AERECO

TECHNICAL MANUAL
INSTALLATION AND MAINTENANCE INSTRUCTIONS

CONNECT WP120 / CONNECT WP130

v2017.2

Dear customer,

We would like to thank you for choosing an Aereco product. It is a product based on many years' experience and careful project studies, and has been manufactured using high-quality materials and the latest technology.

Furthermore, the CE designation guarantees that the units meets the requirements of the EU Machinery Directive with regard to safety. The quality level is continually monitored and Aereco products therefore represent safety, quality and reliability.

Data may be changed at any time and without obligation to give notice if this serves to improve the product.

Thank you again.
Aereco GmbH

Aereco reserves the right to make changes at any time to improve the product without being obliged to make such changes to units already manufactured, delivered or in production.

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Product designation:	Connect WP120 / Connect WP130
Type:	Inverter-controlled, source-controlled brine/water heat pump
Application purpose:	For exhaust air heat recovery in conjunction with Aereco AWN Basic products for exhaust air conveyance with an air/brine heat exchanger
Document version:	2017.2

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1. GENERAL INFORMATION

The units have been manufactured in accordance with technical standards and recognised safety regulations. They have been developed to recover heat from exhaust air systems and to heat heating and domestic hot water, and are to be used for these purposes. Any contractual and extra-contractual liability of the company for damage to persons, animals or property as a result of installation, adjustment and maintenance errors or improper use shall be excluded. Any use not expressly stated in this manual shall not be permitted.

1.1. RETAINING DOCUMENTS

These instructions, together with all other documents, are to be given to the unit operator, who assumes responsibility for retaining these documents and shall ensure that they are available if required. Please read through the handbook provided carefully.
All works are to be carried out by specialist personnel in accordance with the provisions in force applicable to each country.

The **CONTROL CONSOLE OPERATING INSTRUCTIONS** and the
ELECTRICAL CIRCUIT DIAGRAMS are included with the unit.

Give the instructions and all supplementary documentation to the unit's user, who assumes responsibility for retaining these instructions so that they are always available if required.

1.2. SAFETY INFORMATION AND INSTALLATION REQUIREMENTS

The unit must be installed by an approved specialist in compliance with the national legislation in force in the country of destination. Aereco shall not accept any liability for damage resulting from non-compliance with these instructions.

The unit must be installed so that maintenance and/or repair work can be carried out.

Before starting any work, it is necessary to READ THE INSTRUCTIONS CAREFULLY AND TO UNDERTAKE SAFETY CHECKS TO PREVENT ANY RISK. All
authorised personnel must be familiar with the work steps and risk that may occur when starting installation work on the unit.

1.3. WARRANTY

The unit warranty shall not cover the cost of motor ladders, scaffolding or other lifting systems which may be necessary to provide the services covered by the warranty. Give the following installation instructions and all supplementary documentation to the unit's user, who assumes responsibility for retaining these instructions so that they are always available if required. READ THESE INSTRUCTIONS CAREFULLY.
The unit must be installed by trained personnel in compliance with the national legislation in force in the country of destination.

It must be installed so that maintenance and/or repair work can be carried out. The warranty shall become void if work is carried out on the unit contrary to the instructions given here or in any other way without professional care.

No changes may be made to the unit as this may result in hazards and the manufacturer cannot be held liable for any damage caused.

1.4. TYPE PLATE

The heat pump is labelled with a technical type plate.

Caution
If the type plate or other elements that safely identify the product are changed, removed or go missing, installation and maintenance work will be more difficult.

1.5. INTRODUCTION

The Connect WP is a water-cooled heat pump that uses R410A refrigerant. This interior unit has a hermetic cooling circuit with an inverter rotary piston compressor, as well as a unit- and source-side plate heat exchanger. It is therefore perfectly designed to use waste heat from exhaust fans and offers the following benefits in particular:

Highly efficient
These units have been optimised for waste heat utilisation, whereby high levels of efficiency can be achieved.

Connections
All power and water connections are in the upper section of the unit, which makes installation and maintenance easier. By reducing the required space, the unit can also be positioned in minimal free space.

Quiet
The Connect WP units stand out given their quiet operation. The careful sound insulation of the unit using sound-absorbing material means the Connect WP series can be used in plant rooms.

Area of application
The exhaust air heat can be fed back to the building by the heat pump via a domestic hot water preheating stage and a return flow boost on the heating side. Combining these two heat sinks guarantees that as much heat is removed as possible and offers the opportunity to provide heat all year round. The Connect WP output is adjusted automatically to the heat quantity of the exhaust air.

2. UNIT DESCRIPTION

The Connect WP is a water-cooled heat pump that uses R410A refrigerant. This interior unit has a hermetic cooling circuit with an inverter rotary piston compressor, as well as a unit- and source-side plate heat exchanger. It is a single-circuit unit. A water filter, differential pressure controller and safety valve are all installed on the sink- and source-side as standard. Microprocessor-controlled regulation including LCD display allows the unit to be operated easily via the user menu.

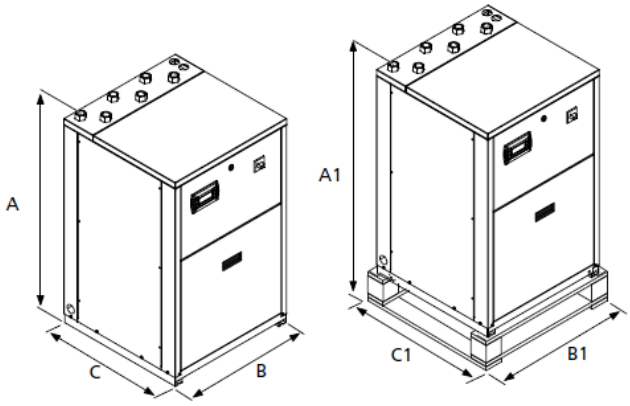
2.1. PLINTH AND LOAD-BEARING CONSTRUCTION

Consisting of elements made from hot-dipped galvanised sheet steel of the appropriate strength. All components feature a weather-resistant polyester powder coating (RAL 9002). During the design phase, it was ensured that all interior components are easily accessible. All housing plates are coated with sound-absorbing material of the appropriate thickness. The power and water connections are all located at the top of the unit. This makes them easily accessible for installation and maintenance work, and very little technical space is required given their space-saving layout.

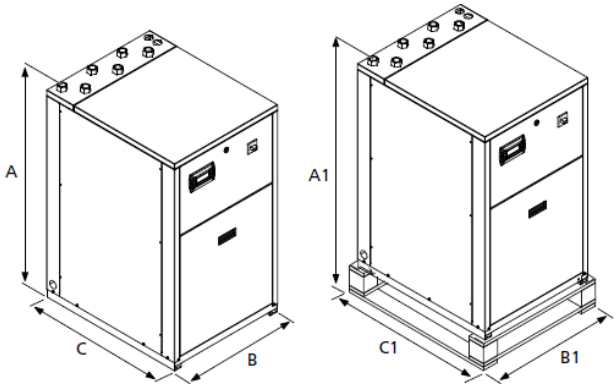
2.2. UNIT DIMENSIONS

2.2.1. HOUSING DIMENSIONS

Connect WP 120



Connect WP 130

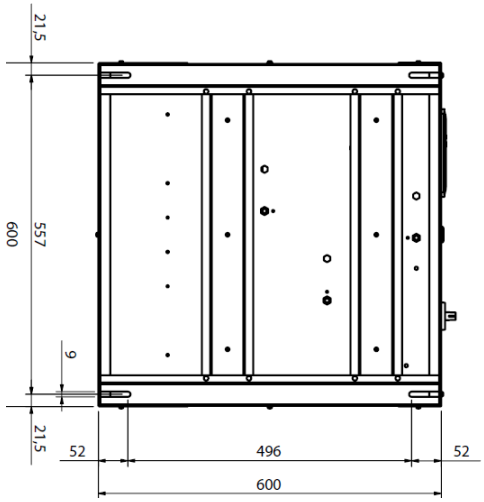


WP	Dimensions without pallet (mm)			Dimensions with Euro pallet (mm)		
Sizes	A	B	C	A1	B1	C1
120	976	605	603	1120	800	1200
130	1126	605	773	1120	800	1200

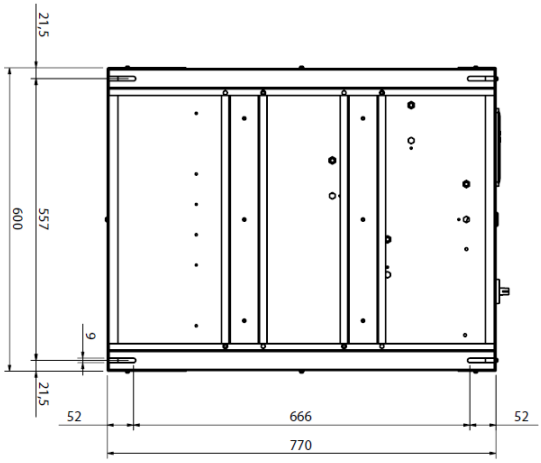
2.2.2. POSITION OF THE VIBRATION DAMPERS

To prevent structure-borne sound from being transferred to the installation surface, it can be helpful to fit the unit with vibration dampers. The intended fixing points are shown on the schematic.

Connect WP 120

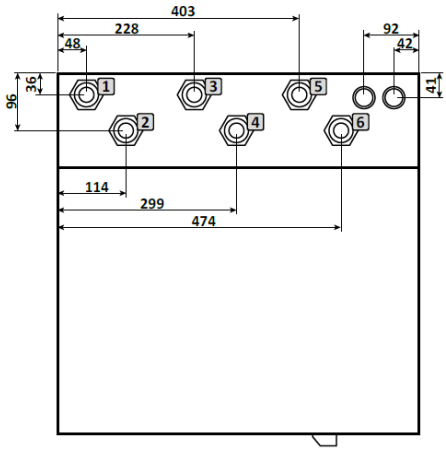


Connect WP 130

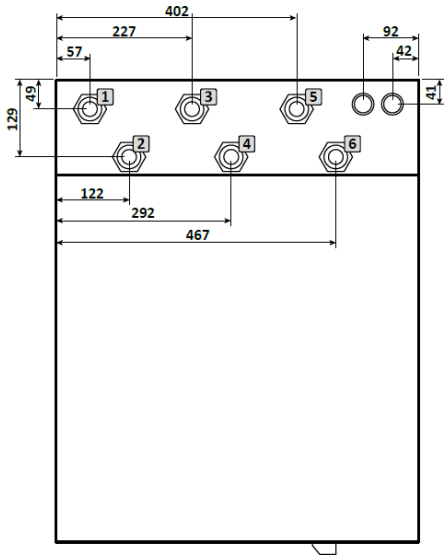


2.2.3. POSITION OF THE MEDIA CONNECTIONS

Connect WP 120



Connect WP 130



Connect	AWN connection side (brine)		Heating circuit connection side (hot water)	
Connection no.	1	2	3	4
All sizes	Outlet 1 1/4" IG	Inlet 1 1/4" IG	Outlet 1 1/4" IG	Inlet 1 1/4" IG

Connections 5 and 6 are not used.

2.3. COMPONENTS

2.3.1. REFRIGERANT CIRCUIT COMPONENTS

COMPRESSOR
A hermetic inverter rotary piston compressor that is highly efficient and uses an energy-saving DC electric motor. Mounted on elastic vibration-damping compensators.

COMPRESSOR INVERTER MODULE
The inverter module infinitely controls the compressor speed using the sensor-controlled power specification on the system controller. This means the compressor motor is continually monitored and protected from damage.

CONDENSER
Featuring a plate structure (stainless steel, 1.4401). Featuring closed cellular insulation material on the outside to minimise heat loss.

EVAPORATOR
Featuring a plate structure (stainless steel, 1.4401). Featuring closed cellular insulation material on the outside to minimise heat loss and to prevent condensate formation.

REFRIGERANT COLLECTOR
A refrigerant collector ensures a bubble-free liquid upstream of the expansion valve in all performance ranges.

FILTER DRYER
A hermetic-mechanical filter dryer with cartridges made of ceramic and hygroscopic material retains impurities and any traces of moisture present in the cooling circuit.

THERMOSTATIC EXPANSION VALVE
The mechanical expansion valve with external pressure compensation regulates the gas flow to the evaporator depending on the thermal load to ensure the intake gas overheats to a sufficient degree.

REFRIGERANT SIGHT GLASS WITH HUMIDITY INDICATOR
Used to check the refrigerant fill level and any possible humidity in the cooling circuit.

2.3.2. WATER CIRCUIT COMPONENTS

<table>
<tr><th>SINK CIRCUIT (HOT WATER)</th><th>SOURCE CIRCUIT (AWN BRINE CIRCUIT)</th></tr>
<tr><td colspan="2">WATER FILTER
A steel filter net prevents the heat exchangers from clogging.</td></tr>
<tr><td></td><td>DIFFERENTIAL PRESSURE CONTROLLER
A differential pressure sensor allows continuous water circulation to be controlled in the AWN heat exchanger circuit. In the event of a fault, the cooling circuit is switched off.</td></tr>
<tr><td colspan="2">SAFETY VALVE (6 BAR)
In the event of pressure faults in the brine and heating water pipes, a safety valve is triggered and excess pressure is released. This can be connected to a drain on site.</td></tr>
</table>

	BRINE CIRCUIT EXPANSION VESSEL For the brine circuit, an expansion vessel (membrane type) is already integrated in the heat pump and pre-filled with nitrogen. The expansion vessel must be adapted to the existing system pressure during commissioning.
VENTILATION VALVE Used to manually vent the system.	
DRAIN COCKS To drain the system (heating water circuit and brine circuit), drain lines with cocks are provided at the lowest points of the two heat exchangers for service and decommissioning purposes.	
BUFFER CHARGE PUMP A hot water feed pump provides an available external feed pressure to overcome pressure losses outside the heat pump in the heating circuit between the heat pump and the hot water buffer. The feed volume of this high-efficiency energy-efficiency pump is adjusted by the electronic system control by means of a PWM signal.	AWN PUMP A brine feed pump provides an available external feed pressure to overcome pressure losses outside the heat pump in the brine circuit between the heat pump and the AWN module. This high-efficiency energy-efficient pump must be adjusted to the respective hydraulic losses during commissioning. Instructions on how to do this are also included with the unit.
HEAT METER VOLUME MEASURING UNIT A heat meter determines the volume flow of the heating water in the heat pump and its temperature at the heat pump heating water outlet. An additional temperature sensor is fitted at the heating water inlet. The respective measurement data is transferred to the unit control system. The quantity of heat discharged is calculated from the volume flow and the temperature difference.	

2.3.3. CONTROL AND SAFETY COMPONENTS

LOW-PRESSURE PRESSURE SWITCH
This device fixed on the low-pressure side of the cooling circuit stops the compressor from running if the normal operating pressure range is undershot.

HIGH-PRESSURE PRESSURE SWITCH
This device fixed on the high-pressure side of the cooling circuit stops the compressor from running if the normal operating pressure range is overshot.

ELECTRONIC CONTROL AND SWITCH PANEL
The heat pump is equipped with a power switch and control cabinet according to standard EN 60204-1/IEC 204-1, including:

- Door lock disconnect switch
- Circuit breaker or motor protection switch for compressors
- Terminals for connecting the external temperature sensors
- Terminals for connecting external components such as heating circuit pump or heating circuit mixer
- Terminals for boiler/heating resistors alarm signal input,
- Terminals for external WP release by the AWN

ELECTRONIC CONTROL UVR 1611

The unit control panel allows plant operating parameters to be adjusted quickly and intuitively. The display shows various indications of the operating mode, set parameters and any alarms triggered. All standard settings and any changes are saved in the controller control panel.

After a power failure, the unit is able to restart automatically and retains the original settings.

Some accesses are password-protected and are only available for technical customer service. The electronics also include a range of protection algorithms to prevent damage to key plant components.
Further information can be found in the operating instructions for the UVR module.

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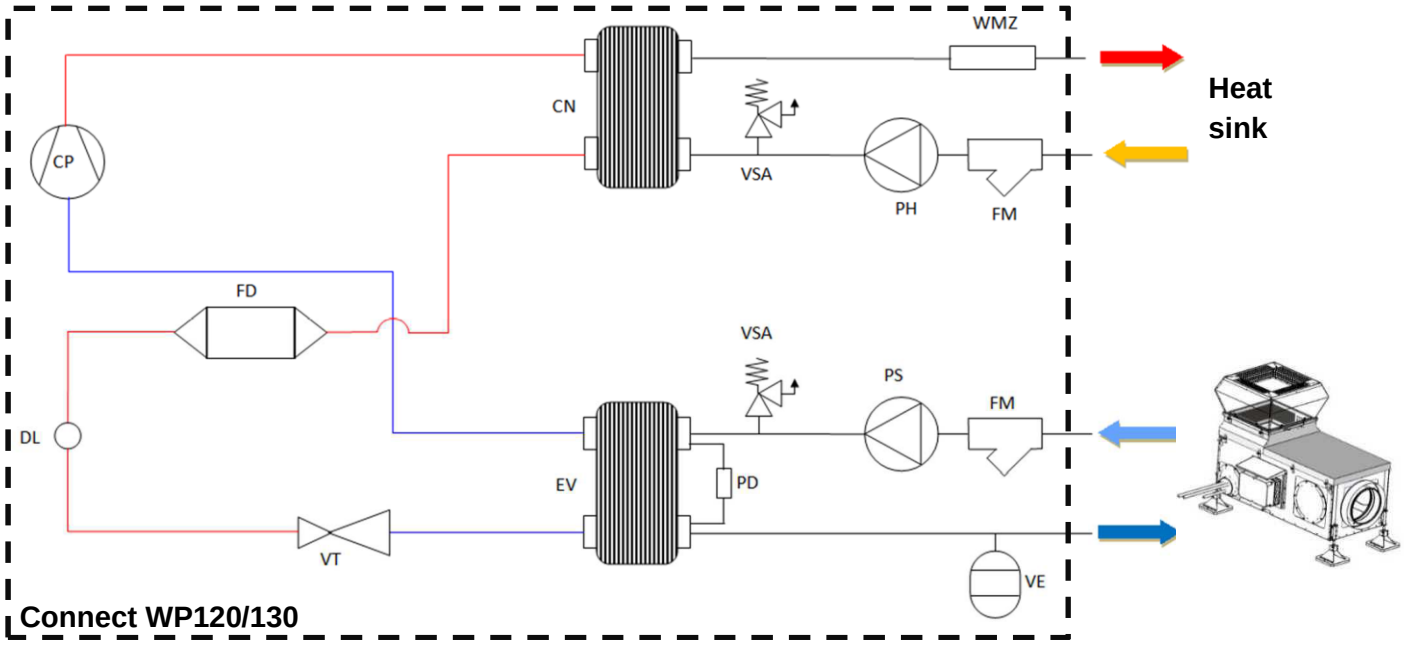
2.4. **TECHNICAL DATA**

	Connect WP120	**Connect WP130**
PERFORMANCE DATA		
Nominal heat output/COP A20/W35	6.06 kW / 5.66	13.62 kW / 5.33
A20/W35 modulation output range	3.25-8.62 kW	4.83-22.28 kW
Modulation range of exhaust air volume flow (effective)	480-1,800 m³/h	1,250-4,500 m³/h
Exhaust minimum volume flow (effective)	480 m³/h	1,250 m³/h
Max. electrical power consumption	2.25 kW	6.2 kW
Max. flow temperature	55°C	55°C
Housing radiation sound output	52 dB(A)	58 dB(A)
Sound pressure level at 3 m distance	31 dB(A)	33 dB(A)
BRINE CIRCUIT		
Brine circuit water volume flow	1,340 l/h	2,760 l/h
Available external feed pressure	52 kPa	48 kPa
Medium	Ethylene glycol 35%	Ethylene glycol 35%
Flow/return connections	1 ¼" IG	1 ¼" IG
HEATING CIRCUIT		
Heating circuit water volume flow (max.)	1,805 l/h	3,155 l/h
Available external feed pressure	48 kPa	42 kPa
Medium	Hot water	Hot water
Flow/return connections	1 ¼" IG	1 ¼" IG
COOLING CIRCUIT DATA		
Refrigerant	R410A	R410A
Refrigerant fill level	1.6 kg	2.39 kg
Compressor type	Inverter rotary piston	Inverter rotary piston
Max. system pressure	42 bar	42 bar
ELECTRICAL DATA		
Maximum power consumption	10.2 A	
Power supply	230 V /1/ 50 Hz	
cable connection	3G2.5 mm² (max. cable length 20 m)	
Main switch	25 A	
DIMENSIONS		
Height (A)	0.976 m	1.13 m
Width (B)	0.605 m	0.6 m
Depth (C)	0.603 m	0.77 m
Net weight	95 kg	140 kg

All data for exhaust air at 20°C and 50% rel. humidity.

2.5. HEAT PUMP CIRCUIT AND WATER CIRCUIT



Key

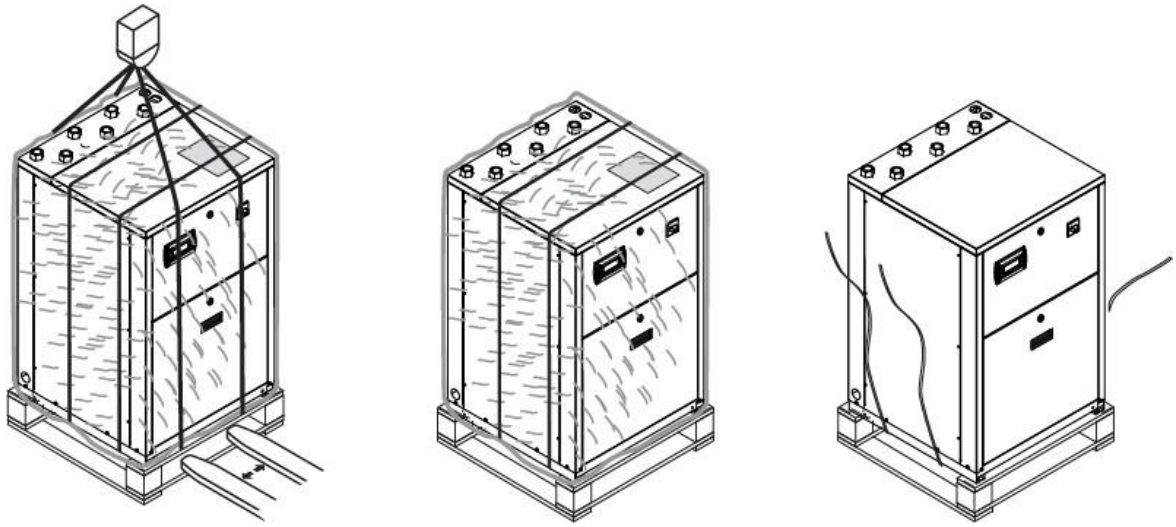
CP	Compressor
CN	Condenser
DL	Refrigerant sight glass
EV	Evaporator
FD	Filter dryer
FM	Water filter
PD	Differential pressure switch for brine circuit flow
monitoring PH	Heating circuit charge pump
PS	Brine circuit pump
VE	Brine circuit membrane expansion vessel
VSA	Pressure relief valve
VT	Expansion valve
WMZ	Heat meter volume measuring unit FTS

3. RECEIVING AND MOVING THE UNIT

The unit is shipped ex works wrapped in foil. Before moving the unit, the load capacity of the hoists used must be checked. The unit may only be moved by qualified and suitably equipped personnel.

3.1. **HANDLING THE UNIT:**

If belt lifting is to be used, place protective parts between the belt and the housing to prevent damage to the structure. All coverings must be firmly secured before handling the unit. Before lifting, the specific weight must be checked on the technical type plate. Use all specified lifting points and only these points. Use ropes of the same length in accordance with the regulations. Use a spacer that complies with the regulations (not included). Handle the unit carefully and without jerking.



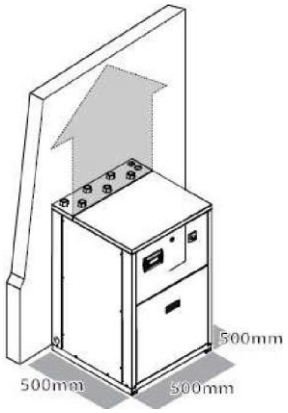
3.2. **CHOOSING THE INSTALLATION SITE**

The units are subjected to a final inspection at the factory and only need to be connected to the electricity and water supply at the installation site.

Before the unit is installed, its installation location must be agreed with the customer, and the following points must be observed:

- ⚠ The supporting surface must be able to withstand the weight of the unit.
- ⚠ The safety distances between the units and other devices or building elements must be strictly observed.
- ⚠ The device must be installed by a technician in accordance with the applicable national laws of the country of use.
- ⚠ The technically required minimum clearances must be provided in order to allow work to be carried out for REGULAR AND EXTRAORDINARY MAINTENANCE.
- ⚠ It should be noted that the refrigeration unit may transmit vibrations during operation; it is therefore recommended that the vibration damping brackets are attached to the base in accordance with the installation diagram.
- ⚠ When securing the unit, check carefully that it is balanced.

3.3. **MINIMUM SPACE REQUIREMENT**



CAUTION!

& It is strictly forbidden to stay below the elevated unit.
& The units must NOT be stacked.
& The unit must be installed in such a way that maintenance and/or repair operations are possible.
& The drawings are for illustrative purposes only.
& The specified technical minimum distances must be observed; height and rear side must be designed according to the type of installation and the installation site.
& The device must be installed in a technical room or a room with at least one drain.

4. INTEGRATION IN THE BUILDING HEATING SYSTEM

To best use the Connect WP exhaust air heat pump, we recommend hydraulically integrating it into the building heating system as shown in the system diagrams below. The device always operates in the optimum power range and with the highest efficiency. Seasonal changes in heating and hot water requirements are automatically recorded and adjusted. Due to this type of integration of the system, the building heating technology remains virtually unaffected.

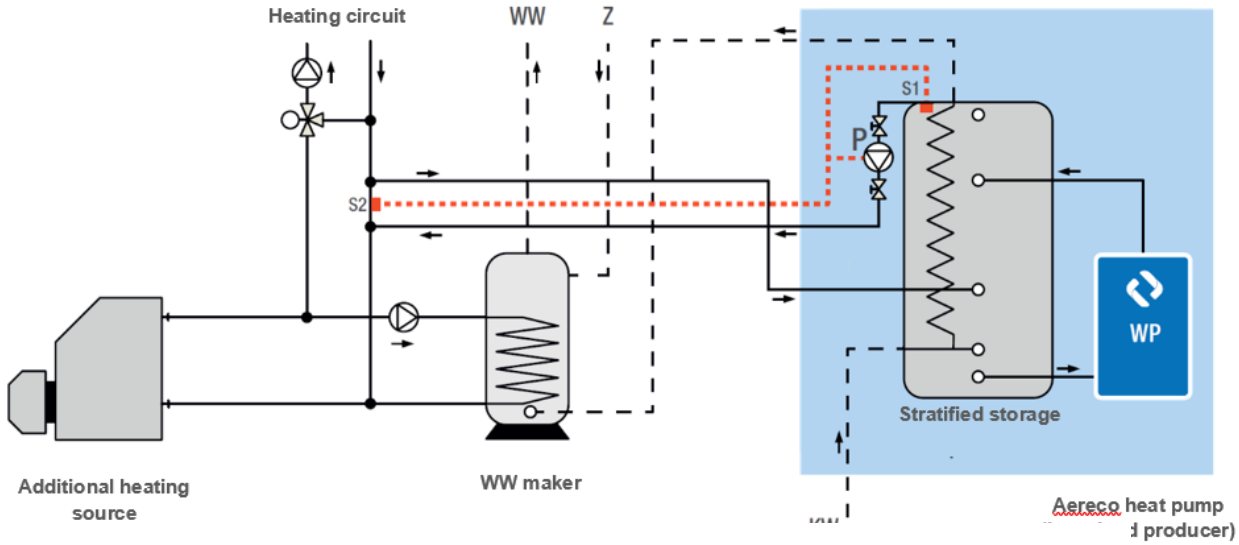
4.1. RECOMMENDATION AND SYSTEM DIAGRAM WITH AWN STRATIFIED STORAGE

To integrate an AWN in the heat supply of a building, Aereco recommends a combination with a stratified storage tank with discharge system and preheating stage for domestic hot water (DHW). This enables both an increase in the return flow of the heating circuit during the heating period and support for hot water preparation throughout the year. As a result, the heat sink available to the AWN is maximised, as are running times and contribution margins.

With this concept, it is not necessary to communicate with the components in the rest of the heating system. An independent controller measures the temperature in the upper section of the stratified tank (S1) and the heating water return (S2) in the heating circuit installed on site. The controller takes these measured variables into account and controls the discharge pump (P) so that the heating water return flow is always increased (S1 > S2).

DW preheating is automatically ensured by passing through a stainless-steel coil in the stratified storage tank. The cold water (CW) is thus heated and then enters the water heater. Due to the small volume in the preheating, this stage can be designed as a purely continuous system. A DW storage tank with an internal heating water coil (storage system) would be considerably less efficient for preheating.

The heating water pump integrated in the exhaust air heat pump constantly pumps the heat via the heating water into the stratified storage tank, where a simplified diagram is shown for use with central heating and hot water preparation. In the case of deviating concepts, it is possible and necessary to appropriately adapt the integration logic.



⚠ The respective concrete dimensioning and implementation only results from an individual viewpoint. This drawing is to be understood as a non-binding planning proposal and does not replace any execution planning. The shut-off and safety devices required for professional installation are not included.

4.2. SETTINGS FOR USE WITH STRATIFIED STORAGE

If the Connect WP is integrated into the building heating system according to the above recommendation (see concept sketch 4.1), the factory settings do not have to be adjusted. Only the following steps need to be taken:

- Attach the temperature sensor to the lower part of the buffer tank and connect it to input terminal 6 (see circuit diagram).
- Ensure the buffer tank discharge pump (“P” in concept sketch 4.1) is regulated as described above.

4.3. SETTINGS FOR USE WITHOUT STRATIFIED STORAGE

Deviating from the recommended system diagram (4.1), the unit can also be used in conjunction with separate heating and domestic hot water storage tanks. The addition of an outdoor temperature sensor enables dynamic temperature control of the treated water and thus increases the energy efficiency of the system in this integration variant. In this case, the following steps must be carried out:

- Remove the cable bridge on input terminal 16
- Fit an outdoor temperature sensor to input terminal 12 (see circuit diagram)
- Attach the temperature sensor to the lower part of the buffer tank and connect it to input terminal 6 (see circuit diagram)
- Attach sensor 4 to the domestic hot water storage tank (see circuit diagram)
- Assemble and install the 3-way switch-over valves for switching between heating and domestic hot water preparation (see circuit diagram)
- Set the value for the outlet temperature during hot water preparation to the desired setpoint (see UVR module instructions)
- Set the desired heating curve for the heating backup (see UVR module instructions)
- Set the desired hot water temperature (see UVR module instructions). The

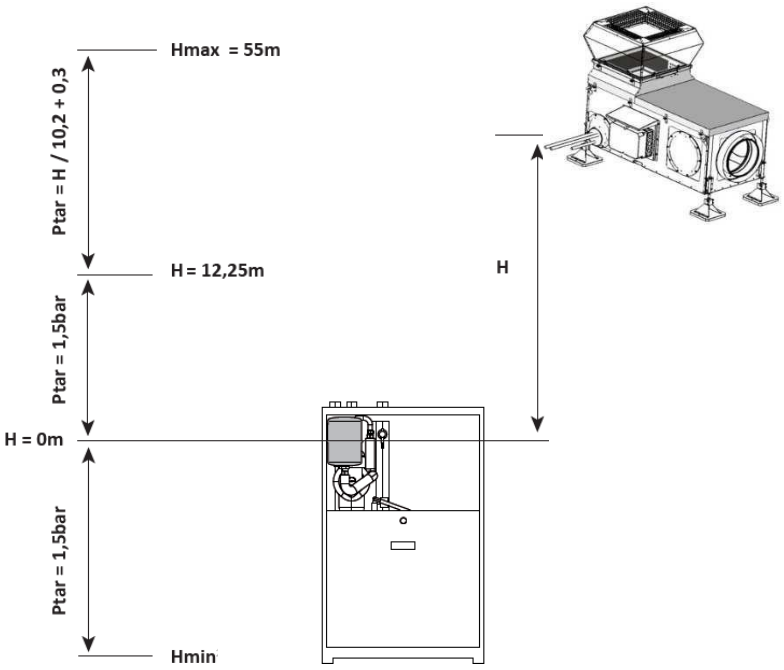
corresponding circuit diagrams are included with the respective unit.

4.4. SETTING THE EXPANSION VESSEL

The standard value for the preload pressure of the expansion vessel is 1.5 bar, the maximum value is 6 bar.

Adjust the vessel according to the maximum difference in height (H) of the consumption point (see figure) according to the following formula:

$$p_{setting}[bar] = H[m] + \frac{0.3}{10.2}$$



If, for example, the value of the height difference H equals 20 m, the setting value of the vessel is 2.3 bar.
If the setting value obtained by the calculation is less than 1.5 bar (i.e. for H < 12.25), the standard setting must be retained. For height differences of over 55 m, a special solution must be
determined. The pressure relief valve and expansion vessel are not designed for this purpose.

Key

Hmax	Ensure that the highest consumption point does not exceed the height difference of 55 metres.
Hmin	Ensure that the lowest consumption point can withstand the total pressure at this point.

Reference operating conditions:

Max. water temp. = 60°C,
Min. water temp. = 15°C

4.5. INTEGRATION WARNINGS

CAUTION
Based on expertise, the selection and installation of components outside the unit is the responsibility of the installer, who must work in accordance with good engineering practice and the regulations in force in the country of destination.

CAUTION
The connecting pipes to the machinery must be adequately dimensioned for the actual water flow required by the system when in operation. The water flow at the heat exchanger must always be constant. In particular, pressure loss values must be subjected to the correction factors specified under 0 for the glycol content present.

CAUTION
Clean the unit thoroughly before connecting it. This cleaning allows any possible residues, such as welding beads, secretions, rust or other impurities, to be removed from the pipes. These substances may otherwise accumulate inside the unit and lead to the unit malfunctioning.

CAUTION
The connecting lines must be adequately supported so that their weight does not burden the unit.

CAUTION
In the event of system downtime, the water contained in the heat exchanger may freeze and cause irreparable damage to the source-side heat exchanger (AWN circuit). To avoid the danger of freezing, there are three possible solutions:

1. **Fully draining the water** from the unit.
2. **Operating with glycolised water**, with a glycol content selected according to the minimum external temperature.
3. **Using resistors.** In this case, the resistors must always be live whenever there is the possibility of frost (machine in standby mode).

CAUTION
If the AWN fan fails (loss of power or fault), ensure that the heat pump also switches off. Otherwise the system may be damaged. For this purpose, a release signal must be transmitted from the AWN to the Connect WP via a potential-free contact (see below).

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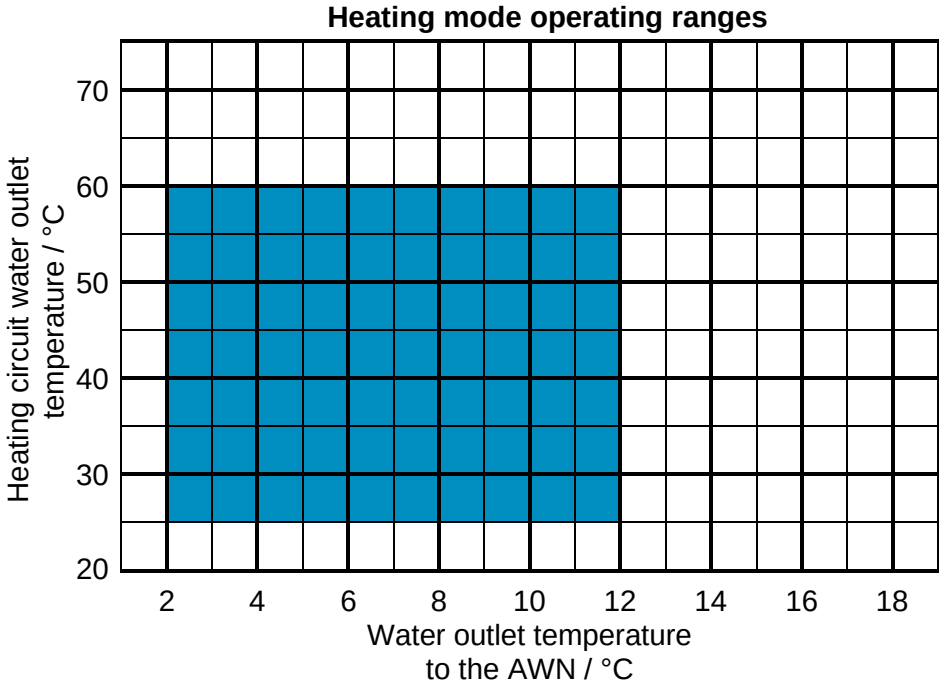
5. OPERATING RANGE AND OPERATING LIMITS

In its standard configuration, the unit is not suitable for installation in a salty environment. The operating limits refer to a temperature difference at the evaporator and at the condenser of ∆t = 5°C. Whenever the unit is to be operated outside the operating range, we recommend that you contact our technical service department beforehand.
For further information, please refer to the table of power ratings and power consumption deviating from the nominal value in the corresponding chapter.



When operating under full load, the Connect WP provides hot water up to 60°C. An efficiency limit is pre-programmed at the factory, which switches off the heat pump at a buffer memory temperature of 45°C (bottom). This can be adapted on site or during commissioning. This is particularly suitable for operation with own electricity (e.g. from photovoltaics). Please refer to the technical documentation for further details.

5.1. REQUIREMENTS FOR SOURCE AND SINK MEDIA

In order to ensure the Connect WP operates faultlessly for many years, we strongly recommend filling the two system circuits (AWN brine circuit and heating water charge circuit) with softened and desalinated water. This serves to protect against corrosion and contamination of the heat exchanger. The following limit values must be adhered to:

pH value	7.5-9
Electrical conductivity	100-500 µS/cm
Total hardness	4.5-8.5 dH
Temperature	< 65 °C
Oxygen content	< 0.1 ppm
Glycol percentage	< 50%
Phosphate (PO4)	< 2 ppm
Manganese (Mn)	< 0.05 ppm
Iron (Fe)	< 0.3 ppm
Alkalinity (HCO3)	70-300 ppm
Chlorine ions (Cl-)	< 50 ppm
Sulphate ions (S)	< 50 ppm
Sulphide ions (S)	None
Ammonia ions (NH4)	None
Silicon dioxide (SiO2)	< 30 ppm

5.2. OPERATING WITH ANTIFREEZE

5.2.1. ETHYLENE GLYCOL SOLUTIONS

CORRECTION FACTORS WITH ETHYLENE GLYCOL SOLUTIONS – HEATING											
Freezing point	°C	0	-3.63	-6.10	-8.93	-12.11	-15.74	**-19.94**	-24.79	-30.44	-37.10
Ethylene glycol percentage	%	0	10	15	20	25	30	**35**	40	45	50
Qwh	-	1.000	1.027	1.038	1.050	1.063	1.078	**1.095**	1.114	1.135	1.158
Ph	-	1.000	1.000	1.000	1.000	1.000	1.000	**1.000**	1.000	1.000	1.000
Pa	-	1.000	1.002	1.003	1.004	1.005	1.007	**1.008**	1.010	1.012	1.015
Dp	-	1.000	1.087	1.128	1.175	1.227	1.286	**1.353**	1.428	1.514	1.610

Qwh: Correction factor for water flow (average water temperature 42.5 °C)
Ph: Correction factor for heating capacity
Pa: Correction factor for power consumption
Dp: Correction factor for pressure losses

5.2.2. PROPYLENE GLYCOL SOLUTIONS

CORRECTION FACTORS WITH PROPYLENE GLYCOL SOLUTIONS – HEATING											
Freezing point	°C	0	-3.43	-5.30	-7.44	-9.98	-13.08	-16.86	-21.47	-27.04	-33.72
Propylene glycol percentage	%	0	10	15	20	25	30	35	40	45	50
Qwh	-	1.000	1.008	1.014	1.021	1.030	1.042	1.055	1.071	1.090	1.112
Ph	-	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Pa	-	1.000	1.003	1.004	1.005	1.007	1.009	1.011	1.014	1.018	1.023
Dp	-	1.000	1.050	1.077	1.111	1.153	1.202	1.258	1.321	1.390	1.467

Qwh: Correction factor for water flow (average water temperature 42.5 °C)
Ph: Correction factor for heating capacity
Pa: Correction factor for power consumption
Dp: Correction factor for pressure losses

7. INSTALLATION

7.1. ON-SITE INSTALLATION REQUIREMENTS

Before the heat pump can be installed, the following prerequisites must be fulfilled by the customer:

1. Electrical connections have been made in accordance with local public utility regulations, including the necessary fuses.
2. The electrical wiring between the on-site components, including the data line, has been fully and continuously produced.
3. The heat pump is connected on the source side and the sink side. Strainer and pipe network are installed. The connected circuits are filled and vented.
4. Signal line for releasing the WP by the AWN is routed accordingly and connected to the AWN.
5. General basic requirements at the installation site such as sufficient lighting, power supply, accessibility, etc., are guaranteed.
6. External services that must be provided by other specialist companies, such as MSR, ventilation, etc., must be available during commissioning.
7. Sufficient heating load (min. 50%) is permanently available during installation to enable the heat pump and its safety device to be checked.
8. Information on the adjacent hydraulic losses of the brine pipeline (AWN circuit) is available.

7.2. INDIVIDUAL STEPS TO BE COMPLETED DURING INSTALLATION

1. System check (visual inspection), e.g. checking on-site services, etc.
2. Check the factory-set control parameters and adjust to local conditions.
3. Connect the external WP release by the AWN (input 8).
4. Connect the potential-free fault signal (output 13) to the BMS.
5. Adjust the energy efficiency pump for the AWN brine circuit to the hydraulic losses.
6. Electrical test of the supply, control and electrically acting safety devices in dry operation (without compressor operation).
7. Refrigeration test of safety devices such as high-pressure/low-pressure devices.
8. Start up the heat pump and log the measured data (temperatures, pressures, current consumption of all consumers).
9. Leak test according to Regulation (EC) No. 842/2006 of the cooling circuit(s) by means of suitable measuring instruments or suitable measuring methods. Document the inspection.
10. Instruct the operator or a representative. Instruction is given with regard to the operation of the heat pump, the function of the safety devices and behaviour in the event of accidents or faults.

7. MAINTENANCE AND SERVICE

7.1. EXTRAORDINARY MAINTENANCE

The Connect units are factory filled with R410A gas and fully tested. As per standard conditions, technical service does not need to intervene to check the cooling gas. Over time, small losses may occur at the joints causing the refrigerant to leak, draining the circuit. This will cause the unit to malfunction. In these cases, the refrigerant outlet points must be determined, repaired and the cooling circuit replenished.

The following procedure should be used for filling:

- Empty and drain the entire cooling circuit. Use a vacuum pump connected to both the low- and high-pressure ports until the negative-pressure gauge reads approximately 10 Pa. Wait a few minutes and make sure that said value does not rise above 50 Pa again.
- Connect the cooling gas cylinder or filling cylinder to the connection on the low-pressure line.
- Add the quantity of cooling gas specified on the unit type plate.
- After a few hours of operation, check that the liquid indicator indicates that the circuit is dry (dry – green). In the case of partial losses, the circuit must be completely emptied before being refilled.
- The refrigerant R410A may only be added when liquid.
- Operating conditions that deviate from the nominal values lead to deviating values.
- A leak test or leak detection may only be carried out with refrigerant R410A and suitable leak detection devices.
- The use of oxygen, acetylene or other flammable or toxic gases in the cooling circuit is prohibited, as this can lead to explosions and poisoning.

⚠ **CAUTION**

Safety checks, maintenance work and repairs may only be carried out by a legally qualified technician.

Inadequate inspections/maintenance work can lead to damage to objects and persons.

7.2. **REGULAR MAINTENANCE**

Disconnect the unit from the electrical power supply prior to undertaking any cleaning work. Before starting work, make sure that there is no live voltage. Periodic maintenance is essential to keep the unit fully functional, both from a functional and energy point of view. It is therefore essential to provide **annual checks** for:

	Test object	**Target state**	**Measure for deviation from target**	Remarks
Heating water circuit	Water circuit	Filled	Filling the water circuit	
		Air-free	Ventilate	
	Water filter	Residue-free	Cleaning the water filter	
	Thermal insulation of water pipes	available, not damaged	Replacement	
Brine circuit	Glycol concentration	35% (if not specified otherwise)	Adjustment	
	Evaporator	Constant water flow rate	Cleaning the water filter	
	Flow monitor	Electrical contact connected during operation	Clean the water filter, check proper operation of the pump, shut-offs in the pipeline network must be open	
Electric	Fuses	Work correctly	Replacement	
	Supply voltage	According to technical data	Adjustment	
	Power consumption	According to technical data	Investigate causes, inform customer service	
	Connections	Seated firmly	Check for damage and remedy it, fasten the connections	
Refrigerant circuit	Compressor	Condition unremarkable	Inform customer service	
	Operating pressure	According to technical data	Inform customer service	
	Circuit[1]	Tight, leak-free	Inform customer service, remedy leak, refill	
	Max./min. pressure switch	Work correctly	Replacement	
	Filter dryer	Work correctly	Replacement	
	Refrigerant sight glass	Filling quantity ok and dry (visual inspection)	Refill	
Sum of components	Screws, compressors, switch boxes, housing, etc.	Seated firmly	Mounting (no noise development)	
	Overall appearance	No rust spots, etc.	Treat affected surfaces with suitable paints	

A leak test is not mandatory according to EU regulation 517/201.

Approved refrigerants
It is forbidden to fill the refrigerant circuits with a refrigerant other than the one specified. Using a refrigerant other than R410A can seriously damage the compressor.

System logbook
We recommend that you keep a system logbook, which can be used to trace the operations carried out on the unit. This means interventions can be organised more easily, searches can be made easier and machine defects can be avoided. The date, type of intervention carried out (regular maintenance, inspection or repair), description of the intervention, measures taken, etc., should be entered in the system logbook.

Disposal
The unit must be disposed of in accordance with the regulations in force in the individual countries.

8. STANDARDS AND GUIDELINES

Safety

Machinery Directive 2006/42/EC Low

Voltage Directive 2006/95/EC

Electromagnetic Compatibility (EMC) Directive 2004/108/EC Pressure

Equipment Directive PED 97/23/EC, EN 378, DIN EN 14276

Electric

EN 60204-1

Acoustic

Sound power (EN ISO 9614-2) Peak

Sound Pressure Level (EN ISO 3744)

Refrigerant

This unit contains fluorinated greenhouse gases covered by the Kyoto Protocol. Maintenance and disposal work may only be carried out by qualified personnel.

Notes:

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