



TECHNICAL MANUAL INSTALLATION AND MAINTENANCE INSTRUCTIONS

AWN ECO+



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 meet the requirements of the Machinery Directive (2006/42/EC) with regard to safety. The quality level is continually monitored and Aereco products therefore represent safety, quality and reliability.

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. Therefore, no claims can be derived from the text information, illustrations or drawings. Errors reserved. Read these operating instructions in their entirety and keep them in a safe place for future reference.

In addition to the provisions of these operating instructions, other applicable rules must also be observed. This applies in particular to rules for accident prevention, recognised technical rules and safety rules (DIN, VDI, VDE, etc.).

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Product designation: AWN Eco+ 111 / AWN Eco+ 121 / AWN Eco+ 131

Type: Constant-pressure-controlled exhaust air unit with integrated, source-controlled exhaust air/water heat pump

Application purpose: Exhaust air conveyance and simultaneous use of exhaust air heat in outdoor areas in collective dwellings. The use of exhaust air heat serves to support the heat supply in bivalent heat supply systems.

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1. GENERAL INFORMATION

The AWN Eco+ range has been manufactured in accordance with technical standards and recognised safety regulations. It was developed to recover heat from exhaust air systems and to heat heating water to support building heating and domestic hot water preparation and is to be used for these purposes. Any use not expressly stated in this manual shall not be permitted.

Any contractual and extra-contractual liability of Aereco for damage to persons, animals or property as a result of installation, adjustment and maintenance errors or improper use shall be excluded.

1.1. SCOPE OF APPLICATION

These assembly instructions apply only to the article described and under no circumstances to the complete system. Relationships to other system components are displayed, if necessary, in diagrams and in the text. However, this is only done to clarify the overall context. Further assembly instructions as well as assembly instructions from manufacturers of other devices must be strictly observed.

1.2. INSTRUCTIONS FOR USE

Before starting any work, read this manual carefully and undertake any necessary safety checks to prevent any risk.

We reserve the right to make changes to the design and technical data. Said changes are also effective without prior notice. Therefore, no claims can be derived from the text information, illustrations or drawings. Errors reserved.

In addition to the provisions of these assembly instructions, other applicable rules must also be observed. This applies in particular to rules for accident prevention, recognised technical rules and safety rules (DIN, VDI, VDE, etc.). All works are to be carried out by specialist personnel in accordance with the provisions in force applicable to each country.

The 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.

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2. INTENDED USE

This unit is designed for use as an exhaust air heat pump in multi-storey residential buildings. It may only be operated in exhaust air systems with normal air (low dust content) up to 40°C conveying medium temperature. For proper and efficient use, the unit requires a minimum exhaust air volume that is always present (see the Technical data/minimum exhaust air volume flow section).

On the heating side, the lowest possible system temperatures are an advantage. If the operated heat sink is not extremely large, a stratified storage tank must be connected to the device to ensure efficient operation and long heat-pump running times. We recommend a capacity of 300 litres and use in conjunction with a low-temperature heating system. The unit can only provide heat input if a sufficiently large heat sink is available. The unit's operating limits must be taken into account here. It is not possible or permitted to prepare domestic hot water using this unit alone. The applicable regulations for domestic hot water hygiene must always be observed.

The unit is approved exclusively for outdoor installation on the flat roof of a building with a maximum building height of 60 m (Eco+ 111/ Eco+ 121) & 50m for Eco+ 131. Installation in zones other than wind zones 1-3 (DIN EN 1991-1-4:2005) is not permitted.

The procedures described in these assembly instructions for assembly, operation and maintenance must also be observed when using the unit for its intended purpose. Please read all the assembly instructions before starting work. Modifications and alterations are only permitted with our written approval.

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. The unit must be installed by trained personnel in compliance with the national legislation in force in the country of destination.

The unit must be installed in such a way 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.

Approved refrigerants

It is forbidden to fill the refrigerant circuits with a refrigerant other than the one specified. Using another refrigerant 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. In this way, 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.

3. SAFETY REGULATIONS

The unit is not a complete machine and is therefore not a ready-to-use product. It may only be operated if it is connected to an air conditioning system and a permissible heat sink in accordance with these instructions.

Assembly, electrical installation and repair may only be carried out by trained specialist personnel. Only operate the device in the areas indicated on the type plate or in the technical data.

Only use the device for its intended purpose. Planners, system constructors or operators are responsible for proper and safe installation and operation. Safety components, e.g. protective grids, must not be bypassed or rendered inoperative.



Before starting any work, read this manual carefully and undertake any necessary safety checks to prevent any risk.



All persons carrying out work on the device must be physically, healthily and professionally apt, and must be equipped with suitable personal protective equipment (PPE). Adequately ensure it is not possible to fall off the building.



The unit is largely made of sheet metal and has sharp-edged components due to the production process. These do not represent a hindrance or risk of injury when used as intended. During assembly, however, contact with these components can lead to injuries. Therefore, fitters should always wear protective gloves when working on the unit.



Only open the unit when it is switched off. During operation, and when the fan is running on, there is negative pressure in the housing.



The device generates heat. Parts of the unit, especially inside the compressor housing, can become very hot.



When working on the roof, ensure that all parts detached from the unit cannot be blown away or fall.

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

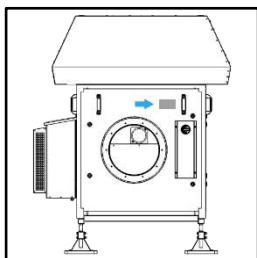
With regard to the selection of protective devices (e.g. miniature circuit breakers), cable cross-sections, earthing, measurements to be carried out, etc., DIN VDE, BG, EVU and VDS regulations, as well as the generally recognised rules of technology must be followed and observed. The planning/exercise or the observance of these is carried out exclusively by specialist planners/engineering offices/installers.

4. UNIT DESCRIPTION

The AWN Eco+ is an exhaust fan with integrated exhaust air heat pump for outdoor installation. The exhaust fan is intended for conveying exhaust air from apartments at a constant negative pressure. The AWN Eco+ continuously adjusts its output to the existing exhaust air volume flow.

The unit includes a water-cooled heat pump that operates with R410A refrigerant in a hermetic cooling circuit with inverter rotary piston compressor. It is a single-circuit unit with hermetic cooling circuit and inverter rotary piston compressor, as well as a plate heat exchanger on the system side and a lamella heat exchanger on the source side (direct evaporator). Two automatic vent valves as well as a safety valve (3.0 bar) are installed on the sink side as standard. Microprocessor-controlled regulation including LCD display allows the heat pump components to be operated easily via the user menu. The exhaust fan can be regulated via a separate control unit.

4.1. TYPE PLATE



The unit is labelled with a technical type plate.

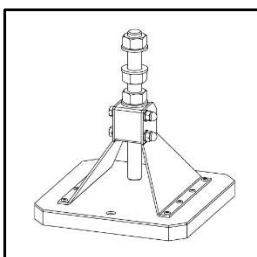


Do not modify or remove the type plate.

4.2. LOAD-BEARING CONSTRUCTION AND ERECTING DEVICE

The construction is based on a hot-dip galvanized steel frame of appropriate thickness. All other parts in contact with the environment are made of sufficiently corrosion-resistant materials. To lift the unit, eye bolts must be attached to the top corners of the frame. (These must be removed after installation and the remaining openings must be closed with the enclosed cover caps.)

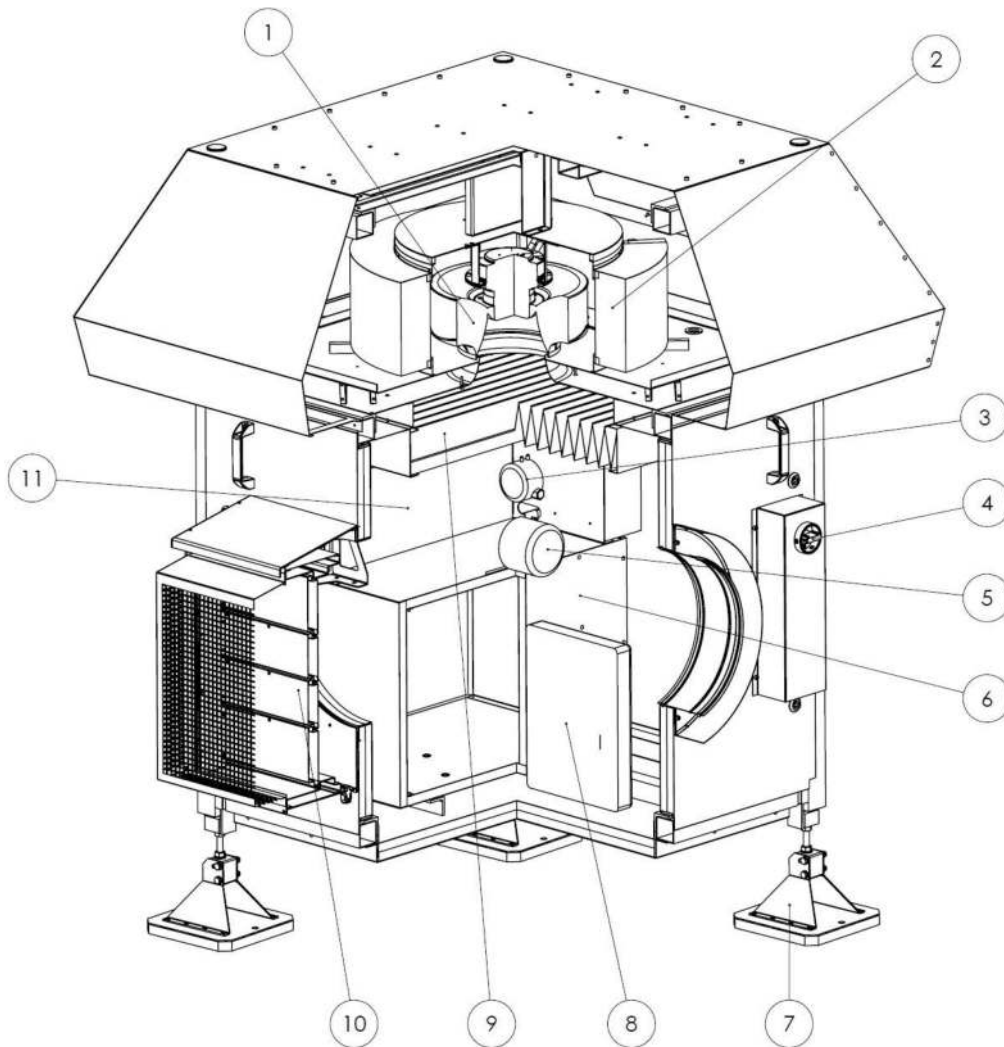
During the design phase, it was ensured that all interior components are easily accessible. All inner surfaces on the exhaust side are lined with sound-absorbing material of suitable thickness.



The unit is equipped with feet which are each fitted with a base plate with two holes for mounting fasteners. Each foot sits on a 20-mm-thick anti-vibration mat, which also protects the roof skin from damage and reduces the transmission of structure-borne noise to the installation surface.

4.3. UNIT STRUCTURE

4.3.1. POSITION OF KEY COMPONENTS

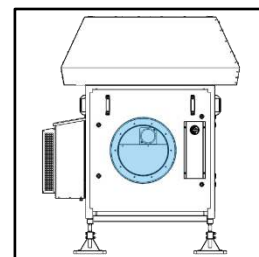


1	Fan	7	Stand
2	Evaporator	8	Plate heat exchanger
3	Filter monitoring differential pressure switch	9	Air filter
4	Main switch	10	Bypass (multi-leaf damper)
5	Smoke detector	11	Control unit
6	Compressor housing		

4.3.2. POSITION OF THE MEDIA CONNECTIONS

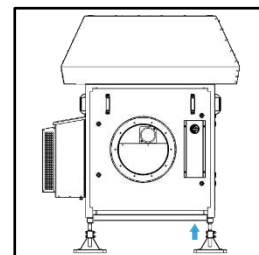
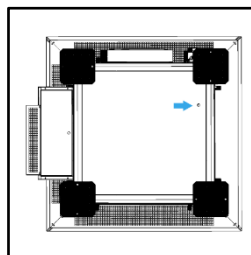
Exhaust air connection

The unit has a pipe connection (DN 355 for Eco+ 111 and Eco+ 121 & DN560 for Eco+ 131) in the exhaust air panel next to the main switch. The exhaust air from the collecting pipe is fed into the unit via this connection.



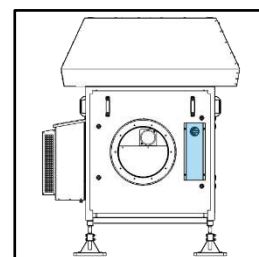
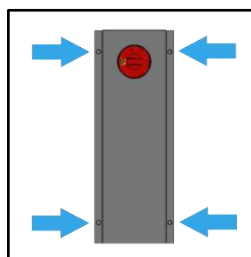
Condensate drain

The condensate drain connection is located on the underside of the unit in the floor panel.



Connector cover

All other connections are located under the connection cover in the exhaust panel. To gain access to these connections, loosen four screws on the cover (arrows) and remove the cover. The following connections are located below it:



Main switch for electrical connection

Multi-cable feed-through for further cables such as temperature sensors. A pressure measuring hose also discharges here.

Collecting point for protective equipotential bonding for connection with ground wire

Heating water connections for flow and return (labelled)

4.3.3. SIZE OF THE MEDIA CONNECTIONS

- **Eco+ 111 and Eco+ 121**

Connection	Size	Number
Exhaust air connection	355 mm (DN)	1
Heating water supply (AWN)	1" IG	1
Heating water return (AWN)	1" IG	1
Condensate drain	16 mm Metal composite pipe	1

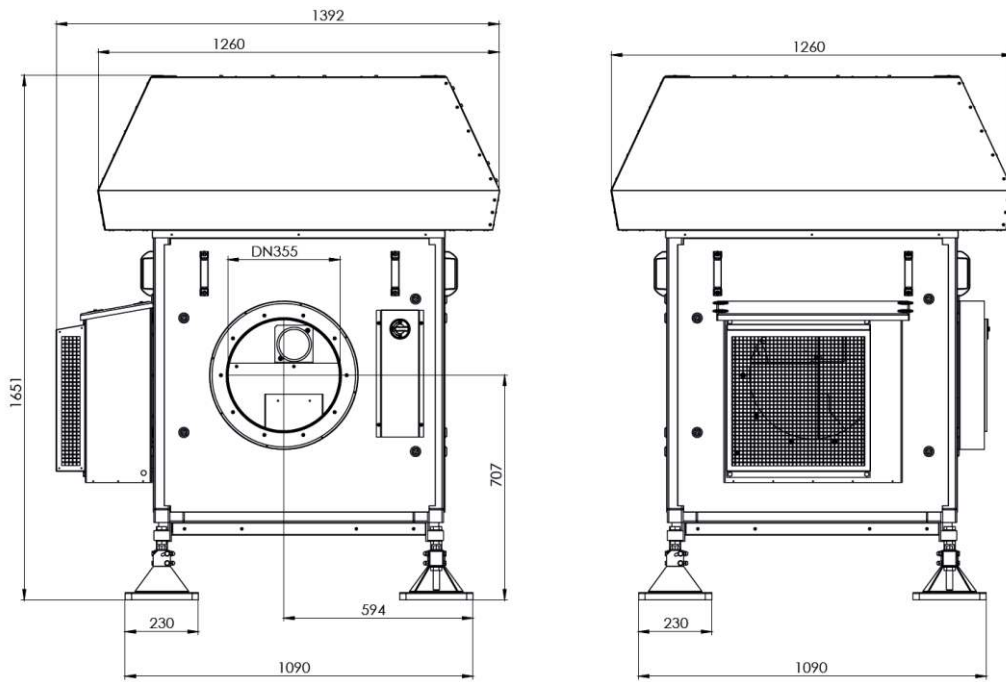
- **Eco+ 131**

Connection	Size	Number
Exhaust air connection	560 mm (DN)	1
Heating water supply (AWN)	1" IG	1
Heating water return (AWN)	1" IG	1
Condensate drain	16 mm Metal composite pipe	1

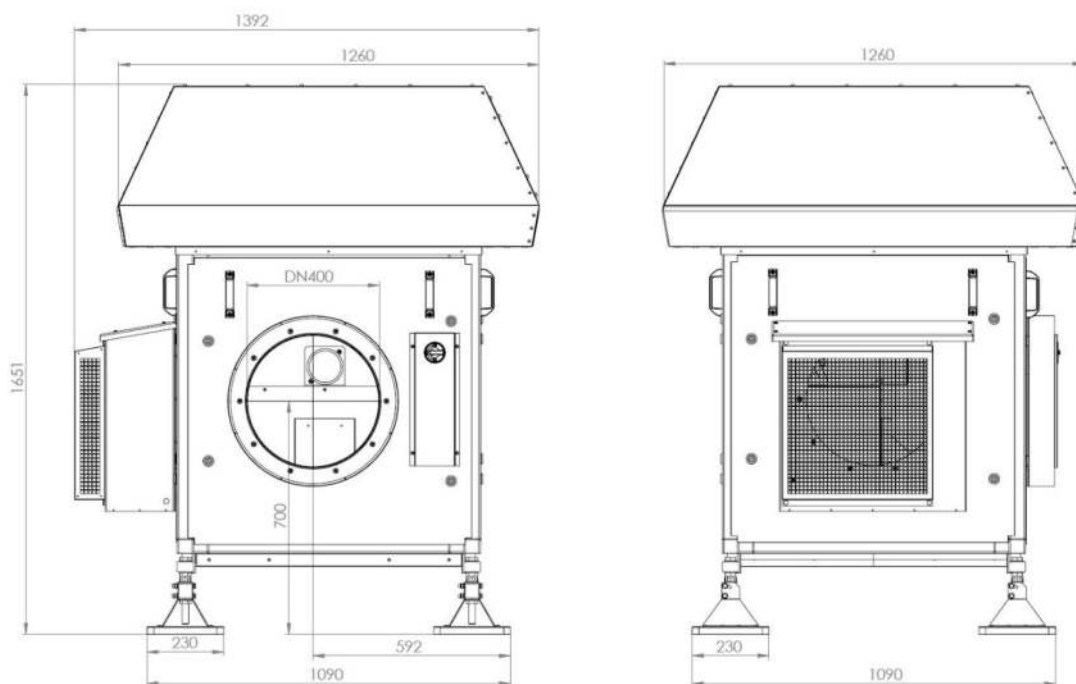
4.4. UNIT DIMENSIONS

4.4.1. HOUSING DIMENSIONS

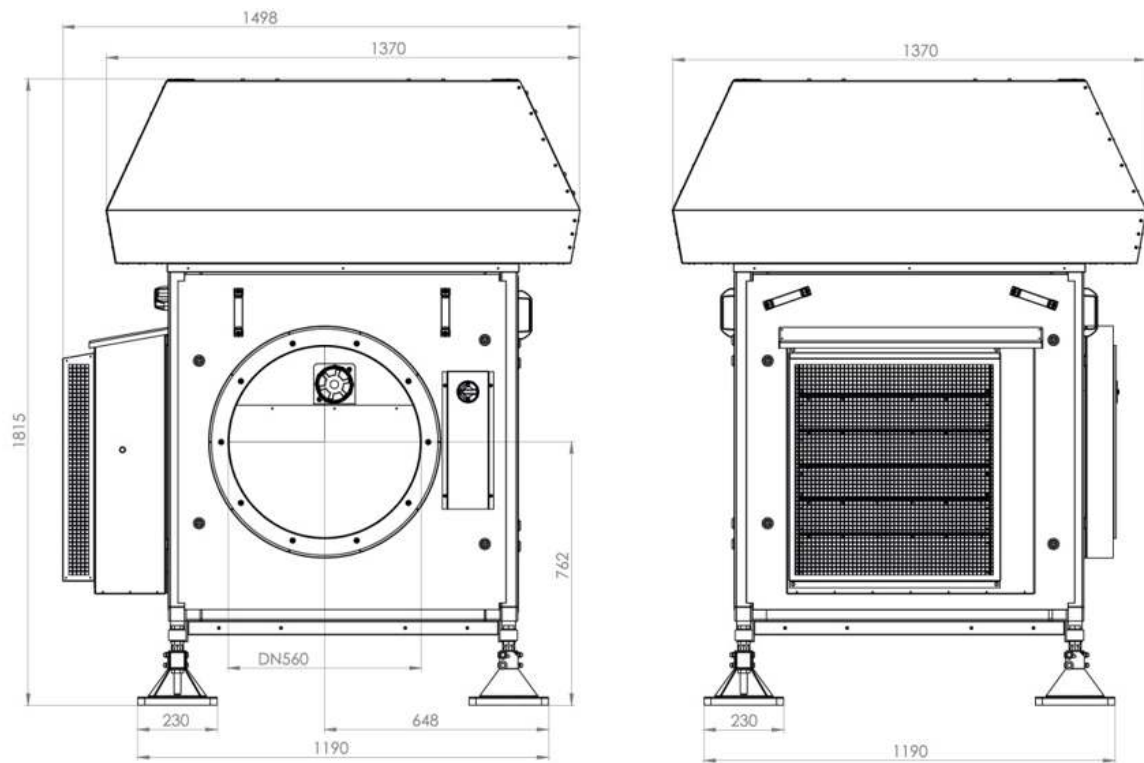
Eco+ 111 :



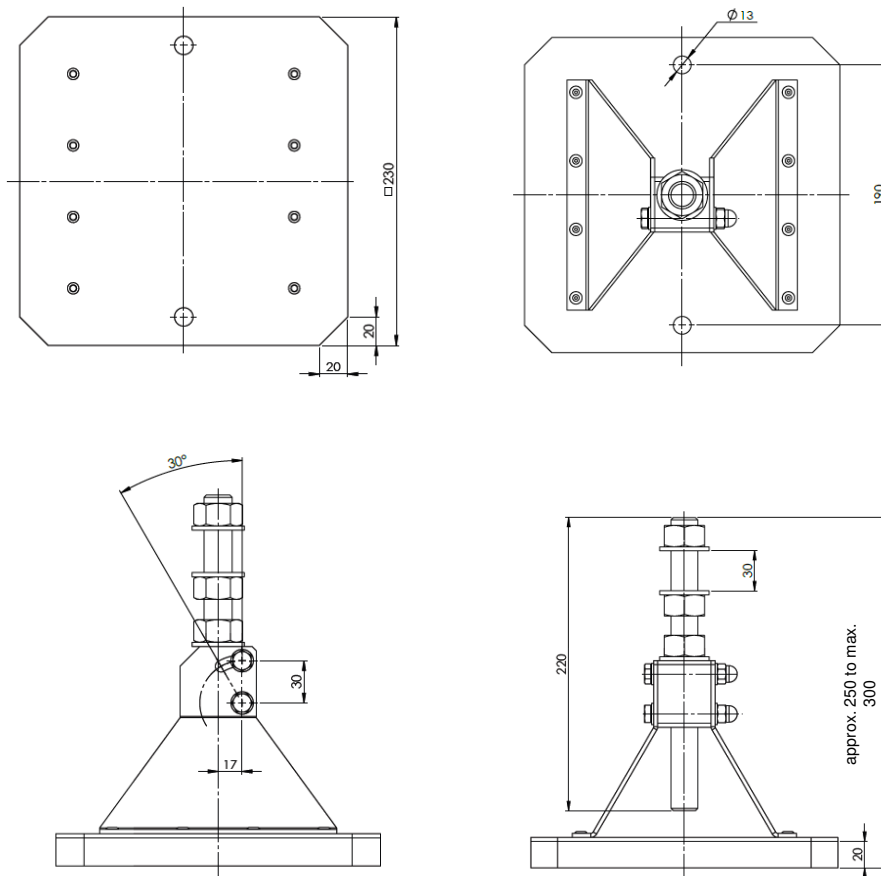
Eco+ 121 :



Eco+ 131 :



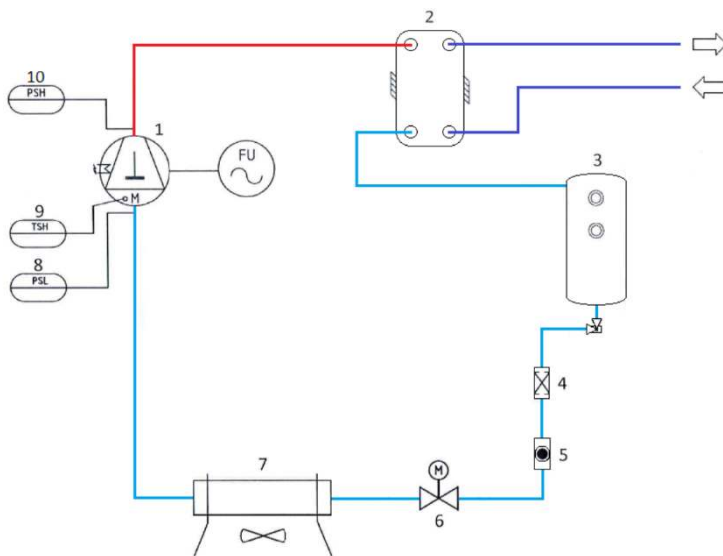
4.4.2. STANDS FOR ECO+ 111 ; ECO+ 121 AND ECO+ 131



4.5. INTEGRATED COMPONENTS

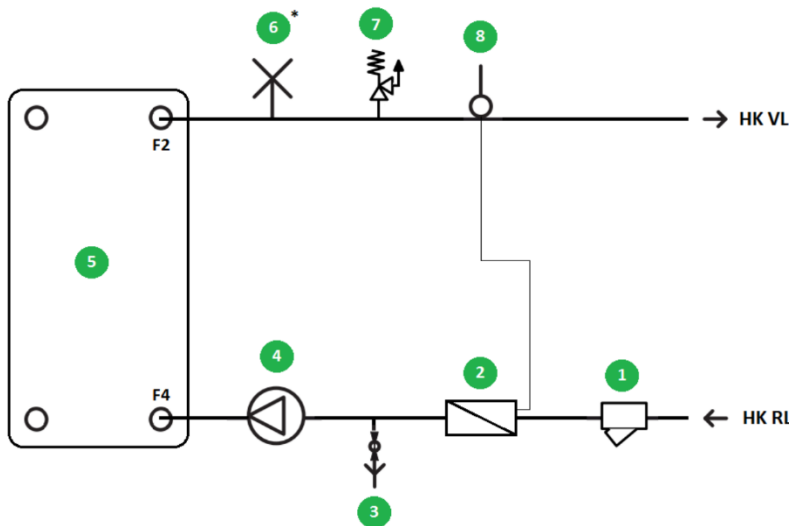
The integrated components of the heating circuit and cooling circuit are shown in the following flow diagrams.

Cooling circuit



- 1 Compressor with inverter control
- 2 Condenser
- 3 Refrigerant collector
- 4 Filter dryer
- 5 Sight glass with humidity indicator
- 6 Thermostatic expansion valve
- 7 Evaporator
- 8 LP controller
- 9 Motor protection
- 10 HP controller

Heating circuit



- 1 Filter
- 2 Heat meter
- 3 Drain cock
- 4 Pump
- 5 Plate heat exchanger (condenser)
- 6 Vent
- 7 Relief valve
- 8 Temperature sensor
- * Shut off ventilation after commissioning.

4.5.1. EXHAUST AIR CONVEYANCE COMPONENTS

Fan

EC centrifugal fan (curved backward) for conveying exhaust air

Differential pressure control

Control module for measuring the generated negative pressure in the intake chamber in relation to the environment and corresponding control of the fan speed in order to achieve the adjustable target value.

Air filter

Class G4 air filter to protect the heat exchanger from contamination

Filter monitoring differential pressure switch

Differential pressure switch for warning when exceeding the maximum filter load (contamination)

Smoke detector

Optical smoke detector for detecting smoke and opening the bypass in case of fire

Bypass

Insulated multi-leaf damper (open when not powered) to ensure free air flow in the event of a fire

4.5.2. 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 (SINK SIDE)

Plate structure (stainless steel, 1.4401), with closed cell insulation material to reduce heat loss

EVAPORATOR (SOURCE SIDE)

Cooling fin structure (copper/aluminium), surrounds the fan in a circle

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.

4.5.3. HEATING WATER CIRCUIT COMPONENTS

SAFETY VALVE (3 BAR)

In the event of pressure faults in the heating water pipes, a safety valve is triggered and excess pressure is released. This can be connected to a drain on site.

VENTILATION VALVE

Used to manually vent the system.

DRAIN COCK

To drain the system, a drain line is provided at the lowest point of the heating water pipe in the unit 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.

VOLUME FLOW SENSOR AND HEAT METER

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.

4.5.4. HEAT PUMP 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 unit is equipped with a switch and control cabinet (IP65), including:

- 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 resistor alarm signal input
- Terminals for public authority approval and Smart Grid approval
The heat pump can be switched on and off via the public authority approval. The exhaust fan is intended for continuous operation. A corresponding release line is therefore not provided for the ventilation components.

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.

For more information on operation and control logic, see the **Control manual operating instructions (UVR)**.

4.6. TECHNICAL DATA

Eco+ 111:

DIMENSIONING INFORMATION

Installation site		Outside
Pressure increase for dimensioning	Pa	130
Max. flow rate for dimensioning (75%) at 130 Pa	m ³ /h	2.400
Heating capacity modulation range (A20W35)	kW	2,5-8,4
Corresponding modulation range exhaust air	m ³ /h	480-1.800
Min. required effective exhaust air volume flow	m ³ /h	480
Max. flow temperature	°C	55
Sound pressure level at a distance of 3 metres from the design (75%) - $L_{p,A}$	dB(A)	54
Sound power level on the suction side for dimensioning (75%) - $L_{w,A}$	dB(A)	66

CONNECTION TO THE PIPE NETWORK

Exhaust air – pipe connection (DN)	mm	355
Exhaust air – connection options		1 x horizontal
Elastic connector for pipe connection		integrated
Heat sink medium – pipe connection		1" IG
Heat sink medium – max. volume flow	m ³ /h	1,382
Heat sink medium – permissible antifreeze agent		Ethylene glycol
Heat sink medium – available external delivery pressure	kPa	48
Condensate – pipe connection		Metal composite pipe (16 mm)

ENERGY DATA

Max. recoverable exhaust air heat – heating period	MWh	27
Nominal heat output / COP (A20W35)		5,6 / 6,0
Nominal heat output / COP (A20W35)		5,6 / 8,2
COP (A20W40)		4,9
Refrigerant		R410A
Refrigerant fill level		1,9

VENTILATION AND ACOUSTIC DATA FOR FURTHER OPERATING POINTS

Max. volume flow (100%) at 130 Pa	m ³ /h	2.200
Sound pressure level at a distance of 3 metres at 100/50% - $L_{p,A}$	dB(A)	61/46
Sound power level on the suction side at 100/50% - $L_{w,A}$	dB(A)	67/59

INTEGRATED PRESSURE CONTROL

Digital pressure control display		integrated
Max. pressure increase	Pa	300

ELECTRICAL DATA

Fan – drive technology		EC motor
Compressor – drive technology		source-oriented performance-controlled
Repair switch		integrated
Supply voltage	V / Hz	230 / 50
Max. power consumption	A	12,3
Fan power consumption for dimensioning (75%) at 130 Pa	W	224
SFP fan for dimensioning (75%) at 130 Pa	W/m ³ /h	0,136
Max. fan power consumption	W	450
Max. fan power consumption (unit total)	kW	2,42
Motor protection type (fan)	IP	54
Motor protection (fan)		integrated
Contact for external release of heat pump components		integrated
Fault message		Contact for group alarm, digital display on the unit
Max. permissible exhaust air temperature	°C	40

HOUSING PROPERTIES

Weight (empty complete unit)	kg	325
Material		Steel (galvanised)

OTHER COMPONENTS

Filter class (with filter monitoring)		G4
Condensate tray with siphon		integrated
Smoke detector and bypass for free outflow		integrated
Heat sink medium feed pump (speed controlled)		integrated

All data for exhaust air at 20°C and 50% rel. humidity and for water. Data according to EN 14511:2013

Eco+ 121:**DIMENSIONING INFORMATION**

Installation site		Outside
Pressure increase for dimensioning	Pa	130
Max. flow rate for dimensioning (75%) at 130 Pa	m ³ /h	2.400
Heating capacity modulation range (A20W35)	kW	3,2-10,4
Corresponding modulation range exhaust air	m ³ /h	630-2.500
Min. required effective exhaust air volume flow	m ³ /h	630
Max. flow temperature	°C	55
Sound pressure level at a distance of 3 metres from the design (75%) - L _{p,A}	dB(A)	50
Sound power level on the suction side for dimensioning (75%) - L _{w,A}	dB(A)	62

CONNECTION TO THE PIPE NETWORK

Exhaust air – pipe connection (DN)	mm	400
Exhaust air – connection options		1 x horizontal
Elastic connector for pipe connection		integrated
Heat sink medium – pipe connection		1" IG
Heat sink medium – max. volume flow	m ³ /h	1.780
Heat sink medium – permissible antifreeze agent		Ethylene glycol
Heat sink medium – available external delivery pressure	kPa	53
Condensate – pipe connection		Metal composite pipe (16 mm)

ENERGY DATA

Max. recoverable exhaust air heat – heating period	MWh	34
Nominal heat output / COP (A20W35)		8,7 / 6,0
Nominal heat output / COP (A20W35)		8,7 / 8,2
COP (A20W40)		4,9
Refrigerant		R410A
Refrigerant fill level		1,9

VENTILATION AND ACOUSTIC DATA FOR FURTHER OPERATING POINTS

Max. volume flow (100%) at 130 Pa	m ³ /h	3.200
Sound pressure level at a distance of 3 metres at 100/50% - L _{p,A}	dB(A)	57/44
Sound power level on the suction side at 100/50% - L _{w,A}	dB(A)	68/54

INTEGRATED PRESSURE CONTROL

Digital pressure control display		integrated
Max. pressure increase	Pa	300

ELECTRICAL DATA

Fan – drive technology		EC motor
Compressor – drive technology		source-oriented performance-controlled
Repair switch		integrated
Supply voltage	V / Hz	230 / 50
Max. power consumption	A	14,2
Fan power consumption for dimensioning (75%) at 130 Pa	W	313
SFP fan for dimensioning (75%) at 130 Pa	W/m ³ /h	0,130
Max. fan power consumption	W	500
Max. fan power consumption (unit total)	kW	2,9
Motor protection type (fan)	IP	54
Motor protection (fan)		integrated
Contact for external release of heat pump components		integrated
Fault message		Contact for group alarm, digital display on the unit
Max. permissible exhaust air temperature	°C	40

HOUSING PROPERTIES

Weight (empty complete unit)	kg	335
Material		Steel (galvanised)

OTHER COMPONENTS

Filter class (with filter monitoring)		G4
Condensate tray with siphon		integrated
Smoke detector and bypass for free outflow		integrated
Heat sink medium feed pump (speed controlled)		integrated

All data for exhaust air at 20°C and 50% rel. humidity and for water. Data according to EN 14511:2013

Eco+ 131:**DIMENSIONING INFORMATION**

Installation site		Outside
Pressure increase for dimensioning	Pa	130
Max. flow rate for dimensioning (75%) at 130 Pa	m ³ /h	3.375
Heating capacity modulation range (A20W35)	kW	6,6 - 22,2
Corresponding modulation range exhaust air	m ³ /h	1.250 - 4.500
Min. required effective exhaust air volume flow	m ³ /h	1.250
Max. flow temperature	°C	55
Sound pressure level at a distance of 3 metres from the design (75%) - L _{p,A}	dB(A)	49
Sound power level on the suction side for dimensioning (75%) - L _{w,A}	dB(A)	67

CONNECTION TO THE PIPE NETWORK

Exhaust air – pipe connection (DN)	mm	560
Exhaust air – connection options		1 x horizontal
Elastic connector for pipe connection		integrated
Heat sink medium – pipe connection		1" IG
Heat sink medium – max. volume flow	m ³ /h	3.155
Heat sink medium – permissible antifreeze agent		Ethylene glycol
Heat sink medium – available external delivery pressure	kPa	52
Condensate – pipe connection		Metal composite pipe (16 mm)

ENERGY DATA

Max. recoverable exhaust air heat – heating period	MWh	59
Nominal heat output / COP (A20W35)		13,4 / 5,7
Nominal heat output / COP (A20W35)		13,7 / 8,0
COP (A20W40)		4,7
Refrigerant		R410A
Refrigerant fill level		2,6

VENTILATION AND ACOUSTIC DATA FOR FURTHER OPERATING POINTS

Max. volume flow (100%) at 130 Pa	m ³ /h	4.500
Sound pressure level at a distance of 3 metres at 100/50% - L _{p,A}	dB(A)	55/44
Sound power level on the suction side at 100/50% - L _{w,A}	dB(A)	74/57

INTEGRATED PRESSURE CONTROL

Digital pressure control display		integrated
Max. pressure increase	Pa	300

ELECTRICAL DATA

Fan – drive technology		EC motor
Compressor – drive technology		source-oriented performance-controlled
Repair switch		integrated
Supply voltage	V / Hz	400 / 50
Max. power consumption	A	14
Fan power consumption for dimensioning (75%) at 130 Pa	W	440
SFP fan for dimensioning (75%) at 130 Pa	W/m ³ /h	0.130
Max. fan power consumption	W	690
Max. fan power consumption (unit total)	kW	6,9
Motor protection type (fan)	IP	54
Motor protection (fan)		integrated
Contact for external release of heat pump components		integrated
Fault message		Contact for group alarm, digital display on the unit
Max. permissible exhaust air temperature	°C	40

HOUSING PROPERTIES

Weight (empty complete unit)	kg	430
Material		Steel (galvanised)

OTHER COMPONENTS

Filter class (with filter monitoring)		G4
Condensate tray with siphon		integrated
Smoke detector and bypass for free outflow		integrated
Heat sink medium feed pump (speed controlled)		integrated

5. RECEIVING AND MOVING THE UNIT

The unit is shipped ex works wrapped in foil on a pallet. Pay attention to possible damage to the packaging or the exhaust fan. Avoid striking or knocking it at all costs. Any transport damage must be reported to the carrier immediately. 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.

5.1. STORAGE



Store the device in a dry and weatherproof place until final assembly. Avoid exposure to extreme heat or cold, or exposure to dusty ambient air. Condensate or rainwater under the packaging cannot dry off and will cause corrosion damage to the unit surfaces.

5.2. INSTALLATION SITE AND FIXING

The unit is approved exclusively for outdoor installation on the flat roof of a building. For this purpose, professional and sufficiently secure fastening or weighting is required in order to permanently withstand wind and weather loads outdoors.



The unit may only be installed on buildings up to a maximum height of 60 m and only in wind zones 1-3 (DIN EN 1991-1-4:2005).

Use only approved stainless-steel fasteners of sufficient number and size. The decisive factors here are the conditions at the installation site, which are influenced by the wind zone there, the building height and the terrain exposure.

The need for measures to be taken shall be assessed on a case-by-case basis, taking into account local conditions. Dimensions and weights can be found in the technical data.

Before the unit is installed, where it is to be installed must be agreed with the decision-makers involved, 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.



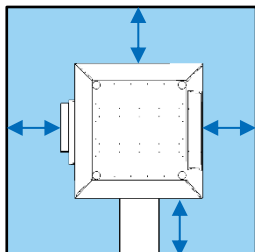
It should be noted that the heat pump module can transmit vibrations during operation.



When securing the unit, check carefully that it is balanced.



The static proof for stability and the resulting type of fastening must be provided by the customer. The specific local conditions, e.g. wind loads, must be taken into account.



TECHNICALLY REQUIRED MINIMUM DISTANCES

To allow regular and extraordinary maintenance work on the unit, minimum distances of **1 m** from walls, railings, other appliances or similar obstacles must be provided on all sides of the unit.



If the unit is inadequately fixed, it may come loose and start moving. There is a danger of personal injury or damage to property.

Secure the device properly and in accordance with the requirements of the installation site. The fasteners must be distributed evenly across all system feet. Both through holes in the feet must be used for screw connections. The type of fastener must be determined independently by the installer. Check whether drilling into the ceiling is permitted.

The fastening is planned and completed on site. In particular, when selecting the fasteners and weights for any loading, the expected weather conditions and other project-specific influencing factors must be taken into account. The dimensioning of the fastening must be carried out in accordance with DIN EN 1991-1-4.

5.3. CONNECTIONS TO BE PROVIDED BY THE CUSTOMER

The following cables or connections must be available for mounting the device.

Medium	Connection	Number/connection type
Water	Supply line	1*
	Return line	1*
	Condensate line	1* (e.g. 16 mm)
Power	AWN on main switch	L/N/PE 230 volt*
	Trace heating for heating water pipes	According to local conditions*
	Trace heating for condensate line	According to local conditions*
	Protective equipotential bonding	1*
Signal	Heat pump release**	2* (e.g. 0.75 mm ²)
	Buffer sensor	2* (e.g. 0.75 mm ² , shielded)
	Fault message	2* (e.g. 0.75 mm ²)
	Smart Grid (optional when using PV power)	2* (e.g. 0.75 mm ²)
	EVU release (optional for heat flow rate)	2* (e.g. 0.75 mm ²)
	KW inlet flow switch (optional)	2* (e.g. 0.75 mm ²)
	Heating circuit return sensor (optional)	2* (e.g. 0.75 mm ² , shielded)
	CMI module (optional when using remote maintenance)	5* (e.g. 0.75 mm ²)

* All pipe cross-sections must be designed independently, professionally and in accordance with standards in accordance with local conditions.

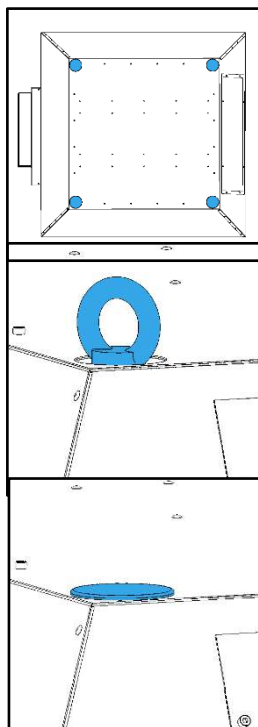
** The heat pump can be switched on and off via the EVU release (input 1). The exhaust fan is intended for continuous operation. A corresponding release line is therefore not provided for the ventilation components.

5.4. HANDLING THE UNIT

The unit is bolted to a pallet for transport. With suitable transport equipment, the unit can be transported on this pallet for all logistical processes except lifting onto the roof.

Free lifting of the unit (e.g. when lifting to the roof) may only be carried out using the eye bolts provided on the top of the unit. The screw connection with the pallet must first be loosened and the plate removed. **The rest of the packaging and the safety devices provided must only be removed after the lifting procedure has been completed.**

The unit must always be handled with professional care and without jerky movements. Before lifting, check the weight on the technical type plate. In accordance with the regulations, suitable hoists of the same length and spacers must be used.



Anchor points

The unit has four anchor points under its hood. There are four openings in the unit hood for this purpose, in each of which an eyebolt is already mounted on delivery.

Eyebolt

All four eyebolts must be used to lift the unit.

Ensure the eyebolts are seated firmly before loading.

Cover

After finishing handling, unscrew the eyebolts and close the remaining openings with the supplied covers. If you need to move the unit again, keep the eyebolts in a safe place.



All parts of the unit must be secured against loss during lifting. It is strictly forbidden to stay below the elevated unit.



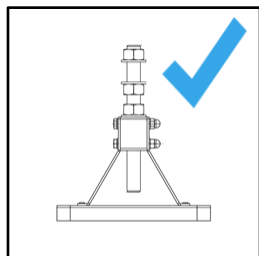
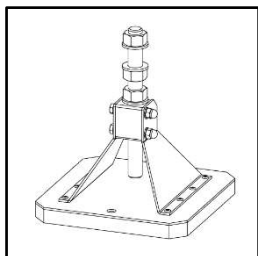
The suitability of the planned installation site must be checked in advance.



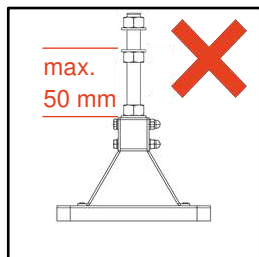
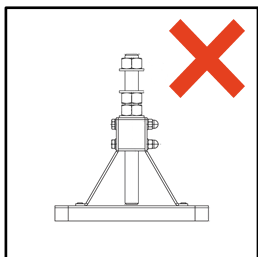
The units must NOT be stacked.

5.5. ALIGNING THE UNIT

After installation, the device must be aligned at the intended destination to ensure proper functioning. For this purpose, after removing the two service panels, use a spirit level or comparable means to check the horizontal alignment.



To compensate for slight unevenness, the device has height- and angle-adjustable feet. The unit is approved exclusively for installation on flat roofs. If it is not possible to adjust the feet sufficiently to ensure horizontal alignment, further measures must be checked by the customer.



The unit may only be installed on buildings up to a maximum height of 60 m (for Eco+ 111 and Eco+ 121) & 50m for Eco+ 131 and only in wind zones 1-3 (DIN EN 1991-1-4:2005).



Do not lift the unit so far that the threaded rod is standing back in the threaded hole of the stand. The marked free length must not exceed 50 mm.

Height adjustment of the foot

- Loosen the lowest nut.
- Turn the foot clockwise to lift the unit, counter-clockwise to lower the unit.
- Tighten the lowest nut.

Angle adjustment of the foot

- Loosen the two cap nut screws at the angle adjustment.
- Set the required angle.
- Tighten the two cap nut screws at the angle adjustment.

5.6. CONDENSATE DRAIN CONNECTION

The unit condensate drain must be connected in such a way that the condensate is drained off appropriately. Ensure that a continuous outflow is guaranteed at all times. The drain must be protected against freezing by suitable insulation and trace heating in the event of frost.



Free drainage of the condensate must be ensured at all times.



Draining the condensate onto the open-air roof surface can lead to smooth surfaces in frosty conditions and thus endanger people.

5.7. PROTECTIVE EQUIPOTENTIAL BONDING

The protective equipotential bonding must be applied at the designated point under the terminal cover. Ensure that the M6 nut with lock washer is seated firmly. The connection must be carried out professionally and in accordance with standards in compliance with the national legislation in force in the country of destination.

In addition, on the basis of relevant technical standards and recognised rules of technology, check whether potential equalisation between the exhaust fan and the ventilation duct must be ensured. Any implementation on site must be carried out by the installer on his own responsibility and in a professional manner.

5.8. **LIGHTNING PROTECTION**

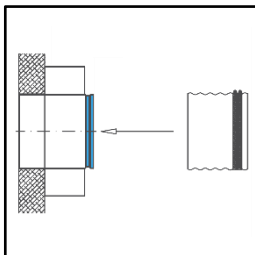
Lightning protection must be provided by the customer in accordance with the local conditions and in compliance with the national legislation applicable in the country of destination.

6. INTEGRATION IN THE VENTILATION SYSTEM

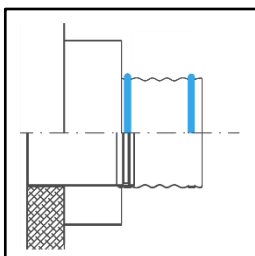
6.1. PIPE CONNECTION

Only suitable ventilation pipes or fittings with the nominal diameter specified on the type plate may be connected to the unit. Ensure a straight minimum inlet distance on the suction side of 3 x connection diameter. Otherwise, fan performance and noise may be adversely affected.

The enclosed elastic pipe connectors must be used for the installation of the ventilation ducts. In addition to the existing seal, we recommend sealing with cold-shrink tape. Adhere to the system-related conditions and specifications of the planner or system constructor.



For the connection to the ventilation duct, an elastic connector must be pushed onto the **pipe connection** of the unit.



Then tighten the **tension locks** until they are tight and seated firmly. The same applies to the collecting pipe to be connected.



The on-site piping to the pipe connection pieces must be carried out by a qualified installer.



The exhaust air ducts above the roof are protected separately against condensation, weather influences and wind. The exhaust air ducts must be carried by separate installations and must not transfer any load to the unit.

6.2. COMMISSIONING THE EXHAUST FAN



The exhaust fan must not be commissioned until the installation of the exhaust air ducts, connecting ducts and exhaust air elements, as well as the heating water ducts, has been completed in full.



The exhaust air must already have the same characteristics as normal room exhaust air when the unit is commissioned and subsequently operated. Operation with increased dust exposure (e.g. due to grinding work in the residential buildings) is not permitted.



The service panels and all electrical components must be closed during commissioning. The specialist commissioning the unit must exclude possible hazards from work carried out on site.

Commissioning must be carried out as follows:

- Switch on the main switch.
- Check the function of the bypass damper:
During regular operation, the bypass bell closes slowly (approx. 1 minute) straight after switching on the device. Check for complete sealing.
The device must be de-energised again by actuating the main switch. Check that the bypass damper is opened fully and quickly (in only a few seconds).
- Check that the fan is running smoothly (wait for start-up delay).
- Check the power consumption with the information on the type plate.
- Switch off the power again and check that the bypass is opened quickly (a few seconds).



If the bypass function is impaired, the unit must not be commissioned. In this case, you must consult technical customer service.



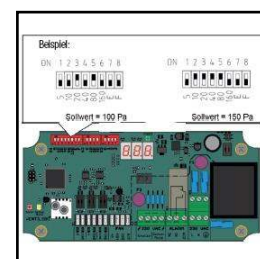
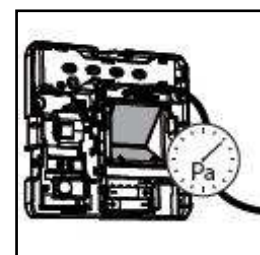
The smoke detector must not be covered at any time during operation.

After commissioning has been completed, continue to adjust the exhaust fan.

6.2.1. ADJUSTING THE EXHAUST FAN

We recommend that you adjust the exhaust fan as described below to ensure the ventilation system operates correctly.

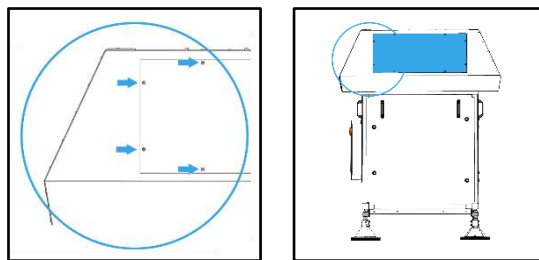
1. The measurement when adjusting the ventilation system must be carried out line-by-line. Before starting the adjustment measurements, all exhaust air elements must be made airtight and an adequate supply of air flow must be ensured. Finally, the AWN must be put into operation.
2. The first measurement should be taken on the exhaust air element that is furthest away from the exhaust fan. A suitable differential pressure gauge must be used for this purpose.
3. The measurements are carried out directly on the exhaust air elements. A special plug connection makes it easy to measure the negative pressure. As soon as it is removed, the plug is used to block the humidity control in min. position (see fig. right).
4. The furthest exhaust air element should have negative pressure of at least 60 Pa so that the required air volumes can be conveyed in accordance with DIN 1946-6 and 18017-3. Negative pressure of 120 Pa should not be exceeded at the closest exhaust air element to the exhaust fan.
5. When evaluating the pressure conditions, the value of the farthest exhaust air element is decisive. If negative pressure of less than 60 Pa is measured here, the exhaust fan must be adjusted accordingly.
6. To adjust the exhaust fan, set the pressure setpoint higher (or lower) (see picture on the right and the Differential Pressure Control section). If the specified values are reached, no further settings need to be made.



The negative pressure of the exhaust fan must be set at least high enough to ensure that the exhaust fan runs trouble-free. If the exhaust fan malfunctions after a short time, the negative pressure set must be increased.

6.2.2. DIFFERENTIAL PRESSURE CONTROL

The device is equipped with a pressure control. This is mounted under the hood directly behind the maintenance opening. To gain access, the eight screws must be loosened (pictures on the right).

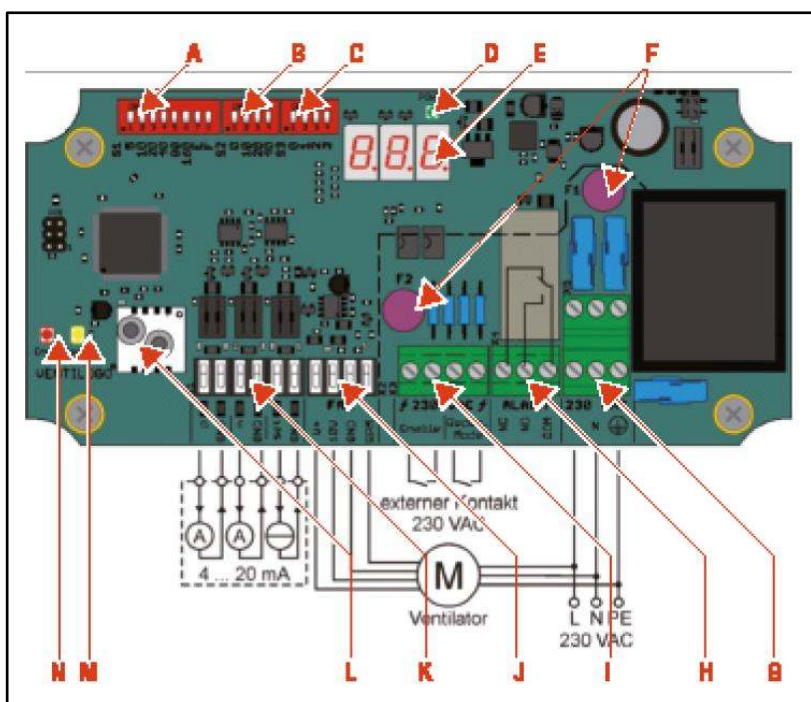


The maintenance opening cover must be secured against falling when loosening the screws.

The differential pressure control has an internally connected discharge port for receiving the static negative pressure in the unit suction chamber next to the filter unit and a discharge port for receiving the ambient pressure under the port cover. The position of the pressure measuring hoses and pressure connections must not be changed. Care must be taken that the transparent pressure measuring hoses are not bent or otherwise disconnected or blocked over their entire length. The opening at the end must remain free. Otherwise the unit's intended function may be affected.



Before opening the controller, the unit must be disconnected from the mains and secured against being switched on again. Wait for the fan impeller to come to a standstill.



- A** DIP switch S1 "Pressure setpoint"
- B** DIP switch S2 "% setback"
- C** DIP switch S3 "Hall sensors"
- D** "Network" LED
- E** Pressure indicator
- F** Fuses
- G** Terminal X5 "Mains power supply"
- H** Terminal X4 "Error message"
- I** Terminal X3 "ON", "Setback"
- J** Terminal X2 "Control signal"
- K** Terminal X1 "External"
- L** Pressure sensor
- M** "Setback mode" LED
- N** "Error" LED

The pressure control regulates the negative pressure on the suction side by adjusting the fan speed to an adjustable fixed pressure level relative to the atmospheric pressure. The pressure regulator is thus the heart of a demand-driven ventilation system that automatically reduces the fan output and thus the power consumption when the air volume requirement is low. As an output signal, the pressure control module supplies DC voltage between 0-10 V, which serves as input for the fan motor (control signal).

The control operation is monitored. The signals from the pressure sensor are evaluated for this purpose. If a too large deviation of the signals from the setpoint value is detected for longer than five minutes (optionally

switchable from S1.8 “F” to 1 minute) (+/- 10%), an error is displayed (red LED and contact X4 “NC-NO-COM”).

For the operator, visual displays are available for information and to control the functions. The presence of mains voltage is indicated by a green LED. Setback mode is indicated by a yellow LED. The three-digit display shows the measured pressure in control mode, otherwise an error code “Exx” or calibration mode “CAL”. Error messages are additionally indicated by a red LED.

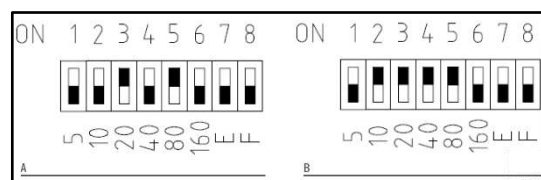
6.2.3. PRESSURE LEVEL SETPOINT VALUE SPECIFICATION

The setpoint for the differential pressure in normal operation is set at pins 1-6 of switch S1 (A). The sum of all pins gives the setpoint in Pascal.

Value range: 5...300 Pa

Increments: 005-155 Pa in steps of 5 Pa

160-300 Pa in steps of 10 Pa



Examples:

Setpoint A = 100 Pa

Setpoint B = 150 Pa



Caution! Not all pins 1-6 may be set to “ON” at the same time. This puts the controller into “calibration mode”. The maximum permissible setpoint is 300 Pa. The setpoint is set to 100 Pa ex works. If the measured air volume flows are too large or too small during commissioning, the pressure level can be lowered or raised in 20 Pa steps, for example, and later in smaller steps for fine adjustment.

6.2.4. PRESSURE CONTROL DISPLAY ELEMENTS

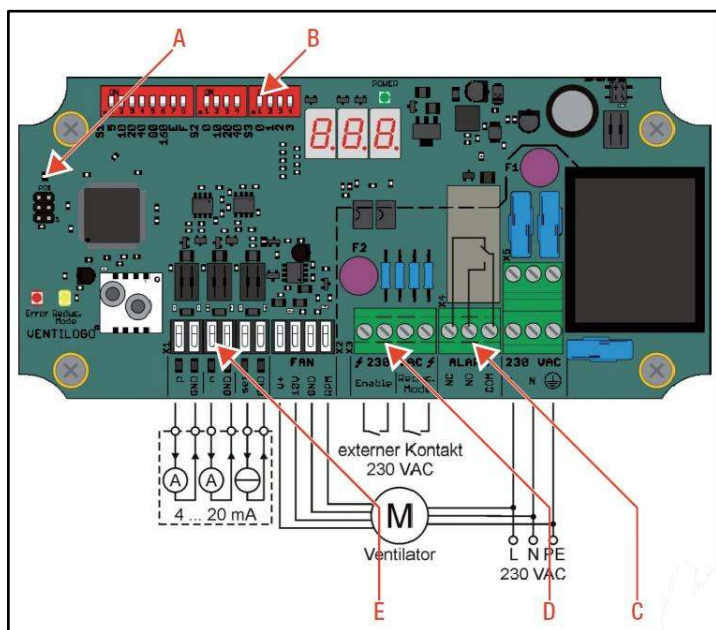
- D** “Network” LED
- E** Pressure indicator
- M** “Setback mode” LED
- N** “Error” LED

Element	Display	Meaning
“Network” LED (green)	Solid light	Mains voltage on
“Setback mode” LED (yellow)	Solid light	Setback mode is active
“Error” LED (red)	Flashing slowly	Pressure setpoint undershot
	Flashing quickly	Pressure setpoint overshoot
Display	approx. “000”	Sensor without differential pressure
	e.g. “120”	Current differential pressure (example)

6.2.5. TROUBLESHOOTING

Problem	Possible cause	Suggested solution
“Network” LED is not illuminated.	The unit is not powered.	Switch on repair switch. Check fuse F1.
“OFF” on the display	Terminal X3 – “Enable” input not bridged or fuse F2 defective.	Insert bridge. Check fuse F2.
“E01” on the display	Set analogue input activated, set signal < 4 mA	Deactivate “E” S1.7 if no ext. set signal wanted
“E02” on the display	Current pressure > 10% above set pressure	Check pressure measuring points and hoses, calibrate pressure regulator
“E03” on the display	Current pressure < 10% below set pressure	Check pressure measuring points, hoses and fan, calibrate pressure regulator
“E04” on the display	Incorrect speed feedback	Check fan cable RPM to X1, deactivate Hall signal input S3.1 to S3.4
“E05” on the display	Faulty pressure sensor signal	Contact the manufacturer
“E06” on the display, “999” on the display	Faulty pressure sensor signal	Check pressure measuring points and hoses; contact the manufacturer
“CAL/Err” or “rd/Err” on the display	Incorrect calibration	Restart calibration, check pressure measuring points and hoses, contact the manufacturer
Setback mode does not work.	“Reduc. Mode” input not bridged or fuse F2 faulty	Check bridge to timer. Check fuse F2

6.2.6. OPTIONS



- A** Test contacts
- B** DIP switch S3 “Hall sensors”
- C** Terminal X4 “Error message”
- D** Terminal X3 “ON”, “Setback”
- E** Terminal X1 “External”

Calibration

If all pins 1-6 at S1 are simultaneously set to “ON”, the controller is set to “calibration mode”. This is only necessary for troubleshooting. Each controller is delivered pre-calibrated and ready for operation, calibration during commissioning is normally not necessary.

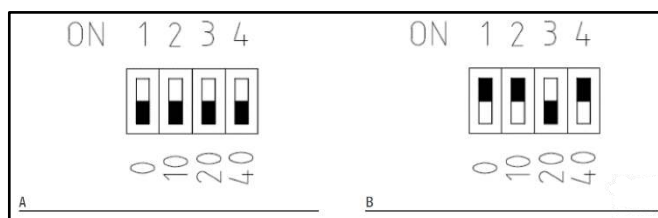
Setback mode

Optionally, a second, lower pressure level can be set for the set pressure level and activated externally, for example by a timer.

Pin 1 at S2 must be set to “ON” to enable setback mode. The setpoint for setback mode is lowered by the percentage value specified with switch S2, pins 2 to 4. The percentages of pins 2-4 at switch S2 are added together.



The setback mode is activated by an external potential-free closing contact at X3 “Reduc. Mode”. If several exhaust fans are controlled via a timer, each exhaust fan requires a separate potential-free NO contact to avoid reverse voltages.



Value range: OFF, reduction by 10-70%

Increments: 10%

Examples:

A: OFF

B: 50% reduction of the S1 setpoint



The test contacts are required for the production and in-house quality control of the pressure control. Under no circumstances must they be connected or short-circuited.

7. INTEGRATION IN THE BUILDING HEATING SYSTEM

To best use the unit, 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.

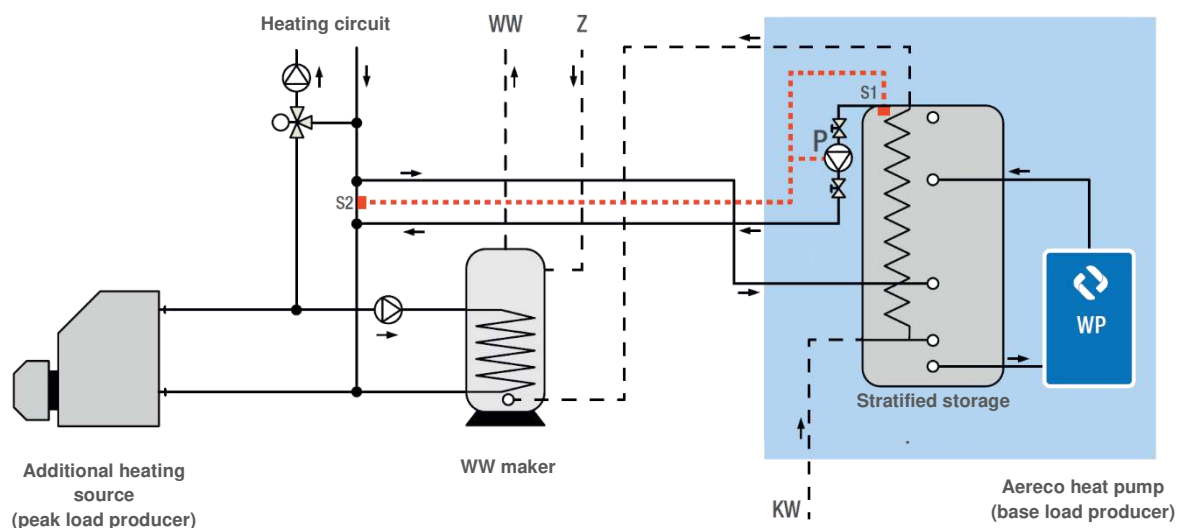
7.1. RECOMMENDATION AND SYSTEM DIAGRAM

Combination – return flow boost (heating) + preheating stage (domestic hot water): 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.

Independent regulation: 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 ($S1 > S2$).

Preheating as continuous flow system: 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 automatically transfers the heat via the heating water to the stratified storage tank. A simplified diagram for use with central heating and hot water preparation is shown here. 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 proposal and does not replace any execution planning. The shut-off and safety devices required for professional installation are not included.

7.1.1. SETTINGS FOR USE WITH STRATIFIED STORAGE

If the unit is integrated into the building heating system according to the above recommendation, 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 4 (terminal strip X2) (see circuit diagram)
- Ensure the buffer tank discharge pump (“P” in concept sketch) is regulated as described above.

Suitable temperature sensors are supplied with the unit in the control unit.

7.1.2. SETTINGS FOR USE WITHOUT STRATIFIED STORAGE

Deviating from the above system diagram, 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 (terminal strip X2)
- Fit an outdoor temperature sensor to input terminal 12 (terminal strip X2)
- Attach the temperature sensor to the lower part of the buffer tank and connect it to input terminal 4 (terminal strip X2)
- Attaching the sensor to input terminal 6 (terminal strip X2) on the domestic hot water storage tank
- 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)

Suitable temperature sensors are supplied with the unit.



The heating pipes must be protected against freezing in the event of frost without operating the heat pump (e.g. by trace heating).

Circuit diagrams and operating instructions for the control module (UVR) are supplied separately with the unit.

7.2. OPERATING RANGE AND OPERATING LIMITS

The operating limits refer to a temperature difference at the evaporator and at the condenser of $\Delta t = 5^{\circ}\text{C}$. 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 unit provides hot water up to 55°C . An efficiency limit is pre-programmed at the factory, which switches off the heat pump at a buffer memory temperature of 40°C (bottom). This can be adapted on site or during commissioning. This is particularly suitable for operation with own electricity (e.g. from photovoltaics). Refer to the operating instructions for the control module (UVR) for details.

In its standard configuration, the unit is not suitable for installation in a salty environment.

7.2.1. REQUIREMENTS FOR THE SINK MEDIUM

In order to ensure the unit operates faultlessly for many years, we strongly recommend filling the sink-side system circuit with softened and desalinated water. We also recommend the use of water filters on site. 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	Iron (Fe)	< 0.3 ppm
Electrical conductivity	100-500 $\mu\text{S}/\text{cm}$	Alkalinity (HCO_3)	70-300 ppm
Total hardness	4.5-8.5 dH	Chlorine ions (Cl^-)	< 50 ppm
Temperature	< 65°C	Sulphate ions (S)	< 50 ppm
Oxygen content	< 0.1 ppm	Sulphide ions (S)	None
Glycol percentage	< 50%	Ammonia ions (NH_4)	None
Phosphate (PO_4)	< 2 ppm	Silicon dioxide (SiO_2)	< 30 ppm
Manganese (Mn)	< 0.05 ppm		

7.2.2. OPERATING WITH ANTIFREEZE

It is essentially possible to operate the system with antifreeze (brine). Depending on the concentration, efficiency and performance losses are to be expected. In order to keep the transfer losses between brine and the target medium as low as possible, plate heat exchangers that have been designed accordingly must be used. The quality of the heat transfer at this point significantly influences the efficiency of the exhaust air heat utilisation.

ETHYLENE GLYCOL SOLUTIONS

CORRECTION FACTORS FOR ETHYLENE GLYCOL SOLUTIONS											
Freezing point	°C	0	-3.63	-6.10	-8.93	-12.11	-15.74	-19.94	-24.79	-30.44	-37.10
Ethylene glycol proportion	%	0	10	15	20	25	30	35	40	45	50
Q _{wh}	-	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

PROPYLENE GLYCOL SOLUTIONS

CORRECTION FACTORS FOR PROPYLENE GLYCOL SOLUTIONS											
Freezing point	°C	0	-3.43	-5.30	-7.44	-9.98	-13.08	-16.86	-21.47	-27.04	-33.72
Propylene glycol proportion	%	0	10	15	20	25	30	35	40	45	50
Q _{wh}	-	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

Q_{wh}: 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



When operating with antifreeze agents, precautions must be taken on site to prevent leakages. When operating without antifreeze, the heating cables must be protected against freezing in the event of frost.

7.3. COMMISSIONING THE HEAT PUMP

7.3.1. ON-SITE COMMISSIONING REQUIREMENTS

Before the heat pump can be commissioned, 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 sink side. Strainer and pipe network are installed. The connected circuits are filled and vented.
4. Signal lines for fault signal and external release have been routed and connected accordingly.
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 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 hot water pipeline is available.

7.3.2. INDIVIDUAL STEPS TO BE COMPLETED DURING COMMISSIONING

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 external release lines and sensors.
4. Connect the potential-free fault signal (output 13, terminal strip X1) to the BMS.
5. Electrical test of the supply, control and electrically operated safety devices in dry operation (without compressor operation).
6. Refrigeration test of safety devices such as high-pressure/low-pressure devices.
7. Start up the heat pump and log the measured data (temperatures, pressures, power consumption of all consumers).
8. 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.
9. Testing the functionality of the smoke detector and bypass damper
10. Adjusting the constant-pressure-controlled exhaust fan
11. Instruct the operator or a representative. Instruction is given with regard to the operation of the unit, the function of the safety devices and the behaviour in the event of accidents or faults.

7.4. WARNING WHEN INTEGRATING IN THE BUILDING HEATING SYSTEM



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.



The connecting pipes to the machine must be adequately dimensioned for the maximum possible water volume flows in the unit heating circuit. If glycol mixtures are used, pressure loss values must be subjected to the correction factors specified under 7.2.2 for the glycol content present.



Clean the connected system thoroughly before connecting the unit. 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.



When a system that has already been commissioned is at a standstill, the water contained in the heat exchanger can freeze and cause irreparable damage to the heat exchanger on the lower side. To avoid the danger of freezing, the following solutions are possible:

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).

8. MAINTENANCE

8.1. EXTRAORDINARY MAINTENANCE

The unit is factory filled with R410A gas and fully tested. As per standard conditions, technical service does not need to intervene to check the cooling gas. 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.



Safety checks, maintenance work and any repairs may only be carried out by qualified personnel who are legally qualified to do so and who have a certificate of competence for the corresponding category.

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



All work on the device must be carried out after disconnecting the device from the mains (main switch). Due to possible residual voltage at the frequency inverter (inverter module), wait at least 5 minutes after actuating the main switch (disconnect the unit) before starting work.

8.2. REGULAR MAINTENANCE

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:

Module	Test object	Target state	Measure for deviation from target	Remarks
Fan	All fan parts	No obvious damage detectable, free of contamination	Check for deposits, clean up, inform customer service if necessary	
	Impeller	Quiet, vibration-free running, no grinding noises	Check for deposits, clean up, inform customer service if necessary If the roller bearings are defective, the entire drive must be replaced. After approximately 10 years, the exhaust fan must be subject to a thorough inspection and a decision taken by an expert on its continued operation.	
Electric	Fuses	Work correctly	Replacement	
	Supply voltage	Corresponding technical data	Adjustment	
	Power consumption	Corresponding technical data	Investigate causes, inform customer service	
	Connections	Seated firmly	Check for damage and remedy it, fasten the connections	
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	
Refrigerant circuit	Compressor	Condition unremarkable	Inform customer services	
	Evaporator	Free of deposits and corrosion	Inform customer services	
	Operating pressure	Corresponding technical data	Inform customer services	
	Circuit	Tight*, leak-free	Inform customer services, 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	
Condensate drip tray	Condensate drip tray	No standing condensate, no foreign bodies or contamination visible	Check whether drain free, cleaning	
	Condensate drain	Free drain, no foreign bodies visible in opening	Cleaning	
Bypass module	Smoke detector	Flashes red for 4 minutes (1x per second) after switching on the unit, detector less than 8 years old (see date of manufacture)	Replace the smoke detector	
	Bypass	Opens quickly and completely when switched off, closes completely after switching on the unit (approx. 1 minute)	Investigate causes, inform customer service	
Sum of components	Screws, compressors, switch boxes, housing, etc.	Seated firmly	Fixings	
	Overall appearance, especially feet and fixings	No signs of corrosion, stuck fasteners, no deformations	Treatment of affected surfaces with suitable means, re-tightening of fasteners, testing for stability	

* Leak test is not mandatory according to EU regulation 517/2014.



All work on the device must be carried out after disconnecting the device from the mains (main switch). Due to possible residual voltage at the frequency inverter (inverter module), wait at least 5 minutes after actuating the main switch (disconnect the unit) before starting work.



Disconnect the unit from the electrical power supply prior to undertaking any cleaning work. Before starting work and when working, make sure that there is no live voltage.



Cleaning fluids must not dissolve the materials used, particularly the plastics.



Do not use hard objects for mechanical cleaning.



The unit or parts thereof must not be cleaned with water jets, high-pressure cleaners or compressed air. The components must not be immersed in water or cleaning fluid. Only clean with damp cloths.

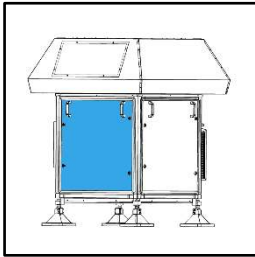
8.3. HANDLING INDIVIDUAL COMPONENTS



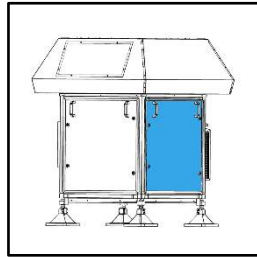
All loose parts must always be secured against blowing away or falling from the roof of the building.

8.3.1. SERVICE PANELS

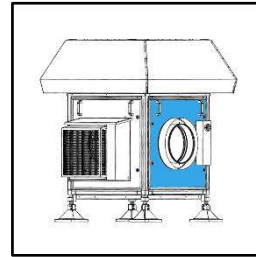
The unit has four panels:



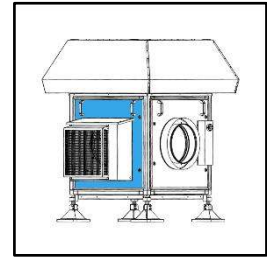
Service panel A



Service panel B



Exhaust panel
(do not open!)

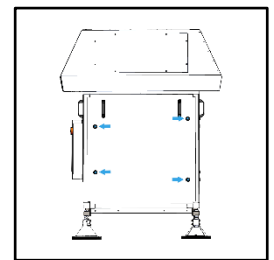
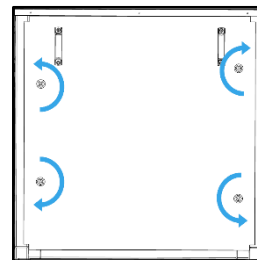


Bypass panel
(do not open!)



The sash fasteners of the exhaust air panel and bypass panel must not be opened and are factory sealed with screw varnish. Deviations from this are only permitted after prior consultation with technical customer service.

The service panels must be loosened by opening the sash fasteners. To do so, turn the sash fasteners 90° with the tool provided, in accordance with the direction of rotation shown in the picture (right). The panel can then be lifted out of the unit by holding and lifting both handles.



Ensure that the panel does not tip or slip out prematurely.



Only a suitable tool (inner triangle 8 mm) should be used for opening. A suitable key (picture on the right) is included with the unit.



8.3.2. MULTI-CABLE FEEDTHROUGH



Under the connection cover, there is a multi-cable feedthrough for all necessary sensor and signal lines to the switch box inside the unit.

Proceed as follows:



Pierce the membrane with a pointed object or cut the end with a side cutter to create a **small hole**. Ensure that the hole is clearly smaller than the diameter of the cable to be fed through.



Push the cable through the hole in the membrane.



Finally, pull the cable back by approx. 20 mm until the membrane is flush around the cable and closes tightly.

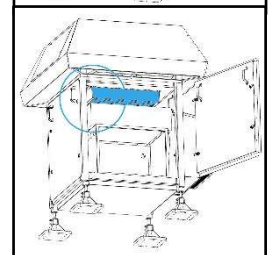
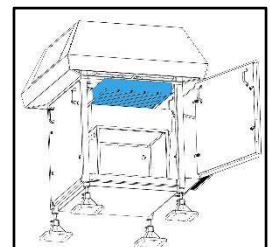
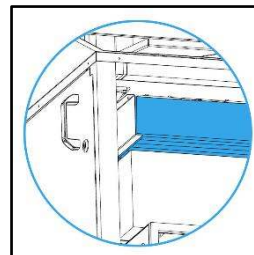
8.3.3. AIR FILTER

To service the air filter, open service panel B opposite the exhaust air connection. The filter is located in the filter slot below the hood in the middle of the unit. To remove the air filter from the unit, simply pull it out of the filter insert in the direction of the opened service panel (picture on the right).

When inserting the filter, make sure that it does not jam in the filter insert and that it is flush with the filter insert.

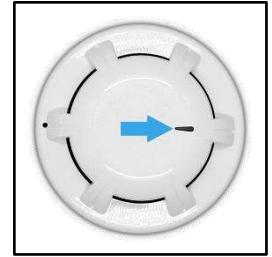
Filter type: **Eco+ 111** and **Eco+ 121:**
 Filter cell (filter class G4 / ISO Coarse 75%)
 Aereco item no.: 310170

Filter type: **Eco+ 131:**
 Filter cell (filter class G4 / ISO Coarse 75%)
 Aereco item no.: 310171



8.3.4. SMOKE DETECTOR

The smoke detector has an LED to indicate the status (Status LED: picture on the right). The smoke detector automatically enters the start-up phase when the unit is switched on and is signalled by the flashing **red LED**. The start-up phase lasts 4 minutes after switching on, before the smoke detector is automatically switched to normal operation. During the start-up phase, the smoke detector responds more sensitively to smoke gases. At the end of the start-up phase, the signal output and its meaning changes.









The smoke detector is equipped with a resting value tracking system to compensate for environmental changes. If the detector is dirty beyond a certain state, the **yellow LED** flashes during the start-up phase. When deciding how long the detector should remain installed in such a case, use the following rule of thumb:

- Operating time + 25% (e.g. if the detector has been in operation for 4 years when the yellow signal is seen, it can be operated for another 12 months maximum).

If the exterior of the smoke detector is dirty, it can be carefully cleaned with a damp cloth and a little industrial alcohol.

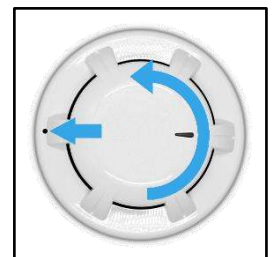
The following table shows the possible signal output and its meaning:

Signal	Meaning	Measures
Start-up phase (4 min)		
 (flashing, 1x in 1 sec.)	Regular operation, correctly installed, any fault message is not triggered by smoke detectors.	Check control unit wiring
 (permanently)	Smoke alarm (smoke detector detects visually), sensor may be covered by condensate or dust	Replace smoke detector
 (flashing, 1x in 1 sec.)	Contamination warning (limit value for resting value tracking reached), possible hardware error	Check signal after start-up phase, smoke detector still works, but must be replaced promptly
 (no signal)	Smoke detector or connection defective	Check wiring, replace smoke detector
After start-up phase		
 (flashing, 1x in 4 sec.)	Smoke detector does not work properly (hardware error)	Replace smoke detector
 (no signal)	If flashing red during start-up phase: regular operation, correctly fitted Otherwise: Smoke detector or connection defective	Check wiring, replace smoke detector

Replacing the detector insert

To release the detector insert from the base, simultaneously release the locking device and carefully unscrew the smoke detector counter-clockwise. The locking device is accessed via a small opening ($\varnothing = 2 \text{ mm}$) on the detector insert (picture on the right). Using a suitable tool, slide the inside lock apart to turn the detector insert.

To insert a new smoke detector, place the detector insert on the detector base and turn it clockwise until the detector insert engages and locks.



Smoke detector type:

Orbis optical smoke detector

Apollo Gesellschaft für Meldetechnologie GmbH, Am Anger 31, 33332 Gütersloh

Aereco item no.: 310172



The smoke detector must not be covered at any time during operation.

9. EC DECLARATION OF CONFORMITY

Manufacturer: Aereco GmbH
Robert-Bosch-Str. 9
D-65719 Hofheim Wallau
Germany
Tel.: +49 (0)6122 / 9276830
info@aereco.de
www.aereco.de

Product: Aereco
AWN Eco+ 111 exhaust air heat pump
Item no. 310121

We declare that the above product complies with the following guidelines.

Machinery Directive 2006/42/EC, protection goals of the NSR (2014/35/EU) are considered and fulfilled

EMC Directive 2004/108/EC

Pressure Equipment Directive 2014/30/EU

The above product complies with the relevant harmonised standards of the European Community:

EN 60335-2-40:2005
EN 60335-2-40/A1:2007
EN 61000-6-1:2007
EN 61000-6-2:2007
EN 61000-6-3:2007
EN 61000-6-4:2007
EN 55014-1:2008
EN 55014-2:1998
EN 378-2:2012
EN 12735-1:2010
EN 14276-1:2011
EN 1991-1-4:2010

The documentation authorization lies with AWN Product Management.

This declaration is made on behalf of the manufacturer by


Robert-Bosch-Str. 9 · 65719 Hofheim-Wallau
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Dr Volkhard Nobis, Head of Technology Division



Manufacturer: Aereco GmbH
Robert-Bosch-Str. 9
D-65719 Hofheim Wallau
Germany
Tel.: +49 (0)6122 / 9276830
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www.aereco.de

Product: Aereco
AWN Eco+ 121 exhaust air heat pump
Item no. 310122

We declare that the above product complies with the following guidelines.

Machinery Directive 2006/42/EC, protection goals of the NSR (2014/35/EU) are considered and fulfilled

EMC Directive 2004/108/EC

Pressure Equipment Directive 2014/30/EU

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www.aereco.de

Product: Aereco
AWN Eco+ 131 exhaust air heat pump
Item no. 310123

We declare that the above product complies with the following guidelines.

Machinery Directive 2006/42/EC, protection goals of the NSR (2014/35/EU) are considered and fulfilled

EMC Directive 2004/108/EC

Pressure Equipment Directive 2014/30/EU

The above product complies with the relevant harmonised standards of the European Community:

EN 60335-2-40:2005
EN 60335-2-40/A1:2007
EN 61000-6-1:2007
EN 61000-6-2:2007
EN 61000-6-3:2007
EN 61000-6-4:2007
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