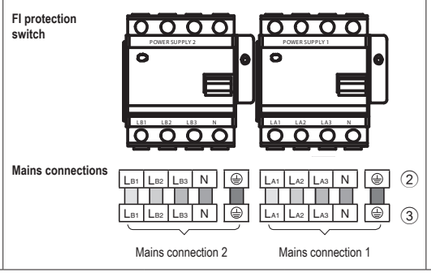


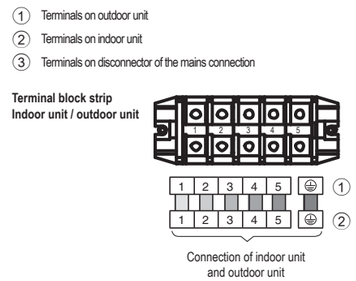
Models	Mains connection 1			Mains connection 2		
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Phases	Max. current consumption (A)	Max. power consumption (kW)
WH-SDC09H3E8 + WH-UD09HE8	3	11.8	7.94	1	13.0	3.0
WH-SXC09H3E8 + WH-UX09HE8	3	14.7	9.85	1	13.0	3.0
WH-SQC09H3E8 + WH-UQ09HE8	3	14.7	9.85	1	13.0	3.0
WH-SHF09F3E8 + WH-UH09FE8	3	14.5	9.67	1	13.0	3.0
	FI protection switch and mains connections			**Indoor unit /outdoor unit connection**		





Models	Mains connection 1			Mains connection 2		
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Phases	Max. current consumption (A)	Max. power consumption (kW)
WH-SDC12H9E8 + WH-UD12HE8	3	8.8	5.85	3	13.0	9.0
WH-SDC16H9E8 + WH-UD16HE8	3	9.9	6.59	3	13.0	9.0
WH-SXC12H9E8 + WH-UX12HE8	3	11.9	7.91	3	13.0	9.0
WH-SXC16H9E8 + WH-UX16HE8	3	15.5	10.27	3	13.0	9.0
WH-SQC12H9E8 + WH-UQ12HE8	3	11.9	7.91	3	13.0	9.0
WH-SQC16H9E8 + WH-UQ16HE8	3	15.5	10.27	3	13.0	9.0
WH-SHF12F9E8 + WH-UH12FE8	3	10.8	7.07	3	13.0	9.0
	FI protection switch and mains connections			**Indoor unit /outdoor unit connection**		





Connection conditions

For hydro-modules of the F generation:

- For the connection to the electricity supply, use an approved power cord with polychloroprene material, symbol 60245 IEC 57 or higher, for mains connection.
- An approved flexible cable with polychloroprene material, symbol 60245 IEC 57 or higher is to be used as the connecting cable between indoor and outdoor units

For the hydro-module WH-SHF09F3E5 and WH-SHF12F6E5.

- Mains supply 1 of this device fulfils EN/IEC 61000-3-12, provided that the short-circuit power S_k at the transfer point of the energy provider to the operator is greater than or equal to 1100 kW. The installer or operator of the device is, therefore, responsible for ensuring, in case a consultation with the EVU is needed, that the device is only connected, if the short-circuit power S_k is greater than or equal to 1100 kW.
- Mains supply 1 of the device is to be connected to a suitable voltage source, which has a current rating ≥100 A per phase. Connect to the EVU to ensure that the current rating at the transfer point is sufficient for the device.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-12.
- Mains supply 2 of the device is to be connected to a suitable voltage source, with a maximum system impedance of Z_{max} = 0.244 Ω at the transfer point. Connect to the EVU to ensure that the mains supply 2 is only connected to a grid with the maximum of this impedance.

For the hydro-module WH-SHF09F3E8:

- Mains supply 1 of this device fulfils EN/ IEC 61000-3-12.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-12.

For the hydro-module WH-SHF12F9E8

- Mains supply 1 of this device fulfils EN/ IEC 61000-3-12.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-12.
- Mains supply 2 of the device is to be connected to a suitable voltage source, with a maximum system impedance of Z_{max} = 0.449 Ω at the transfer point. Connect to the EVU to ensure that the mains supply 2 is only connected to a grid with the maximum of this impedance.

For hydro-modules of the H generation:

- For the connection to the electricity supply, use an approved power cord with polychloroprene material, symbol 60245 IEC 57 or higher, for mains connection.
- An approved flexible cable with polychloroprene material, symbol 60245 IEC 57 or higher is to be used as the connecting cable between indoor and outdoor units

For the hydro-modules WH-SDC03H3E5-1, WH-SDC05H3E5-1, WH-SDC07H3E5-1 and WH-SDC09H3E5-1, WH-SDC09H3E8, WH-SXC09H3E8, WH-SQC09H3E8:

- Mains supply 1 of this device fulfils EN/ IEC 61000-3-2.
- Mains supply 1 of this device fulfils EN/ IEC 61000-3-3 and can be connected to the current supply grid.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-2.
- The mains supply 2 of this device fulfills IEC/EN 61000-3-11 and is to be connected to a suitable voltage source, whose maximum allowed system impedance at the interface is Z_{max} = 0.426 Ω. Connect to the EVU to ensure that the mains supply 2 is only connected to a grid with the maximum of this impedance.

For the hydro-module WH-SDC12H6E5, WH-SDC16H6E5:

- Mains supply 1 of this device fulfils EN/IEC 61000-3-12, provided that the short-circuit power S_k at the transfer point of the energy provider to the operator is greater than or equal to 2200 kW. The installer or operator of the device is, therefore, responsible for ensuring, in case a consultation with the EVU is needed, that the device is only connected, if the short-circuit power S_k is greater than or equal to 2200 kW.
- Mains supply 1 of the device fulfils ICE/ EN 61000-3-11 and is to be connected to a suitable voltage source, which has a current rating ≥100 A per phase. Connect to the EVU to ensure that the current rating at the transfer point is sufficient for the device.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-12.
- Mains supply 2 of the device fulfils IEC/EN 61000-3-11 and is to be connected to a suitable voltage source, which has a maximum permissible system impedance of Z_{max} = 0.271 Ω at the transfer point. Connect to the EVU to ensure that the mains supply 2 is only connected to a grid with the maximum of this impedance.

For the hydro-module WH-SXC09H3E5, WH-SXC12H6E5:

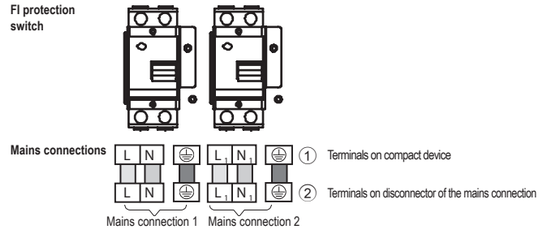
- Mains supply 1 of this device fulfils EN/IEC 61000-3-12, provided that the short-circuit power S_k at the transfer point of the energy provider to the operator is greater than or equal to 1700 kW. The installer or operator of the device is, therefore, responsible for ensuring, in case a consultation with the EVU is needed, that the device is only connected, if the short-circuit power S_k is greater than or equal to 1700 kW.
- Mains supply 1 of the device fulfils ICE/ EN 61000-3-11 and is to be connected to a suitable voltage source, which has a current rating ≥100 A per phase. Connect to the EVU to ensure that the current rating at the transfer point is sufficient for the device.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-12.
- Mains supply 2 of the device fulfils IEC/EN 61000-3-11 and is to be connected to a suitable voltage source, which has a maximum permissible system impedance of Z_{max} = 0.271 Ω at the transfer point. Connect to the EVU to ensure that the mains supply 2 is only connected to a grid with the maximum of this impedance.

For the hydro-modules WH-SDC12H9E8, WH-SDC16H9E8, WH-SXC12H9E8, WH-SXC16H9E8, WH-SQC12H9E8 and WH-SQC16H9E8:

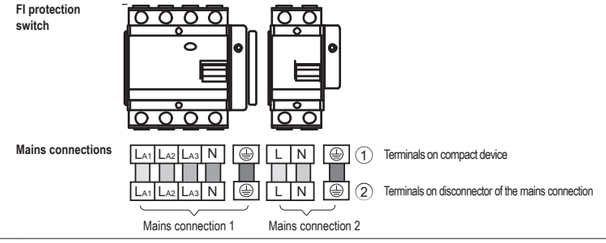
- Mains supply 1 of this device fulfils EN/ IEC 61000-3-2.
- Mains supply 1 of this device fulfils EN/ IEC 61000-3-3 and can be connected to the current supply grid.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-2.
- Mains supply 1 of this device fulfils EN/ IEC 61000-3-3 and can be connected to the current supply grid.

Compact systems

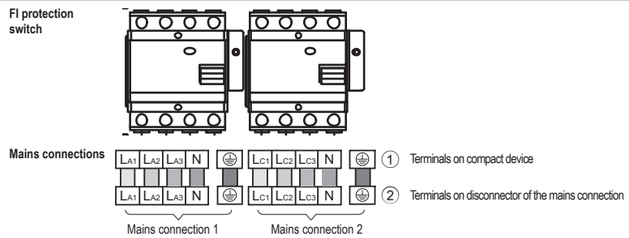
Models	Mains connection 1			Mains connection 2		
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Phases	Max. current consumption (A)	Max. power consumption (kW)
WH-MDC05H3E5	1	19.5	4.26	1	13.0	3.0
WH-MDC07H3E5	1	20.5	4.48	1	13.0	3.0
WH-MDC09H3E5	1	22.9	5.01	1	13.0	3.0
WH-MXC09H3E5	1	25.0	5.41	1	13.0	3.0
WH-MXC12H6E5	1	29.0	6.27	1	26.0	6.0
WH-MHF09G3E5	1	28.5	6.09	1	13.0	3.0
WH-MHF12G6E5	1	29.0	6.20	1	26.0	6.0
	FI protection switch and mains connections					



Models	Mains connection 1			Mains connection 2		
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Phases	Max. current consumption (A)	Max. power consumption (kW)
WH-MXC09H3E8	3	14.7	9.85	1	13.0	3.0
WH-MHF09G3E8	3	14.5	9.67	1	13.0	3.0
	FI protection switch and mains connections					



Models	Mains connection 1			Mains connection 2		
	Phases	Max. current consumption (A)	Max. power consumption (kW)	Phases	Max. current consumption (A)	Max. power consumption (kW)
WH-MXC12H9E8	3	11.9	7.91	3	13.0	9.0
WH-MXC16H9E8	3	15.5	10.27	1	13.0	9.0
WH-MHF12G9E8	3	10.8	7.07	3	13.0	9.0
	FI protection switch and mains connections					



Connection conditions

For compact devices of the H generation

- For the connection to the electricity supply, use an approved power cord with polychloroprene material, symbol 60245 IEC 57 or higher, for mains connection.

For the compact device WH-MDC05H3E5:

- Mains supply 1 of this device fulfils EN/ IEC 61000-3-2.
- Mains supply 1 of this device fulfils EN/ IEC 61000-3-3 and can be connected to the current supply grid.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-2.
- The main supply 2 of this device fulfills IEC/EN 61000-3-11 and is to be connected to a suitable voltage source, whose maximum allowed system impedance at the interface is Z_{max} = 0.257 Ω. Connect to the EVU to ensure that the mains supply 2 is only connected to a grid with the maximum of this impedance.

For the compact devices WH-MDC07H3E5 and WH-MDC09H3E5:

- Mains supply 1 of this device fulfils EN/IEC 61000-3-12, provided that the short-circuit power S_k at the transfer point of the energy provider to the operator is greater than or equal to 750 kW. The installer or operator of the device is, therefore, responsible for ensuring, in case a consultation with the EVU is needed, that the device is only connected, if the short-circuit power S_k is greater than or equal to 750 kW.
- Mains supply 1 of the device fulfils ICE/ EN 61000-3-11 and is to be connected to a suitable voltage source, which has a current rating ≥100 A per phase. Connect to the EVU to ensure that the current rating at the transfer point is sufficient for the device.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-2.
- The main supply 2 of this device fulfills IEC/EN 61000-3-11 and is to be connected to a suitable voltage source, whose maximum allowed system impedance at the interface is Z_{max} = 0.257 Ω. Connect to the EVU to ensure that the mains supply 2 is only connected to a grid with the maximum of this impedance.

For the compact devices WH-MXC09H3E5 and WH-MXC12H6E5:

- Mains supply 1 of this device fulfils EN/IEC 61000-3-12, provided that the short-circuit power S_k at the transfer point of the energy provider to the operator is greater than or equal to 1700 kW. The installer or operator of the device is, therefore, responsible for ensuring, in case a consultation with the EVU is needed, that the device is only connected, if the short-circuit power S_k is greater than or equal to 1700 kW.
- Mains supply 1 of the device fulfils ICE/ EN 61000-3-11 and is to be connected to a suitable voltage source, which has a current rating ≥100 A per phase. Connect to the EVU to ensure that the current rating at the transfer point is sufficient for the device.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-12.
- The main supply 2 of this device fulfills IEC/EN 61000-3-11 and is to be connected to a suitable voltage source, whose maximum allowed system impedance at the interface is Z_{max} = 0.453 Ω. Connect to the EVU to ensure that the mains supply 2 is only connected to a grid with the maximum of this impedance.

For the compact devices WH-MXC09H3E8, WH-MXC16H9E8 and WH-MHF09G3E8:

- Mains supply 1 and mains supply 2 of this device fulfils EN/ IEC 61000-3-2.
- Mains supply 1 and mains supply 2 of this device fulfils EN/ IEC 61000-3-3 and can be connected to the current supply grid.

For the compact devices WH-MXC12H9E8 and WH-MHF12G9E8:

- Mains supply 1 of this device fulfils EN/ IEC 61000-3-2.
- Mains supply 1 of this device fulfils EN/ IEC 61000-3-3 and can be connected to the current supply grid.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-2.
- The main supply 2 of this device fulfills IEC/EN 61000-3-11 and is to be connected to a suitable voltage source, whose maximum allowed system impedance at the interface is Z_{max} = 0.449 Ω. Connect to the EVU to ensure that the mains supply 2 is only connected to a grid with the maximum of this impedance.

For the compact devices WH-MHF09G3E5 and WH-MHF12G6E5:

- Mains supply 1 of this device fulfils EN/IEC 61000-3-12, provided that the short-circuit power S_k at the transfer point of the energy provider to the operator is greater than or equal to 1200 kW. The installer or operator of the device is, therefore, responsible for ensuring, in case a consultation with the EVU is needed, that the device is only connected, if the short-circuit power S_k is greater than or equal to 1200 kW.
- Mains supply 1 of the device fulfils ICE/ EN 61000-3-11 and is to be connected to a suitable voltage source, which has a current rating ≥100 A per phase. Connect to the EVU to ensure that the current rating at the transfer point is sufficient for the device.
- Mains supply 2 of this device fulfils EN/ IEC 61000-3-12.
- The main supply 2 of this device fulfills IEC/EN 61000-3-11 and is to be connected to a suitable voltage source, whose maximum allowed system impedance at the interface is Z_{max} = 0.257 Ω. Connect to the EVU to ensure that the mains supply 2 is only connected to a grid with the maximum of this impedance.

5.4.2 Electric meters and rates

For connecting heat pumps to the power grid, consent should be obtained from the competent Energy Supply Company (EVU) and connection conditions should be requested. In this context, data regarding the building, about the heat pump and operating mode is also to be provided. If it is possible to utilise more favourable heat pump charges, possible cut-off times and their duration are to be requested and taken into account for planning.

The power consumption of the heat pump is measured to determine the annual performance number and for settlement of a possibly different tariff, measured by means of one's own current counter, to which all power connections of the heat pump are connected.

CAUTION

Danger of Water Lines Freezing Over During the Cut-off Times by EVU

If cut-off times by the Energy Supply Company (EVU) coincide with frost periods, there can be frost damage, if the device for ensuring frost-free working is similarly affected by the cut-off time.

► Connect booster cabinet heating or other devices for frost-free working to the power grid such that it is not affected by the cut-off times.

5.5 Heating and cooling capacity depending on water inflow and outside temperature

Key for the Performance Table

The values in the performance 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_a: Outside temperature (°C)
t_v: Water inflow temperature (°C)
P_{Hzg}: Heating capacity (kW)
P_{Klg}: Cooling capacity (kW)

P_{zu}: Power consumption (kW)
COP: Performance number in heating mode
EER: Performance number in cooling mode

Performances of split systems with combination hydro-module in heating mode

Aquarea LT, combination hydro-module, single- phase, heating and cooling (ADC), Generation H

	WH-ADC0309H3E5(B) / WH-UD03HE5-1																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	3.20	0.42	7.62	3.20	0.46	6.96	3.20	0.55	5.82	3.20	0.63	5.08	3.20	0.73	4.38	3.20	0.82	3.90
7	3.20	0.58	5.52	3.12	0.64	4.88	3.20	0.77	4.16	3.20	0.89	3.60	3.20	1.05	3.05	3.20	1.20	2.67
2	3.20	0.82	3.90	3.29	0.90	3.66	3.20	1.03	3.11	3.20	1.16	2.76	3.20	1.33	2.41	3.20	1.49	2.15
-7	3.20	1.08	2.96	3.58	1.19	3.00	3.20	1.34	2.39	3.20	1.48	2.16	3.20	1.67	1.92	3.20	1.86	1.72
-15	3.20	1.26	2.54	3.13	1.39	2.25	3.10	1.52	2.04	3.00	1.64	1.83	2.80	1.78	1.57	2.75	1.92	1.43

	WH-ADC0309H3E5(B) / WH-UD05HE5-1																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	5.00	0.74	6.76	5.00	0.82	6.10	5.00	1.02	4.90	5.00	1.22	4.10	5.00	1.35	3.70	5.00	1.49	3.36
7	5.00	0.97	5.15	5.00	1.08	4.63	5.00	1.28	3.91	5.00	1.48	3.38	5.00	1.68	2.98	5.00	1.89	2.65
2	4.20	1.22	3.44	4.20	1.35	3.11	4.20	1.50	2.80	4.20	1.65	2.55	4.15	1.86	2.23	4.10	2.07	1.98
-7	4.20	1.46	2.88	4.20	1.62	2.59	4.00	1.72	2.33	3.80	1.82	2.09	3.70	1.95	1.90	3.55	2.08	1.71
-15	4.20	1.75	2.40	4.20	1.94	2.17	3.80	1.96	1.94	3.40	1.98	1.72	3.20	2.05	1.56	3.00	2.12	1.42

Aquarea LT, combination hydro-module, single- phase, heating and cooling (ADC), Generation H

	WH-ADC0309H3E5(B) / WH-UD07HE5-1																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	7.00	0.79	8.86	7.00	0.97	7.22	6.74	1.14	5.91	6.74	1.14	5.91	6.24	1.43	4.36	6.00	1.55	3.87
7	7.00	1.43	4.90	7.00	1.57	4.46	7.00	1.84	3.81	7.00	1.84	3.81	6.90	2.35	2.94	6.80	2.59	2.63
2	6.70	1.83	3.66	6.55	1.96	3.34	6.58	2.29	2.87	6.58	2.29	2.87	6.30	2.82	2.24	6.00	3.01	1.99
-7	5.15	1.80	2.86	5.15	1.92	2.68	5.08	2.14	2.37	5.08	2.14	2.37	4.90	2.45	2.00	4.80	2.54	1.89
-15	4.60	1.87	2.46	4.60	1.98	2.32	4.60	2.19	2.10	4.60	2.19	2.10	4.55	2.63	1.73	4.50	2.86	1.57

	WH-ADC0309H3E5(B) / WH-UD09HE5-1																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	9.00	1.07	8.41	9.00	1.26	7.14	8.66	1.48	5.87	8.66	1.48	5.87	8.03	1.85	4.34	7.74	2.01	3.85
7	9.00	1.93	4.66	9.00	2.18	4.13	9.00	2.49	3.62	9.00	2.49	3.62	8.95	3.25	2.76	8.90	3.70	2.41
2	6.80	1.87	3.64	6.70	2.14	3.13	6.65	2.38	2.79	6.65	2.38	2.79	6.30	2.82	2.24	6.00	3.01	1.99
-7	6.10	2.16	2.82	5.90	2.34	2.52	5.85	2.61	2.24	5.85	2.61	2.24	5.80	2.98	1.95	5.80	3.08	1.88
-15	6.00	2.55	2.35	5.90	2.66	2.22	5.65	2.82	2.00	5.65	2.82	2.00	5.20	3.08	1.69	5.00	3.18	1.57

	WH-ADC1216H6E5 / WH-UD12HE5																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	12.00	1.38	8.70	12.00	1.66	7.23	11.80	1.94	6.08	11.70	2.23	5.25	11.50	2.49	4.62	11.40	2.74	4.16
7	12.00	2.10	5.71	12.00	2.53	4.74	12.00	2.96	4.05	12.00	3.39	3.54	12.00	3.78	3.17	12.00	4.16	2.88
2	11.80	3.10	3.81	11.40	3.31	3.44	11.00	3.53	3.12	10.60	3.74	2.83	9.80	3.94	2.49	9.10	4.14	2.20
-7	10.40	3.37	3.09	10.00	3.66	2.73	9.60	3.95	2.43	9.20	4.24	2.17	8.70	4.26	2.04	8.20	4.27	1.92
-15	9.30	3.46	2.69	8.90	3.62	2.46	8.50	3.79	2.24	8.10	3.95	2.05	7.50	4.05	1.85	7.00	4.16	1.68

	WH-ADC1216H6E5 / WH-UD16HE5																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	16.00	2.31	6.93	16.00	2.69	5.95	16.00	3.07	5.21	16.00	3.45	4.64	16.00	3.67	4.36	15.90	3.89	4.09
7	16.00	3.21	4.98	16.00	3.74	4.28	16.00	4.27	3.75	16.00	4.80	3.33	15.20	5.11	2.97	14.50	5.41	2.68
2	13.50	3.74	3.61	13.00	3.96	3.28	12.40	4.18	2.97	11.90	4.40	2.70	10.80	4.46	2.42	9.80	4.51	2.17
-7	11.90	4.03	2.95	11.40	4.43	2.57	10.80	4.83	2.24	10.30	5.22	1.97	9.60	5.09	1.89	9.00	4.95	1.82
-15	10.60	4.09	2.59	10.30	4.38	2.35	10.00	4.67	2.14	9.70	4.96	1.96	8.80	4.94	1.78	7.90	4.91	1.61

Aquarea LT, Combination hydro-module, Three-phase, Heating and cooling (ADC), Generation H

	WH-ADC0916H9E8 / WH-UD09HE8																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	9.00	1.05	8.57	9.00	1.24	7.26	8.73	1.44	6.06	8.46	1.64	5.16	8.28	1.82	4.55	8.10	2.00	4.05
7	9.00	1.54	5.84	9.00	1.86	4.84	9.00	2.16	4.17	9.00	2.46	3.66	9.00	2.76	3.26	9.00	3.06	2.94
2	9.31	2.35	3.96	9.00	2.51	3.59	9.00	2.78	3.24	9.00	3.05	2.95	8.90	3.49	2.55	8.80	3.94	2.23
-7	9.35	2.91	3.21	9.00	3.16	2.85	8.85	3.54	2.50	8.70	3.92	2.21	8.30	3.89	2.13	7.90	3.86	2.05
-15	8.65	3.06	2.83	8.30	3.21	2.59	7.95	3.41	2.33	7.60	3.61	2.11	7.15	3.71	1.93	6.70	3.81	1.76

	WH-ADC0916H9E8 / WH-UD12HE8																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	12.00	1.38	8.70	12.00	1.66	7.23	11.80	1.94	6.08	11.70	2.23	5.25	11.50	2.49	4.62	11.40	2.74	4.16
7	12.00	2.10	5.71	12.00	2.53	4.74	12.00	2.96	4.05	12.00	3.39	3.54	12.00	3.78	3.17	12.00	4.16	2.88
2	11.80	3.10	3.81	11.40	3.31	3.44	11.00	3.53	3.12	10.60	3.74	2.83	9.80	3.94	2.49	9.10	4.14	2.20
-7	10.40	3.37	3.09	10.00	3.66	2.73	9.60	3.95	2.43	9.20	4.24	2.17	8.70	4.26	2.04	8.20	4.27	1.92
-15	9.30	3.46	2.69	8.90	3.62	2.46	8.50	3.79	2.24	8.10	3.95	2.05	7.50	4.05	1.85	7.00	4.16	1.68

	WH-ADC0916H9E8 / WH-UD16HE8																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	16.00	2.31	6.93	16.00	2.69	5.95	16.00	3.07	5.21	16.00	3.45	4.64	16.00	3.67	4.36	15.90	3.89	4.09
7	16.00	3.21	4.98	16.00	3.74	4.28	16.00	4.27	3.75	16.00	4.80	3.33	15.20	5.11	2.97	14.50	5.41	2.68
2	13.50	3.74	3.61	13.00	3.96	3.28	12.40	4.18	2.97	11.90	4.40	2.70	10.80	4.46	2.42	9.80	4.51	2.17
-7	11.90	4.03	2.95	11.40	4.43	2.57	10.80	4.83	2.24	10.30	5.22	1.97	9.60	5.09	1.89	9.00	4.95	1.82
-15	10.60	4.09	2.59	10.30	4.38	2.35	10.00	4.67	2.14	9.70	4.96	1.96	8.80	4.94	1.78	7.90	4.91	1.61

Aquarea T-CAP, combination hydro-module, single- phase, Heating and cooling (ADC), Generation H

	WH-ADC1216H6E5 / WH-UX09HE5																	
t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	13.60	1.50	9.07	13.60	1.71	7.95	13.20	1.93	6.84	12.80	2.14	5.98	12.00	2.41	4.98	11.20	2.67	4.19
7	9.00	1.64	5.49	9.00	1.86	4.84	9.00	2.16	4.17	9.00	2.46	3.66	9.00	2.76	3.26	9.00	3.06	2.94
2	9.00	2.36	3.81	9.00	2.51	3.59	9.00	2.78	3.24	9.00	3.05	2.95	9.00	3.56	2.53	9.00	4.07	2.21
-7	9.00	2.71	3.32	9.00	3.16	2.85	9.00	3.62	2.49	9.00	4.07	2.21	9.00	4.27	2.11	9.00	4.46	2.02
-15	9.00	3.24	2.78	9.00	3.51	2.56	9.00	3.91	2.30	9.00	4.30	2.09	9.00	4.73	1.90	9.00	5.16	1.74

	WH-ADC1216H6E5 / WH-UX12HE5																	
t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	13.60	1.55	8.77	13.60	1.76	7.73	13.40	2.10	6.38	13.20	2.43	5.43	12.60	2.66	4.74	12.00	2.89	4.15
7	12.00	2.18	5.50	12.00	2.53	4.74	12.00	2.96	4.05	12.00	3.39	3.54	12.00	3.78	3.17	12.00	4.16	2.88
2	12.00	3.19	3.76	12.00	3.49	3.44	12.00	3.87	3.10	12.00	4.25	2.82	12.00	4.86	2.47	12.00	5.47	2.19
-7	12.00	3.85	3.12	12.00	4.41	2.72	12.00	4.98	2.41	12.00	5.54	2.17	12.00	5.90	2.03	12.00	6.26	1.92
-15	12.00	4.75	2.53	12.00	4.96	2.42	12.00	5.17	2.22	11.00	5.38	2.04	10.80	5.82	1.86	10.50	6.26	1.68

Aquarea T-CAP, combination hydro-module, Three-phase, Heating and cooling (ADC), Generation H

	WH-ADC0916H9E8 / WH-UX09HE8 or WH-ADC0916H9E8 / WH-UQ09HE8																	
t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	13.60	1.50	9.07	13.60	1.71	7.95	13.20	1.93	6.84	12.80	2.14	5.98	12.00	2.41	4.98	11.20	2.67	4.19
7	9.00	1.64	5.49	9.00	1.86	4.84	9.00	2.16	4.17	9.00	2.46	3.66	9.00	2.76	3.26	9.00	3.06	2.94
2	9.00	2.36	3.81	9.00	2.51	3.59	9.00	2.78	3.24	9.00	3.05	2.95	9.00	3.56	2.53	9.00	4.07	2.21
-7	9.00	2.71	3.32	9.00	3.16	2.85	9.00	3.62	2.49	9.00	4.07	2.21	9.00	4.27	2.11	9.00	4.46	2.02
-15	9.00	3.24	2.78	9.00	3.51	2.56	9.00	3.91	2.30	9.00	4.30	2.09	9.00	4.73	1.90	9.00	5.16	1.74

	WH-ADC0916H9E8 / WH-UX12HE8 or WH-ADC0916H9E8 / WH-UQ12HE8																	
t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	13.60	1.55	8.77	13.60	1.76	7.73	13.40	2.10	6.38	13.20	2.43	5.43	12.60	2.66	4.74	12.00	2.89	4.15
7	12.00	2.18	5.50	12.00	2.53	4.74	12.00	2.96	4.05	12.00	3.39	3.54	12.00	3.78	3.17	12.00	4.16	2.88
2	12.00	3.19	3.76	12.00	3.49	3.44	12.00	3.87	3.10	12.00	4.25	2.82	12.00	4.86	2.47	12.00	5.47	2.19
-7	12.00	3.85	3.12	12.00	4.41	2.72	12.00	4.98	2.41	12.00	5.54	2.17	12.00	5.90	2.03	12.00	6.26	1.92
-15	12.00	4.75	2.53	12.00	4.96	2.42	12.00	5.41	2.22	12.00	5.86	2.05	11.80	6.24	1.89	11.10	6.62	1.68

	WH-ADC0916H9E8 / WH-UX16HE8 or WH-ADC0916H9E8 / WH-UQ16HE8																	
t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	16.00	2.02	7.92	16.00	2.58	6.20	16.00	2.90	5.52	16.00	3.36	4.76	16.00	3.74	4.27	16.00	4.00	4.00
7	16.00	3.35	4.77	16.00	3.74	4.28	16.00	4.30	3.75	16.00	4.80	3.33	16.00	5.43	2.95	16.00	5.91	2.71
2	16.00	4.67	3.43	16.00	5.21	3.10	16.00	5.74	2.79	16.00	6.31	2.54	16.00	6.99	2.31	16.00	7.50	2.13
-7	16.00	5.85	2.74	16.00	6.42	2.49	16.00	7.00	2.29	16.00	7.57	2.11	16.00	8.10	1.97	16.00	8.62	1.86
-15	16.00	6.30	2.54	16.00	6.89	2.32	16.00	7.50	2.13	16.00	8.10	1.98	16.00	8.48	1.89	15.20	8.96	1.70

Performances of split systems with combination hydro-module in cooling mode

Aquarea LT, combination hydro-module, single- phase, heating and cooling (ADC), Generation H

	WH-ADC0309H3E5(B) / WH-UD03HE5-1									WH-ADC0309H3E5(B) / WH-UD05HE5-1								
t_v (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	2.90	1.20	2.42	3.50	1.20	2.92	3.00	0.88	3.41	3.30	1.53	2.16	4.10	1.52	2.70	4.40	1.53	2.88
35	3.20	1.04	3.08	3.90	1.07	3.64	3.30	0.74	4.46	4.50	1.67	2.69	5.50	1.68	3.27	5.00	1.33	3.76
25	3.20	0.73	4.38	4.10	0.86	4.77	3.50	0.59	5.93	5.00	1.43	3.50	6.30	1.50	4.20	5.40	1.06	5.09
18	2.40	0.42	5.71	4.40	0.73	6.03	3.70	0.49	7.55	4.50	0.89	5.06	5.00	0.90	5.56	5.70	0.90	6.33

	WH-ADC0309H3E5(B) / WH-UD07HE5-1									WH-ADC0309H3E5(B) / WH-UD09HE5-1								
t_v (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	4.85	2.65	1.83	6.00	2.82	2.13	4.80	1.98	2.42	5.20	2.85	1.83	6.99	3.84	1.82	5.60	2.55	2.20
35	6.00	2.28	2.63	6.60	2.48	2.66	6.00	1.68	3.57	7.99	2.88	2.77	7.60	3.20	2.38	7.00	2.15	3.26
25	7.00	1.90	3.68	8.47	1.78	4.76	6.00	1.27	4.72	7.85	2.40	3.27	10.20	2.46	4.15	7.00	1.77	3.96
16	4.80	0.80	6.0	7.20	1.16	6.21	6.00	1.13	5.31	5.40	1.00	5.40	8.40	1.62	5.19	7.00	1.61	4.25

	WH-ADC1216H6E5 / WH-UD12HE5									WH-ADC1216H6E5 / WH-UD16HE5								
t_v (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	7.80	3.80	2.05	11.10	3.19	3.48	8.00	2.85	2.81	7.75	3.40	2.28	13.80	5.95	2.32	9.70	4.00	2.43
35	10.00	2.56	3.91	12.00	2.67	4.49	10.00	2.40	4.17	12.20	4.76	2.56	15.00	4.98	3.01	12.20	2.96	4.12
25	12.08	2.90	4.17	15.70	2.05	7.66	10.00	1.97	5.07	14.40	3.92	3.67	19.20	3.83	5.01	12.20	2.79	4.37
16	7.86	1.18	6.66	13.15	1.40	9.39	10.00	1.73	5.78	9.20	1.62	5.68	16.40	2.58	6.36	12.20	2.45	4.98

Aquarea LT, Combination hydro-module, Three-phase, Heating and cooling (ADC), Generation H

	WH-ADC0916H9E8 / WH-UD09HE8									WH-ADC0916H9E8 / WH-UD12HE8								
t_v (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	5.52	2.54	2.17	7.69	2.77	2.78	5.60	1.80	3.11	7.80	3.80	2.05	11.10	3.19	3.48	8.00	2.85	2.81
35	7.00	2.23	3.14	8.30	2.32	3.58	7.00	1.52	4.61	10.00	2.56	3.91	12.00	2.67	4.49	10.00	2.40	4.17
25	8.35	1.77	4.72	10.90	1.78	6.12	7.00	1.24	5.65	12.08	2.90	4.17	15.70	2.05	7.66	10.00	1.97	5.08
16	7.50	1.15	6.52	9.10	1.20	7.58	8.00	1.13	7.08	7.86	1.18	6.66	13.15	1.40	9.39	10.00	1.73	5.78

	WH-ADC0916H9E8 / WH-UD16HE8								
t_v (°C)	7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	7.75	3.40	2.28	13.80	5.95	2.32	9.70	4.00	2.43
35	12.20	4.76	2.56	15.00	4.98	3.01	12.10	2.96	4.09
25	14.40	3.92	3.67	19.20	3.83	5.01	12.20	2.79	4.37
16	9.20	1.62	5.68	16.40	2.58	6.36	12.20	2.45	4.98

Aquarea T-CAP, combination hydro-module, single- phase, Heating and cooling (ADC), Generation H

	WH-ADC1216H6E5 / WH-UX09HE5									WH-ADC1216H6E5 / WH-UX12HE5								
t_v (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	7.80	3.80	2.05	11.10	3.19	3.48	8.00	2.85	2.81	7.75	3.40	2.28	13.80	5.95	2.32	9.70	4.00	2.43
35	10.00	2.56	3.91	12.00	2.67	4.49	10.00	2.40	4.17	12.20	4.76	2.56	15.00	4.98	3.01	12.20	2.96	4.12
25	12.08	2.90	4.17	15.70	2.05	7.66	10.00	1.97	5.07	14.40	3.92	3.67	19.20	3.83	5.01	12.20	2.79	4.37
16	7.86	1.18	6.66	13.15	1.40	9.39	10.00	1.73	5.78	9.20	1.62	5.68	16.40	2.58	6.36	12.20	2.45	4.98

Aquarea T-CAP, combination hydro-module, Three-phase, Heating and cooling (ADC), Generation H

	WH-ADC0916H9E8 / WH-UX09HE8									WH-ADC0916H9E8 / WH-UX12HE8								
t_v (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	6.25	2.66	2.35	–	–	–	–	–	–	8.00	3.01	2.66	–	–	–	–	–	–
35	7.00	2.21	3.17	–	–	–	–	–	–	10.00	3.56	2.81	–	–	–	–	–	–
25	7.65	1.91	4.01	–	–	–	–	–	–	8.90	2.16	4.12	–	–	–	–	–	–
18	7.00	1.36	5.15	–	–	–	–	–	–	7.50	1.41	5.32	–	–	–	–	–	–

	WH-ADC0916H9E8 / WH-UX16HE8								
t_v (°C)	7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	7.10	3.31	2.15	–	–	–	9.80	3.31	2.96
35	12.20	4.76	2.56	–	–	–	12.20	3.50	3.49
25	14.00	4.00	3.50	–	–	–	14.00	2.94	4.76
18	8.50	1.70	5.00	–	–	–	10.00	1.70	5.88

Performances of split systems with hydro-module in heating mode

Aquarea LT, Split, single- phase, Heating and Cooling (SDC), Generation H

	WH-SDC03H3E5-1 / WH-UD03HE5-1																	
t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	3.20	0.42	7.62	3.20	0.46	6.96	3.20	0.55	5.82	3.20	0.63	5.08	3.20	0.73	4.38	3.20	0.82	3.90
7	3.20	0.58	5.52	3.12	0.64	4.88	3.20	0.77	4.16	3.20	0.89	3.60	3.20	1.05	3.05	3.20	1.20	2.67
2	3.20	0.82	3.90	3.29	0.90	3.66	3.20	1.03	3.11	3.20	1.16	2.76	3.20	1.33	2.41	3.20	1.49	2.15
-7	3.20	1.08	2.96	3.58	1.19	3.00	3.20	1.34	2.39	3.20	1.48	2.16	3.20	1.67	1.92	3.20	1.86	1.72
-15	3.20	1.26	2.54	3.13	1.39	2.25	3.10	1.52	2.04	3.00	1.64	1.83	2.80	1.78	1.57	2.75	1.92	1.43

	WH-SDC05H3E5-1 / WH-UD05HE5-1																	
t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	5.00	0.74	6.76	5.00	0.82	6.10	5.00	1.02	4.90	5.00	1.22	4.10	5.00	1.35	3.70	5.00	1.49	3.36
7	5.00	0.97	5.15	5.00	1.08	4.63	5.00	1.28	3.91	5.00	1.48	3.38	5.00	1.68	2.98	5.00	1.89	2.65
2	4.20	1.22	3.44	4.20	1.35	3.11	4.20	1.50	2.80	4.20	1.65	2.55	4.15	1.86	2.23	4.10	2.07	1.98
-7	4.20	1.46	2.88	4.20	1.62	2.59	4.00	1.72	2.33	3.80	1.82	2.09	3.70	1.95	1.90	3.55	2.08	1.71
-15	4.20	1.75	2.40	4.20	1.94	2.17	3.80	1.96	1.94	3.40	1.98	1.72	3.20	2.05	1.56	3.00	2.12	1.42

Aquarea LT, Split, single- phase, Heating and Cooling (SDC), Generation H

WH-SDC07H3E5-1 / WH-UD07HE5-1

t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	7.00	0.79	8.86	7.00	0.97	7.22	6.74	1.14	5.91	6.74	1.14	5.91	6.24	1.43	4.36	6.00	1.55	3.87
7	7.00	1.43	4.90	7.00	1.57	4.46	7.00	1.84	3.81	7.00	1.84	3.81	6.90	2.35	2.94	6.80	2.59	2.63
2	6.70	1.83	3.66	6.55	1.96	3.34	6.58	2.29	2.87	6.58	2.29	2.87	6.30	2.82	2.24	6.00	3.01	1.99
-7	5.15	1.80	2.86	5.15	1.92	2.68	5.08	2.14	2.37	5.08	2.14	2.37	4.90	2.45	2.00	4.80	2.54	1.89
-15	4.60	1.87	2.46	4.60	1.98	2.32	4.60	2.19	2.10	4.60	2.19	2.10	4.55	2.63	1.73	4.50	2.86	1.57

WH-SDC09H3E5-1 / WH-UD09HE5-1

t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	9.00	1.07	8.41	9.00	1.26	7.14	8.66	1.48	5.87	8.66	1.48	5.87	8.03	1.85	4.34	7.74	2.01	3.85
7	9.00	1.93	4.66	9.00	2.18	4.13	9.00	2.49	3.62	9.00	2.49	3.62	8.95	3.25	2.76	8.90	3.70	2.41
2	6.80	1.87	3.64	6.70	2.14	3.13	6.65	2.38	2.79	6.65	2.38	2.79	6.30	2.82	2.24	6.00	3.01	1.99
-7	6.10	2.16	2.82	5.90	2.34	2.52	5.85	2.61	2.24	5.85	2.61	2.24	5.80	2.98	1.95	5.80	3.08	1.88
-15	6.00	2.55	2.35	5.90	2.66	2.22	5.65	2.82	2.00	5.65	2.82	2.00	5.20	3.08	1.69	5.00	3.18	1.57

WH-SDC12H6E5 / WH-UD12HE5

t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	12.00	1.38	8.70	12.00	1.66	7.23	11.80	1.94	6.08	11.70	2.23	5.25	11.50	2.49	4.62	11.40	2.74	4.16
7	12.00	2.10	5.71	12.00	2.53	4.74	12.00	2.96	4.05	12.00	3.39	3.54	12.00	3.78	3.17	12.00	4.16	2.88
2	11.80	3.10	3.81	11.40	3.31	3.44	11.00	3.53	3.12	10.60	3.74	2.83	9.80	3.94	2.49	9.10	4.14	2.20
-7	10.40	3.37	3.09	10.00	3.66	2.73	9.60	3.95	2.43	9.20	4.24	2.17	8.70	4.26	2.04	8.20	4.27	1.92
-15	9.30	3.46	2.69	8.90	3.62	2.46	8.50	3.79	2.24	8.10	3.95	2.05	7.50	4.05	1.85	7.00	4.16	1.68

WH-SDC16H6E5 / WH-UD16HE5

t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	16.00	2.31	6.93	16.00	2.69	5.95	16.00	3.07	5.21	16.00	3.45	4.64	16.00	3.67	4.36	15.90	3.89	4.09
7	16.00	3.21	4.98	16.00	3.74	4.28	16.00	4.27	3.75	16.00	4.80	3.33	15.20	5.11	2.97	14.50	5.41	2.68
2	13.50	3.74	3.61	13.00	3.96	3.28	12.40	4.18	2.97	11.90	4.40	2.70	10.80	4.46	2.42	9.80	4.51	2.17
-7	11.90	4.03	2.95	11.40	4.43	2.57	10.80	4.83	2.24	10.30	5.22	1.97	9.60	5.09	1.89	9.00	4.95	1.82
-15	10.60	4.09	2.59	10.30	4.38	2.35	10.00	4.67	2.14	9.70	4.96	1.96	8.80	4.94	1.78	7.90	4.91	1.61

Aquarea LT, Split, Three-phase, Heating and cooling (SDC), Generation H

WH-SDC09H3E8 / WH-UD09HE8

t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	9.00	1.05	8.57	9.00	1.24	7.26	8.73	1.44	6.06	8.46	1.64	5.16	8.28	1.82	4.55	8.10	2.00	4.05
7	9.00	1.54	5.84	9.00	1.86	4.84	9.00	2.16	4.17	9.00	2.46	3.66	9.00	2.76	3.26	9.00	3.06	2.94
2	9.31	2.35	3.96	9.00	2.51	3.59	9.00	2.78	3.24	9.00	3.05	2.95	8.90	3.49	2.55	8.80	3.94	2.23
-7	9.35	2.91	3.21	9.00	3.16	2.85	8.85	3.54	2.50	8.70	3.92	2.21	8.30	3.89	2.13	7.90	3.86	2.05
-15	8.65	3.06	2.83	8.30	3.21	2.59	7.95	3.41	2.33	7.60	3.61	2.11	7.15	3.71	1.93	6.70	3.81	1.76

WH-SDC12H9E8 / WH-UD12HE8

t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	12.00	1.38	8.70	12.00	1.66	7.23	11.80	1.94	6.08	11.70	2.23	5.25	11.50	2.49	4.62	11.40	2.74	4.16
7	12.00	2.10	5.71	12.00	2.53	4.74	12.00	2.96	4.05	12.00	3.39	3.54	12.00	3.78	3.17	12.00	4.16	2.88
2	11.80	3.10	3.81	11.40	3.31	3.44	11.00	3.53	3.12	10.60	3.74	2.83	9.80	3.94	2.49	9.10	4.14	2.20
-7	10.40	3.37	3.09	10.00	3.66	2.73	9.60	3.95	2.43	9.20	4.24	2.17	8.70	4.26	2.04	8.20	4.27	1.92
-15	9.30	3.46	2.69	8.90	3.62	2.46	8.50	3.79	2.24	8.10	3.95	2.05	7.50	4.05	1.85	7.00	4.16	1.68

WH-SDC16H9E8 / WH-UD16HE8

t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	16.00	2.31	6.93	16.00	2.69	5.95	16.00	3.07	5.21	16.00	3.45	4.64	16.00	3.67	4.36	15.90	3.89	4.09
7	16.00	3.21	4.98	16.00	3.74	4.28	16.00	4.27	3.75	16.00	4.80	3.33	15.20	5.11	2.97	14.50	5.41	2.68
2	13.50	3.74	3.61	13.00	3.96	3.28	12.40	4.18	2.97	11.90	4.40	2.70	10.80	4.46	2.42	9.80	4.51	2.17
-7	11.90	4.03	2.95	11.40	4.43	2.57	10.80	4.83	2.24	10.30	5.22	1.97	9.60	5.09	1.89	9.00	4.95	1.82
-15	10.60	4.09	2.59	10.30	4.38	2.35	10.00	4.67	2.14	9.70	4.96	1.96	8.80	4.94	1.78	7.90	4.91	1.61

Aquarea T-CAP, Split, Single-phase, Heating and cooling (ADC), Generation H

WH-SXC09H3E5 / WH-UX09HE5

t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	13.60	1.50	9.07	13.60	1.71	7.95	13.20	1.93	6.84	12.80	2.14	5.98	12.00	2.41	4.98	11.20	2.67	4.19
7	9.00	1.64	5.49	9.00	1.86	4.84	9.00	2.16	4.17	9.00	2.46	3.66	9.00	2.76	3.26	9.00	3.06	2.94
2	9.00	2.36	3.81	9.00	2.51	3.59	9.00	2.78	3.24	9.00	3.05	2.95	9.00	3.56	2.53	9.00	4.07	2.21
-7	9.00	2.71	3.32	9.00	3.16	2.85	9.00	3.62	2.49	9.00	4.07	2.21	9.00	4.27	2.11	9.00	4.46	2.02
-15	9.00	3.24	2.78	9.00	3.51	2.56	9.00	3.91	2.30	9.00	4.30	2.09	9.00	4.73	1.90	9.00	5.16	1.74

WH-SXC12H6E5 / WH-UX12HE5

t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	13.60	1.55	8.77	13.60	1.76	7.73	13.40	2.10	6.38	13.20	2.43	5.43	12.60	2.66	4.74	12.00	2.89	4.15
7	12.00	2.18	5.50	12.00	2.53	4.74	12.00	2.96	4.05	12.00	3.39	3.54	12.00	3.78	3.17	12.00	4.16	2.88
2	12.00	3.19	3.76	12.00	3.49	3.44	12.00	3.87	3.10	12.00	4.25	2.82	12.00	4.86	2.47	12.00	5.47	2.19
-7	12.00	3.85	3.12	12.00	4.41	2.72	12.00	4.98	2.41	12.00	5.54	2.17	12.00	5.90	2.03	12.00	6.26	1.92
-15	12.00	4.75	2.53	12.00	4.96	2.42	12.00	5.17	2.22	11.00	5.38	2.04	10.80	5.82	1.86	10.50	6.26	1.68

Aquarea T-CAP, Split, Three- phase, Heating and Cooling, Standard (SXC) or Super quiet (SQC), Generation H

WH-SXC09H3E8 / WH-UX09HE8 oder WH-SQC09H3E8 / WH-UQ09HE8

t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	13.60	1.50	9.07	13.60	1.71	7.95	13.20	1.93	6.84	12.80	2.14	5.98	12.00	2.41	4.98	11.20	2.67	4.19
7	9.00	1.64	5.49	9.00	1.86	4.84	9.00	2.16	4.17	9.00	2.46	3.66	9.00	2.76	3.26	9.00	3.06	2.94
2	9.00	2.36	3.81	9.00	2.51	3.59	9.00	2.78	3.24	9.00	3.05	2.95	9.00	3.56	2.53	9.00	4.07	2.21
-7	9.00	2.71	3.32	9.00	3.16	2.85	9.00	3.62	2.49	9.00	4.07	2.21	9.00	4.27	2.11	9.00	4.46	2.02
-15	9.00	3.24	2.78	9.00	3.51	2.56	9.00	3.91	2.30	9.00	4.30	2.09	9.00	4.73	1.90	9.00	5.16	1.74

WH-SXC12H9E8 / WH-UX12HE8 or WH-SQC12H9E8 / WH-UQ12HE8

t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	13.60	1.55	8.77	13.60	1.76	7.73	13.40	2.10	6.38	13.20	2.43	5.43	12.60	2.66	4.74	12.00	2.89	4.15
7	12.00	2.18	5.50	12.00	2.53	4.74	12.00	2.96	4.05	12.00	3.39	3.54	12.00	3.78	3.17	12.00	4.16	2.88
2	12.00	3.19	3.76	12.00	3.49	3.44	12.00	3.87	3.10	12.00	4.25	2.82	12.00	4.86	2.47	12.00	5.47	2.19
-7	12.00	3.85	3.12	12.00	4.41	2.72	12.00	4.98	2.41	12.00	5.54	2.17	12.00	5.90	2.03	12.00	6.26	1.92
-15	12.00	4.75	2.53	12.00	4.96	2.42	12.00	5.41	2.22	12.00	5.86	2.05	11.80	6.24	1.89	11.10	6.62	1.68

WH-SXC16H9E8 / WH-UX16HE8 or WH-SQC16H9E8 / WH-UQ16HE8

t_v (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	16.00	2.02	7.92	16.00	2.58	6.20	16.00	2.90	5.52	16.00	3.36	4.76	16.00	3.74	4.27	16.00	4.00	4.00
7	16.00	3.35	4.77	16.00	3.74	4.28	16.00	4.30	3.75	16.00	4.80	3.33	16.00	5.43	2.95	16.00	5.91	2.71
2	16.00	4.67	3.43	16.00	5.21	3.10	16.00	5.74	2.79	16.00	6.31	2.54	16.00	6.99	2.31	16.00	7.50	2.13
-7	16.00	5.85	2.74	16.00	6.42	2.49	16.00	7.00	2.29	16.00	7.57	2.11	16.00	8.10	1.97	16.00	8.62	1.86
-15	16.00	6.30	2.54	16.00	6.89	2.32	16.00	7.50	2.13	16.00	8.10	1.98	16.00	8.48	1.89	15.20	8.96	1.70

Aquarea HT, Split, Single-phase, Heating only (SHF), Generation F

WH-SHF09F3E5 / WH-UX09FE5

t_v (°C)	30			35			40			45			50			55			60			65		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	12.00	1.66	7.23	12.00	1.76	6.82	12.00	2.01	5.97	10.80	2.14	5.05	10.60	2.46	4.31	10.20	2.66	3.83	9.98	2.89	3.39	9.80	3.31	2.96
7	9.00	1.82	4.95	9.00	1.94	4.64	9.00	2.21	4.07	9.00	2.46	3.66	9.00	2.76	3.26	9.00	3.06	2.94	9.00	3.46	2.60	9.00	3.96	2.27
2	9.00	2.43	3.70	9.00	2.61	3.45	9.00	2.91	3.09	9.00	3.21	2.80	9.00	3.55	2.54	9.00	3.88	2.32	9.00	4.35	2.07	9.00	4.76	1.89
-7	9.00	3.06	2.94	9.00	3.29	2.74	9.00	3.56	2.53	8.90	3.83	2.32	8.90	4.11	2.17	8.90	4.46	2.00	8.90	4.96	1.79	8.90	5.46	1.63
-15	9.00	3.46	2.60	9.00	3.71	2.43	8.90	4.01	2.22	8.80	4.26	2.07	8.60	4.61	1.87	8.50	4.91	1.73	8.00	5.06	1.58	7.80	5.86	1.33

WH-SHF12F6E5 / WH-UX12FE5

t_v (°C)	30			35			40			45			50			55			60			65		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	12.00	1.66	7.23	12.00	1.76	6.82	12.00	2.01	5.97	11.80	2.41	4.90	11.70	2.64	4.24	10.80	2.86	3.78	10.50	3.11	3.37	10.30	3.62	2.84
7	12.00	2.52	4.76	12.00	2.69	4.46	12.00	3.06	3.92	12.00	3.44	3.49	12.00	3.81	3.15	12.00	4.28	2.80	12.00	4.76	2.52	12.00	5.41	2.22
2	12.00	3.42	3.51	12.00	3.68	3.26	11.50	3.86	2.98	11.30	4.14	2.73	11.00	4.51	2.44	10.80	4.86	2.22	10.65	5.31	2.01	10.30	5.59	1.84
-7	12.00	4.43	2.71	12.00	4.76	2.52	11.50	4.91	2.34	11.20	5.06	2.21	10.80	5.16	2.09	10.10	5.28	1.91	10.00	5.66	1.76	9.60	5.91	1.62
-15	12.00	5.16	2.33	12.00	5.53	2.17	11.00	5.51	2.00	10.60	5.53	1.92	10.30	5.63	1.83	9.70	5.76	1.68	9.00	6.01	1.50	8.00	6.11	1.31

Aquarea HT, Split, Three-phase, Heating only (SHF), Generation F

	WH-SHF09F3E8 / WH-UX09FE8																							
t_V (°C)	30			35			40			45			50			55			60			65		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	12.00	1.66	7.23	12.00	1.76	6.82	12.00	2.01	5.97	10.80	2.14	5.05	10.60	2.46	4.31	10.20	2.66	3.83	9.80	2.89	3.39	9.60	3.31	2.90
7	9.00	1.82	4.95	9.00	1.94	4.64	9.00	2.21	4.07	9.00	2.46	3.66	9.00	2.76	3.26	9.00	3.06	2.94	9.00	3.46	2.60	9.00	3.96	2.27
2	9.00	2.43	3.70	9.00	2.61	3.45	9.00	2.91	3.09	9.00	3.21	2.80	9.00	3.55	2.54	9.00	3.88	2.32	9.00	4.35	2.07	9.00	4.76	1.89
-7	9.00	3.06	2.94	9.00	3.29	2.74	9.00	3.56	2.53	8.90	3.83	2.32	8.90	4.11	2.17	8.90	4.46	2.00	8.90	4.96	1.79	8.90	5.46	1.63
-15	9.00	3.46	2.60	9.00	3.71	2.43	9.00	4.01	2.24	8.80	4.26	2.07	8.60	4.61	1.87	8.50	4.91	1.73	8.00	5.06	1.58	7.80	5.86	1.33

	WH-SHF12F9E8 / WH-UX12FE8																							
t_V (°C)	30			35			40			45			50			55			60			65		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	12.00	1.66	7.23	12.00	1.76	6.82	12.00	2.01	5.97	11.80	2.41	4.90	11.20	2.64	4.24	10.80	2.86	3.77	10.50	3.11	3.38	10.30	3.62	2.85
7	12.00	2.52	4.76	12.00	2.69	4.46	12.00	3.06	3.92	12.00	3.44	3.49	12.00	3.81	3.15	12.00	4.28	2.80	12.00	4.76	2.52	12.00	5.41	2.22
2	12.00	3.42	3.51	12.00	3.68	3.26	11.50	3.86	2.98	11.30	4.14	2.73	11.00	4.51	2.44	10.80	4.86	2.22	10.65	5.31	2.01	10.30	5.59	1.84
-7	12.00	4.43	2.71	12.00	4.76	2.52	11.50	4.91	2.34	11.20	5.06	2.21	10.80	5.16	2.09	10.10	5.28	1.91	10.00	5.66	1.76	9.60	5.91	1.62
-15	12.00	5.16	2.33	12.00	5.53	2.17	11.00	5.51	2.00	10.60	5.53	1.92	10.30	5.63	1.83	9.70	5.76	1.68	9.00	6.01	1.50	8.00	6.11	1.31

Capacities of split systems with hydro-module in cooling mode

Aquarea LT, Split, single- phase, Heating and Cooling (SDC), Generation H

	WH-SDC03H3E5-1 / WH-UD03HE5-1									WH-SDC05H3E5-1 / WH-UD05HE5-1								
t_V (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	2.90	1.20	2.42	3.50	1.20	2.92	3.00	0.88	3.41	3.30	1.53	2.16	4.10	1.52	2.70	4.40	1.53	2.88
35	3.20	1.04	3.08	3.90	1.07	3.64	3.30	0.74	4.46	4.50	1.67	2.69	5.50	1.68	3.27	5.00	1.33	3.76
25	3.20	0.73	4.38	4.10	0.86	4.77	3.50	0.59	5.93	5.00	1.43	3.50	6.30	1.50	4.20	5.40	1.06	5.09
18	2.40	0.42	5.71	4.40	0.73	6.03	3.70	0.49	7.55	4.50	0.89	5.06	5.00	0.90	5.56	5.70	0.90	6.33

	WH-SDC07H3E5-1 / WH-UD07HE5-1									WH-SDC09H3E5-1 / WH-UD09HE5-1								
t_V (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	4.85	2.65	1.83	6.00	2.82	2.13	4.80	1.98	2.42	5.20	2.85	1.83	6.99	3.84	1.82	5.60	2.55	2.20
35	6.00	2.28	2.63	6.60	2.48	2.66	6.00	1.68	3.57	7.99	2.88	2.77	7.60	3.20	2.38	7.00	2.15	3.26
25	7.00	1.90	3.68	8.47	1.78	4.76	6.00	1.27	4.72	7.85	2.40	3.27	10.20	2.46	4.15	7.00	1.77	3.96
16	4.80	0.80	6.0	7.20	1.16	6.21	6.00	1.13	5.31	5.40	1.00	5.40	8.40	1.62	5.19	7.00	1.61	4.25

	WH-SDC12H6E5 / WH-UD12HE5									WH-SDC16H6E5 / WH-UD16HE5								
t_V (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	7.80	3.80	2.05	11.10	3.19	3.48	8.00	2.85	2.81	7.75	3.40	2.28	13.80	5.95	2.32	9.70	4.00	2.43
35	10.00	2.56	3.91	12.00	2.67	4.49	10.00	2.40	4.17	12.20	4.76	2.56	15.00	4.98	3.01	12.20	2.96	4.12
25	12.08	2.90	4.17	15.70	2.05	7.66	10.00	1.97	5.07	14.40	3.92	3.67	19.20	3.83	5.01	12.20	2.79	4.37
16	7.86	1.18	6.66	13.15	1.40	9.39	10.00	1.73	5.78	9.20	1.62	5.68	16.40	2.58	6.36	12.20	2.45	4.98

Aquarea LT, Split, Three-phase, Heating and cooling (SDC), Generation H

	WH-SDC09H3E8 / WH-UD09HE8									WH-SDC12H9E8 / WH-UD12HE8								
t_V (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	5.52	2.54	2.17	7.69	2.77	2.78	5.60	1.80	3.11	7.80	3.80	2.05	11.10	3.19	3.48	8.00	2.85	2.81
35	7.00	2.23	3.14	8.30	2.32	3.58	7.00	1.52	4.61	10.00	2.56	3.91	12.00	2.67	4.49	10.00	2.40	4.17
25	8.35	1.77	4.72	10.90	1.78	6.12	7.00	1.24	5.65	12.08	2.90	4.17	15.70	2.05	7.66	10.00	1.97	5.08
16	7.50	1.15	6.52	9.10	1.20	7.58	8.00	1.13	7.08	7.86	1.18	6.66	13.15	1.40	9.39	10.00	1.73	5.78

	WH-SDC16H9E8 / WH-UD16HE8								
t_V (°C)	7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	7.75	3.40	2.28	13.80	5.95	2.32	9.70	4.00	2.43
35	12.20	4.76	2.56	15.00	4.98	3.01	12.10	2.96	4.09
25	14.40	3.92	3.67	19.20	3.83	5.01	12.20	2.79	4.37
16	9.20	1.62	5.68	16.40	2.58	6.36	12.20	2.45	4.98

Aquarea T-CAP, Split, Single-phase, Heating and cooling (ADC), Generation H

	WH-SXC09H3E5 / WH-UX09HE5									WH-SXC12H6E5 / WH-UX12HE5								
t_V (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	6.25	2.66	2.35	8.55	2.71	3.16	5.60	1.60	3.50	8.00	3.35	2.39	10.00	3.46	2.89	8.00	2.30	3.48
35	7.00	2.21	3.17	9.23	2.37	3.90	7.00	1.35	5.19	10.00	3.56	2.81	12.55	3.63	3.46	10.00	1.95	5.13
25	7.65	1.91	4.01	11.10	1.98	5.61	7.00	1.10	6.36	11.20	2.67	4.20	16.50	3.01	5.48	10.00	1.60	6.25
18	7.00	1.36	5.15	8.55	1.41	6.06	7.00	1.00	7.00	10.00	1.75	5.71	13.20	1.96	6.73	10.00	1.40	7.14

Aquarea T-CAP, Split, three- phase, heating and cooling (SXC), Generation H

	WH-SXC09H3E8 / WH-UX09HE8 oder WH-SQC09H3E8 / WH-UQ09HE8									WH-SXC12H9E8 / WH-UX12HE8 or WH-SQC12H9E8 / WH-UQ12HE8								
t_V (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	6.25	2.66	2.35	–	–	–	–	–	–	8.00	3.01	2.66	–	–	–	–	–	–
35	7.00	2.21	3.17	–	–	–	–	–	–	10.00	3.56	2.81	–	–	–	–	–	–
25	7.65	1.91	4.01	–	–	–	–	–	–	8.90	2.16	4.12	–	–	–	–	–	–
18	7.00	1.36	5.15	–	–	–	–	–	–	7.50	1.41	5.32	–	–	–	–	–	–

	WH-SXC16H9E8 / WH-UX16HE8 or WH-SQC16H9E8 / WH-UQ16HE8								
t_V (°C)	7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	7.10	3.31	2.15	–	–	–	9.80	3.31	2.96
35	12.20	4.76	2.56	–	–	–	12.20	3.50	3.49
25	14.00	4.00	3.50	–	–	–	14.00	2.94	4.76
18	8.50	1.70	5.00	–	–	–	10.00	1.70	5.88

Capacities of the compact systems in the heating mode

Aquarea LT, Compact, single-phase, Heating and Cooling (MDC), Generation H

	WH-MDC05H3E5																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	5.00	0.67	7.46	5.00	0.71	7.04	5.00	0.78	6.41	5.00	0.86	5.81	5.00	0.98	5.10	5.00	1.10	4.55
7	5.00	0.91	5.49	5.00	0.98	5.10	5.00	1.13	4.42	5.00	1.26	3.97	5.00	1.44	3.47	5.00	1.63	3.07
2	4.80	1.22	3.93	4.80	1.28	3.75	4.65	1.40	3.32	4.50	1.52	2.96	4.25	1.62	2.62	4.00	1.72	2.33
-7	4.50	1.44	3.13	4.50	1.51	2.98	4.50	1.64	2.74	4.50	1.78	2.53	4.40	1.94	2.27	4.30	2.10	2.05
-15	5.00	1.82	2.75	5.00	1.95	2.56	5.00	2.20	2.27	5.00	2.45	2.04	5.00	1.68	2.99	5.00	2.90	1.72

	WH-MDC07H3E5																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	7.30	0.78	9.36	7.10	0.93	7.63	6.90	1.09	6.33	6.70	1.24	5.40	6.50	1.41	4.61	6.30	1.58	3.99
7	6.00	1.13	5.31	6.00	1.35	4.44	6.00	1.58	3.80	6.00	1.80	3.33	6.00	2.09	2.87	6.00	2.38	2.52
2	5.00	1.23	4.07	5.00	1.45	3.45	5.00	1.68	2.98	5.00	1.90	2.63	5.00	2.19	2.28	5.00	2.48	2.02
-7	5.18	1.68	3.08	5.15	1.92	2.68	5.13	2.17	2.36	5.10	2.41	2.12	5.45	2.81	1.94	5.80	3.20	1.81
-15	6.15	2.50	2.46	5.90	2.66	2.22	5.65	2.82	2.00	5.40	2.98	1.81	5.20	3.15	1.65	5.00	3.32	1.51

	WH-MDC09H3E5																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	9.00	0.99	9.09	9.00	1.31	6.87	9.00	1.63	5.52	9.00	1.95	4.62	9.00	2.20	4.09	9.00	2.45	3.67
7	9.00	1.87	4.81	9.00	2.17	4.16	9.00	2.48	3.63	9.00	2.78	3.24	8.95	3.31	2.70	8.90	3.84	2.32
2	7.00	2.01	3.48	7.45	2.37	3.14	7.00	2.60	2.69	7.00	2.89	2.42	7.00	3.37	2.08	7.00	3.85	1.82
-7	7.80	3.38	2.31	7.70	3.63	2.12	7.60	3.88	1.96	7.50	4.13	1.82	7.55	4.59	1.64	7.60	5.05	1.50
-15	7.90	3.62	2.19	7.60	3.77	2.02	7.30	3.93	1.86	7.00	4.08	1.72	6.45	4.06	1.59	5.90	4.03	1.46

Aquarea T-CAP, Compact, single-phase, Heating and Cooling (MXC), Generation H

	WH-MXC09H3E5																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	13.60	1.50	9.07	13.60	1.71	7.95	13.20	1.93	6.84	12.80	2.14	5.98	12.00	2.41	4.98	11.20	2.67	4.19
7	9.00	1.64	5.49	9.00	1.86	4.84	9.00	2.16	4.17	9.00	2.46	3.66	9.00	2.76	3.26	9.00	3.06	2.94
2	9.00	2.36	3.81	9.00	2.51	3.59	9.00	2.78	3.24	9.00	3.05	2.95	9.00	3.56	2.53	9.00	4.07	2.21
-7	9.00	2.71	3.32	9.00	3.16	2.85	9.00	3.62	2.49	9.00	4.07	2.21	9.00	4.27	2.11	9.00	4.46	2.02
-15	9.00	3.24	2.78	9.00	3.51	2.56	9.00	3.91	2.30	9.00	4.30	2.09	9.00	4.73	1.90	9.00	5.16	1.74

	WH-MXC12H6E5																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	13.60	1.55	8.77	13.60	1.76	7.73	13.40	2.10	6.38	13.20	2.43	5.43	12.60	2.66	4.74	12.00	2.89	4.15
7	12.00	2.18	5.50	12.00	2.53	4.74	12.00	2.96	4.05	12.00	3.39	3.54	12.00	3.78	3.17	12.00	4.16	2.88
2	12.00	3.19	3.76	12.00	3.49	3.44	12.00	3.87	3.10	12.00	4.25	2.82	12.00	4.86	2.47	12.00	5.47	2.19
-7	12.00	3.85	3.12	12.00	4.41	2.72	12.00	4.98	2.41	12.00	5.54	2.17	12.00	5.90	2.03	12.00	6.26	1.92
-15	12.00	4.75	2.53	12.00	4.96	2.42	12.00	5.41	2.22	11.00	5.38	2.04	10.80	5.82	1.86	10.50	6.26	1.68

1 Provisional data

Aquarea T-CAP, Compact, three- phase, Heating and Cooling (MXC), Generation H

	WH-MXC09H3E8																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	13.60	1.50	9.07	13.60	1.71	7.95	13.20	1.93	6.84	12.80	2.14	5.98	12.00	2.41	4.98	11.20	2.67	4.19
7	9.00	1.64	5.49	9.00	1.86	4.84	9.00	2.16	4.17	9.00	2.46	3.66	9.00	2.76	3.26	9.00	3.06	2.94
2	9.00	2.36	3.81	9.00	2.51	3.59	9.00	2.78	3.24	9.00	3.05	2.95	9.00	3.56	2.53	9.00	4.07	2.21
-7	9.00	2.71	3.32	9.00	3.16	2.85	9.00	3.62	2.49	9.00	4.07	2.21	9.00	4.27	2.11	9.00	4.46	2.02
-15	9.00	3.24	2.78	9.00	3.51	2.56	9.00	3.91	2.30	9.00	4.30	2.09	9.00	4.73	1.90	9.00	5.16	1.74

	WH-MXC12H9E8																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	13.60	1.55	8.77	13.60	1.76	7.73	13.40	2.10	6.38	13.20	2.43	5.43	12.60	2.66	4.74	12.00	2.89	4.15
7	12.00	2.18	5.50	12.00	2.53	4.74	12.00	2.96	4.05	12.00	3.39	3.54	12.00	3.78	3.17	12.00	4.16	2.88
2	12.00	3.19	3.76	12.00	3.49	3.44	12.00	3.87	3.10	12.00	4.25	2.82	12.00	4.86	2.47	12.00	5.47	2.19
-7	12.00	3.85	3.12	12.00	4.41	2.72	12.00	4.98	2.41	12.00	5.54	2.17	12.00	5.90	2.03	12.00	6.26	1.92
-15	12.00	4.75	2.53	12.00	4.96	2.42	12.00	5.41	2.22	12.00	5.38	2.05	11.80	5.82	1.89	11.10	6.62	1.68

	WH-MXC16H9E8																	
t_V (°C)	30			35			40			45			50			55		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	16.00	2.02	7.92	16.00	2.58	6.20	16.00	2.91	5.52	16.00	3.36	4.76	16.00	3.74	4.27	16.00	4.00	4.00
7	16.00	3.35	4.77	16.00	3.74	4.28	16.00	4.30	3.75	16.00	4.80	3.33	16.00	5.43	2.95	16.00	5.91	2.71
2	16.00	4.67	3.43	16.00	5.21	3.10	16.00	5.74	2.79	16.00	6.31	2.54	16.00	6.90	2.31	16.00	7.50	2.13
-7	16.00	5.85	2.74	16.00	6.42	2.49	16.00	7.00	2.29	16.00	7.57	2.11	16.00	8.10	1.97	16.00	8.62	1.86
-15	16.00	6.30	2.54	16.00	6.89	2.32	16.00	7.45	2.13	16.00	8.10	1.98	16.00	8.48	1.89	15.20	8.96	1.70

1 Provisional data

Aquarea HT, Compact, Single- phase, Heating only (MHF), Generation F

	WH-MHF09G3E5																							
t_V (°C)	30			35			40			45			50			55			60			65		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	9.00	1.52	5.92	9.00	1.70	5.29	9.00	1.88	4.79	9.00	2.16	4.17	9.00	2.63	3.42	9.00	3.20	2.81	9.98	2.89	3.39	9.80	3.31	2.96
7	9.00	1.82	4.95	9.00	1.94	4.64	9.00	2.21	4.07	9.00	2.46	3.66	9.00	2.99	3.01	9.00	3.64	2.47	9.00	3.46	2.60	9.00	3.96	2.27
2	9.00	2.43	3.70	9.00	2.61	3.45	9.00	2.91	3.09	9.00	3.21	2.80	9.00	3.72	2.42	9.00	4.37	2.06	9.00	4.35	2.07	9.00	4.76	1.89
-7	9.00	3.06	2.94	9.00	3.29	2.74	9.00	3.56	2.53	8.90	3.83	2.32	8.90	4.28	2.08	9.00	5.02	1.79	8.90	4.96	1.79	8.90	5.46	1.63
-15	9.00	3.46	2.60	9.00	3.71	2.43	9.00	4.01	2.24	8.80	4.26	2.07	8.50	4.71	1.80	7.80	5.38	1.45	8.00	5.06	1.58	7.80	5.86	1.33

	WH-MHF12G6E5																							
t_V (°C)	30			35			40			45			50			55			60			65		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	12.00	2.03	5.91	12.00	2.36	5.08	12.00	2.69	4.46	12.00	3.02	3.97	12.00	3.61	3.32	12.00	4.37	2.75	10.50	3.11	3.37	10.30	3.62	2.84
7	12.00	2.52	4.76	12.00	2.69	4.46	12.00	3.06	3.92	12.00	3.44	3.49	12.00	4.10	2.93	12.00	4.97	2.41	12.00	4.76	2.52	12.00	5.41	2.22
2	12.00	3.42	3.51	12.00	3.68	3.26	11.50	3.86	2.98	11.30	4.14	2.73	10.80	4.66	2.32	10.30	5.13	2.01	10.65	5.31	2.01	10.30	5.59	1.84
-7	12.00	4.43	2.71	12.00	4.76	2.52	11.50	4.91	2.34	11.20	5.06	2.21	10.10	5.06	2.00	9.60	5.43	1.77	10.00	5.66	1.76	9.60	5.91	1.62
-15	12.00	5.16	2.33	12.00	5.53	2.17	11.00	5.51	2.00	10.80	5.49	1.97	9.70	5.52	1.76	8.00	5.61	1.43	9.00	6.01	1.50	8.00	6.11	1.31

Aquarea HT, Compact, Three-phase, Heating only (MHF), Generation F

	WH-MHF09F3E8																							
t_V (°C)	30			35			40			45			50			55			60			65		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	9.00	1.52	5.92	9.00	1.70	5.29	13.20	1.88	7.02	9.00	2.16	4.17	9.00	2.63	3.42	9.00	3.20	2.81	9.80	2.89	3.39	9.60	3.31	2.90
7	9.00	1.82	4.95	9.00	1.94	4.64	9.00	2.21	4.07	9.00	2.46	3.66	9.00	2.99	3.01	9.00	3.64	2.47	9.00	3.46	2.60	9.00	3.96	2.27
2	9.00	2.43	3.70	9.00	2.61	3.45	9.00	2.91	3.09	9.00	3.21	2.80	9.00	3.72	2.42	9.00	4.37	2.06	9.00	4.35	2.07	9.00	4.76	1.89
-7	9.00	3.06	2.94	9.00	3.29	2.74	9.00	3.56	2.53	8.90	3.83	2.32	8.90	4.28	2.08	9.00	5.02	1.79	8.90	4.96	1.79	8.90	5.46	1.63
-15	9.00	3.46	2.60	9.00	3.71	2.43	9.00	4.01	2.24	8.80	4.26	2.07	8.50	4.71	1.80	7.80	5.38	1.45	8.00	5.06	1.58	7.80	5.86	1.33

	WH-MHF12F9E8																							
t_V (°C)	30			35			40			45			50			55			60			65		
t_a (°C)	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP	P_{Hzg} (kW)	P_{zu} (kW)	COP
25	12.00	2.03	5.91	12.00	2.36	5.08	12.00	2.69	4.46	12.00	3.02	3.97	12.00	3.61	3.32	12.00	4.37	2.75	10.50	3.11	3.38	10.30	3.62	2.85
7	12.00	2.52	4.76	12.00	2.69	4.46	12.00	3.06	3.92	12.00	3.44	3.49	12.00	4.10	2.93	12.00	4.97	2.41	12.00	4.76	2.52	12.00	5.41	2.22
2	12.00	3.42	3.51	12.00	3.68	3.26	11.50	3.86	2.98	11.30	4.14	2.73	10.80	4.66	2.32	10.30	5.13	2.01	10.65	5.31	2.01	10.30	5.59	1.84
-7	12.00	4.43	2.71	12.00	4.76	2.52	11.50	4.91	2.34	11.20	5.06	2.21	10.10	5.06	2.00	9.60	5.43	1.77	10.00	5.66	1.76	9.60	5.91	1.62
-15	12.00	5.16	2.33	12.00	5.53	2.17	11.00	5.51	2.00	10.80	5.49	1.97	9.70	5.52	1.76	8.00	5.61	1.43	9.00	6.01	1.50	8.00	6.11	1.31

Capacities of the compact systems in the cooling mode

Aquarea LT, Compact, single-phase, Heating and Cooling (MDC), Generation H

	WH-MDC05H3E5[1]									WH-MDC07H3E5[1]								
t_V (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	3.75	1.75	2.14	4.50	1.80	2.50	4.25	1.20	3.54	4.56	2.34	1.95	6.31	2.47	2.55	7.14	2.45	2.91
35	4.50	1.35	3.33	5.10	1.50	3.40	5.00	1.00	5.00	5.50	2.03	2.71	6.70	2.06	3.25	7.30	2.05	3.56
25	5.00	1.25	4.00	6.30	1.20	5.25	6.30	0.80	7.88	5.85	1.43	4.09	9.55	1.73	5.52	9.81	1.68	5.84
18	1.95	0.45	4.33	2.20	0.45	4.89	2.45	0.50	4.90	4.64	0.91	5.10	5.83	0.99	5.89	6.74	0.94	7.17

	WH-MDC09H3E5[1]								
t_V (°C)	7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	5.32	3.18	1.67	6.34	2.48	2.56	6.78	2.46	2.76
35	7.00	2.90	2.41	8.40	2.95	2.85	9.00	3.00	3.00
25	6.44	1.85	3.48	10.50	2.51	4.18	11.16	2.52	4.43
18	5.36	1.05	5.10	6.12	1.08	5.67	7.02	1.08	6.50

1 Provisional data

Aquarea T-CAP, Compact, Single- phase, Heating and Cooling (MXC), Generation H

	WH-MXC09H3E5									WH-MXC12H6E5								
t_V (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	6.25	2.66	2.35	8.55	2.71	3.15	5.60	1.60	3.50	8.00	3.35	2.39	10.00	3.46	2.89	8.00	2.30	3.48
35	7.00	2.21	3.17	9.23	2.37	3.89	7.00	1.35	5.19	10.00	3.56	2.81	12.55	3.63	3.46	10.00	1.95	5.13
25	7.65	1.91	4.01	11.10	1.98	5.61	7.00	1.10	6.36	11.20	2.67	4.19	16.50	3.01	5.48	10.00	1.60	6.25
18	7.00	1.36	5.15	8.55	1.41	6.06	7.00	1.00	7.00	10.00	1.75	5.71	13.20	1.96	6.73	10.00	1.40	7.14

1 Provisional data

Aquarea T-CAP, Compact, Three- phase, Heating and Cooling (MXC), Generation H

	WH-MXC09H3E8[1]									WH-MXC12H9E8[1]								
t_V (°C)	7			14			18			7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	6.25	2.66	2.35	8.55	2.71	3.15	5.60	1.60	3.50	8.00	3.35	2.39	10.00	3.46	2.89	8.00	2.30	3.48
35	7.00	2.21	3.17	9.23	2.37	3.89	7.00	1.35	5.19	10.00	3.56	2.81	12.55	3.63	3.46	10.00	1.95	5.13
25	7.65	1.91	4.01	11.10	1.98	5.61	7.00	1.10	6.36	11.20	2.67	4.19	16.50	3.01	5.48	10.00	1.60	6.25
18	7.00	1.36	5.15	8.55	1.41	6.06	7.00	1.00	7.00	10.00	1.75	5.71	13.20	1.96	6.73	10.00	1.40	7.14

	WH-MXC16H9E8[1]								
t_V (°C)	7			14			18		
t_a (°C)	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER	P_{Klg} (kW)	P_{zu} (kW)	EER
43	7.10	3.31	2.15	–	–	–	9.80	3.31	2.96
35	12.20	4.76	2.56	–	–	–	12.20	3.50	3.49
25	14.00	4.00	3.50	–	–	–	14.00	2.94	4.76
18	8.50	1.70	5.00	–	–	–	10.00	1.70	5.88

1 Provisional data

5.6 Examples of use

This section illustrates various possibilities of using Aquarea air-to-water heat pumps.

IMPORTANT

The figures used are purely schematic representations with the principal components that can be used as the basis for planning concrete systems. They do not, however, include all the components needed according to EN 12828 and safety devices.

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

The following application examples only relate to the current split systems of the H generation with hydro-module or combination hydro-module in standard version or version “B” (→ *4.6.2.1 Components (split systems), p. 32*).

The hydraulic schematic was created with the hydraulic schematics 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 for downloading at www.PanasonicProClub.com.

You will find a detailed legend for all the hydraulic schematics below in the appendix to the graphic representations (→ *5.6.9 Key for the examples of use, p. 135*).

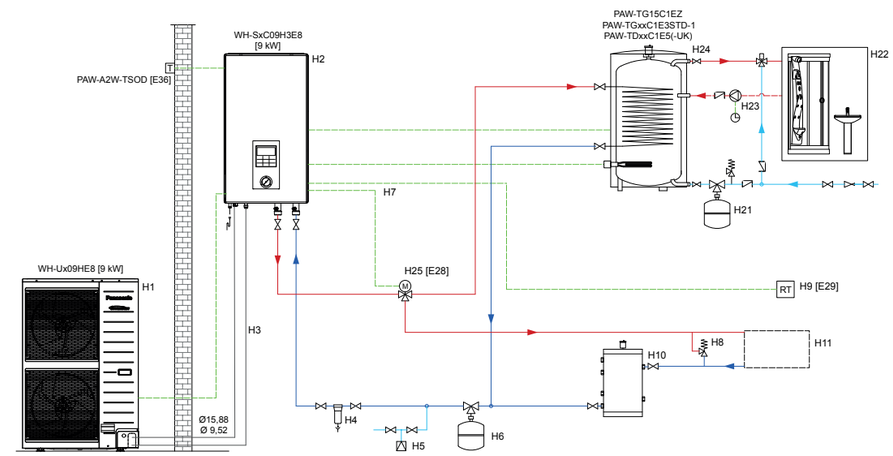
Details about the settings on the operating unit for the various examples of use are given in the operating instructions for the respective device and in the Appendix to this Planning Manual (→ *8.1 Extract from the operating instructions (H-Generation), p. 203*).

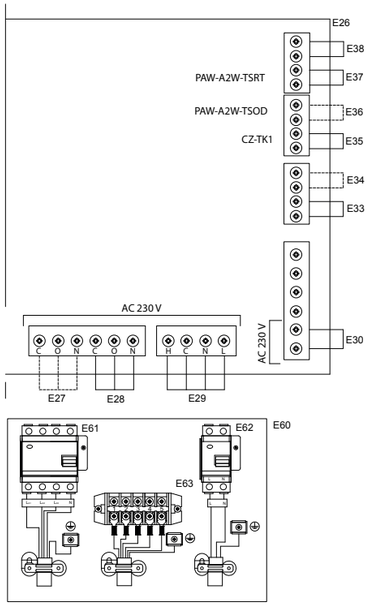
Note

You will find information about examples of use with split systems of earlier generations in the Planning Manual of from 2014.

5.6.1 Example 1: One-circuit system without buffer tank

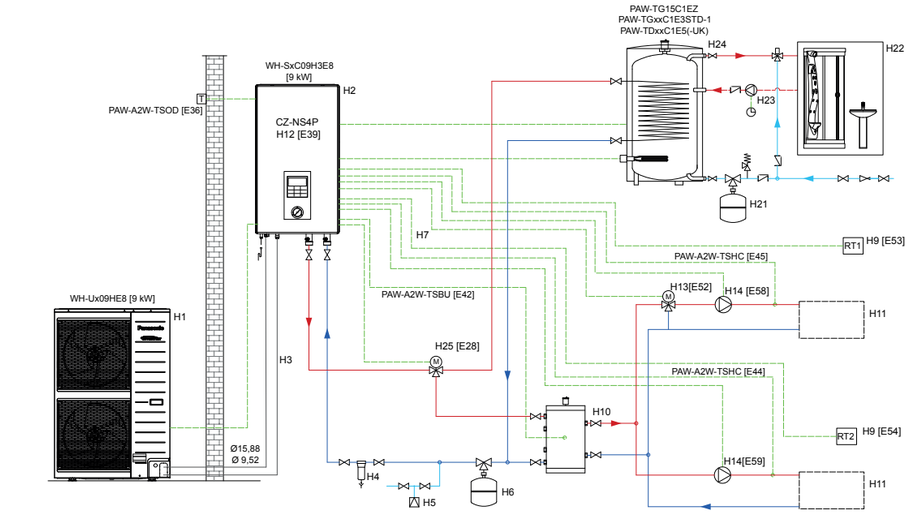
Hydro-module, T-CAP, 9 kW, 3 Ph, Hot water tank

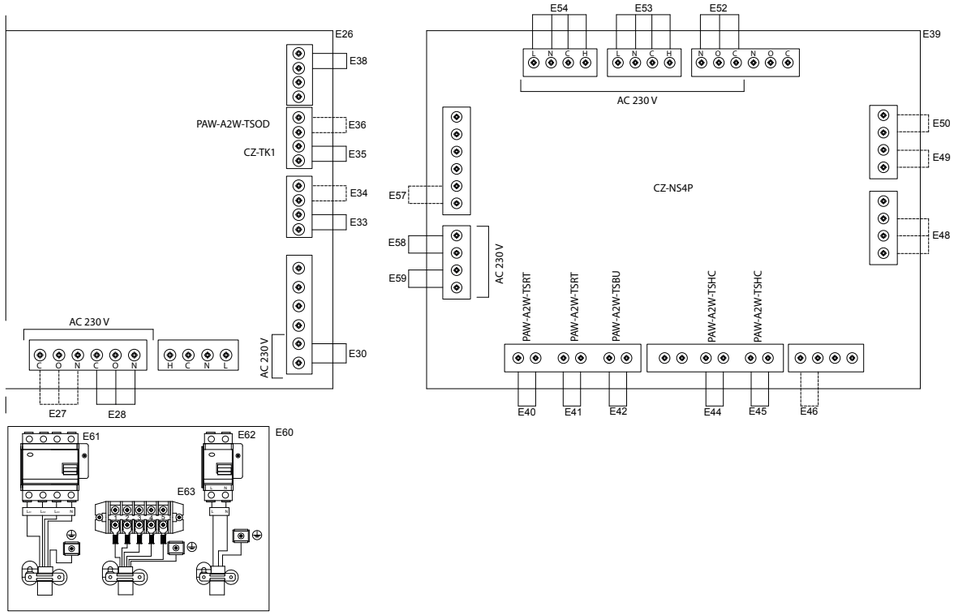




5.6.2 Example 2: Two-circuit system with buffer tank

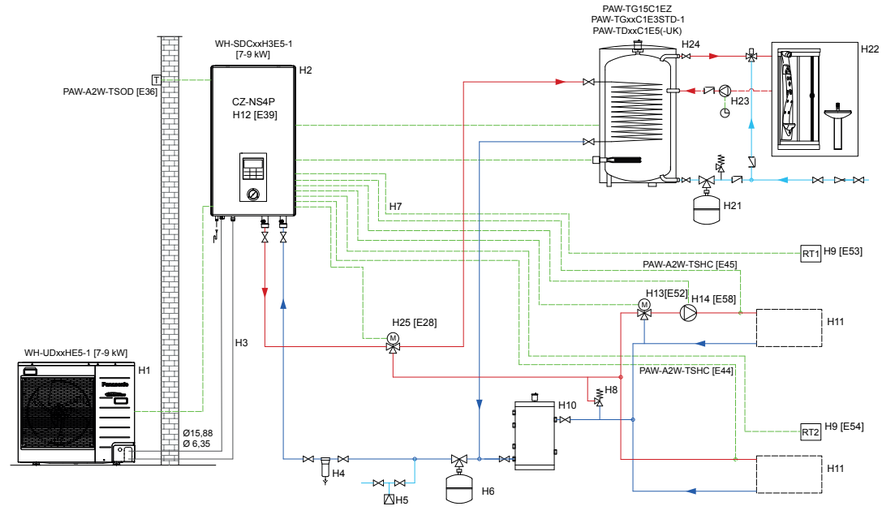
Hydro-module, T-CAP, 9 kW, 3 Ph, Hot water tank

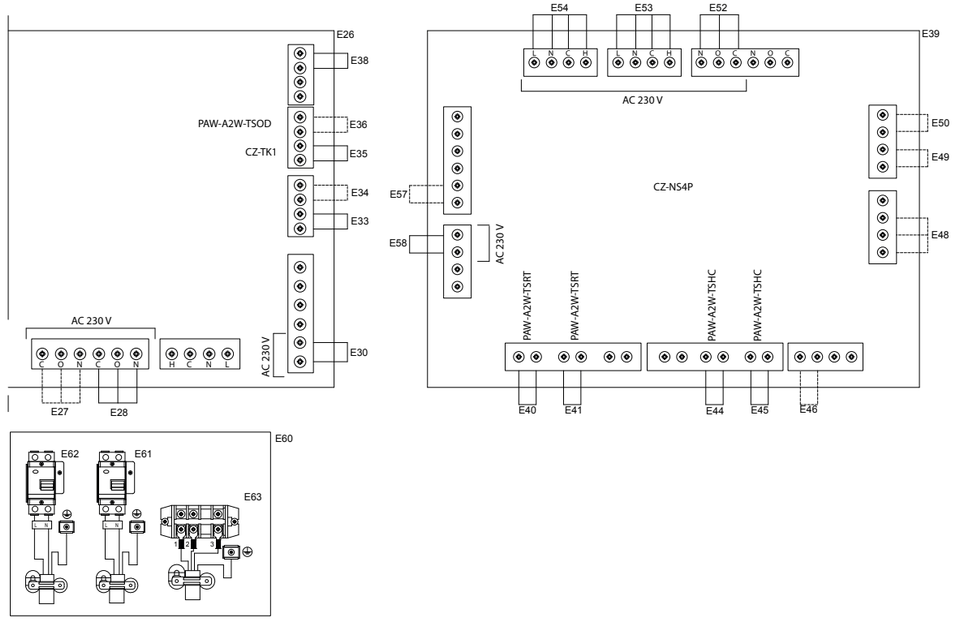




5.6.3 Example 3: Single-phase two-circuit system

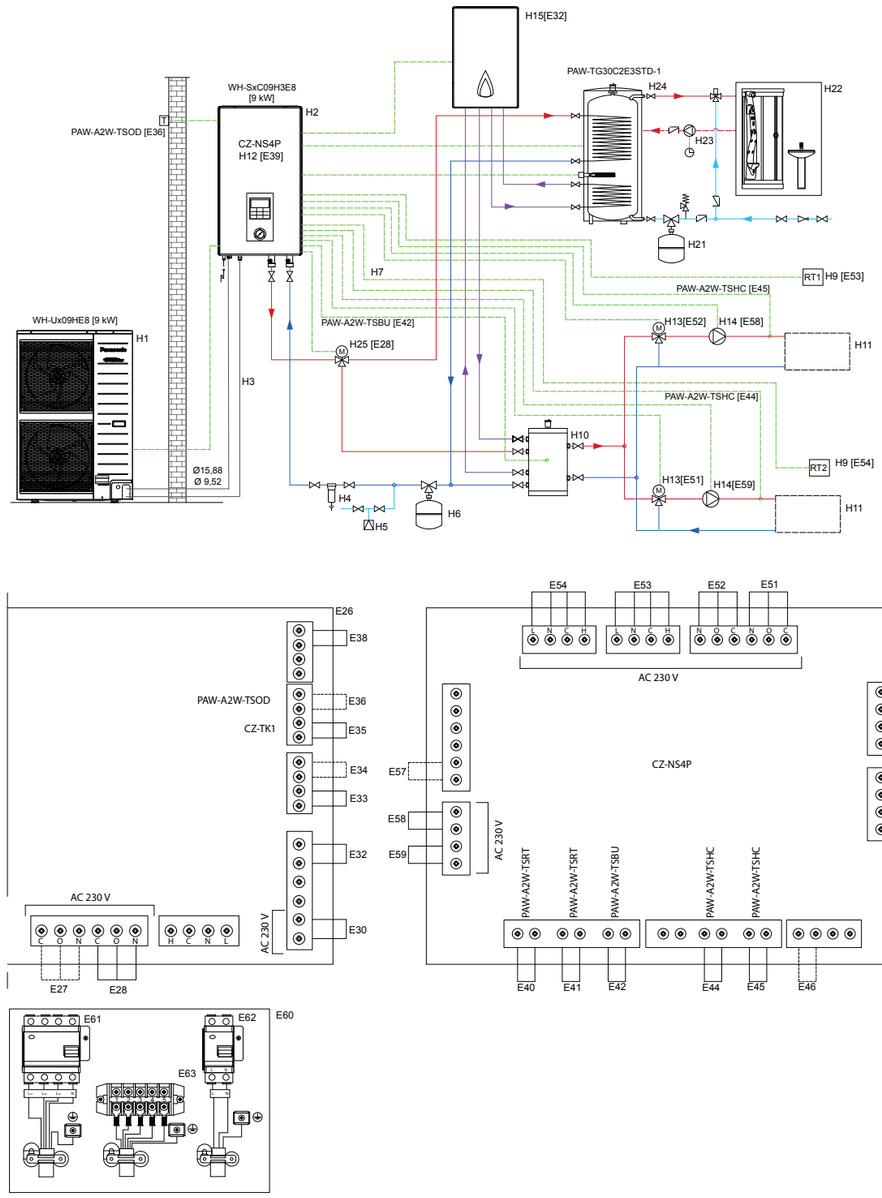
Hydro-module, LT, 7/9 kW, Hot water tank





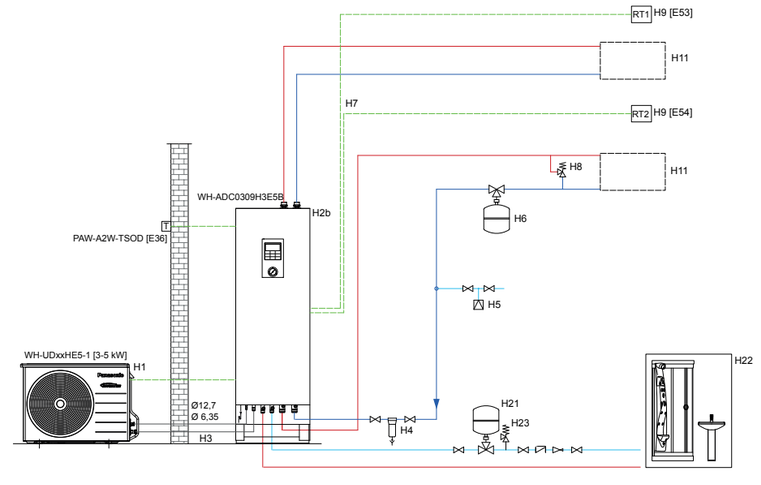
5.6.4 Example 4: Bivalent two-circuit system with buffer tank

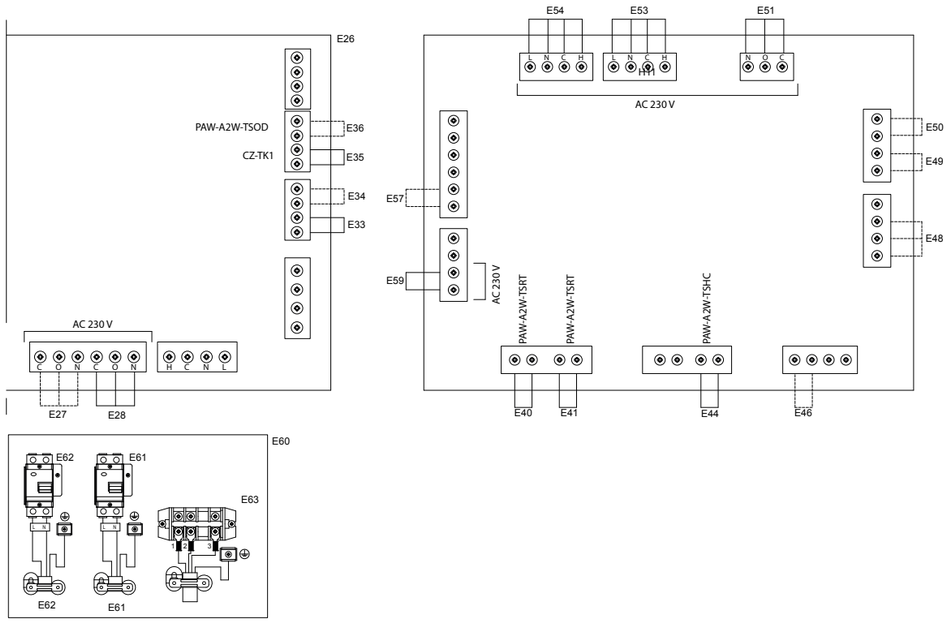
Hydro-module, T-CAP, 9 kW, second heat source, Hot water tank, 2 heatc.



5.6.5 Example 5: Two-circuit system with integ. domestic hot water tank

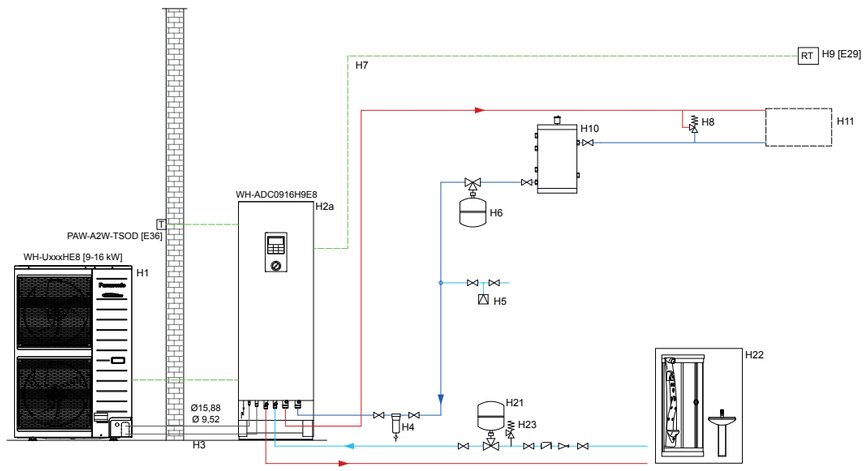
Combination Hydro-module “B”, LT, 3/5 kW

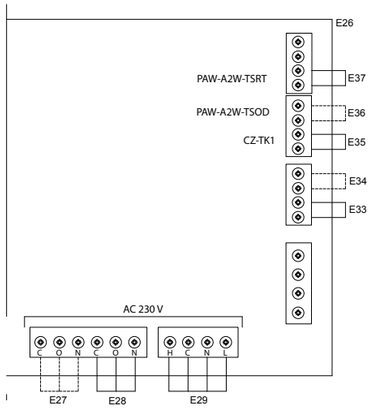


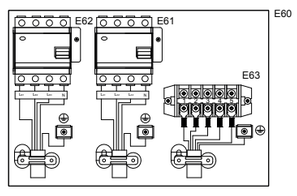


5.6.6 Example 6: One-circuit system with integrated domestic hot water tank

Combination hydro-module standard version, LT, 9/12/16 kW

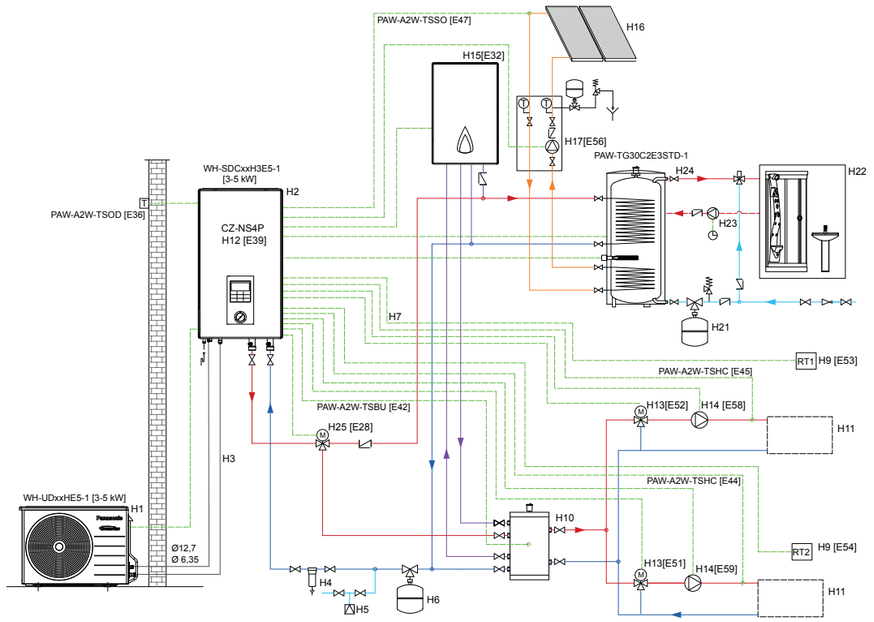


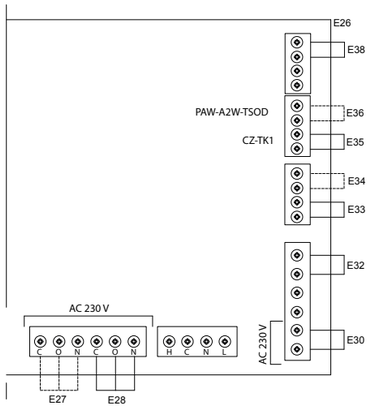


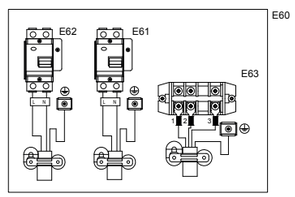


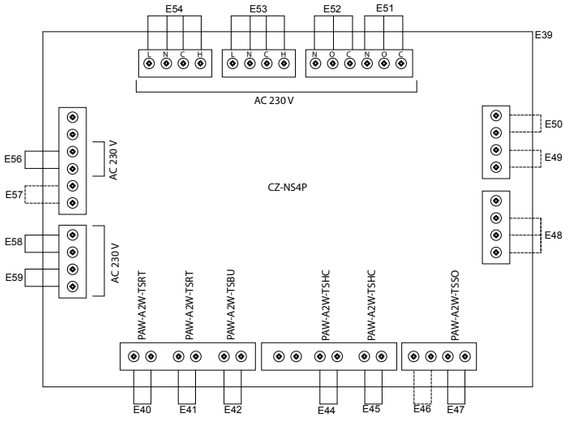
5.6.7 Example 7: Bivalent two-circuit system with solar heating system

Hydro-module, second heat source, solar heat, bivalent hot water tank, buffer tank



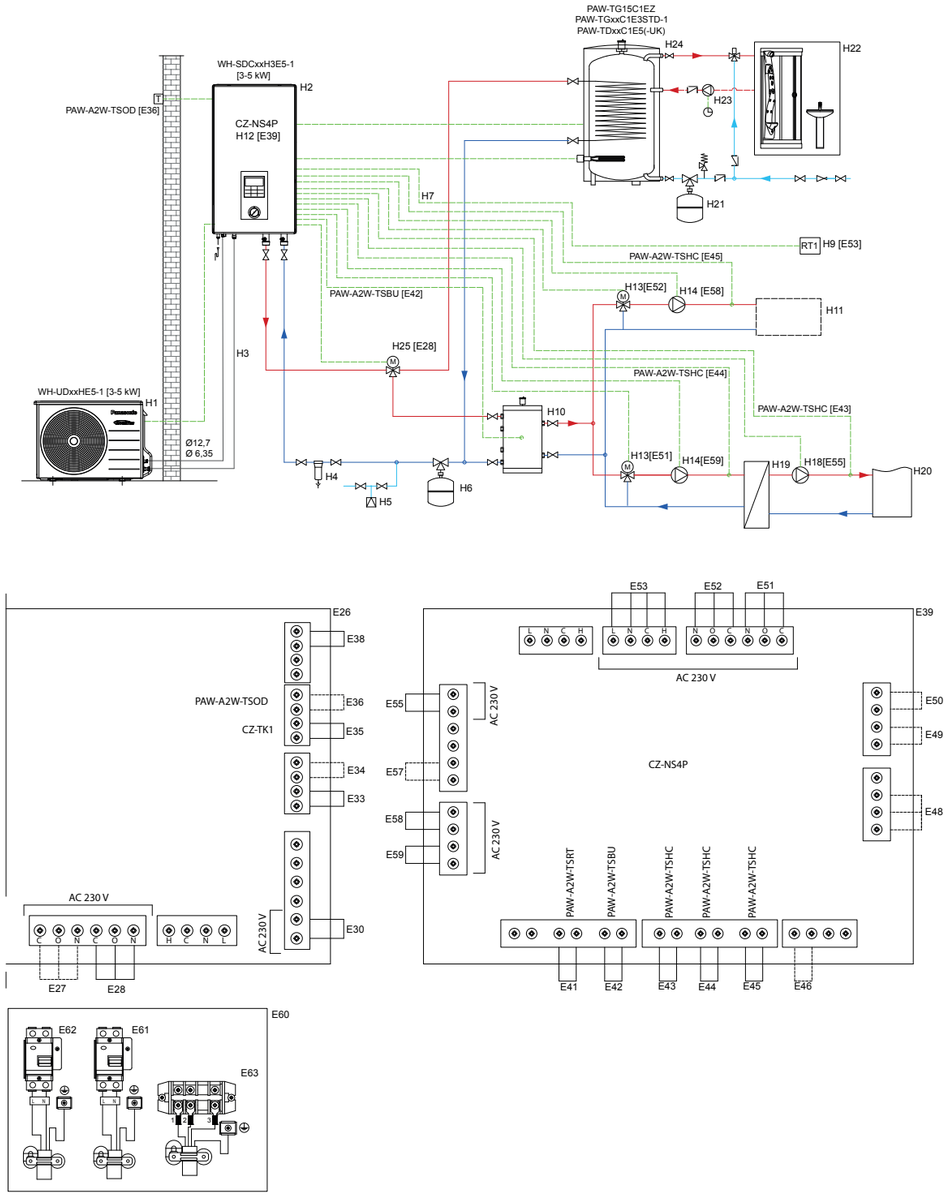






5.6.8 Example 8: Two-circuit system with swimming pool

Hydro-module, hot water tank, buffer tank, swimming pool heating



5.6.9 Key for the examples of use

Key for the Hydraulic Part

H1 Outdoor unit of the split system (provide condensation drain on the outdoor unit)

H2 Indoor unit of the split system: In all models of the H series a dirt catcher and an inflow flow meter form part of the scope of delivery.

H2a Indoor unit (combination hydro-module) of the split system: The combination hydro-module includes a 200 litres hot water tank, a tank temperature sensor, a 3-way valve and a hydro module. The combination hydro-module must be set up inside a building. In all models of the H series, a dirt catcher and an inflow flow meter form part of the scope of delivery.

H2b Indoor unit (combination hydro-module version “B”) of the split system: The combination hydro-module of version “B” with additional fitting for a second heating circuit contains a 200 litres hot water tank, a tank temperature sensor, a 3-way valve, a hydro-module, a mixing valve, a water circulation pump, an inflow temperature sensor and a dirt catcher for the additional mixed heating circuit (in the “upper section”). The combination hydro-module must be set up inside a building. In all models of the H series, a dirt catcher and an inflow flow meter form part of the scope of delivery.

H3 The heat pumps are filled with a coolant R410A. For all split systems (except systems with 3 and 5 kW), the maximum connection distance is 30 m and the maximum height difference between indoor and outdoor unit is 20 m. For all LT systems (except systems with 3 and 5 kW), the maximum connection distance is 15 m and the maximum height difference between indoor and outdoor unit is 5 m. For all heat pump systems, the minimum connection distance between indoor and outdoor units is 3 m.

H4 Magnetic filter (recommended)

H5 Fill- and non-return valve

H6 Expansion vessel: Every heat pump has a 10 litres expansion vessel that is designed for a total water quantity in the heating system of 200 litres for an inflow temperature of 55 °C. For every deviation from one of these provisions, another expansion vessel must be provided on site.

H7 Electrical connections: Depending on hydraulic schematics and components to be controlled

H8 Overflow valve

H9 Optional Thermostat: Every heating circuit can be controlled by means of an optional thermostat, either by means of a room temperature sensor or the operating unit (this can only be used for one heating circuit).

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

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

H12 Optional additional PCB CZ-NS4P – required for this schematics

H13 Mixing valve with three point regulation

H14 Water pump for secondary circuit: The selection is made depending on the requirements of the secondary circuit.

H15 Bivalent heat source

H16 Solar heat modules

H17 Solar pump

H18 Swimming pool pump

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

H20 Swimming pool

H21 Expansion vessel (in domestic cold water inflow)

H22 Sanitary systems

H23 (only split systems with hydro-module)
Optional circulation pump with timer switch

H23 (only split systems with combination hydro-module)
For combination hydro-module of the H generation, a safety valve (opening pressure 8 bar) is integrated into the hot water tank.

H24 Hot water tank: In the case of Panasonic 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 6 or 20 m long cable). As the hot water tank PAW-TG15C1EZ from Panasonic does not have any circulation connection, the circulation pipeline must be connected to the cold water entry pipeline when installing this tank.

H25 3-way changeover valve: As a 3-way valve, you can use either a Panasonic CZ-NV1, which is installed inside the hydro-module, 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

Pipelines of the bivalent heat source

Pipelines of the solar heat circuit

Pipelines

Pipelines for domestic cold water

(only systems with hydro-module)
Pipelines of the circulation circuit

Electric cable

Key for the Hydraulic 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 and closed in cooling mode.
E28 3-way valve: Opened in drinking water preparation and closed in heating or cooling mode.
E29 Optional Thermostat: Every heating circuit can be controlled by means of an optional thermostat (E29 for one heating circuit, E53 and E54 for two heating circuits), either in combination with a room temperature sensor (E37 for one heating circuit, E40 and E41 for two heating circuits) or by means of the operating unit (E33, this can only be used for one heating circuit).
E30 Hot water tank E-heating element
E31 Control output for additional circulation pump
E32 On/off switch of the bivalent heat source (dry contact)
E33 Operating unit: The operating unit of the heat pumps of the H Generation can be used for one heating circuit as a room thermostat. The maximum cable length is 50 m.
E34 External on/off switch (dry contact)
E35 Temperature sensor for hot water tank
E36 Outdoor temperature sensor (optional)
E37 Room temperature sensor for heatC. 1 (see explanation for E29)
E38 Overload protection of the domestic hot water tank E-heating element: If an external hot water tank uses E-heating element and is controlled by means of the Panasonic heat pump, a contact bridge must be placed at this entrance.
E39 Optional additional PCB CZ-NS4P: 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 connections for the external room thermostats 1 and the room temperature sensor 1 are deactivated on the main PCB.
E40 Room temperature sensor for heatC. 2 (see explanation for E29)
E41 Room temperature sensor for heatC. 1 (see explanation for E29)
E42 Buffer tank temperature sensor
E43 Swimming pool temperature sensor
E44 Inflow temperature sensor for heatC. 2
E45 Inflow temperature sensor for heatC. 1
E46 Power control by means of 0--10 Volt signal
E47 Solar temperature sensor
E48 Smart Grid signal (for functions of the intelligent power grid): The set-point for the hot water preparation or the heating mode can be raised in two stages via the two contacts, if photovoltaics modules are connected and electricity is currently being supplied.
E49 External heating/ cooling switchover
E50 EVU input
E51 Mixing valve heatC. 2
E52 Mixing valve heatC. 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 Fault report output (dry contact)
E58 Pump for heatC. 1
E59 Pump for heatC. 2
E60 Power supply connections in indoor unit (hydro-module/combination hydro-module)
E61 Mains connection 1 - Main connection
E62 Mains connection 2 - Connection for E-heating elements
E63 Indoor unit /outdoor unit connection: The power supply of the outdoor unit is provided via the connection line from indoor unit (hydro-module / combination hydro-module), so no direct power supply need be provided in the outdoor unit.

Important: All the items mentioned on this page are only examples and can vary according to the project. Always respect the support documents provided by Panasonic.

6 Installation

The correct assembly of the devices as well as their hydraulic and electrical installation 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 notices before you begin work.
2. Keep this installation manual safely together with the device after assembly.
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.

Note

The figures of the following installation instructions predominantly feature models of the H generation. The instructions are, however, also valid for F and G generation models.

Detailed installation instructions for the F and G generation models are given in the planning manual for split systems or compact systems from 2014 as well as in the installation instructions and in the service manual of the respective device.

6.1 Safety Notices for installation

Pay particular attention to the following safety notices 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 superheat.

- ► 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 regulations 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 protection switch (FI protection switch).

CAUTION

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

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

- ► Work on the cooling circuit and in connection with the coolant must be carried out by a trained technician or an authorised trader holding a coolant certificate.
- ► Wear gloves when handling coolants (e.g. when emptying or filling the cooling circuit).
- ► Observe the Safety Notices in force for the respective coolant (R410A or R407C).

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 coolant comes into contact with fire

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

For this reason, if coolants 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 coolant circuit being too high

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

- ► Carry out installation of the coolant pipes in a proper manner and check that there are no leaks in the installation before turning on the compressor.
- ► Before the coolant pipes are removed or work is carried out on the pipes, switch the compressor off.

CAUTION

Danger of the devices being damaged by incorrect coolant

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

- ► Only use coolant Type R410A for the Aquarea LT and T-CAP series and only Type R407C coolant for the Aquarea HT series.
- ► Do not mix the prescribed coolant with coolants of another type or replace it with a coolant 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 (hydro-modules or combined hydro-modules) are only to be installed in indoor areas.
  - Outdoor units and compact devices 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 and compact devices near the sea, in regions with a high content of sulphur or at sites where large quantities of oil (e.g. machine oil, etc.) is 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 clearing and defining the following important aspects during the planning phase (respect the pointers to elaborate explanations about the respective topic in this manual):

1. Determine the power requirement and the refrigeration requirements for the heating system to be installed (→ *5.1 Cooling technique and performance criteria, p. 79*).
2. Based on the performance features of Aquarea air-to-water heat pumps, select the model suitable for the power requirements (→ *4.6 Functions and technical data, p. 30*).
3. Based on the ambient conditions and the setting up criteria for the various model types, determine the optimum installation location for the indoor and outdoor unit or the compact device (→ *5.2 Installation criteria, p. 87*).
4. Determine the requirements for the hydraulic connection of the devices (→ *5.3 Hydraulics, p. 100*). Always conform to the valid legal provisions.
5. Determine the requirements for the electrical connection of the devices (→ *5.4 Electricals, p. 105*). 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	Quantity	Description	Split systems				Compact systems	
				with combination hydro-module		with hydro-module			
				H-Generation / Standard config.	H-Generation / Version “B”	F-Generation	H-Generation	G-Generation	H-Generation
a	Top mounting plate	1	for F-Generation			●			
b	Top mounting plate	1	for H -Generation				●		
c	Outlet bend	1	for condensation hose	●	●	●	●	●	●
d	Sealing washer	1	for outlet bend	●	●		●		
e	Bottom mounting plate	1	for F-Generation			●			
f	Bottom mounting plate	1	for H -Generation				●		
g	Screw	3	to fasten the hydro-module to the bottom mounting plate			●	●		
h	Rubber cap	8				●		●	●
i	Cable sleeve	2				●			
j	Cover of the operating unit opening	1	for separate assembly of the operating unit	●	●		●		
k	Adjustable legs	4		●	●				
l	Reducing piece	1		●	●				
m	Local remote control	1						●	●[1]

1 Assembly accessory is to be provided on site.

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.

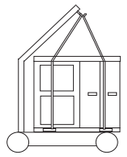
► Use mechanical hoists for loads that are too heavy to lift.

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 and compact devices 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 Technical data (split systems), p. 16*, → *4.6.3.1 Components (compact systems), p. 47*) you will need two to four persons and/or a suitable mechanical hoist.

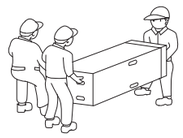
   Examples of transport:

   Outdoor unit (B7) or Compact device (B9)

   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.

   Combination Hydro-Module (ADC) - H - Generation

   The combination hydro-module 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 legs, for example, which are included in the scope of delivery of combination hydro-modules.

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
- Adjustable spanner set
- Knife
- Gas leak detector
- Measuring tape
- Megohm meter
- Multimeter
- Torque wrench

The following tools are also needed for installing split 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

CAUTION

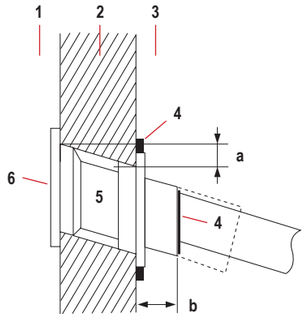
Danger of cables being chewed through by rodents in hollow walls

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 or for the compact device fulfils the installation criteria (→ *5.2.2 Setting up Split System, p. 90*, → *5.2.3 Setting up the Compact system, p. 96*).
2. Drill a wall hole of 70 mm diameter at the appropriate point. The hole must be made according to the illustration (see above) 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

Combination Hydro-Modules

Carry out the following steps to install the combination hydro-module:

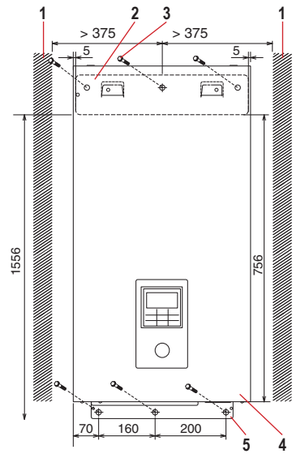
1. Carefully unpack the combination hydro-module at the installation location.
2. Align the device by means of the adjustable legs (use spirit level).

Hydro-modules

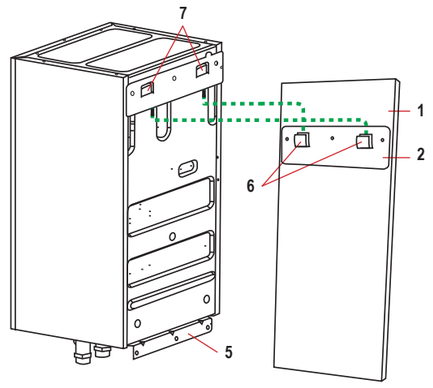
Carry out the following steps to install the hydro-module:

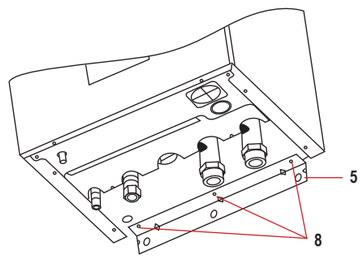
1. Exercise caution as you unpack the hydro-module at the installation site.
2. Attach the two mounting plates contained in the scope of delivery on the wall as shown in the illustration (above). For this, use six M8 hexagon screws, washers and dowels with threaded insert (all to be provided on site). Ensure horizontal alignment (use spirit level). Maintain the minimum distances from the wall and floor entered in the corresponding illustration.
3. Have the hydro-module lifted by two persons and suspend the hydro-module 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 hydro-module by using three Phillips head screws on the bottom mounting plate.

Hydro-module H-Generation



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





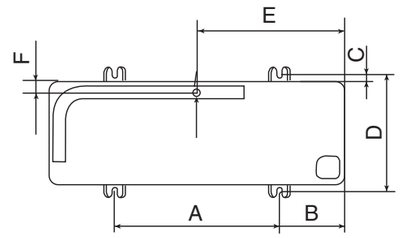
6.4.2 Outdoor units and compact devices

Carry out the following steps to install the outdoor unit or compact device:

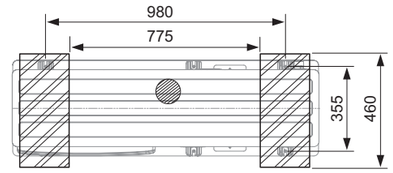
1. Exercise caution when unpacking the device at the installation site.
2. Attach the device to a concrete foundation or a strong ground frame by means of four anchor bolts as shown in the illustration see above) e.g. on the outer wall of a building. Ensure horizontal alignment of the device. Also observe the instructions in the sections on attaching the devices (→ *5.2.2.3 Securing the outdoor unit, p. 92*, → *5.2.3.3 Securing the compact device, p. 99*).

Drilling template outdoor units and compact devices

Outdoor units



Compact devices



Outdoor unit type*	A	B	C	D	E	F
Outdoor unit for models B1 and B4	540	160	20	330	430	46
Outdoor unit for models B2 and B5	620	140	15	355	450	44
Outdoor unit for models B3 and B6	620	140	25	355	450	44
Outdoor unit for models B7 and B10	k. A.	k. A.	k. A.	k. A.	k. A.	k. A.

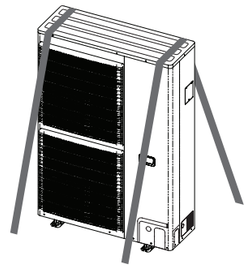
Unit: mm

* cfr. → *1 Model range, p. 8* and → *Dimensions (outdoor units), p. 37*

When fastening the outdoor unit or compact device 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 or compact device must be additionally secured to the side of the building to prevent tipping over (e.g. by bracing).

Bracing as support against tilting



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 run 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. 92*, → *5.2.3.3 Securing the compact device, p. 99*).

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 split systems, see that the electric supply of the hydro-module or combination hydro-module, the tank and the E-heating element is disconnected.

6.5.1 Combination Hydro-Modules

Removing and replacing the front plate

CAUTION

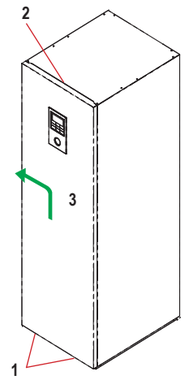
Danger of injury due to crushing

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 open the front plate:

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



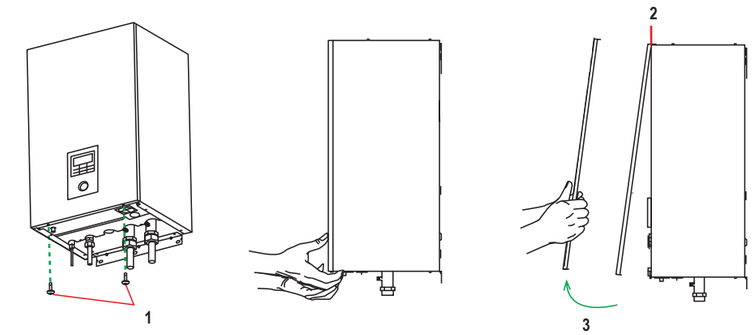
6.5.2 Hydro-modules

Removing and replacing the front plate

Carry out the following steps to remove the front plate:

1. Remove the attachment 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.

Hydro-module H-Generation



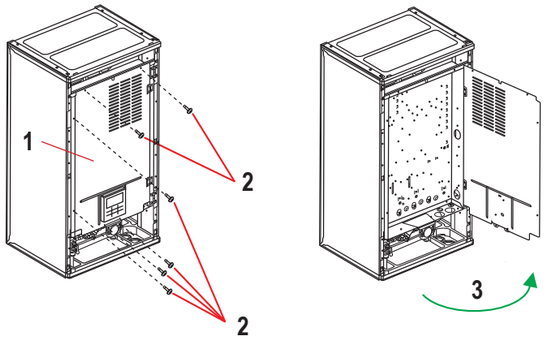
Two screws at the bottom edge of the front plate

Opening and reclosing the connection box

Carry out the following steps to open the cover of the connection box for the hydro-module of the H Generation:

1. Remove the front plate as described earlier.
2. Remove the six attachment 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.

Hydro-module H-Generation



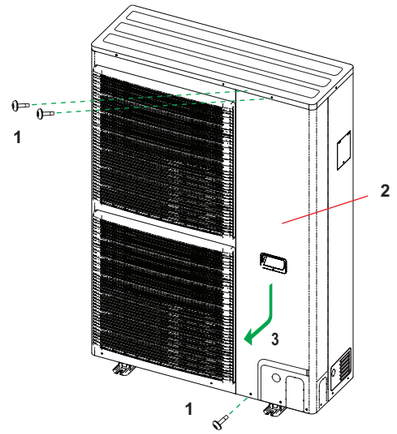
6.5.3 Outdoor units and compact devices

Removing and replacing the front plate

Carry out the following steps to remove the front plate i.e. the cover of the connection box on the front side of the outdoor unit or compact device:

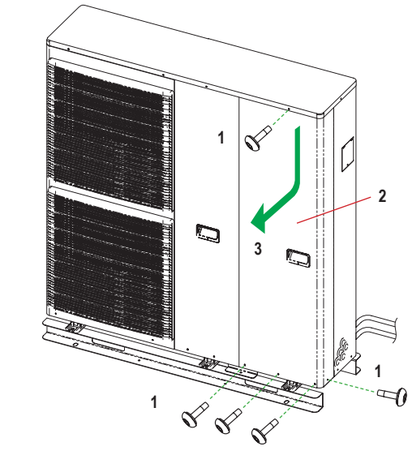
1. Remove the attachment screws (**1**) on the front plate (**2**).
2. Push the front plate downwards (**3**), to release the latches.
3. Then pull the front plate to yourself to remove it.
4. To replace the front plate, proceed in the reverse order.

Outdoor units



An outdoor unit for the B3* and B6* models is shows as an example. For other outdoor unit types, proceed similarly as appropriate.

Compact devices



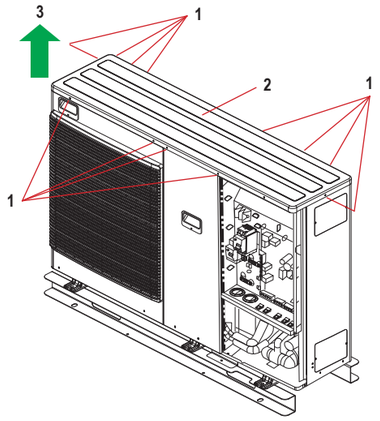
A compact device of the B9* model is shown as an example. For other compact devices of the B8* model, proceed in exactly the same manner as appropriate.

* cfr. → *1 Model range, p. 8*

Removing top cover plate and replacing it

Carry out the following steps to remove the top cover plate of the outdoor unit or compact device:

1. Remove the attachment screws (**1**) along the edge of the cover plate (**2**).
2. Lift the cover plate from the device (**3**).
3. To replace the top cover plate, proceed in the reverse order.



A compact device of the B8* model is shown as an example. For compact devices of the B9* model and for outdoor units, proceed in exactly the same manner as appropriate.

* cfr. → *1 Model range, p. 8*

6.6 Connecting the cooling circuit

Note

For the installation of compact devices, you can skip chapter 6.6 “Connecting the cooling circuit”. Continue with section → *6.7 Connecting the heating circuit, p. 161*.

Defaults for correctly configured flange connections

CAUTION

Danger of leakages due to incorrect tool

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

► Use a suitable adjustable spanner or ring spanner.

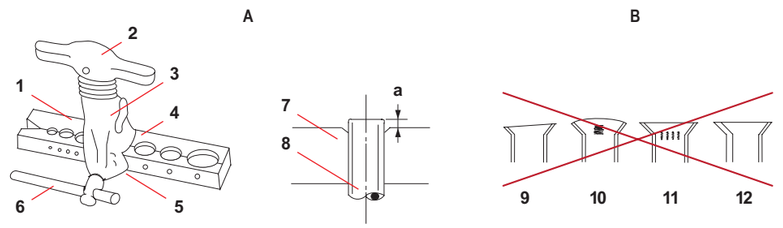
Danger of leakages caused by exceeding the tightening torque

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

► Observe the correct torque when tightening the cap nut (→ *Permissible tightening torques of the coolant pipelines - Combination hydro-module H-Generation, p. 156*, → *Permissible tightening torques of the coolant pipelines - hydro-module H-Generation, p. 157*, → *Permissible tightening torques of the coolant pipelines - outdoor units, p. 159*).

The pipelines of the cooling circuit are connected with flange connections. When cutting and flanging pipes, adhere to the following specifications in order to avoid leakages and device faults.

1. Insert only copper tubing conforming to the requirements of the EN 12 735-1 for coolant pipelines used in refrigeration and air conditioning.
2. Cut the tubes to the required length using a tube cutter.
3. Remove the burr using a deburrer.
4. Hold the tube ends downwards when deburring, so that chips will not fall into the tube.
5. Push up the flange nut and only then begin flanging the tube ends.
6. Check the quality of flanging: Correctly executed flanging is uniformly thick and shines. Moreover, the contact surface that lies on the connecting piece must be completely smooth.



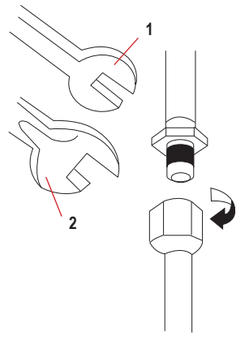
A	Tube expander
1	Lock
2	Handle
3	Yoke
4	Core
5	Arrow marking
6	Clamp handle
7	Lock
8	Copper tube
a	0 – 0.5 mm

B	Unprofessional flanging
9	Skew
10	Surface damaged
11	Ripped
12	Nonuniform thickness

6.6.1 Connecting coolant pipelines to the indoor unit

Carry out the following steps to connect coolant pipelines to the indoor unit:

1. Determine the tube length and disconnect the tube using a tube cutter to the required length.
2. Remove the burr on the cut edges.
3. Push the cap nut (which is screwed at the time of dispatch onto the connection nozzle of the indoor unit) onto the tube end.
4. Flange the tube ends.
5. Align the tube and valve centrally and first pull the cap nut by hand and then with a torque wrench and an adjustable spanner to counter it. Maintain the correct torques (→ *Permissible tightening torques of the coolant pipelines - Combination hydro-module H-Generation, p. 156*, → *Permissible tightening torques of the coolant pipelines - hydro-module H-Generation, p. 157*).

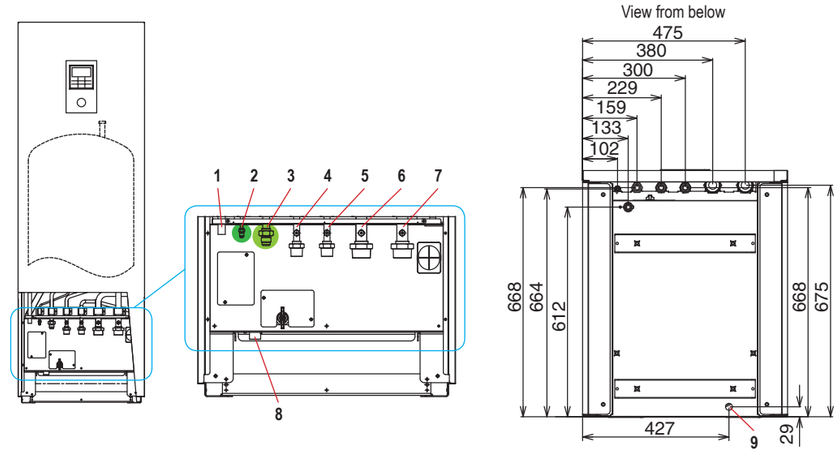


1 Adjustable spanner
2 Torque wrench

6. Install the pipelines to the outdoor unit through the wall grommet.

Combination Hydro-Modules

Connections of the coolant pipelines - Combination hydro-module H-Generation



1 Outflow of the safety valve
2 Coolant fluid line
3 Coolant -hot gas pipeline
4 Water inflow hot water
5 Fresh water
6 Water inflow heating (1st heating circuit)
7 Water return
8 Draining valve of the hot water tank
9 Water discharge

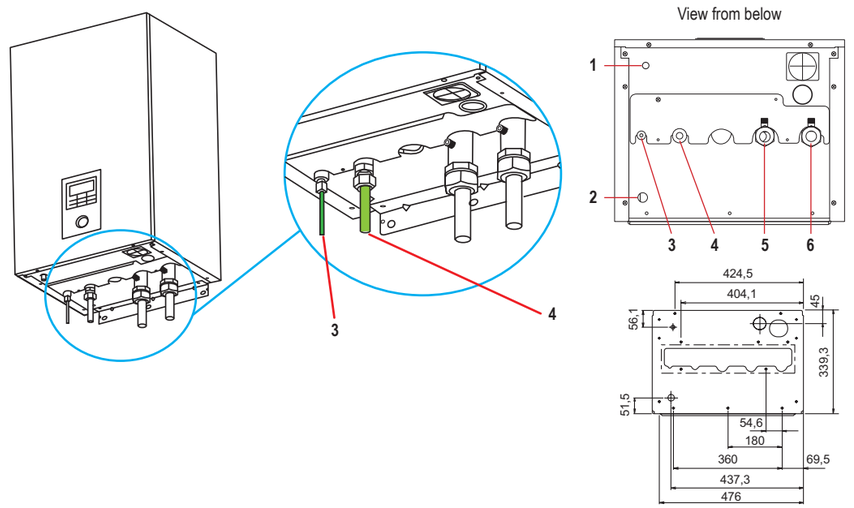
Permissible tightening torques of the coolant pipelines – Combination hydro-module H-Generation

Model		Note	Refrigerant - hot gas pipeline		Coolant - fluid pipeline	
			Diameter mm (inches)	Torque Nm	Diameter mm (inches)	Torque Nm
LT	WH-ADC0309H3E5(B) + WH-UD03HE5-1	1	12.7 (1/2)	55	6.35 (1/4)	18
	WH-ADC0309H3E5(B) + WH-UD05HE5-1	1				
	WH-ADC0309H3E5(B) + WH-UD07HE5-1		15.88 (5/8)	65		
	WH-ADC0309H3E5(B) + WH-UD09HE5-1					
	WH-ADC1216H6E5 + WH-UD12HE5				9.52 (3/8)	42
	WH-ADC1216H6E5 + WH-UD16HE5					
	WH-ADC0916H9E8 + WH-UD09HE8					
	WH-ADC0916H9E8 + WH-UD12HE8					
	WH-ADC0916H9E8 + WH-UD16HE8					
T-CAP	WH-ADC1216H6E5 + WH-UX09HE5					
	WH-ADC1216H6E5 + WH-UX12HE5					
	WH-ADC0916H9E8 + WH-UX09HE8					
	WH-ADC0916H9E8 + WH-UX12HE8					
	WH-ADC0916H9E8 + WH-UX16HE8					
	WH-ADC0916H9E8 + WH-UQ09HE8					
	WH-ADC0916H9E8 + WH-UQ12HE8					
	WH-ADC0916H9E8 + WH-UQ16HE8					

1 In these indoor unit/outdoor unit combinations, the reducer piece, supplied as part of the scope of delivery of the combination hydro-module, must be installed in the suction gas pipeline.

Hydro-modules

Connections of the coolant pipelines – hydro-module H-Generation



1 Outflow of the safety valve
2 Water discharge
3 Coolant fluid line
4 Coolant-hot gas pipeline
5 Water exit
6 Water entry

Permissible tightening torques of the coolant pipelines – hydro-module H-Generation

Model		Refrigerant - hot gas pipeline		Coolant - fluid pipeline	
		Diameter mm (inches)	Torque Nm	Diameter mm (inches)	Torque Nm
LT	WH-SDC03H3E5-1 + WH-UD03HE5-1	12.7 (1/2)	55	6.35 (1/4)	18
	WH-SDC05H3E5-1 + WH-UD05HE5-1				
	WH-SDC07H3E5-1 + WH-UD07HE5-1	15.88 (5/8)	65		
	WH-SDC09H3E5-1 + WH-UD09HE5-1				
	WH-SDC12H6E5 + WH-UD12HE5			9.52 (3/8)	42
	WH-SDC16H6E5 + WH-UD16HE5				
	WH-SDC09H3E8 + WH-UD09HE8				
	WH-SDC12H9E8 + WH-UD12HE8				
	WH-SDC16H9E8 + WH-UD16HE8				
T-CAP	WH-SXC09H3E5 + WH-UX09HE5				
	WH-SXC12H6E5 + WH-UX12HE5				
	WH-SXC09H3E8 + WH-UX09HE8				
	WH-SXC12H9E8 + WH-UX12HE8				
	WH-SXC16H9E8 + WH-UX16HE8				
	WH-SQC09H3E8 + WH-UQ09HE8				
	WH-SQC12H9E8 + WH-UQ12HE8				
	WH-SQC16H9E8 + WH-UQ16HE8				

6.6.2 Connecting coolant pipelines 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 hydro-module or combination hydro-module, tank and E-heating element) is disconnected from the electric supply.

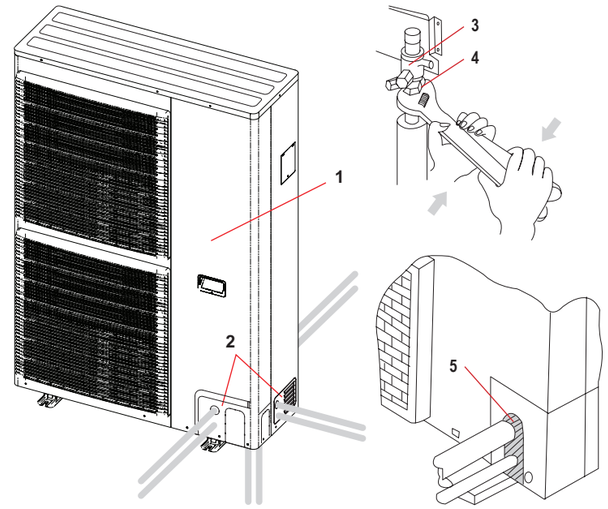
IMPORTANT

The pipelines can be installed in four directions from the device: front, back, to the right and to the left. Select the direction most suitable for the installation location.

Carry out the following steps to connect prepared coolant pipelines coming from the indoor unit to the outdoor unit:

1. Open the outdoor unit (→ *6.5 Opening devices, p. 148*).
2. Remove the selected pipe collimator (**2**) and provide it with suitable holes for the pipelines.
3. Reassemble the pipe collimator so that rain will not enter the outdoor unit.
4. Align the tube and valve centrally and first pull the cap nut by hand and then with a torque wrench and an adjustable spanner to counter it. Ensure the correct torques (→ *Permissible tightening torques of the coolant pipelines - outdoor units, p. 159*).
5. Lock the pipe entries into the outdoor unit using thermal insulation or putty knife (provided on site) to ensure that no gap is left.

Connections of the coolant pipelines – outdoor units



1 Front plate
2 Pipe collimators
3 Impermissible location to place the adjustable spanner
4 Correct location to place the adjustable spanner
5 Thermal insulation or putty knife

Permissible tightening torques of the coolant pipelines – outdoor units

Model		Note	Refrigerant - hot gas pipeline		Coolant - fluid pipeline	
			Diameter mm (inches)	Torque Nm	Diameter mm (inches)	Torque Nm
LT	WH-ADC0309H3E5(B) + WH-UD03HE5-1	1	12.7 (1/2)	55	6.35 (1/4)	18
	WH-ADC0309H3E5(B) + WH-UD05HE5-1	1				
	WH-ADC0309H3E5(B) + WH-UD07HE5-1		15.88 (5/8)	65	9.52 (3/8)	42
	WH-ADC0309H3E5(B) + WH-UD09HE5-1					
	WH-ADC1216H6E5 + WH-UD12HE5					
	WH-ADC1216H6E5 + WH-UD16HE5					
	WH-ADC0916H9E8 + WH-UD09HE8					
	WH-ADC0916H9E8 + WH-UD12HE8					
	WH-ADC0916H9E8 + WH-UD16HE8					
	WH-SDC03H3E5-1 + WH-UD03HE5-1		12.7 (1/2)	55	6.35 (1/4)	18
	WH-SDC05H3E5-1 + WH-UD05HE5-1					
	WH-SDC07H3E5-1 + WH-UD07HE5-1		15.88 (5/8)	65	9.52 (3/8)	42
	WH-SDC09H3E5-1 + WH-UD09HE5-1					
	WH-SDC12H6E5 + WH-UD12HE5					
	WH-SDC16H6E5 + WH-UD16HE5					
	WH-SDC09H3E8 + WH-UD09HE8					
	WH-SDC12H9E8 + WH-UD12HE8					
	WH-SDC16H9E8 + WH-UD16HE8					

Model		Note	Refrigerant - hot gas pipeline		Coolant - fluid pipeline	
			Diameter mm (inches)	Torque Nm	Diameter mm (inches)	Torque Nm
T-CAP	WH-ADC1216H6E5 + WH-UX09HE5		15.88 (5/8)	65	9.52 (3/8)	42
	WH-ADC1216H6E5 + WH-UX12HE5					
	WH-ADC0916H9E8 + WH-UX09HE8					
	WH-ADC0916H9E8 + WH-UX12HE8					
	WH-ADC0916H9E8 + WH-UX16HE8					
	WH-ADC0916H9E8 + WH-UQ09HE8					
	WH-ADC0916H9E8 + WH-UQ12HE8					
	WH-ADC0916H9E8 + WH-UQ16HE8					
	WH-SXC09H3E5 + WH-UX09HE5					
	WH-SXC12H6E5 + WH-UX12HE5					
	WH-SXC09H3E8 + WH-UX09HE8					
	WH-SXC12H9E8 + WH-UX12HE8					
	WH-SXC16H9E8 + WH-UX16HE8					
	WH-SQC09H3E8 + WH-UQ09HE8					
	WH-SQC12H9E8 + WH-UQ12HE8					
	WH-SQC16H9E8 + WH-UQ16HE8					
HT	WH-SHF09F3E5 + WH-UH09FE5		15.88 (5/8)	65	9.52 (3/8)	42
	WH-SHF12F6E5 + WH-UH12FE5					
	WH-SHF09F3E8 + WH-UH09FE8					
	WH-SHF12F9E8 + WH-UH12FE8					

1 In these indoor unit/outdoor unit combinations, the reducer piece, supplied as part of the scope of delivery of the combination hydro-module, must be installed in the suction gas pipeline.

6.7 Connecting the heating circuit

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.

CAUTION

Danger of water pipes freezing in outside temperatures below 0 °C

If the heating circuit in the compact system is filled with water and the outside temperature falls below 0 °C, the risk exists in the compact system that the water pipes may freeze. This can cause a lot of damage to the device.

The client should therefore ensure the absence of frost by taking **one** of the following measures:

► Operate the heating circuit using a food-safe antifreeze mixture (propylene glycol).

► Provide an additional cabinet heating in the compact device to prevent the heating circuit from freezing up.

► Empty the heating circuit by using a built-in device (manually or automatically) before freezing starts.

Danger of corrosion in open systems

In the case of open systems, oxygen entry can cause excessive corrosion of the pipelines and subsequent problems in operation.

► Install devices only in closed systems without direct contact of the heating water to the ambient air.

Danger of damage to the hydro-module 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.

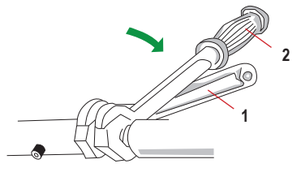
► Do not use worn out pipes.

► Lock line ends in bushing through walls so that dirt does not enter the lines.

► Flush the water-side pipeline before connecting the device 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 adjustable spanner

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



1 Adjustable spanner
2 Torque wrench

Therefore, only use a torque wrench to tighten and an adjustable spanner to counter it (see the illustration above).

6.7.1 Connecting water pipelines to the indoor unit or compact device

Note

Follow the planning documents to connect the water pipelines of the heating circuit or follow the examples of application (→ *5.6 Examples of use, p. 126*).

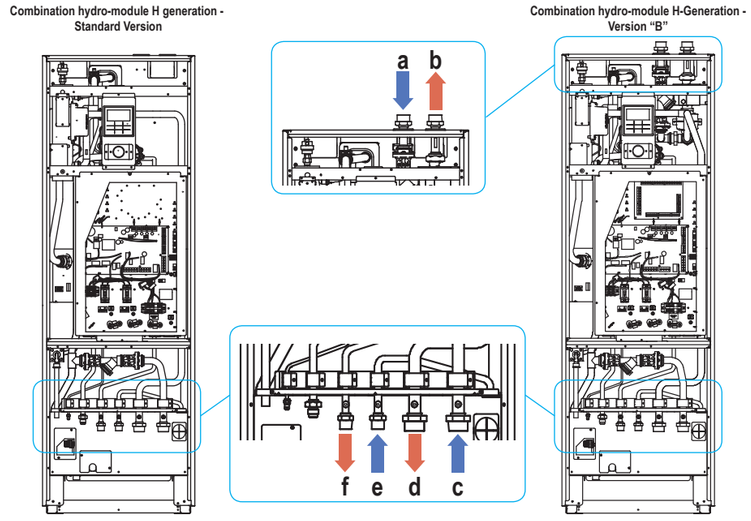
Carry out the following steps to connect water pipelines of the heating circuit to the indoor unit (indoor unit or combination hydro-module) or the compact device:

1. Install the required pipelines, valves, dirt catchers and other components according to the planning documents.
2. Connect the water circuit to the water entry and water exit nozzles of the indoor unit or compact device.
3. Use suitable cap nuts to connect water return (water entry, marked “WATER IN”) and water outlet (water exit, marked “WATER OUT”). Use a torque wrench to tighten and apply the allowable tightening torque in each case (→ *Allowable tightening torques of the water pipelines - Combination hydro-module H-Generation, p. 164*, → *Allowable tightening torques of the water pipelines - hydro-module H-Generation, p. 165*, → *Allowable tightening torques of the water pipelines - Compact devices, p. 166*).
4. **Only** for heat pump models of the **F- and G-Generation**: Install a dirt catcher (mesh width at least 500 to 600 µm) provided on site before the water entry (water return) of the indoor unit or compact device to protect the heat pump. It is advisable to install a shut-off valve before and after the dirt catcher to facilitate later servicing work on the dirt catcher.

   This does not apply to the hydro-module and combination hydro-module of the H-Generation, because a dirt catcher with two shut-off valves is integrated as standard with these.

Combination Hydro-Modules

Connections of the water pipelines – Combination hydro-module H-Generation



Standard version

a (not available)
b (not available)
c Water return
d Water inflow heating
e Fresh water
f Water inflow hot water

Version “B”

a Water return (2nd heating circuit)
b Water inflow heating (2nd heating circuit)
c Water return (1st heating circuit)
b Water inflow heating (1st heating circuit)
e Fresh water
f Water inflow hot water

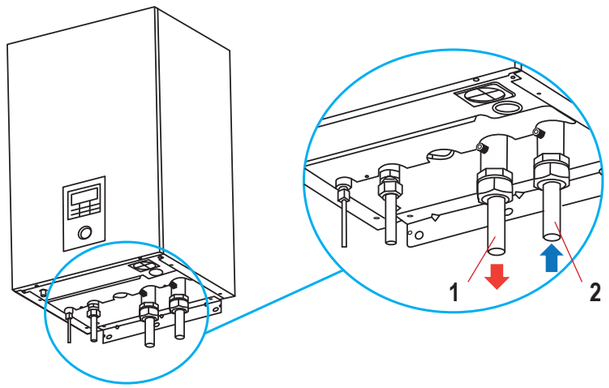
Allowable tightening torques of the water pipelines – Combination hydro-module H-Generation

Model		Connection[1]	Size of the cap nut	Torque Nm
LT	WH-ADC0309H3E5(B) + WH-UD03HE5-1	a - Water return[2] b - Water inflow heating[2]	Rp 1¼“	117.6
	WH-ADC0309H3E5(B) + WH-UD05HE5-1			
	WH-ADC0309H3E5(B) + WH-UD07HE5-1			
	WH-ADC0309H3E5(B) + WH-UD09HE5-1	c - Water return[3] d - Water inflow heating[3]		
	WH-ADC1216H6E5 + WH-UD12HE5			
	WH-ADC1216H6E5 + WH-UD16HE5			
	WH-ADC0916H9E8 + WH-UD09HE8	e - Fresh water f - Water inflow hot water	Rp ¾“	58.8
	WH-ADC0916H9E8 + WH-UD12HE8			
	WH-ADC0916H9E8 + WH-UD16HE8			
T-CAP	WH-ADC1216H6E5 + WH-UX09HE5	c - Water return d - Water inflow heating	Rp 1¼“	117.6
	WH-ADC1216H6E5 + WH-UX12HE5			
	WH-ADC0916H9E8 + WH-UX09HE8			
	WH-ADC0916H9E8 + WH-UX12HE8			
	WH-ADC0916H9E8 + WH-UX16HE8	e - Fresh water f - Water inflow hot water	Rp ¾“	58.8
	WH-ADC0916H9E8 + WH-UQ09HE8			
	WH-ADC0916H9E8 + WH-UQ12HE8			
	WH-ADC0916H9E8 + WH-UQ16HE8			

1 Cfr. → *Connections of the water pipelines - Combination hydro-module H-Generation, p. 163*
2 For Version “B“ for 2. Heating circuit; not available for standard version.
3 For Version “B“ for 1. Heating circuit.

Hydro-modules

Connections of the water pipelines – hydro-module H-Generation



1 Water inflow
2 Water return

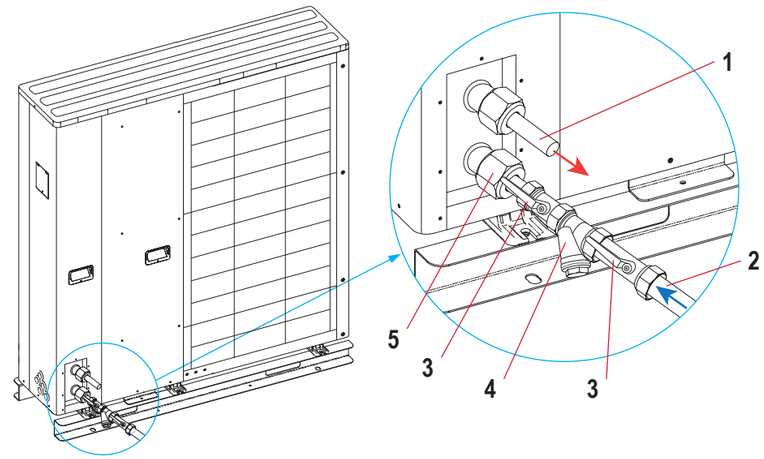
Allowable tightening torques of the water pipelines – hydro-module H-Generation

Model		Connection[1]	Size of the cap nut	Torque Nm
LT	WH-SDC03H3E5-1 + WH-UD03HE5-1	1 - Water inflow 2 - Water return	Rp 1¼“	117.6
	WH-SDC05H3E5-1 + WH-UD05HE5-1			
	WH-SDC07H3E5-1 + WH-UD07HE5-1			
	WH-SDC09H3E5-1 + WH-UD09HE5-1			
	WH-SDC12H6E5 + WH-UD12HE5			
	WH-SDC16H6E5 + WH-UD16HE5			
	WH-SDC09H3E8 + WH-UD09HE8			
	WH-SDC12H9E8 + WH-UD12HE8			
	WH-SDC16H9E8 + WH-UD16HE8			
T-CAP	WH-SXC09H3E5 + WH-UX09HE5	1 - Water inflow 2 - Water return	Rp 1¼“	117.6
	WH-SXC12H6E5 + WH-UX12HE5			
	WH-SXC09H3E8 + WH-UX09HE8			
	WH-SXC12H9E8 + WH-UX12HE8			
	WH-SXC16H9E8 + WH-UX16HE8			
	WH-SQC09H3E8 + WH-UQ09HE8			
	WH-SQC12H9E8 + WH-UQ12HE8			
	WH-SQC16H9E8 + WH-UQ16HE8			

1 Cfr. → *Connections of the water pipelines - hydro-module H-Generation, p. 164*

Compact devices

Connections of the water pipelines – Compact devices



Typical installation example with dirt catcher

1 Water inflow
2 Water return
3 Shut-off valve
4 Dirt catcher
5 Cap nut

Allowable tightening torques of the water pipelines – Compact devices

Model		Connection[1]	Size of the cap nut	Torque Nm
LT	WH-MDC05H3E5	1 - Water inflow 2 - Water return	Rp 1¼“	117.6
	WH-MDC07H3E5			
	WH-MDC09H3E5			
T-CAP	WH-MXC09H3E5	1 - Water inflow 2 - Water return	Rp 1¼“	117.6
	WH-MXC12H6E5			
	WH-MXC09H3E8			
	WH-MXC12H9E8			
	WH-MXC16H9E8			
HT	WH-MHF09G3E5	1 - Water inflow 2 - Water return	Rp 1¼“	117.6
	WH-MHF12G6E5			
	WH-MHF09G3E8			
	WH-MHF12G9E8			

1 Cfr. → *Connections of the water pipelines - Compact devices, p. 165*

5. **Only** for heat pump models of the **F-Generation**: Install an overflow valve, if no hydraulic disconnection (e.g. hydraulic shunt or buffer tank) has been provided. Take care to set the overflow valve not for the minimum flow rate, but for the nominal flow rate of the respective heat pump.

   This is only allowable for heat pump models of the F-Generation, because hydraulic disconnection is necessary for all heat pump models of the G- and H-Generation.
6. If a heat pump with cooling function is used, you may have to install 2-way valves for switching off the heating circuits in cooling mode.
7. Install the 3-way switchover valve (to be provided on site) to switch over from heating mode to hot water mode and reverse, if a Panasonic hot water tank is not used. The valve should by default be opened in the direction of the heating circuit. Moreover, the valve should have CE conformity and not exceed a peak load of 12 VA.
8. Connect inflow (water out) and return (water in) of the indoor unit or compact device to the heat exchanger of the hot water tank. Take care not to mix up the connections.
9. Install a device for draining the system provided on site.
10. Insulate the pipelines and connections according to the locally valid European, national and regional specifications and guidelines.

Example of Germany: Thermal insulation of pipelines and fittings according to Energy Saving Regulations (EnEV 2014)

Type of lines / fittings	Minimum thickness of the insulation layer, relating to a thermal conductivity of 0.035 W/(m•K)	
	Indoor units	Compact devices
Internal diameter up to 22 mm	20 mm	40 mm
Internal diameter more than 22 mm up to 35 mm	30 mm	60 mm
Internal diameter more than 35 mm up to 100 mm	1 x internal diameter	2 x internal diameter

6.7.2 Connecting the condensation and water outflows

On site, a hose must be connected to the condensation drain of the indoor, outdoor and compact devices as well as to the water drain of the safety valve. For connection to the condensation drain, an outlet bend and a seal are provided for each device. The outflow hoses and pipelines must be provided on site.

IMPORTANT

When installing the outflow hoses, in addition to the warning notices applicable for the entire heating circuit, pay attention also to the following notices:

- Use commercially available outflow hoses with a suitable diameter.

Device	Hose internal diameter	
	Condensation outlet including outlet bend (mm)	Drain of the safety valve (Inches)
Combination hydro-module H-Generation	17	R ½
Hydro-module F-Generation	17	k. A.
Hydro-module H-Generation	17	3/8
Outdoor unit	17	k. A.
Compact device	15	k. A.

- Install the outflow hoses with a constant slope and in such a way that the water exit cannot be clogged.
- Install the outflow hoses in a frost-free environment.

  This is particularly important in the case of outdoor and compact devices, 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 run 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 outflow hoses into a sewage or cleaning connection from which ammoniac, sulphurous gases or such others can rise.

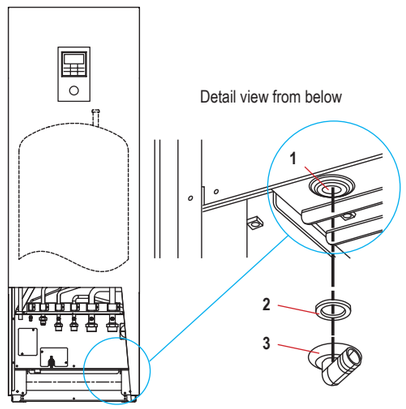
6.7.2.1 Connecting the condensation outflow hose

Indoor units

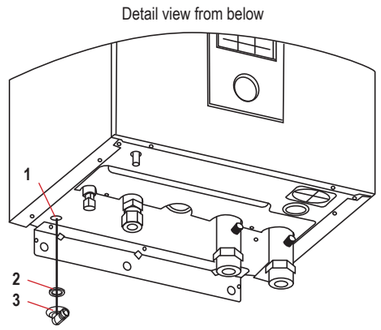
Carry out the following steps to connect the outflow hose to the condensation outflow of the indoor unit:

1. Assemble the supplied outlet bend with seal on the condensation outflow on the underside of the indoor unit, as shown in the illustrations below.
2. Push the hose over the outlet bend.
3. Ensure that the outflow hose is seated firmly. Use a hose clip to attach the hose, if necessary (to be provided on site).
4. Lay the outflow hose in a constant downward alignment into a suitable collection fixture for the condensation (to be provided on site).

Combination Hydro-module H-Generation



Hydro-module H-Generation



1 Condensation outlet
2 Sealing washer
3 Outlet bend

Outdoor units

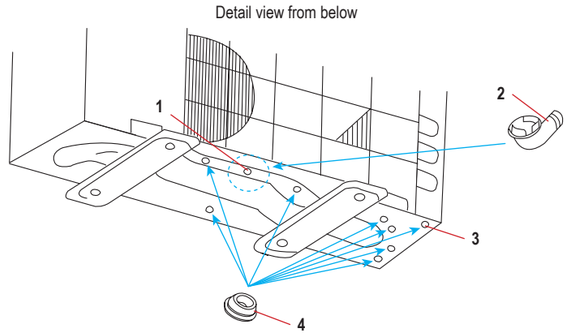
IMPORTANT

Also use the following instructions at the time of installation of the condensation outflow hose on the outdoor unit:

- When using the outlet bend, 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. 92*). 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 outflow hose to the condensation outflow of the outdoor unit:

1. Assemble the supplied outlet bend with seal on the condensation outflow on the underside of the outdoor unit, as shown in the figures below.
2. Seal the openings on the underside of the outdoor unit (model-dependent number: 7 or 8) using the supplied rubber sealing caps.
3. Push the hose over the outlet bend.
4. Ensure that the outflow hose is seated firmly. Use a hose clip to attach the hose, if necessary (to be provided on site).
5. Lay the outflow hose in a constant downward alignment. For large outflow hose lengths, you may want to use a metal support (provided on site) to prevent the hose from bending.

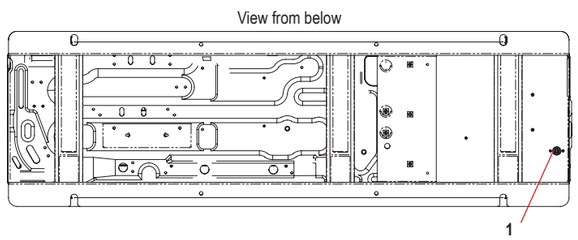


1 Condensation outlet
2 Outlet bend
3 Openings (7 or 8, depending on model)
4 Rubber seal caps

Compact devices

Carry out the following steps to connect the outflow hose to the condensation outflow of the compact device:

1. Slide the outflow hose onto the condensation outlet socket on the compact device.
2. Ensure that the outflow hose is seated firmly. Use a hose clip to attach the hose, if necessary (to be provided on site).
3. Lay the outflow hose in a constant downward alignment. For large outflow hose lengths, you may want to use a metal support (provided on site) to prevent the hose from bending.



1 Condensation outlet

6.7.2.2 Connecting the water outflow to the safety valve

Combination Hydro-module H-Generation

For the combination hydro-module of the H-Generation, a safety valve (initial pressure 8 bar) is integrated into the hot water tank. Safety valve and hot water tank have a common water outlet.

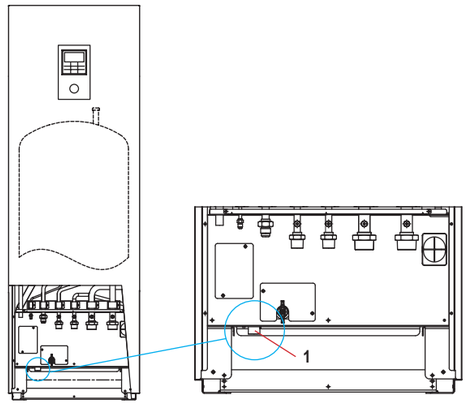
IMPORTANT

Also use the following instructions at the time of installation of the condensation outlet on the combination hydro-module of the H-Generation:

- The outflow pipeline may be maximum 2 m long and have not more than 2 bends.

Carry out the following steps to connect the outflow line to the water outlet socket of the safety valve of the combination hydro-module:

1. Use a connection of the size R ½ inches for installing the outflow line.
2. Lay the outflow line in a consistently downward alignment. The end of the outflow pipeline must be visible and must not be near electrical components.
3. It is advisable to insert an outflow siphon in the outflow line, which is also visible and is not in the vicinity of electrical components.



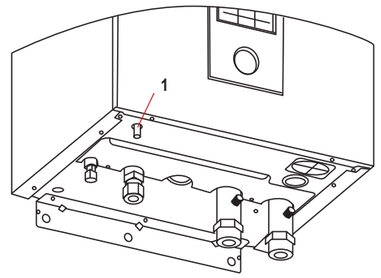
1 Water outlet socket of the safety valve

Hydro-module H-Generation

Carry out the following steps to connect the outflow hose to the water outlet socket of the safety valve of the hydro-module:

1. Slide the outflow hose onto the condensation outlet socket on the hydro-module.
2. Ensure that the outflow hose is seated firmly. Use a hose clip to attach the hose, if necessary (to be provided on site).
3. Lay the outflow hose in a constant downward alignment into a suitable collection fixture for the condensation (to be provided on site).

Detail view from below



1 Water outlet socket of the safety valve

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 superheat.

- ► 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.

CAUTION

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 Technical data (split systems), p. 16*, → *4.6.3.3 Technical data (compact systems), p. 50*), the minimum required contact distance and the maximum permissible cable length (if indicated) as well as the connecting conditions for the individual devices (→ *5.4 Electricals, p. 105*).
- ► 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 through sharp edges.
- ► Make sure that the cables do not come into contact with hot objects such as the water pipelines, so that the insulation is not damaged.

IMPORTANT

When connecting electrical wiring, also respect the following specifications.

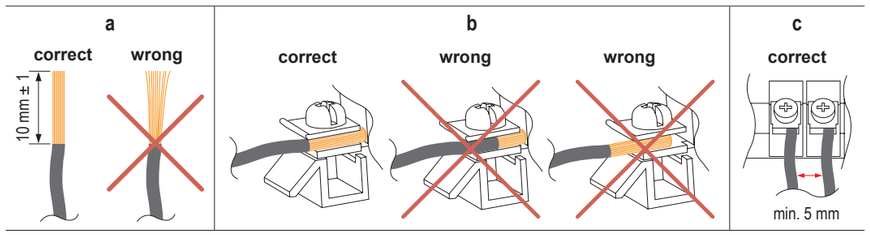
Requirements for correctly configured cable connections

1. Note the following changes in the insulation:

a. The length of the insulation must be 10 mm ±1 mm. See that no litz wire is free, all litzes are clamped.

b. See that the insulated part of the conductor is fully introduced into the terminal. Neither should the insulation be entered in the terminal, nor should the insulated part of the conductor project out from the terminal.

c. The distance between the cables must be a minimum of 5 mm.



2. When tightening the terminal screw connections, ensure the following tightening torques:

Terminal screw connection	Tightening torque (Ncm)
M4	157 – 196
M5	196 – 245

3. Note that, for safety reasons, the ground conductor must be longer than the other cables in case the cable slips out from the cable holder.
4. Use separate cable grommets for power cords on the one hand and accessory cables on the other, to avoid disturbances in control signals.
5. Fasten the power cord by using cable holders/ cable reliefs.
6. Bundle accessory cables together using cable binders.

6.8.1 Connecting power cord

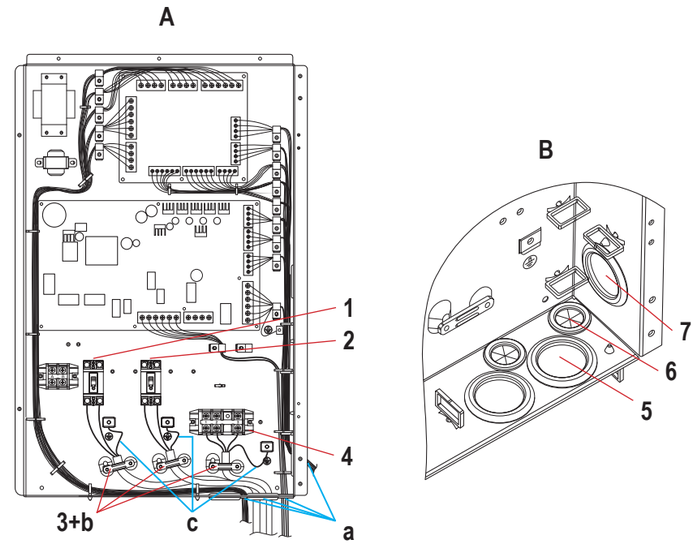
6.8.1.1 Connecting the power cord to the indoor unit

The following method is applicable as appropriate for all indoor units, combination hydro-modules and hydro-modules of all generations, but will be explained here on the basis of the example of a hydro-module of the H-Generation (→ *Installation example: Hydro-module, p. 175*).

Carry out the following steps to connect the power cord to the indoor unit:

1. Open the indoor unit (→ *6.5 Opening devices, p. 148*) and, if applicable, 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 holder (cable 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 (see below) and the connection diagram following it and ensure that the ground connector is longer than the other cables in every case (**c**).
5. Connect the connecting cable to the outdoor unit on the indoor unit terminal (**4**) and take care to leave the ground connector longer than the other cables (**c**). Also ensure that you connect conductors of the same cable colour to outdoor and indoor unit to the same terminal number.
6. Connect the other end of the power cord to the power grid via the separator which is absolutely required in all cases.
7. Secure the individual mains connections according to the cable cross section and the maximum power consumption. Note that the separation distance between the poles must be a minimum of 3.0 mm.

Installation example: Hydro-module WH-SDC03H3E5-1

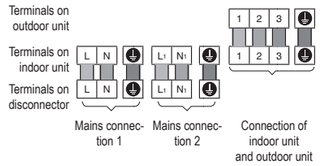
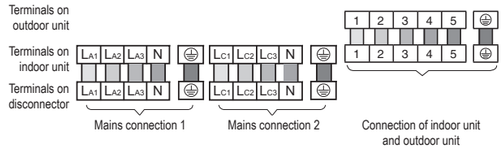


A Connection of the power cord
1 FI switch for mains connection 1
2 FI switch for mains connection 2
3 Cable holders / cable reliefs
4 Terminal strip for connecting cable indoor unit / outdoor unit

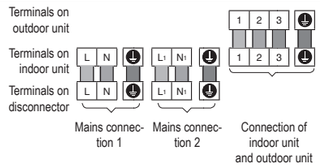
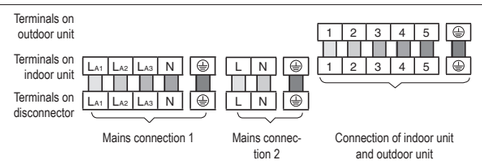
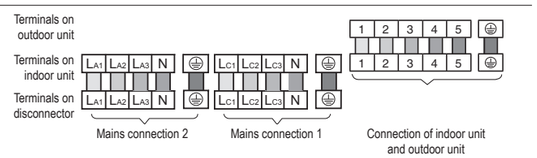
B Detailed view: Cable glands
5 Cable gland for power cord 1 and 2 for the connecting cable between indoor and outdoor unit
6+7 Cable glands for control pipelines from optional accessories

a Use separate cable glands for power cord and accessory cables
b Fixing power cord with cable holders /cable reliefs
c Leave ground connector longer than the other cables for safety reasons

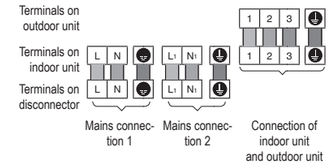
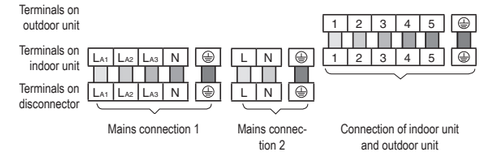
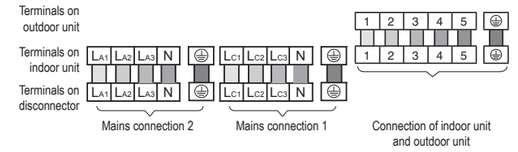
Connection diagram - Combination Hydro-Module - H - Generation

Models	Connection diagram
WH-ADC0309H3E5(B) + WH-UD03HE5-1 WH-ADC0309H3E5(B) + WH-UD05HE5-1 WH-ADC0309H3E5(B) + WH-UD07HE5-1 WH-ADC0309H3E5(B) + WH-UD09HE5-1 WH-ADC1216H6E5 + WH-UD12HE5 WH-ADC1216H6E5 + WH-UD16HE5 WH-ADC1216H6E5 + WH-UX09HE5 WH-ADC1216H6E5 + WH-UX12HE5	
WH-ADC0916H9E8 + WH-UD09HE8 WH-ADC0916H9E8 + WH-UD12HE8 WH-ADC0916H9E8 + WH-UD16HE8 WH-ADC0916H9E8 + WH-UX09HE8 WH-ADC0916H9E8 + WH-UX12HE8 WH-ADC0916H9E8 + WH-UX16HE8 WH-ADC0916H9E8 + WH-UQ09HE8 WH-ADC0916H9E8 + WH-UQ12HE8 WH-ADC0916H9E8 + WH-UQ16HE8	

Connection diagram - Hydro-modules F-Generation

Models	Connection diagram
WH-SHF09F3E5 + WH-UH09FE5 WH-SHF12F6E5 + WH-UH12FE5	
WH-SHF09F3E8 + WH-UH09FE8	
WH-SHF12F9E8 + WH-UH12FE8	

Connection diagram - Hydro-modules H-Generation

Models	Connection diagram
WH-SDC03H3E5-1 + WH-UD03HE5-1 WH-SDC05H3E5-1 + WH-UD05HE5-1 WH-SDC07H3E5-1 + WH-UD07HE5-1 WH-SDC09H3E5-1 + WH-UD09HE5-1 WH-SDC12H6E5 + WH-UD12HE5 WH-SDC16H6E5 + WH-UD16HE5 WH-SXC09H3E5 + WH-UX09HE5 WH-SXC12H6E5 + WH-UX12HE5	
WH-SDC09H3E8 + WH-UD09HE8 WH-SXC09H3E8 + WH-UX09HE8 WH-SQC09H3E8 + WH-UQ09HE8	
WH-SDC12H9E8 + WH-UD12HE8 WH-SDC16H9E8 + WH-UD16HE8 WH-SXC12H9E8 + WH-UX12HE8 WH-SXC16H9E8 + WH-UX16HE8 WH-SQC12H9E8 + WH-UQ12HE8 WH-SQC16H9E8 + WH-UQ16HE8	

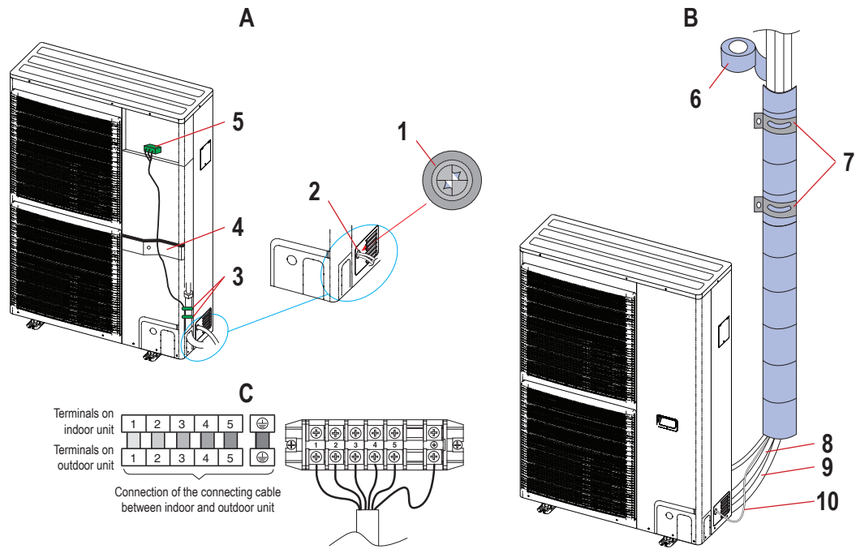
6.8.1.2 Connecting the connection cable between indoor and outdoor unit

The following method is applicable as appropriate for all outdoor units, but will be explained here on the basis of the example of a 12 kW outdoor unit of the H-Generation (→ *Installation example: Outdoor unit, p. 178*).

Carry out the following steps to connect the power 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. 148*) 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 in the form of a cross using a knife. If not, continue with the next step.
4. Guide the cable through the cable gland (**2**) into the device.
5. Fix the cable using a cable binder (**3**) and cable holder (cable relief) (**4**).
6. Connect the connecting cable on the outdoor unit to the outdoor unit terminal (**5**) according to the following installation example (see below) and take care to leave the ground connector longer than the other cables (c). Also ensure that you connect conductors of the same cable colour to outdoor and indoor unit to the same terminal number.
7. 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 pipelines and cables in one cable channel.
8. Seal the wall grommet into the building using a suitable sealing compound (provided by customer) after installing all cables.

Installation example: Outdoor unit WH-UD12HE8



A Connection of the connecting cable

1 Rubber cable sleeve (available or not, depending on model)
2 Cable gland (one of three options depending on the model)
3 Cable binder
4 Cable holder
5 Terminal blocks

B Insulation of the pipe and cable

6 Cable tape or cable duct
7 Fastening clips
8 Coolant fluid line
9 Coolant - hot gas line
10 Connecting cable between indoor and outdoor unit

C Detailed view of terminal block on outdoor unit

6.8.1.3 Connecting power cord to the compact device

The following method is applicable as appropriate for all compact devices, but will be explained here on the basis of the example of a B8 model compact device (H-Generation) and B9 model (G-Generation) (→ *Installation example: Compact devices, p. 179*).

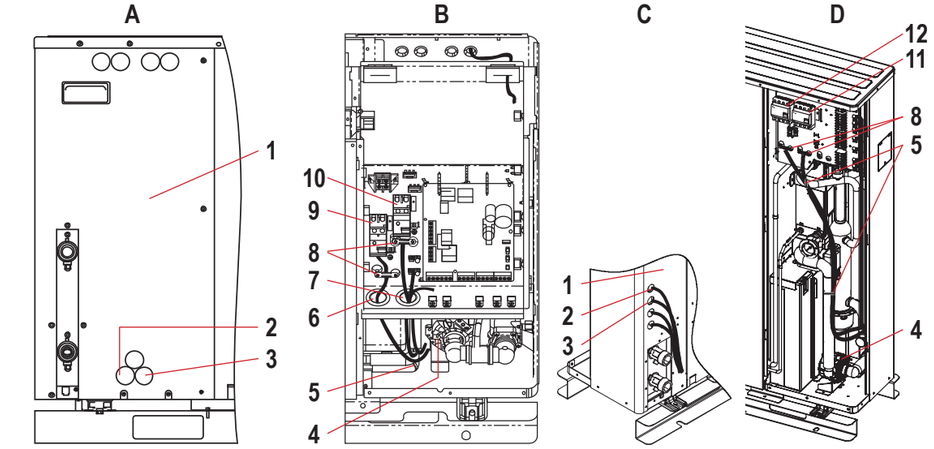
Carry out the following steps to connect the power cord to the compact device:

1. Open the compact device (→ *6.5 Opening devices, p. 148*).
2. If a cover is available on the rear side of the cabinet on the cable gland (depends on model), remove the cover before connecting the cable and re-assemble it afterwards.

   If a cable sleeve is available (depends on model), cut the cable sleeve in the form of a cross using a knife.
3. Guide the cable through the cable glands (**2**, **3**) into the device.
4. Fix the cables using cable binders (**5**) and cable holders (cable reliefs) (**8**).

5. Connect the power cords 1 and 2 accordingly to mains connection 1 and 2 (**9**, **10** or **11**, **12**), according to the following installation example (see below) and the connection diagram following it and take care to leave the ground connector longer than the other cords in every case. Also see that the cables do not come in contact with the pump (**4**) or other hot objects such as the water pipelines at any point, so that the insulation is not damaged.
6. Connect the other end of the power cord to the power grid via the separator which is absolutely required in all cases.
7. Secure the individual mains connections according to the cable cross section and the maximum power consumption. Note that the separation distance between the poles must be a minimum of 3.0 mm.

Installation example: Compact devices WH-MDC09H3E5 and WH-MHF12G9E8



A WH-MDC09H3E5: Detailed view of the Rear Side

1 Rear side of the Cabinet
2 Cable gland for power cord 1
3 Cable gland for power cord 2

B WH-MDC09H3E5: Detailed view of the Front Side

4 Pump
5 Cable binder
6 Internal cable gland for power cord 1
7 Internal cable gland for power cord 2
8 Cable holders / Main lead cleats
9 FI switch for mains connection 1
10 FI switch for network connection 2

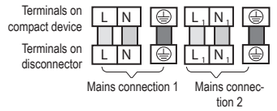
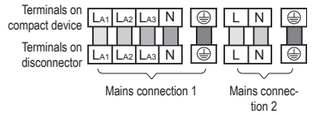
C WH-MHF12G9E8: Detailed view of the Rear Side

1 Rear side of the Cabinet
2 Cable gland for power cord 1
3 Cable gland for power cord 2

D WH-MHF12G9E8: View of the Front Side

4 Pump
5 Cable binder
8 Cable holders / Main lead cleats
11 FI switch for network connection 2
12 FI switch for mains connection 1

Connection diagram - Compact devices

Models	Connection diagram
WH-MDC05H3E5 WH-MDC07H3E5 WH-MDC09H3E5 WH-MXC09H3E5 WH-MXC12H6E5 WH-MHF09G3E5 WH-MHF12G6E5	
WH-MXC09H3E8 WH-MHF09G3E8	
WH-MXC12H9E8 WH-MXC16H9E8 WH-MHF12G9E8	

6.8.2 Connecting the optional on-site accessories

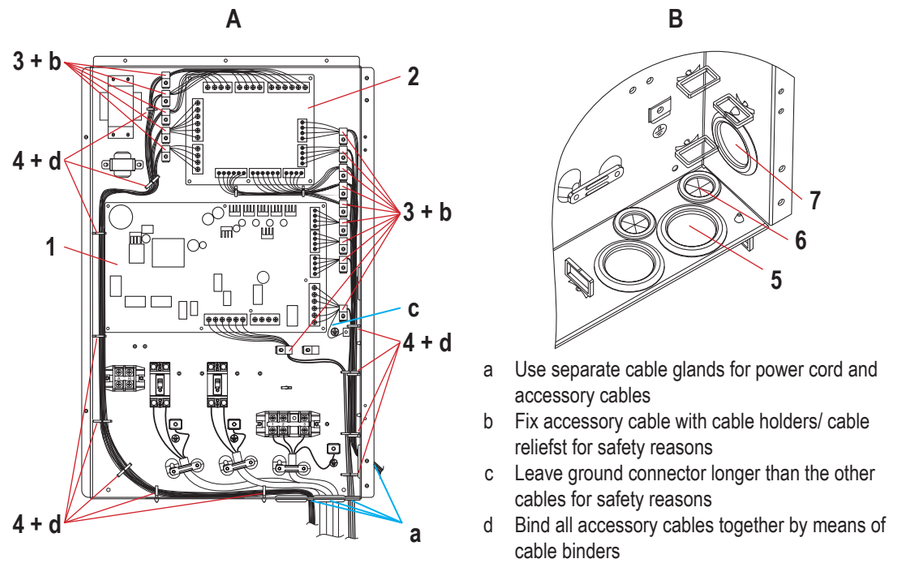
6.8.2.1 Connecting accessories to the indoor unit

The following method is applicable as appropriate for all indoor units, combination hydro-modules and hydro-modules of all generations, but will be explained here on the basis of the example of a hydro-module of the H-Generation (→ *Installation example for accessories: Hydro-module, p. 181*).

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. 148*) and, if applicable, the connection box.
2. Guide the cable through the cable glands (**6**/**7**, **a**) into the device as shown in the illustrations below.
3. Fix the cable by using cable holders (cable reliefs) (**3**, **b**) and bundle the accessory cables by means of cable binders (**4**, **d**).
4. Connect the accessory cables according to the installation example below and the subsequent brief overview of the external interfaces (→ *6.8.2.3 Brief Overview of the External Interfaces, p. 184*) and take care to leave the ground connector longer than the other cables (**c**).

Installation example for accessories: Hydro-module WH-SDC03H3E5-1



A Connection of the Accessories Cable

1 Main PCB
2 Optional additional PCB CZ-NS4P
3 Cable holders / cable reliefs
4 Cable binder

B Detailed view: Cable glands

5 Cable glands for power and connecting cables
6 Cable gland for 3 way-valve, 2-way valve, room thermostat heatC. 1, E-Heating element hot water tank, booster pump, connection bivalent heating source
7 Cable gland for external control signal, tank temperature sensor, room temperature sensor heatC. 1, outdoor temperature sensor, overload protection hot water tank, operating unit

a Use separate cable glands for power cord and accessory cables
b Fix accessory cable with cable holders/ cable reliefst for safety reasons
c Leave ground connector longer than the other cables for safety reasons
d Bind all accessory cables together by means of cable binders

6.8.2.2 Connecting accessories to the compact device

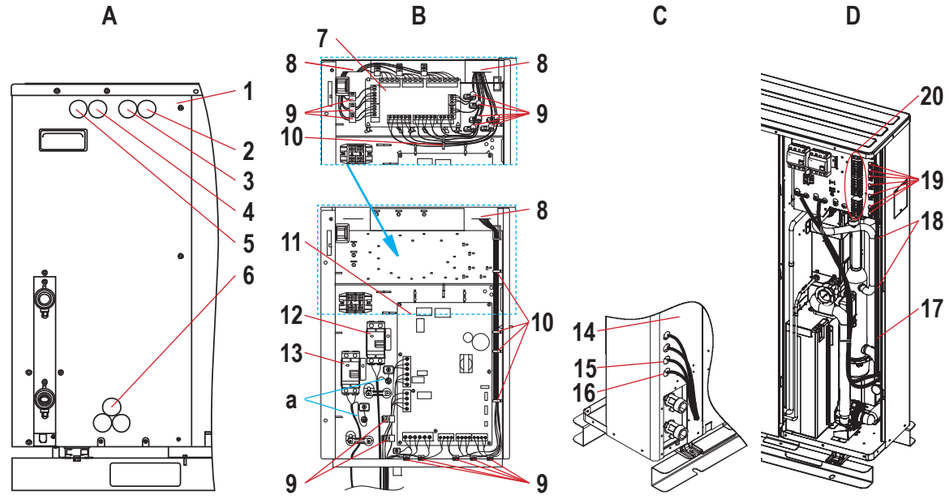
The following method is applicable as appropriate for all compact devices, but will be explained here on the basis of the example of a B8 model compact device (H-Generation) and B9 model (G-Generation) (→ *Installation example for accessories: Compact devices, p. 183*).

Carry out the following steps to connect accessory cables to the external interfaces of the compact devices:

1. Open the compact device (→ *6.5 Opening devices, p. 148*).
2. If a cover is available on the rear side of the cabinet on the cable gland (depends on model), remove the cover before connecting the cable and re-assemble it afterwards.

   If a cable sleeve is available (depends on model), cut the cable sleeve in the form of a cross using a knife.
3. Guide the accessory cables through the cable glands according to the illustration below (**2**, **3**, **4**, **5**, **6**, **16**) into the device.
4. Fix the accessory cables using cable binders (**10**, **18**) and cable holders (cable reliefs) (**9**, **19**).
5. Connect the accessory cable according to the installation example below and the subsequent brief overview of the external interfaces (→ *6.8.2.3 Brief Overview of the External Interfaces, p. 184*) and take care to leave the ground connector (if present) longer than the other cables (**a**). Also see that the cables do not come in contact with the pump or other hot objects such as the water pipelines at any point, so that the insulation is not damaged.

Installation example for accessories: Compact devices WH-MDC09H3E5 and WH-MHF12G9E8



A WH-MDC09H3E5: Detailed view of the Rear Side

1 Rear side of the Cabinet

2 Cable gland for room thermostat heatC. 1, room thermostat heatC. 2, mixing valve heatC. 1, mixing valve heatC. 2

3 Cable gland for pump heatC. 1, pump heatC. 2, solar station, swimming pool pump, fault report signal

4 Cable gland for room temperature sensor heatC. 1, room temperature sensor heatC. 2, buffer tank temperature sensor, swimming pool temperature sensor, water temperature sensor heatC. 1, water temperature sensor heatC. 2, power control signal, solar temperature sensor, Smart Grid signal, heating/ cooling switchover, external outdoor unit switch

5 Cable gland for external control signal, tank temperature sensor, room temperature sensor heatC. 1, outdoor temperature sensor, overload protection hot water tank

6 Cable gland for 3 way-valve, 2-way valve, room thermostat heatC. 1, E-heating element heat pump, booster pump, connection of bivalent heat source, operating unit

B WH-MDC09H3E5: Detailed view of the Front Side

7 Optional additional PCB CZ-NS4P

8 Cable glands for accessories cable

9 Cable holder / cable reliefs

10 Cable binder

11 Main PCB

12 FI switch for mains connection 2

13 FI switch for mains connection 1

a Ground connector for safety reasons to be left longer than the other cables

C WH-MHF12G9E8: Detailed view of the Rear Side

14 Rear side of the Cabinet

15 Cable glands for Operating unit

16 Cable glands for accessory cable

D WH-MHF12G9E8: View of the Front Side

17 Accessory cable

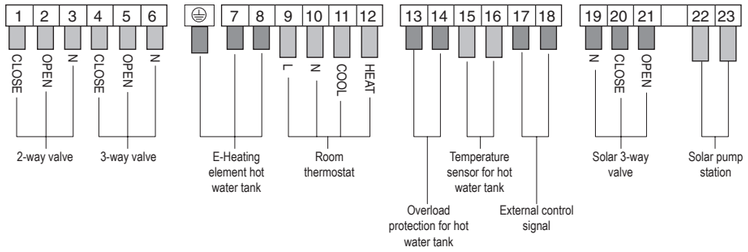
18 Cable binder

19 Cable holder / cable reliefs

20 Terminals of the external interfaces

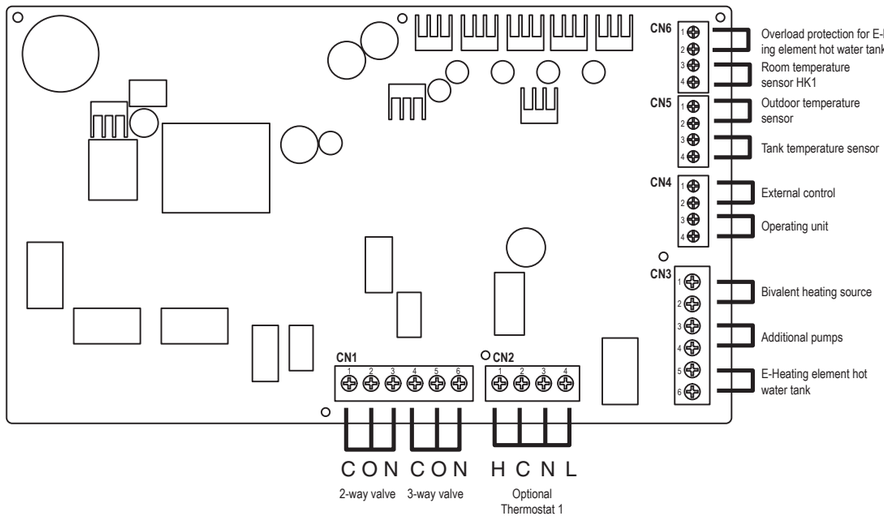
6.8.2.3 Brief Overview of the External Interfaces

Hydro-module and Compact systems F-Generation

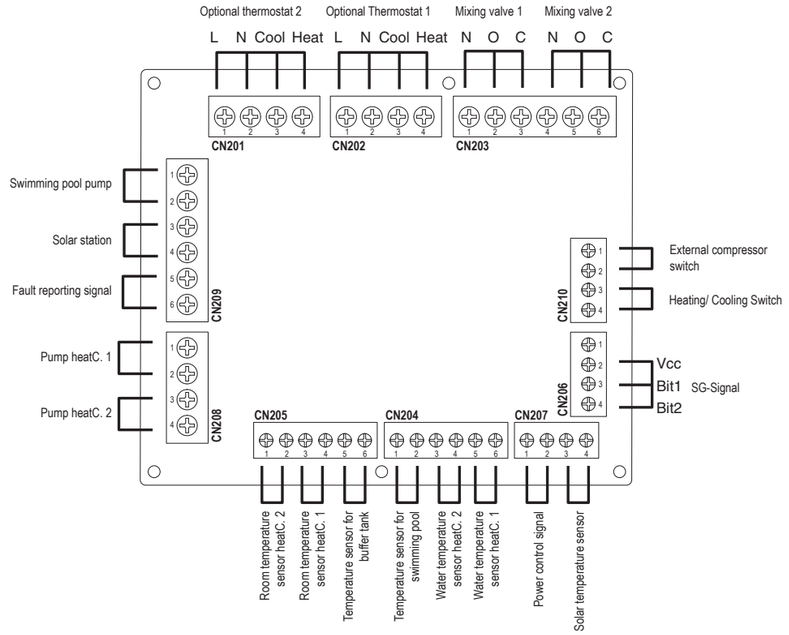


Combination hydro-module, hydro-module and compact systems H-Generation

Main PCB



Additional PCB CZ-NS4P



Note

For further information about connecting the optional on-site accessories, please refer to the following sections: → *4.7.2 External interfaces (in-/outputs), p. 59* and → *4.8.3 Recommended on-site accessories, p. 76*.

6.8.3 Assembling and connecting the operating unit

Note

This section describes assembly and connection of the operating unit only for models of the H-Generation

Detailed assembly instructions for the F and G generation models are given in the planning manual for split systems or compact systems from 2014 as well as in the installation instructions and in the service manual of the respective device.

CAUTION

Danger of electrical shock due to unprofessional installation

Unprofessional installation of the operating unit can result in electrical shock or fire.

- ► Respect the connecting conditions for the operating unit (→ *4.7.2.2 External interfaces for H-Generation models, p. 60*). Take special care to connect the operating unit not to the terminals for the electricity supply, but to the correct terminals.
- ► Do not install the cable of the operating unit in the direct vicinity of coolant or condensate pipelines.

CAUTION

Danger of damage or faults due to unprofessional installation

Unprofessional installation of the operating unit can result in damage to or faults in the control signals.

- ► Install the operating unit at a site where no sunshine and condensation humidity can occur because the operating unit is not proofed against vapour or water.
- ► Mount the operating unit on as a 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 operating unit:

- Install the cable of the operating unit separately from the cables for the power supply in order to avoid operating disruptions.
- Mount the operating unit at a distance of at least 1 m from television, radio and computer devices in order to avoid electrical interference.
- Mount the operating unit 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, to which 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 split systems of the H-Generation, the operating unit is integrated in the indoor unit (hydro-module or combination hydro-module) and is hard-wired. It can, however, be dismantled and assembled at any desired location, e.g. even in another room than the installation room of the indoor unit, on the wall, to serve as a room thermostat.

In compact devices of the H-Generation, the operating unit is supplied separately for wall mounting.

The cable and assembly material must be provided on site.

Carry out the following steps to mount the operating unit on the wall and to connect it:

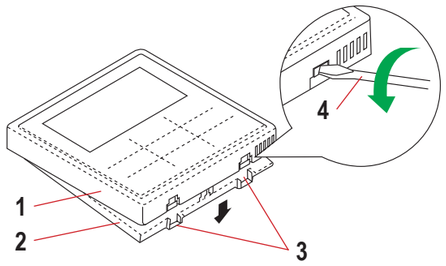
1. For compact systems: Skip this step and begin wall mounting with step 2.
   For split systems: First, disassemble the operating unit from the indoor unit as follows:

a. Open the cabinet of the operating unit (Fig. **A**), by positioning a slot screw driver (**4**) or a similar tool in the slots (**3**) at the bottom edge and then taking apart the cabinet top part (**1**) and cabinet bottom part (**2**), exercising caution. Take care not to damage the cabinet.

b. Disconnect the electrical wiring of the operating unit (**5**) to the terminals of the indoor unit (**8**) and the operating unit (**9**) (Fig. **B** + **C**).

c. Loosen the three screws (**6**) from the cover of the connection box to remove the bottom part of the operating unit (Fig. **B**).

A



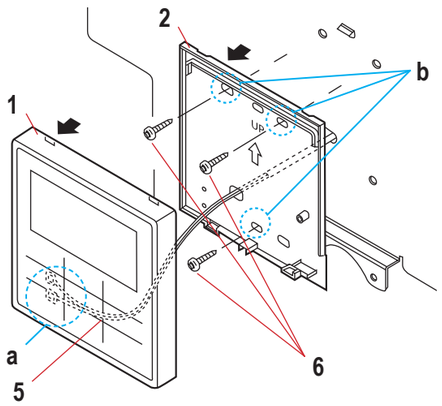
A+B Disassembly of the Operating Unit

1 Cabinet top part
2 Cabinet bottom part
3 Slots
4 Screw driver
5 Electrical wiring of the operating unit (no polarity)
6 Screw

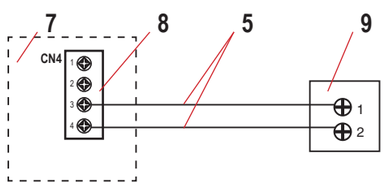
C Schematic detailed representation of the terminals on the indoor unit and operating unit

5 Electrical wiring of the operating unit
7 Indoor unit
8 Terminals on indoor unit for the electrical wiring of the operating unit
9 Terminals on the operating unit

B



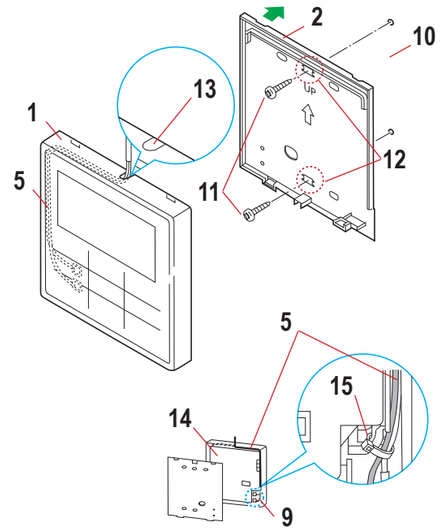
C



a Disconnecting the electrical wiring
b Loosening screws

2. Install a cable (to be provided on site) that is permissible as electrical wiring of the operating unit (→ *4.7.2.2 External interfaces for H-Generation models, p. 60*), from the terminals of the indoor unit to the installation location of the operating unit
3. Mount the cabinet bottom part (**2**) on the wall (**10**) (Fig. **D**), by screwing two self-tapping screws (**11**) (to be provided on site) into the wall through the two central openings (**12**) of the cabinet bottom part. See that the bottom part is seated firmly.
4. Using pincer pliers, open the cable gland (**13**) at the top edge of the cabinet top part. Smoothen the edges of the cable gland so that the electrical wiring is not damaged.
5. Guide the electrical wiring of the operating unit (**5**) through the cable gland into the operating unit and on the inside of the top part (**14**) along the edge up to the terminals of the operating unit. Fasten the cable using cable binders (**15**).
6. Insulate the conductor of the cable for a length of about 6 mm and ensure that the connections of the electrical wiring point in the right direction.
7. Connect the electrical wiring of the operating unit at the terminals of the indoor unit (**9**) and the indoor unit (**7**) (Fig. **E**).

D



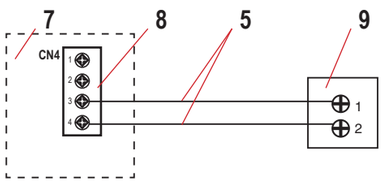
D Disassembly of the Operating Unit

1 Cabinet top part
2 Cabinet bottom part
5 Electrical wiring of the operating unit (no polarity, to be provided on site)
10 Wall
11 Self tapping screws (on site)
12 Opening
13 Cable gland
14 Inside of the cabinet top part
15 Cable binder

E Schematic detailed representation of the terminals on the indoor unit and operating unit

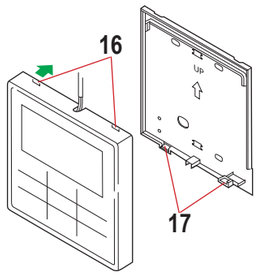
5 Electrical wiring of the operating unit
7 Indoor unit
8 Terminals on indoor unit for the electrical wiring of the operating unit
9 Terminals on the operating unit

E



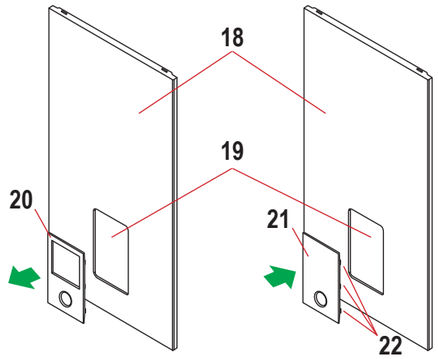
8. Mount the cabinet top part back on the cabinet bottom part by first setting the top part with the two upper straps (**16**) on the bottom part and then pressing the bottom edge of the top part carefully against the bottom part, until the two bottom straps (**17**) latch.
9. For compact systems: Wall mounting is now concluded.
   For split system: Replace the cover of the detached operating unit (**20**) in the front panel (**18**) of the indoor unit by the cover of the operating unit opening (**21**), supplied within the scope of delivery, to seal the opening (**19**). Exercise caution as you press the cover, until the six engagement hooks (**22**) engage with the front panel.

F



F Assembly Top/ Bottom Part
16 Top straps
17 Bottom straps

G



G Front panel indoor unit
18 Front panel of the indoor unit
19 Operating unit opening
20 Removing cover of the detached operating unit
21 Inserting cover of the operating unit opening
22 Engagement hooks (total 6)

6.9 Starting up the system

Commissioning of the system covers the evacuation of the cooling system (only for split systems), filling the water system, the concluding inspection of the system installation, test run as well as system handover and instruction of the end-customer.

6.9.1 Emptying the cooling system and carrying out a pressure test

Note

In the case of compact systems, you can skip this section. Continue with section → *6.9.2.2 Filling the heating and cooling circuit, p. 195*.

CAUTION

Danger of injury due to unprofessional handling of coolants

Unprofessional handling of coolants leads to various dangers of injury such as freezing, fire and the danger of explosions and the danger of injury occurring.

- ► Working with the coolant must be done by a trained skilled person or an authorised dealer with refrigerant certification.
- ► Observe all the Safety Notices in force for the respective coolant (R410A or R407C).

CAUTION

Danger of the devices being damaged by incorrect coolant

Using coolants or coolant mixtures not indicated in this manual or the respective operating instructions can lead to damage to devices and safety risks.

- ► Only use coolant Type R410A for the Aquarea LT and T-CAP series and only Type R407C coolant for the Aquarea HT series.
- ► Do not mix the prescribed coolant with coolants of another type or replace it with a coolant of another type.

Danger of faults in the cooling circuit due to humidity and external gases

To avoid faults in the cooling circuit due to penetrating humidity or external gases, the system must be evacuated before commissioning in all cases.

- ► The system must be evacuated in all cases before commissioning and a pressure test be conducted.
- ► If the length of the coolant pipelines is greater than the pre-filled connection distance of the device (→ *4 Technical data (split systems), p. 16*, → *4.6.3.3 Technical data (compact systems), p. 50*), the indicated quantity of additional coolant must be added.

Endangerment of the environment due to leaking coolant

To keep the endangerment of the environment to a minimum, no coolant must be emitted to the environment when working on the cooling circuit.

- ► While working on the cooling circuit, ensure through suitable measures that no coolant is emitted to the environment.
- ► Suck out the coolant present in the system by means of a suction station and dispose of it professionally according to the provisions in force.

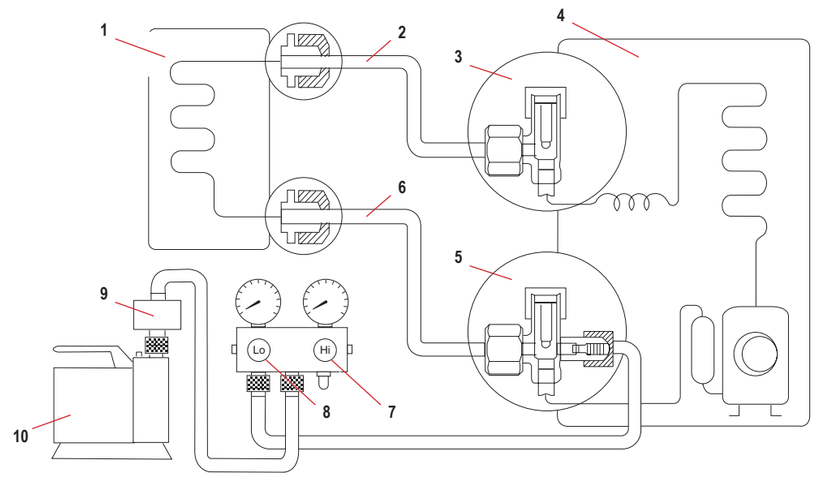
Carry out the following steps to evacuate the system:

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 above). See that the end of the filling hose is connected with the service port with the pin.
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. Evacuate the system for about 30 minutes.
4. Close the valve on the low pressure side of the manometer station and switch off the vacuum pump.
5. Recheck whether the measured value remains constant at -1 bar for 10 minutes.

   Yes: In this case you can assume that the cooling circuit is tight and go directly to step 7.

   No: In this case, there is presumably still a leakage in the coolant circuit. Remove the leakage by performing step 6.
6. If the manometer display does not remain constant at -1 bar, first tighten the connections. Then evacuate the system again as described above. If the measured value of -1 bar is still not maintained, search and repair the leaking places and then again perform step 5, until the cooling circuit is definitely tight.
7. If the manometer display shows -1 bar for 10 minutes, loosen the hose from the vacuum pump and the service port of the 3-way valve.
8. Tighten the end cap on the service port of the 3-way valve by means of a torque wrench with a torque of 18 Nm.
9. Remove the valve caps on the valve spindles of the 2-way and 3-way valves.
10. Open both the valves completely by using a hexagonal spanner (SW 4) so that the coolant streams into the system. Check that the coolant quantity is sufficient, otherwise top up with the requisite coolant quantity (→ *4 Technical data (split systems), p. 16*, → *4.6.3.3 Technical data (compact systems), p. 50*).
11. Screw the valve caps back on the valve spindles of the 2-way and 3-way valves.
12. Examine the connections for leakage.

Schematic Representation of System Evacuation



1	Hydro-module	6	Hot gas pipeline
2	Fluid line	7	CLOSED
3	2-way valve, closed	8	OPEN
4	Outdoor unit	9	Adapter of the vacuum pump
5	3-way valve, closed	10	Vacuum pump

6.9.2 Filling and venting the water system

6.9.2.1 Filling hot water tank

Note

The following method describes exclusively how the combination hydro-modules are filled by Panasonic.

At the time of commissioning split systems with hydro-module or compact systems, which are used in combination with hot water tanks from third party suppliers, when topping the hot water tanks, follow the installation instructions of the third party supplier, supplied with the tank. In such a case, continue with section → *6.9.2.2 Filling the heating and cooling circuit, p. 195*.

When commissioning split systems with hydro-module and compact systems 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 and cooling circuit, p. 195*.

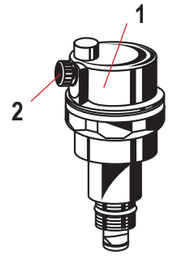
Perform the following steps to fill the hot water tank of the combination hydro-module:

1. Set the venting valve on the outlet socket of the hot water tank (→ *4.6.2.1 Components (split systems), p. 32*) 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 cold water entry (→ *4.6.2.1 Components (split systems), p. 32*). After 20 to 40 minutes, water should come out of the hot water taps. If this does not happen, please contact your specialist dealer.
4. Check whether there are any leakages in the pipeline connections, and repair them if necessary.

6.9.2.2 Filling the heating and cooling circuit

Perform the following steps to fill and vent the heating or cooling circuit:

1. Open the quick vent valve (**1**), by turning the valve cap (**2**) of the quick vent valve one full turn in an anti-clockwise direction (→ *4.6.2.1 Components (split systems), p. 32*, → *4.6.3.1 Components (compact systems), p. 47*).

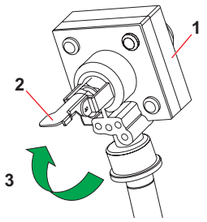


1 Quick vent valve
2 Valve cap

2. Turn up all thermostat valves of the heating system and possibly all other stop valves.
3. Connect a filling hose which has been vacuumed as far as possible to the water return of the system (→ *4.6.2.1 Components (split systems), p. 32*, → *4.6.3.1 Components (compact systems), p. 47*).
4. Fill water until the manometer shows that the set pressure has been reached.
5. Vent the system as follows:

a. Open the indoor and outdoor unit or the compact device (→ *6.5 Opening devices, p. 148*).

b. Place the lever (**2**) of the pressure relief valve (**1**), located in the indoor unit or compact device (→ *4.6.2.1 Components (split systems), p. 32*, → *4.6.3.1 Components (compact systems), p. 47*) in the horizontal position (**3** – open). The included air can now escape audibly (hissing sounds).



1 Pressure relief valve
2 Lever
3 Setting horizontal in the opening position

c. Set the lever of the pressure relief valve after a few seconds in the home position (closed).

d. Repeat the sequence until there are no audible sounds of escaping air.

e. Check the system pressure on the manometer. In normal operation, the system pressure should be between 0.5 and 3 bar. Adjust the set pressure if necessary.

6. Then again check the pressure and top up the fluid if necessary.
7. Check whether there are any leakages in the pipeline 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 superheat.

► Ascertain before beginning checking that the power supply is switched off and secured against unintended switch-on.

Note

Instructions for operating the devices through the operating unit are given in the operating instructions of the respective devices as well as in the appendix to this manual (→ *8.1 Extract from the operating instructions (H-Generation), p. 203*).

Carry out the following steps to check the completely installed system, with the power supply switched off:

1. Check if the cooling circuit is tight in the indoor and outdoor unit or in the compact device. 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 pipelines 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 the integrated manometer (→ *7.1 Checking of the water pressure, p. 198*).
5. Check the functioning of the pressure relief valve (→ *7.2 Checking of the pressure relief valve, p. 199*).
6. Check the initial pressure of the expansion vessel.

   Observe the specifications for the dimensioning of the expansion vessel (→ *5.3.5 Expansion vessel, p. 102*) and of the total water volume (→ *5.3.1 Hydraulic integration, p. 100*).
7. Check the functioning of the FI switch (→ *7.5 Checking of the FI protection switch, p. 200*).
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 through the operating unit are given in the operating instructions of the respective devices as well as in the appendix to this manual (→ *8.1 Extract from the operating instructions (H-Generation), p. 203*).

Carry out the following steps to perform a test run of the system:

1. Switch on the power supply.
2. Switch on the FI switch of the indoor unit or compact device and through the operating unit also the heat pump; (while doing this, follow the instructions given in the operating instructions of the respective device.)
3. Check the water pressure again.

   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 (CP) such that the water pressure is in the normal operating range; (while doing this, 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 specialist dealer.
4. Check whether the water flow rate lies within the model-specific limits (→ *4 Technical data (split systems), p. 16*, → *4.6.3.3 Technical data (compact systems), p. 50*, → *5.3 Hydraulics, p. 100*).

   If necessary, adjust the water flow rate and/or the maximum rotation speed of the circulation pump through the pump control (while doing this, 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. 201*):
6. Switch off the heat pump again to terminate the test run.
7. Clean the dirt catcher immediately thereafter (→ *7.5 Checking of the FI protection switch, p. 200*).
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 end-customer and their training in the operation of the device.

6.9.5 Carrying out a system transfer and familiarisation

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 end-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 FI protection switch, the electrical wiring and the piping. This maintenance work should be conducted by authorised Customer Services staff. Please contact your specialist dealer for maintenance inspections to be carried out.

The following types of maintenance work should be carried out annually:

- Checking of the water pressure
- Checking of the pressure relief valve
- Conducting visual checks on the PCBs and terminals
- Cleaning of the dirt catchers
- Checking of the FI protection switch
- Checking of the quick vent 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.

► 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 split systems, see that the electric supply of the hydro-module or combination hydro-module, the tank and the E-heating element is disconnected.

7.1 Checking of the water pressure

Carry out the following steps:

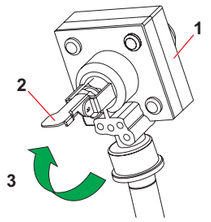
1. Check the system pressure on the manometer (→ *4.6.2.1 Components (split systems), p. 32*, → *4.6.3.1 Components (compact systems), p. 47*).

   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. 194*).

7.2 Checking of the pressure relief valve

Carry out the following steps:

1. Place the lever (**2**) of the pressure relief valve (**1**) located in the indoor unit or compact device (→ *4.6.2.1 Components (split systems), p. 32*, → *4.6.3.1 Components (compact systems), p. 47*) in the horizontal position (**3** - open).



1 Pressure relief valve
2 Lever
3 Setting horizontal in the opening position

   Air or fluids should now be heard escaping. If this is not the case, contact an authorised trader.
1. Set the lever of the pressure relief valve after a few seconds in the home position (closed).

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. Eliminate any defects or damage which may be present.

7.4 Cleaning of the dirt catchers

Carry out the following steps:

1. If mounted, close the shut-off valve before and after the dirt catcher.
3. Open the dirt catcher using a spanner. Remove the insert and ensure that the meshes of the insert are not damaged.
4. Rinse out the insert with tap water. Remove any stubborn dirt using a soft brush.
5. Replace the insert in the dirt catcher and close the dirt catcher using the spanner.
6. Open the shut-off valve again.

7.5 Checking of the FI protection switch

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 FI protection switch.

Carry out the following steps:

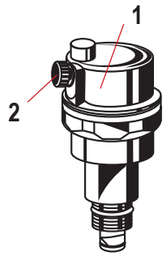
1. Set the FI protection switch to ON.
7. Switch on the electricity supply of the indoor unit or compact device.
8. Press the TEST button on the FI protection switch.

   If the FI protection switch is in perfect working order, the lever must be pointing downwards to the OFF (green) position. If this is not the case, contact an authorised dealer.
9. Interrupt the electricity supply of the hydro-module again.
10. Set the lever of the FI protection switch to ON again.
11. Switch the electricity supply of the indoor unit or compact device off again.

7.6 Checking of the quick vent valve and venting the system

Carry out the following steps:

1. Open the quick vent valve (**1**) by turning the valve cap (**2**) of the quick vent valve one full turn in an anti-clockwise direction (→ *4.6.2.1 Components (split systems), p. 32*, → *4.6.3.1 Components (compact systems), p. 47*).



1 Quick vent valve
2 Valve cap

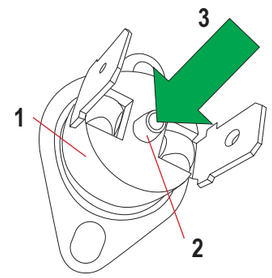
   Air should now be heard escaping.
12. Repeat the sequence until there are no audible sounds of escaping air.
13. Close the quick vent valve again by turning in a clockwise direction.

7.7 Resetting the thermostatic overload protection

The overload protection (→ *4.6.2.1 Components (split systems), p. 32*, → *4.6.3.1 Components (compact systems), p. 47*) protects the system against any superheat of 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.
14. Using a test pin, press the button (**2**) lightly in the centre in order to reset the thermostatic overload protection.



1 Overload protection
2 Button
3 Press

15. Resecure the cover again afterwards.

7.8 Carrying out maintenance work on the cooling circuit

CAUTION

Danger of injury due to unprofessional handling of coolants

Unprofessional handling of coolants leads to various dangers of injury such as freezing, fire and the danger of explosions and the danger of injury occurring.

► Working with the coolant must be done by a trained skilled person or an authorised dealer with refrigerant certification.

► Observe all the Safety Notices in force for the respective coolant (R410A or R407C).

► Before commencing work on the cooling circuit, the coolant must always be pumped out first.

Note

Instructions for switching on the pumping-out operation as well as operating the devices can be found in the operating instructions for the respective device and in the Appendix to this Manual (→ *8.1 Extract from the operating instructions (H-Generation), p. 203*).

Carry out the following steps:

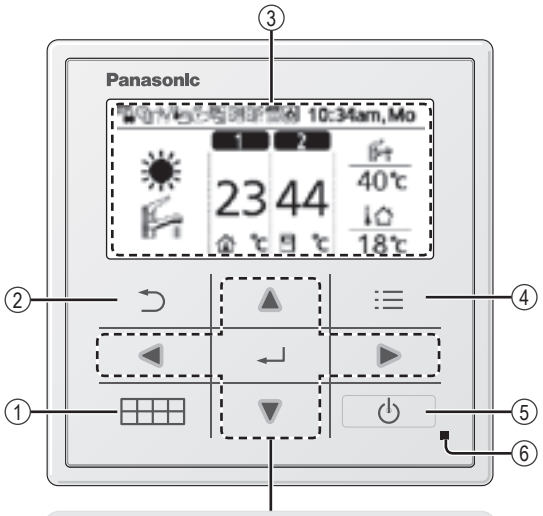
1. Switch the device into pumping-out operating mode via the operating unit. While doing this, follow the instructions given in the operating instructions of the respective device.
16. Operate the system in pumping-out mode for 10 to 15 minutes (or for 1 to 2 minutes in case of a lower ambient temperature of below 10 °C) in order to pump the coolant out of the pipes.
17. Close the 2-way valve fully after the time stated.
18. Close the 3-way valve fully after a further 3 minutes.
19. End the pumping-out operation via the operating unit. While doing this, follow the instructions given in the operating instructions of the respective device.
2. Carry out the work on the coolant pipes. When doing this, adhere to the Warning Notices and instructions regarding connecting the cooling circuit (→ *6.6 Connecting the cooling circuit, p. 152*).
3. Set the system in operation again after the work has been completed (→ *6.9 Starting up the system, p. 191*). When doing this, pay particular attention to the Warning Notices and instructions regarding emptying the cooling circuit (→ *6.9.1 Emptying the cooling system and carrying out a pressure test, p. 191*).

8 Appendix

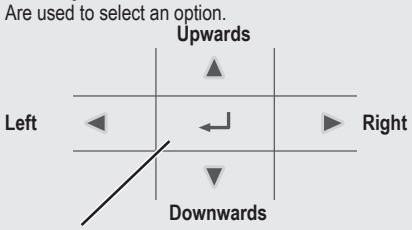
8.1 Extract from the operating instructions (H-Generation)

Keys and display of the operating unit

Keys/display	
①	**Quick menu Key** (Further details are to be found in the separate Quick menu instructions.)
②	**Back Key** Returns to the previous screen
③	**LCD display**
④	**Main menu Key** Used to set the function
⑤	**ON/OFF Key** Used to switch the device on or off.
⑥	**Operating display** Is illuminated during operation and flashes if a fault is detected.

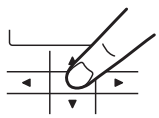


Hash keys
Are used to select an option.

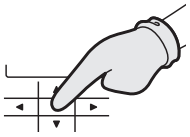


"Enter" Key
Confirms the content selected.

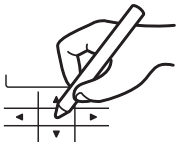
Press the middle of the keys



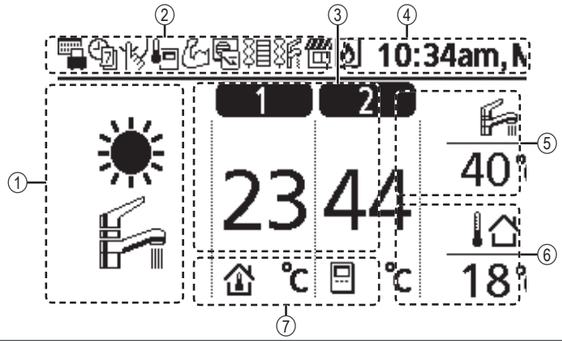
No gloves



No stylus

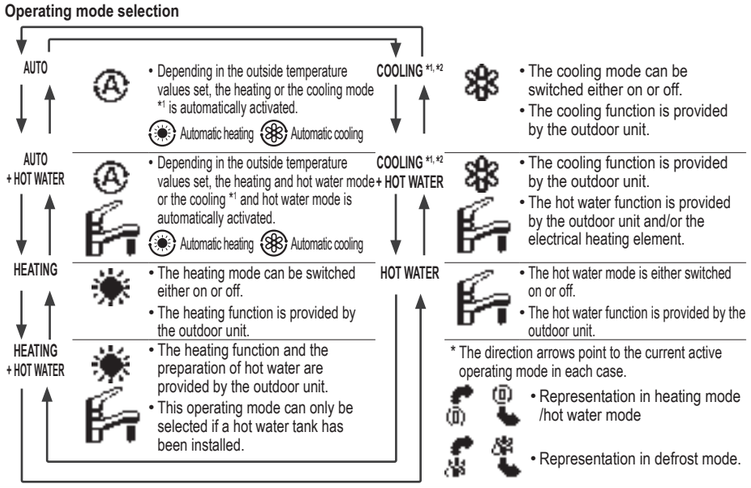


Keys and display of the operating unit



Display

① **Operating mode selection**



② **Operating symbols**
The symbols shown below display the respective operating mode.
The symbol is not displayed (“Mode OFF” under the screen) if the mode is deactivated with the exception of the weekly timer setting.

Holiday mode	Weekly timer mode	Quiet mode
Heating circuit: Room thermostat →Integrated sensor	Power mode	Power control, SG ready or SHP
Electric heating element heating	Electric heating element hot water	Solar mode
Bivalent heating source (Bivalence heating source)		

*1 The system is preset for operation without a cooling function. The cooling function can be activated by an authorised installer or service partner.
*2 This display only appears if the cooling function is activated, i.e. if the cooling mode is available.

③	**Temperature of the respective heating circuit**
④	**Day of the week and time**
⑤	**Temperature of the hot water tank**
⑥	**Outside temperature**
⑦	**Symbols for temperature sensors and temperatures**

Flow temperature →Heating characteristic
Room thermostat →External
Flow temperature →Direct
Room thermostat →Internal
Only for swimming pool heating

Initial settings

Before system settings can be made, the display language must first be set and the date and time entered.
To do this, the following settings must be undertaken on the operating unit.

Selecting the language

Press ⏻ and wait until the display has been initialised.

① **Scroll using ▼ and ▲ to select the language desired.**

② **Press ↵ to confirm your selection.**

Setting the time

① **With the help of ▼ or ▲ , select the mode in which the time is to be displayed, either in 24-hour or in 12-hour format (AM / PM).**

② **Press ↵ to confirm your selection.**

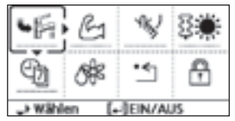
③ **Using ▼ and ▲, set the year, month, day, hours and minutes and press to confirm in each case ↵.**

④ **Once the time has been displayed, the day of the week and the time are shown in the display window, even if the remote control is switched off.**

Quick menu

In addition to the basic settings, further settings can be made via the Quick menu.

① **Press ⊞ to display the Quick menu**



Manual hot water preparation | Power mode | Quiet mode | Heating, always on

Weekly timer | Manual defrost mode | Error reset | Locking the operating unit

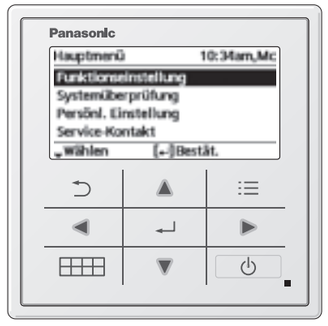
② **Select the Menu by using ▲ ▼ ◀ ▶.**

③ **Press ↵ to switch on or off, or to set, the function selected.**

Menus For users

The menu items and settings to be used depend on the heating system present in each case. All basic settings are to be undertaken by an authorised installer or service partner and should also only be altered by such a person.

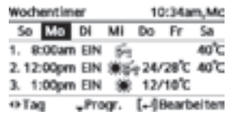
- Once the basic settings have been made, the settings can be adjusted manually.
- The basic settings will remain active until they are altered.
- The operating unit can be used for different systems.
- In order to be able to make settings, the operating LED must not be illuminated.
- Incorrect settings can lead to impaired functioning of the heating system. In such a case, contact your authorised installer or service partner.



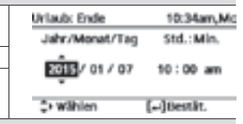
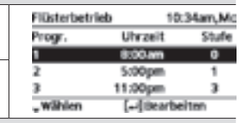
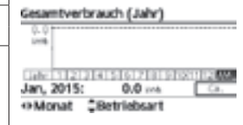
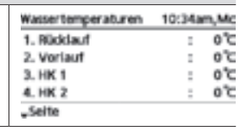
Displaying the "Main menu": ☰

Selecting a menu item: ▲ ▼ ◀ ▶

Confirming the menu item selected: ↵

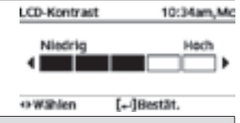
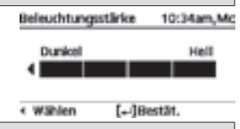
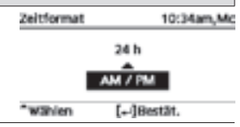
Menu	Standard setting	Setting options /Display
1 Function setting		
1.1 > Weekly timer		
As soon as the weekly timer has been set, the user can adjust this via the Quick menu. Up to 6 switching programmes can be set per day. • The weekly timer is deactivated if the cooling/heating switch is activated or the emergency heating mode is switched on.	**Setting the timer** Select the day of the week and set the programme desired. (Switching time / On/Off / operating mode)	
	Copying the timer Select the day of the week.	

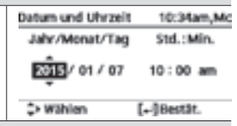
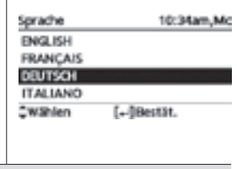
Menus For users

Menu	Standard setting	Setting options /Display
1.2 > Holiday timer		
To save energy, a holiday period can be set which enables the system either to be switched off or for the temperature to be reduced in this period.	OFF	
	> ON	
	Beginning and end of holiday. Date and time	
	OFF or reduced temperature	
• The weekly timer setting can be deactivated during holiday timer setting, but is then reactivated as soon as the holiday timer has expired.		
1.3 > Quiet timer		
For reducing the noise level during the set period of time. 6 programmes can be set. Stage 0 means that the quiet mode has been deactivated.	Starting time for the quiet mode: Date and time	
	Quiet mode stage: 0 to 3	
1.4 > E-heating element heating		
Activating the electric heating element for the heating mode.	OFF	
1.5 > E-heating element for hot water		
Activating the electric heating element for the hot water mode.	OFF	
• Only available if a connection with the hot water tank is in place.		
1.6 > Sterilisation		
Activation or deactivation of automatic sterilisation.	OFF	
• Only available if a connection with the hot water tank is in place. • Do not use the system during sterilisation so as to avoid scalding by hot water. • To set the sterilisation function in accordance with the local laws and regulations in force, please contact your authorised installer or service partner.		
2 System monitoring		
2.1 > Energy monitor		
Diagram with current or recorded data on energy consumption, generation or COP.	**Current data** Select and retrieve	
	Recording Select and retrieve	
• COP = coefficient of performance • Periods covered in the diagrams with recorded data: 1 day / 1 week / 1 year • Energy consumption can be retrieved in kWh for heating mode, cooling mode *1 and hot water mode as well as overall energy consumption. • Overall electricity consumption involves an estimated value based on 230 V alternating current. It can deviate from the value measured using precision equipment.		
2.2 > Water temperatures		
Display of the different current water temperatures.	**Current values of 8 water temperatures: Return flow / inflow / HC 1 / HC 2 hot water tank / buffer tank / solar / swimming pool** Select and retrieve	

*1 The system is preset for operation without a cooling function. The cooling function can be activated by an authorised installer or service partner.
*2 This display only appears if the cooling function is activated, i.e. if the cooling mode is available.

Menus For users

Menu	Standard setting	Setting options /Display
2.3 > Fault memory • Information regarding the fault codes can be found using the fault search facility. • The most recently reported fault code is displayed at the very top.	Select and retrieve	
2.4 > Compressor Information about operating the compressor.	Select and retrieve	
2.5 > E-heating element Operating hours for the booster heater/heating for the domestic hot water tank.	Select and retrieve	
3 Customised setting		
3.1 > Key sound Switching the key sound on or off.	ON	
3.2 > LCD contrast Setting the display contrast	3	
3.3 > Illumination duration Setting the duration of the background illumination for the display.	1 min.	
3.4 > Strength of illumination Setting the brightness of the background illumination for the display.	4	
3.5 > Time format Setting the format for displaying the time.	24 hours	

Menu	Standard setting	Setting options /Display
3.6 > Date and time Setting of the current date and of the current time.	Year / Month / Day / Hour / Min.	
3.7 > Language Setting the display language. • For Greek: Please use the English version.	ENGLISH / FRANÇAIS / DEUTSCH / ITALIANO / ESPAÑOL / DANISH / SWEDISH / NORWEGIAN / POLISH / CZECH / NEDERLANDS / TÜRKÇE / SUOMI / MAGYAR / SLOVENŠČINA / HRVATSKI	
3.8 > Unlocking password 4-digit password for all settings.	0000	
4 Service contact details		
4.1 > Contact 1 / Contact 2 Service telephone number for Customer Service	Select and retrieve	

Menus

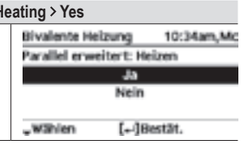
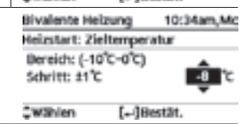
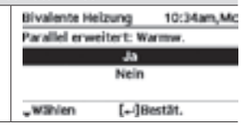
For installers

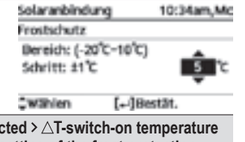
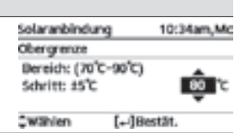
Menu	Standard setting	Setting options /Display
5 Installer set-up > System setting		
5.1 > Connection of optional PCB		
Connection of an optional supplementary PCB	No	Ja / Nein
• If an optional supplementary PCB is connected, the system has the following additional functions: ① Control and temperature regulation of a connected buffer tank. ② Control and regulation of 2 heating circuits (including swimming pool heating). ③ Integration of a solar station, connected to hot water or buffer tank. ④ Input for external switching off of the outdoor unit. ⑤ External fault alarm. ⑥ Inputs for CD-ready control. ⑦ Power control ⑧ Heating/cooling scheme		
5.2 > Heating circuits & sensors		
Selection of the temperature sensor and of the number of heating circuits.	**HC** • After the system has been selected with one or 2 heating circuits, information is to be provided as to whether the respective heating circuit is being used for room or swimming pool heating. • If "swimming pool" has been selected, a temperature difference of "△T for swimming pool" must be set between 2 and 10 K.	Heizkreise u. Fühler 10:34am,Mc HK System mit 1 HK System mit 2 HK Wählen [↵]Bestät.
	Sensors * A distinction is to be made with room thermostats between outside and inside.	Heizkreise u. Fühler 10:34am,Mc Fühler Wassertemperatur Raumthermostat Raumtemp.fühler Wählen [↵]Bestät.
5.3 > Power of E-heating element		
Selection of the maximum power setting desired for the electrical heating element for the heating mode.* 3 kW / 6 kW / 9 kW * The setting options depend on the respective model.	3 kW / 6 kW / 9 kW	Leistung E-Heizstab 10:34am,Mc 3 kW 6 kW 9 kW Wählen [↵]Bestät.
5.4 > Frost protection		
Activation or deactivation of the frost protection function with the device switched off.	Yes	Ja / Nein
5.5 > Hot water tank		
Setting as to whether a hot water tank is connected.	No	Ja / Nein
5.6 > Connection of buffer tank		
Setting as to whether a buffer tank is connected. If YES, setting of the temperature difference. • In order to be able to operate this function, the optional supplementary PCB must be installed and activated. • If "Connection of optional PCB" is not selected, the function will not be shown in the display.	No	Ja / Nein
	> Yes	
	5 °C Temperature difference △T for the buffer tank	Puffersp. 10:34am,Mc ΔT für Puff.speich. Bereich: (0°C-10°C) Schritt: ±1°C 5 °C Wählen [↵]Bestät.

Menu	Standard setting	Setting options /Display
5.7 > E-heating element for hot water		
Selection as to whether the indoor or outdoor electric heating element is to be used for the hot water tank and setting of a timer for the connection of the electric heating element. * This option is available if tank connection is selected (YES).	Inside	E-Heizstab Warmw. 10:34am,Mc Extern Intern Wählen [↵]Bestät.
	> Outside	
	0:20 Delayed switching on of the electric heating element for the hot water tank.	E-Heizstab Warmw. 10:34am,Mc E-Heizstab Warmw.: EIN-Verz. Bereich: (0:20-3:00) Schritt: ±0:05 0:20 Wählen [↵]Bestät.
5.8 > Cabinet heating		
Selection as to whether an optional cabinet heating is connected or not. * Type A - The cabinet heating is only switched on during defrost mode. * Type B - The cabinet heating is switched on at temperatures of 5 °C and below.	No	Ja / Nein
	> Yes	
	A Cabinet heating use type.*	Gehäuseheizungstyp 10:34am,Mc A B Wählen [↵]Bestät.
5.9 > Altern. outdoor sensor		
Selection of an alternative outdoor temperature sensor.	No	Ja / Nein
5.10 > Bivalent heating		
For selecting a bivalent connection so that an additional heat source, e.g. a heating boiler, can heat up the buffer tank and the hot water tank, if the heat pump capacity is not sufficient at low outside temperatures. The bivalent function can be operated in alternating 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 expanded parallel mode (heat pump is operated and heating boiler is activated for buffer tank and/or hot water, depending on the setting options activated for switching behaviour).	No	Ja / Nein
	> Yes	
	-5 °C Outside temperature above which the bivalent heating source is switched on.	Bivalente Heizung 10:34am,Mc Einschalten: Außentemp. Bereich: (-15°C-35°C) Schritt: ±1°C -5 °C Wählen [↵]Bestät.
	Yes > Depending on outside temperature selection	
	Switching behaviour Alternative / Parallel / Parallel extended • "Parallel extended" is to be selected for separate setting of buffer tank and hot water tank.	Bivalente Heizung 10:34am,Mc Schaltverhalten Alternativ Parallel Parallel erweitert Wählen [↵]Bestät.

Menus

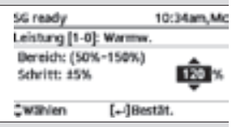
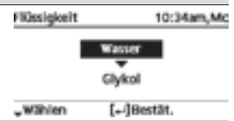
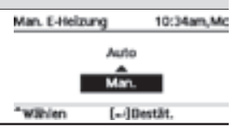
For installers

Menu	Standard setting	Setting options /Display	
	Switching behaviour > Parallel extended		
	Heating	Selection of the tank	
	• "Heating" stands for buffer tank and "Hot water" stands for domestic hot water tank.		
	Switching behaviour > Parallel extended > Heating > Yes		
	• The buffer tank is only activated after "Yes" has been selected.		
	-8 °C	Temperature threshold value for switching on the bivalent heating source.	
	0:30	Delayed switching on for the bivalent heating source. (in hours and minutes)	
	-2 °C	Temperature threshold value for switching off the bivalent heating source.	
	0:30	Delayed switching off for the bivalent heating source. (in hours and minutes)	
	Switching behaviour > Parallel extended > Hot water > Yes		
	• The domestic hot water tank is only activated after "Yes" has been selected.		
	0:30	Delayed switching on for the bivalent heating source. (in hours and minutes)	

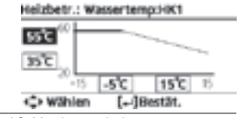
Menu	Standard setting	Setting options /Display	
5.11	**> Outdoor On/Off switch**		
	No		
5.12	**> Solar connection**		
• In order to be able to operate this function, the optional supplementary PCB must be installed and activated. • If "Connection of optional PCB" is not selected, the function will not be shown in the display.	No		
	> Yes		
	Buffer tank	Selection of the buffer tank or of the hot water tank for the solar connection	
	> Yes > According to the hot water tank selected		
	10 °C	Switch on temperature difference	
	> Yes > According to the hot water tank selected > △T-switch-on temperature		
	5 °C	Setting the switch-off temperature difference	
	> Yes > According to the hot water tank selected > △T-switch-on temperature > △T-switch-off temperature		
	5 °C	Frost protection temperature	
	> Yes > According to the hot water tank selected > △T-switch-on temperature > △T-switch-off temperature > According to setting of the frost protection temperature		
	80 °C	Temperature upper limit	

Menus

For installers

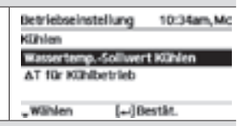
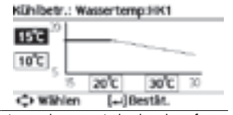
Menu	Standard setting	Setting options /Display
5.13 > Fault alarm output		
	No	
5.14 > Power control		
	No	
5.15 > SG ready		
	No	
	> Yes	
	120 %	Boost (Stages 1 and 2) of buffer tank and domestic hot water tank (in %) 
5.16 > Ext. switch for OU		
	No	
5.17 > Liquid		
Selection as to whether water or glycol is being used as the heating medium.	Water	
5.18 > Heating/cooling scheme		
	No	
5.19 > Man. E-heating		
For switching on the emergency heating mode manually (standard) or automatically.	Man.	
6 Installer set-up > Operational setting		
Setting the four operating modes.	4 operating modes Heating / cooling *1, *2 / Auto / Hot water tank	

*1 The system is preset for operation without a cooling function. The cooling function can be activated by an authorised installer or service partner.
*2 This display only appears if the cooling function is activated, i.e. if the cooling mode is available.

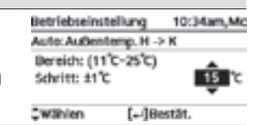
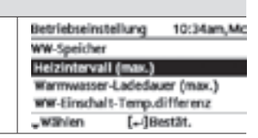
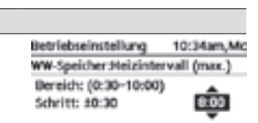
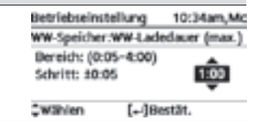
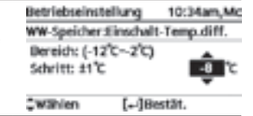
Menu	Standard setting	Setting options /Display
Installer set-up > Operational setting		
6.1 > Heating		
Setting of different temperatures for the heating mode.	Water temp. set-point heating / Summer shutdown / ΔT for heating mode / Bivalence temp. of E-heating element	
	> Water temp. set-point heating	
	Heating	Setting of whether the supply temperature is to be calculated according to heating levels or to be definitively set. 
	> Water temperature set-point for heating > Heating curve	
	X axis: -5 °C, 15 °C Y axis: 55 °C, 35 °C	Entry of 4 temperature values. (2 on the horizontal X axis, 2 on the vertical Y axis). 
	• Temperature range for the X-axis: -15 °C to 15 °C, Y-axis: see below. • Temperature range for the Y-axis depends on the model: 1. Model WH-SDC: 20°C to 55°C 2. Model WH-SHF and E-heating element are activated: 25°C to 65°C 3. Model WH-SHF and E-heating element are not activated: 35°C to 65°C 4. Model WH-SXC/SQC: 20°C to 60°C • If a second heating circuit is present, the 4 temperature values must also be given for heatC 2. • "HC 1" and "HC 2" are not shown in the display if the system only has one heating circuit.	
	> Water temperature set-point for heating > Fixed value	
	35 °C	Inputting a fixed flow temperature 
	• The following input ranges are available: 1. Model WH-SDC: 20°C to 55°C 2. Model WH-SHF and E-heating element are activated: 25°C to 65°C 3. Model WH-SHF and E-heating element are not activated: 35°C to 65°C 4. Model WH-SXC/SQC: 20°C to 60°C	
	> Summer shutdown	
	24 °C	Outside temperature at which the heating is switched off (summer mode) 

Menus

For installers

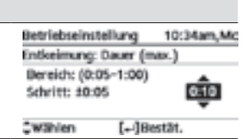
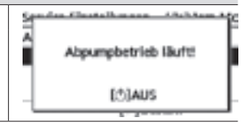
Menu	Standard setting	Setting options /Display	
	> △T for heating mode		
	5 °C	Temperature difference for switching on the heating again	
	> Bivalence temp. E-heating element		
	0 °C	Outside temperature below which the electric heating element can be switched on (bivalence point)	
6.2	**> Cooling** *1, *2		
Setting of different temperatures for the cooling mode.	Water temperatures for cooling ON and △T for cooling ON.		
	> Water temperature set-point for cooling		
	Heating	Setting of whether the supply temperature is to be calculated according to cooling levels or to be permanently set.	
	> Water temperature set-point for cooling > Heating		
	X axis: 20 °C. 30 °C Y axis: 15 °C, 10 °C	Entry of 4 temperature values. (2 on the horizontal X axis, 2 on the vertical Y axis)	
	• If a second cooling circuit is present, the 4 temperature values must also be given for cooling circuit 2. • "HC 1" and "HC 2" are not shown in the display if the system only has one heating circuit (or cooling circuit).		
	> Water temperature set-point for cooling > Fixed value		
	10 °C	Permanently set preliminary temperature	
	> △T for cooling mode		
	5 °C	Temperature difference for switching on the cooling.	

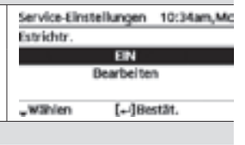
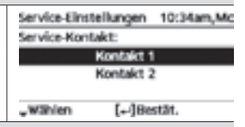
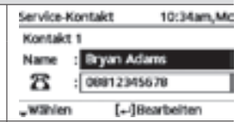
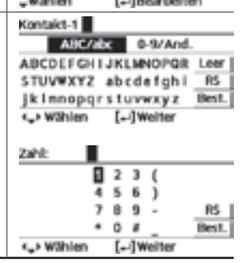
*1 The system is preset for operation without a cooling function. The cooling function can be activated by an authorised installer or service partner.
*2 This display only appears if the cooling function is activated, i.e. if the cooling mode is available.

Menu	Standard setting	Setting options /Display	
6.3	**> Auto**		
Automatic switching from heating to cooling mode or from cooling to heating mode.	Outside temperatures for switching from heating to cooling mode or from cooling to heating mode. Outside temp. for heating -> cooling / Outside temp. for cooling -> heating		
	> Outside temp. for heating -> cooling		
	15 °C	Set outside temp. for switching from heating to cooling mode.	
	> Outside temp. for cooling -> heating		
	10 °C	Set outside temperature for switching cooling to heating mode.	
6.4	**> Hot water tank**		
Settings for the operation of the hot water tank • Only available if a connection with the hot water tank is in place.	Heating interval (max.) / Hot water loading time (max.) / Hot water switchon temp. difference / Sterilisation		
	• The display shows 3 functions at the same time.		
	> Heating interval (max.)		
	8:00	Maximum duration of the heating interval (in hours and minutes)	
	> Hot water loading duration (max.)		
	1:00	Maximum duration of the hot water interval (in hours and minutes)	
	> Hot water switch-on temp. difference		
	-8 °C	Temperature difference for reloading of the hot water tank	

Menus

For installers

Menu	Standard setting	Setting options /Display
	› Sterilisation	
	Sterilisation can be set for 1 or several days of the week. Su / Mo / Tu / We / Th / Fr / Sa	
	› Sterilisation: Time	
	Time sterilisation of the domestic hot water tank is to commence on the day of the week set. 0:00 to 23:59	
	› Sterilisation: Sterilisation temp.	
	65 °C — Water temperature for sterilising the domestic hot water tank.	
	› Sterilisation: Duration (max.)	
	0:10 — Duration of sterilisation (in hours and minutes)	
7 Installer setup › Service settings		
7.1	**› Max. pump speed**	
Setting the maximum pump speed.	Setting of volume flow, max. value und switching on / off of the pump. Vol. flow XX:X l/min Max. value: 0x40 to 0xFE, Pump: ON/OFF/vent	
7.2	**› Pumping out**	
Switching on the pumping-out operating mode	**Pumping-out operating mode** ON	

Menu	Standard setting	Setting options /Display
Installer set-up › Service settings		
7.3	**› Screed drying**	
Settings for the drying of screed and walls during the construction phase. This function should only be used during the construction phase and should not be used for any other purposes.	Setting and switching on of the screed drying function. ON / processing	
	› Processing	
	Steps: 1 Temperature: 25 °C — Entering the steps (1 to 99) as well as the temperatures for screed drying	
	› ON	
	Display of the screed drying stage, the set temperature and the current temperature	
7.4	**› Service contract**	
Entering name and telephone number of Customer Service	Name and telephone number of Customer Service Contact 1 / Contact 2	
	› Contact 1 / Contact 2	
	Name and telephone number of the contact Name / telephone symbol	
	Entering name and telephone number. Contact name: Letters A to Z or a to z Contact number: 1 to 9	

8.2 Troubleshooting

Troubleshooting

The symptoms listed below do not indicate an error function.

Symptom	Cause
Water flow noises during operation.	• Coolant is flowing through the device.
Operation is delayed for some minutes following restarting.	• The delay involves a protection mechanism for the compressor.
Water or steam is escaping from the outdoor unit.	• Water can condense or evaporate on the pipes.
Steam is escaping from the outdoor unit during heating mode.	• This occurs when the heat exchanger of the outdoor unit is being defrosted.
The outdoor unit is not functioning.	• The outside temperature may be outside the permitted temperature range.
The system switches itself off.	• This is caused by the protection mechanism of the system. If the water inlet temperature is lower than 10 °C, the compressor stops operating and the electric booster heater is switched on.
The heating capacity of the system is low.	• If a heater and floor are being heated at the same time, the water temperature can fall and the heating capacity can be reduced. • If the outside temperature is low, the system may need more time to heat up. • The air inlet or outlet openings of the outdoor unit are blocked by an obstacle, e.g. due to a pile of snow. • If the preset water outlet temperature is high, the system may need more time for heating up.
The system is not heating up immediately.	• The system needs some time to heat up the water if it is still cold.
The deactivated electric booster heater is automatically switched on.	• This involves a protection function for the heat exchanger in the indoor unit.
Operation starts automatically if the timer has not been set.	• The sterilisation function has been started by the sterilisation timer.
Loud coolant noise lasting for some minutes.	• The cause is a protection function which is triggered during the defrost mode at outside temperatures of below -10 °C.
The cooling mode *1 is not available.	• The system is preset for operation without a cooling function.

Check the following points before contacting Customer Service.

Symptom	To be checked
The device is not heating or cooling *1 correctly.	• Set the temperature at the correct level. • Close the valves of any heating or cooling devices which are not needed. • Ensure that the air inlet and outlet openings of the outdoor unit are clear.
The device is operating in a loud way.	• The outdoor unit or indoor unit may be tilted. • Close the cover properly.
The system is not functioning.	• The automatic cutout has been triggered/activated.
The operating LED is not illuminated or nothing is being displayed on the operating unit.	• Check whether the electric power supply is in order and that no power outage has occurred.

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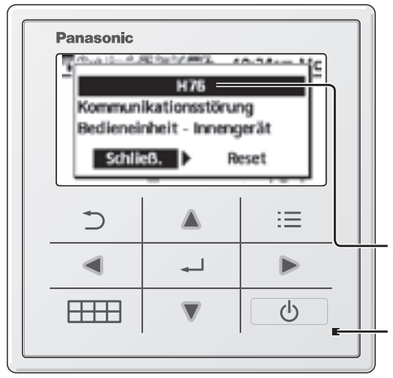
*2 This display only appears if the cooling function is activated, i.e. if the cooling mode is available.

Fault codes



You will find below the list of fault codes which can be shown in the display if any problems occur with the system setting or operation.
If a fault code is shown in the display, as in the example on the left, then please call the telephone number stated in the operating unit or a local authorised dealer.

All keys are deactivated, apart from ◀ ▶ and ⮌.

Error no.	Explanation of error
H12	Inappropriate device capacities
H15	Fault with compressor temperature sensor
H20	Fault with circulation pump
H23	Fault with coolant sensor
H27	Fault with service valve
H28	Fault with solar sensor
H31	Fault with swimming pool sensor
H36	Fault with buffer tank sensor
H38	Fault due to non-matching device brands
H42	Low pressure protection
H43	Fault with the sensor for heatC 1
H44	Fault with the sensor for heatC 2
H62	Fault upstream with the flow monitor
H63	Fault with the low pressure sensor
H64	Fault with the high pressure sensor
H65	Fault with the water circulation during defrosting
H67	Fault with outdoor temperature sensor 1
H68	Fault with outdoor temperature sensor 2
H70	Fault with overload protection for indoor units E-heating element
H72	Fault with hot water tank temperature sensor
H74	Fault with PCB communication
H75	Low water temp. protection
H76	Fault with the PCB communication
H90	Communication fault with indoor/outdoor units
H91	Fault with overload protection for hot water E-heating element
H95	Fault with incorrect voltage IU - OU
H98	Fault due to high pressure protection
H99	Fault due to frost protection of indoor units heat exchanger

Error no.	Explanation of error
F12	High pressure switch in the outdoor unit triggered
F14	Incorrect compressor speed
F15	Incorrect speed of the OU fan motor
F16	Fault due to excessive current consumption
F20	Fault due to overload protection of the compressor
F22	Fault due to overload protection of power transistor
F23	Fault due to direct current peaks in the OU
F24	Fault due to problems in the cooling circuit
F25	*1 Fault due to problems with the switching interval
F27	Fault with the high pressure switch in the OU
F29	Low hot gas superheat
F30	Fault with the inflow temperature sensor
F32	Fault with the room thermostat
F36	Fault with the outdoor temperature sensor
F37	Fault with the return flow temperature sensor
F40	Fault with the hot gas temp. sensor in the outdoor unit
F41	Error in the power factor correction
F42	Error with the heat exchanger sensor in the outdoor unit
F43	Fault with hot gas temp. sensor in the outdoor unit
F45	Fault with the defrost temp. sensor in the outdoor unit
F46	Current transformer switching off
F48	Error with evaporator outlet temp. sensor
F49	Fault with bypass outlet temp. sensor in the OU
F95	*1 Fault due to HP protection cooling in the outdoor unit

* Some error codes may not apply to your model. Please contact a specialist dealer for clarification.

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*2 This display only appears if the cooling function is activated, i.e. if the cooling mode is available.

Notes:

Notes:

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