

TECHNICAL DATA

ECOi-W 140-210



Model No.
Outdoor Unit (Heat Pump)

Class	140	150	170	190	210
Standard without buffer tank	U-140CWNB	U-150CWNB	U-170CWNB	U-190CWNB	U-210CWNB
With buffer tank	U-140CWBL	U-150CWBL	U-170CWBL	U-190CWBL	U-210CWBL

Model No.
Outdoor Unit (Cooling Only)

Class	140	150	170	190	210
Standard without buffer tank	U-140CVNB	U-150CVNB	U-170CVNB	U-190CVNB	U-210CVNB
With buffer tank	U-140CVBL	U-150CVBL	U-170CVBL	U-190CVBL	U-210CVBL

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IMPORTANT!

Please Read Before Starting

This air conditioner must be installed by the sales dealer or installer.

This information is provided for use only by authorized persons.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- This air conditioner shall be installed in accordance with National Wiring Regulations.
- This equipment complies with EN/IEC 61000-6-2
- The product meets the technical requirements of EN/IEC 61000-6-4.
- Pay close attention to all warning and caution notices given in this manual.



WARNING

This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.



CAUTION

This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

SPECIAL PRECAUTIONS



WARNING When Wiring



ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully see the wiring diagram and section 2 when wiring. Improper connections and inadequate grounding can cause **accidental injury or death**.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.
- Provide a power outlet to be used exclusively for each unit.
- ELCB must be incorporated in the fixed wiring. Circuit breaker must be incorporated in the fixed wiring in accordance with the wiring regulations.

	Circuit breaker
U-140C...	125A
U-150C...	125A
U-170C...	160A

	Circuit breaker
U-190C...	160A
U-210C...	200A

* Refer to the § "Electrical Data", page 22 Fuse rating aM, for systems with alternate pump and fan options.

- Provide a power outlet exclusively for each unit, and full disconnection means having a contact separation by 3mm in all poles must be incorporated in the fixed wiring in accordance with the wiring rules.
- To prevent possible hazards from insulation failure, the unit must be grounded.
- This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case of equipment breakdown or insulation breakdown.



When Transporting

- It may need two or more people to carry out the installation work.
- Care should be taken when lifting or moving the liquid cooler to reduce the chance of serious injury. Do not attempt to move the equipment without the correct means of lifting.

When Installing...

Select an installation location which is rigid and strong enough to support or hold the unit, and select a location for easy maintenance.

...In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

...In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

...In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow protection.

When Servicing

- Turn the power OFF at the main power box (mains), wait at least 10 minutes until it is discharged, then open the unit to check or repair electrical parts and wiring. 
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit.



WARNING

- This product must not be modified or disassembled under any circumstances. Modified or disassembled unit may cause fire, electric shock or injury.
- Users must not clean inside the unit. Engage authorized dealer or specialist for cleaning.
- In case of malfunction of this appliance, do not repair by yourself. Contact to the sales dealer or service dealer for a repair and disposal.



CAUTION

- Ventilate any enclosed areas when installing or testing the refrigeration system. Leaked refrigerant gas, on contact with fire or heat, can produce dangerously toxic gas.
- Confirm after installation that no refrigerant gas is leaking. If the gas comes in contact with a burning stove, gas water heater, electric room heater or other heat source, it can cause the generation of toxic gas.

Others

When disposal of the product, comply with national regulations.



CAUTION

- Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured. 
- Do not sit or step on the unit, you may fall down accidentally. 
- Do not stick any object into the FAN CASE. 
You may be injured and the unit may be damaged. 



POWER SUPPLY MUST BE SWITCHED OFF BEFORE STARTING WORK IN THE ELECTRIC CONTROL BOX.

1. General recommendations

The purpose of this Manual is to provide users with instructions for installing, commissioning, using and maintaining the units. It also contains instructions on starting up the machine as well as recommendations to avoid bodily injury and risks of damage to the device during its operation.

It does not contain the complete description of all the maintenance operations guaranteeing the unit's long life and reliability. Only the services of a qualified technician can guarantee the unit's safe operation over a long service life. Please read the following safety precautions very carefully before installing the unit.

1.1. Safety directions

Follow the safety rules in forces when you are working on your appliance.

The installation, commissioning, use and maintenance of these units should be performed by qualified personnel having a good knowledge of standards and local regulations, as well as experience of this type of equipment.

This appliance has not been designed for use by persons (including children) with reduced physical, sensorial or mental faculties or by persons without any experience or knowledge of heating systems, unless they act under the safety and supervision of a responsible person or have received prior training concerning the use of the appliance.

The unit should be handled using lifting and handling equipment appropriate to the unit's size and weight.

Any wiring produced on site must comply with the corresponding national electrical regulations.

Make sure that the power supply and its frequency are adapted to the required electric current of operation, taking into account specific conditions of the location and the current required for any other appliance connected to the same circuit.

The unit must be EARTHED to avoid any risks caused by insulation defects.

It is forbidden to start any work on the electrical components if water or high humidity is present on the installation site.

1.2. Warning

Cutoff power supply before starting to work on the appliance.

When making the hydraulic connections, ensure that no impurities are introduced into the pipe work.

The manufacturer declines any responsibility and the warranty becomes void if these instructions are not respected.

If you meet a problem, please call the Technical Department of your area.

If possible, assemble the compulsory or optional accessories before placing the appliance on its final location (see instructions provided with each accessory).

In order to become fully familiar with the appliance, we suggest to read also our Technical Instructions.

The information contained in these Instructions are subject to modification without advance notice.

1.3. Pressure equipment safety

Gas	Fluid Group	PS (bar)	Category ⁽¹⁾	Evaluation Mode ⁽²⁾	Notified Body
R410A	2	42	2	D1	0062

1) According the 14 § 6 b) article of the directive 2014/68/EU.

2) According the 14 § 2 article of the directive 2014/68/EU.

- These units contain pressurised refrigerant. The pressurised elements within these units should only be disturbed during maintenance by fully qualified and trained personnel.
- Do not damage, bend, or impact the pressurised pipe work.
- Failure to follow these recommendations may result in serious or fatal injury.

2. Disposal information

Information for Users on Collection and Disposal of Old Equipment and Used Batteries



These symbols on the products, packaging, and/or accompanying documents mean that used electrical and electronic products and batteries should not be mixed with general household waste. For proper treatment, recovery and recycling of old products and used batteries, please take them to applicable collection

points, in accordance with your national legislation and the Directives 2002/96/EC and 2006/66/EC.

By disposing of these products and batteries correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling.

For more information about collection and recycling of old products and batteries, please contact your local municipality, your waste disposal service or the point of sale where you purchased the items.

Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

For business users in the European Union

If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

[Information on Disposal in other Countries outside the European Union]

These symbols are only valid in the European Union. If you wish to discard these items, please contact your local authorities or dealer and ask for the correct method of disposal.



Note for the battery symbol (bottom two symbol examples):

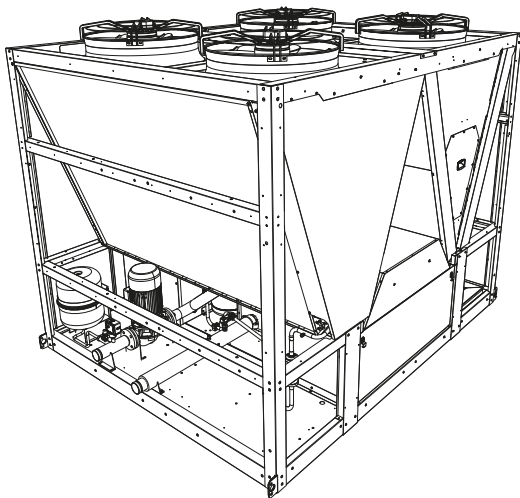
This symbol might be used in combination with a chemical symbol. In this case it complies with the requirement set by the Directive for the chemical involved.



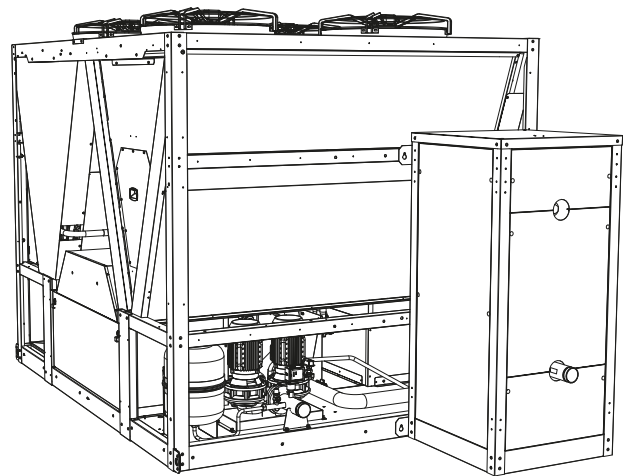
Pb

3. Key Points

- Energy class SCOP A+, SEER class A (Cooling Only)
- R410A refrigerant
- Units are optimized for partial load operation
- High SEER and SCOP
- 2 refrigerant circuits each equipped with 2 compressors fitted in tandem. Up to eight capacity steps provides an immediate return on investment versus inverter units
- Low acoustic level as standard, ECOi-W unit are supplied with an acoustic box around compressors
- “Night Mode” for energy savings and even more reduced noise level in night operation
- Temperature curve is standard for energy savings
- Great accessibility to internal components for service operations
- New display on external panel allowing the complete control of the unit
- Wide operating limits
- High temperature operation up to 50°C
- Operation in heating down to external temperature of -17°C
- Fan speed control for low ambient operation in cooling down to -10°C
- ModBus interface available (read/write)
- Phase sequence monitor supplied as standard
- User-friendly controller that reduces the need of an external water tank in most comfort air conditioning installations
- Control logic on return or leaving water temperature
- In cooling mode, 3,5 litres of buffer volume per kW are recommended
- In heating mode, 6,5 litres of buffer volume per kW are recommended
- New technology “smart deice” to ensure a constant temperature out of water even at very low temperatures
- Double water set point
- Water filter (supplied loose) and water flow switch (factory fitted) are supplied as standard
- “Plug and play” hydraulic pack is optional
- Automatic air vent
- Victaulic connection on internal components ensuring a perfect sealing and facilitating service operations
- Double 2” 1/2 valve on water pipes for pressure measurement
- Small footprint, allowing shipping and handling costs to be saved, units find easily a place to be installed



ECOi-W without buffer tank



ECOi-W with buffer tank

4. Specifications

4.1. General

The new ECOi-W 140 to 210 have been designed and optimized to operate with R410A refrigerant fluid. They are of dual refrigerant circuit type.

Heat pump and cooling only consisting of 5 sizes (140, 150, 170, 190 and 210) and covers a nominal cooling capacity range from 125 to 208kW and a nominal heating capacity range from 143 to 217kW.

All units are equipped with four scroll compressors fitted in tandem for adapting to partial system loads.

The general operation status of the machine is monitored continuously under the control of an IHM controller.

The ECOi-W units can operate without buffer tank, thanks to the IHM controller that implements an auto-adaptative control logic ensuring a total protection of the compressors at different load or water volume conditions.

The minimum water volume required in cooling mode is 3,5L/kW for application air conditioning and 10L/kW for application process.

In heating mode, 6,5L/kW are recommended in order to guarantee homogeneous temperatures during the defrosting cycles (comfort and energy savings).

A fan speed controller can be supplied as a factory-fitted option to authorize the unit to operate in cooling mode at low ambient temperature.

4.2. Cabinet and structure

The cabinet and structure of the unit are of heavy duty galvanized steel. All galvanized steel components are individually painted by a special painting process before assembly of the unit.

This painting system performs a homogeneous protection against corrosion. The painting is a polyester powder based type, coloured in RAL 9003.

The ECOi-W units are suitable for outdoor installation, directly on the building roof or at ground level.

4.3. Compressors

Each unit is equipped with four scroll compressors assembled together to form 2 tandem compressors.

The compressors are then mounted on rubber pads in order to eliminate noise and vibration.

The compressor motors have a direct start-up. Each motor is cooled by the refrigerant gas and is equipped with overload protection.

A phase sequence monitor is supplied as standard.

4.4. Evaporator

The evaporator consists of a stainless steel plate heat exchanger insulated with closed cell synthetic foam. It is protected by an antifreeze electric heater to ensure a good protection against freezing at low ambient temperature (-10°C min.) when the unit is switched off.

Maximum working pressure is 10 bar at water side and 45 at refrigerant side.

4.5. Condenser

The condenser is a finned coil, constructed with seamless copper tubes, mechanically expanded into aluminium, fins. The fins of ECOi-W coils are made of aluminium with hydrophilic blue coating (heat pump version only) to facilitate water droplet drain. The condenser is largely dimensioned in order to optimize performance and defrosting cycles.

New technology "smart deice" standard for ECOi-W units to ensure a constant temperature out of water even at very low temperatures.

- Antifreeze coil with increased fin pitch
Proven technology for more than 8 years on high temperature heat pump, for dividing the frequency of defrost by 2.
- Unique defrost logic prohibiting deicing two circuits simultaneously

4.6. Condenser fans and motors

Each unit has four axial fans, with 2 speeds.

The fan motor has IP54 grade and is equipped with a thermal overload protection.

A pressostatic type fan speed controller can be delivered as a factory-fitted option. It allows the unit to operate in cooling mode at low ambient temperatures down to -10°C minimum. It regulates the fan speed in order to maintain constant condensing temperature.

All fans are fitted with a protective grille.

4.7. Refrigerant circuit

All units have two refrigerants circuits consisting of: scroll tandem compressors, plate heat exchanger, electronic expansion valve, 4-way reverse cycle valve and liquid reservoir (heat pump version only), condenser coil, as well as safety and control devices such as high pressure switch, high/low pressure transducers and PED safety valve. Inspection on refrigerant, via a sight glass, can be done during service operations, without disturbing the unit operating conditions.

All refrigerant components are shown in the functional diagrams illustrated in the following section "Refrigerant flow diagrams".

4.8. Hydraulic circuit

Thanks to the design flexibility on the hydraulic circuit, all the units can be configured in several ways:

- Without Pump: Unit without pump, the hydraulic circuit contains the following components: water filter, mounted water flow switch, water safety valve, automatic air vent, optional field-installed in/out 2" 1/2 water valves.
All water piping is covered with thermal insulation
- Single Pump Low Pressure: One pump unit having the same equipment as unit without pump + a pump with 150kPa external static pressure. An air vent is provided for this configuration
- Single Pump High Pressure: One pump unit having the same equipment as unit without pump + a pump with 300kPa external static pressure. An air vent is provided for this configuration.

- Double Pump Low Pressure: Two pumps unit having the same equipment as unit without pump + 1 dual pump monobloc with 150kPa external static pressure. An air vent is provided for this configuration
- Double Pump High Pressure: Two pumps unit having the same equipment as unit without pump + 1 dual pump monobloc with 300kPa external static pressure. An air vent is provided for this configuration
- “Variable Primary Flow” is used to modulate the power of the hydraulic pump

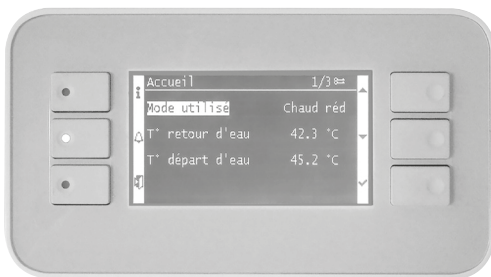
The different components of hydraulic kit are interconnected by Victaulic couplings in order to facilitate maintenance operations.

4.9. Control panel

The units are fitted with an external control panel that displays the operating parameters and alarms. The control panel is accessible from exterior without removing any parts, nor shutting down the unit, because it is placed on an external panel.

The ECOi-W chillers are equipped with a microprocessor based control with a new IHM logic that implements an intelligent control with anticipation of needs, either on entering water temperature, or on leaving water temperature.

User interface



The main features of this control system are:
 User-friendly: with only 6 buttons and a tree logic, it is possible to control the unit easily,
 Reliable: all indications on the display are visible in all weather conditions,
 Internal test procedure,
 Alarm visualization with a logging of the last 10 alarms,
 Remote ON/OFF switching,
 Compressor and pump working hour counter,
 Pressure transducers to control discharge and suction temperatures,
 Maximum discharge temperature control,
 Part load operating mode,
 Remote Cooling/Heating mode switching,
 Compatibility with BMS (RS485 ModBus protocol),
 Compressor operating limits stored in a flash memory.

4.10. Control and safety devices

Each unit is complete with the following safety and control devices:

Safety:

- Fan motor overload protection
- Compressor motor overload protection
- Water flow switch
- Water filter (supplied loose)
- High pressure switch
- High and low pressure transducers
- Evaporator antifreeze electric heater
- Crankcase heater
- Safety valve on 45 bar refrigerated side
- Safety valve on 3 bar water side

Control:

- Entering water temperature sensor
- Leaving water temperature sensor
- Coil temperature sensor
- Discharge temperature sensor
- Air temperature sensor
- Suction and discharge pressure transducers
- Dry contact available to the client:
ON / OFF, SUMMER / WINTER, DAY / NIGHT

4.11. Conformity with standards

All ECOi-W units are in compliant with the following standards:

- Machine Directive: 2006/42/EC
- Low Voltage Directive: 2014/35/UE
- Electromagnetic Compatibility Directive: 2014/30/UE
- Pressure Equipment Directive: 2014/68/UE
- RoHs directive: 2011/65/EU

4.12. Factory-installed options

- Coil with epoxy treatment
- Low water pressure switch
- 1-pump hydraulic low pressure pack
- 1-pump hydraulic high pressure pack
- 2-pump hydraulic low pressure pack
- 2-pump hydraulic high pressure pack
- Fan speed control pack (for operation with low ambient temperature down to -10°C)
- Variable Primary Flow
 - double speed
 - capacity
 - constant outlet pressure
- Nordic Pack including external coil protection and a heating wire in the condensate tray

4.13. Field-installed accessories

- Anti-vibration rubber pads
- Inlet/Outlet valve pack.

5. Model Referencing and Options

5.1. Model Referencing

	Outdoor Unit		Capacity	Chiller	Refrigerant & Compressor Type	Buffer Tank Option	Pump option	Pump Drive option	Hydraulic options	Ambient Options	Misc Options
Options			1		2	3	4	5	6	7	8
System Model Reference	U	-	090	C	W	NB	0	0	0	00	00

Main Model reference

Additional Option References

Options	Ref	Description
	U	Signifies outdoor unit
1	170	Indicate model nominal capacity in kW (Please refer to 9. Physical Data)
	C	Indicates the unit is of a chiller type
2	W	Indicates the unit is a Heat Pump (W), or Cooling Only (V) and utilises R410A refrigerant
3	NB	Indicates the unit buffer tank option, which affects the overall dimensions of the unit (See 15. Dimensions for further details)
4		Pump option. Please refer to options table. (For combination referencing, please refer to your local sales representative)
5		Pump Drive option. Please refer to options table. (For combination referencing, please refer to your local sales representative)
6		Hydraulic options. Please refer to options table. (For combination referencing, please refer to your local sales representative)
7		Ambient Options. Please refer to options table. (For combination referencing, please refer to your local sales representative)
8		Misc Options. Please refer to options table. (For combination referencing, please refer to your local sales representative)

5.2. Main Model Designation

Model	Heat Pump		Capacity		Cooling Only		Capacity
	Std w/o buffer tank	With buffer tank	Cooling	Heating	Std w/o buffer tank	With buffer tank	Cooling
140	U-140CWNB	U-140CWBL	125.4	143.7	U-140CVNB	U-140CVBL	134.0
150	U-150CWNB	U-150CWBL	137.6	153.7	U-150CVNB	U-150CVBL	147.0
170	U-170CWNB	U-170CWBL	150.9	170.1	U-170CVNB	U-170CVBL	161.2
190	U-190CWNB	U-190CWBL	175.8	194.9	U-190CVNB	U-190CVBL	187.8
210	U-210CWNB	U-210CWBL	195.4	217.6	U-210CVNB	U-210CVBL	208.8

5.3. Options table - Heat pump

Option	Type	Ref.	Description	Model				
				140	150	170	190	210
1	Capacity							
2	Refrigerant & compressor type	W	R410A, fixed speed, Heat Pump	•	•	•	•	•
3	Buffer tank option	NB	No buffer	Std	Std	Std	Std	Std
		BL	Buffer tank (large) 1)	•	•	•	•	•
4	Pump option		No pump	•	•	•	•	•
			Single pump low pressure	•	•	•	•	•
			Single pump high pressure	•	•	•	•	•
			Double pump low pressure	•	•	•	•	•
			Double pump high pressure	•	•	•	•	•
5	Pump drive option		Pump drive - fixed speed 2)	Std	Std	Std	Std	Std
			Pump drive - variable twin speed (single pump)	•	•	•	•	•
			Pump drive - variable twin speed (double pump)	•	•	•	•	•
			Pump drive - variable speed capacity (single pump)	•	•	•	•	•
			Pump drive - variable speed capacity (double pump)	•	•	•	•	•
			Pump drive - constant outlet pressure (single pump)	•	•	•	•	•
			Pump drive - constant outlet pressure (double pump)	•	•	•	•	•
			Pump drive - constant differential pressure (single pump) 3)	SO	SO	SO	SO	SO
			Pump drive - constant differential pressure (double pump) 3)	SO	SO	SO	SO	SO
6	Hydraulic options		No hydraulic options	Std	Std	Std	Std	Std
			Low water pressure sensor	•	•	•	•	•
			Water isolation valves	•	•	•	•	•
			Hydraulic gauges	•	•	•	•	•
7	Ambient options		No ambient options	Std	Std	Std	Std	Std
			Finned coil treatment - epoxy	•	•	•	•	•
			Outdoor coil protection grid 4)	•	•	•	•	•
			Rubber pads	•	•	•	•	•
			Spring damper	•	•	•	•	•
			Fan speed control (FSC)	•	•	•	•	•
			Nordic pack	•	•	•	•	•
			Low noise	Std	Std	Std	Std	Std
			High pressure fan	•	•	•	•	•
8	Miscellaneous options		No miscellaneous options	Std	Std	Std	Std	Std
			Soft starter	•	•	•	•	•
			Power supply w/o neutral	•	•	•	•	•
			Standard BMS option (Modbus RTU)	Std	Std	Std	Std	Std
			Modbus TCP/IP	•	•	•	•	•
			Bacnet IP	•	•	•	•	•
			Remote LAN connection	•	•	•	•	•
			Refrigerant gauge	•	•	•	•	•

1) Pump is required when selecting a buffer tank

2) Fixed speed pump drive is supplied as standard when selecting a pump. Please select an alternative pump drive if alternate operation is required

3) Constant differential pump drive options are only available on a special order and require additional production time. Please contact your local sales representative

4) Not available when using Nordic pack. Nordic pack is supplied with special coil mesh

Std: Standard Item Included

•: Optional Item that can be selected

SO: Special Order Item

Options table - Cooling Only

Option	Type	Ref.	Description	Model				
				140	150	170	190	210
1	Capacity							
2	Refrigerant & Compressor Type	V	R410A, fixed speed, Cooling Only	•	•	•	•	•
3	Buffer Tank Option	NB	No buffer	Std	Std	Std	Std	Std
		BL	Buffer tank (large) 1)	•	•	•	•	•
4	Pump option		No pump 2)	•	•	•	•	•
			Single pump low pressure	•	•	•	•	•
			Single pump high pressure	•	•	•	•	•
			Double pump low pressure	•	•	•	•	•
			Double pump high pressure	•	•	•	•	•
5	Pump Drive option		Pump drive - fixed speed 3)	Std	Std	Std	Std	Std
			Pump drive - variable twin speed (single pump)	•	•	•	•	•
			Pump drive - variable twin speed (double pump)	•	•	•	•	•
			Pump drive - variable speed capacity (single pump)	•	•	•	•	•
			Pump drive - variable speed capacity (double pump)	•	•	•	•	•
			Pump drive - constant outlet pressure (single pump)	•	•	•	•	•
			Pump drive - constant outlet pressure (double pump)	•	•	•	•	•
			Pump drive - constant differential pressure (single pump) 4)	SO	SO	SO	SO	SO
6	Hydraulic options		No hydraulic options	Std	Std	Std	Std	Std
			Low water pressure sensor	•	•	•	•	•
			Water isolation valves	•	•	•	•	•
			Hydraulic gauges	•	•	•	•	•
7	Ambient Options		No ambient options	Std	Std	Std	Std	Std
			Finned coil treatment - epoxy	•	•	•	•	•
			Outdoor coil protection grid	•	•	•	•	•
			Rubber pads	•	•	•	•	•
			Spring damper	•	•	•	•	•
			Fan speed control (FSC)	•	•	•	•	•
			Low noise	Std	Std	Std	Std	Std
8	Misc. Options		High pressure fan	•	•	•	•	•
			No miscellaneous options	Std	Std	Std	Std	Std
			Soft starter	•	•	•	•	•
			Power supply w/o neutral	•	•	•	•	•
			Standard BMS option (Modbus RTU)	Std	Std	Std	Std	Std
			Modbus TCP/IP	•	•	•	•	•
			Remote LAN connection	Std	Std	Std	Std	Std
			Bacnet IP	•	•	•	•	•
			Refrigerant gauge	•	•	•	•	•

1) Pump is required when selecting a buffer tank

2) The system may be supplied without a pump, but in order to meet EU ErP compliance, the installation must include a variable speed pump.

3) Fixed speed pump drive on cooling only chiller, is only suitable for installation outside of the EU due to ErP compliance.

4) Constant differential pump drive option is only available on a special order and requires additional production time. Please contact your local sales representative.

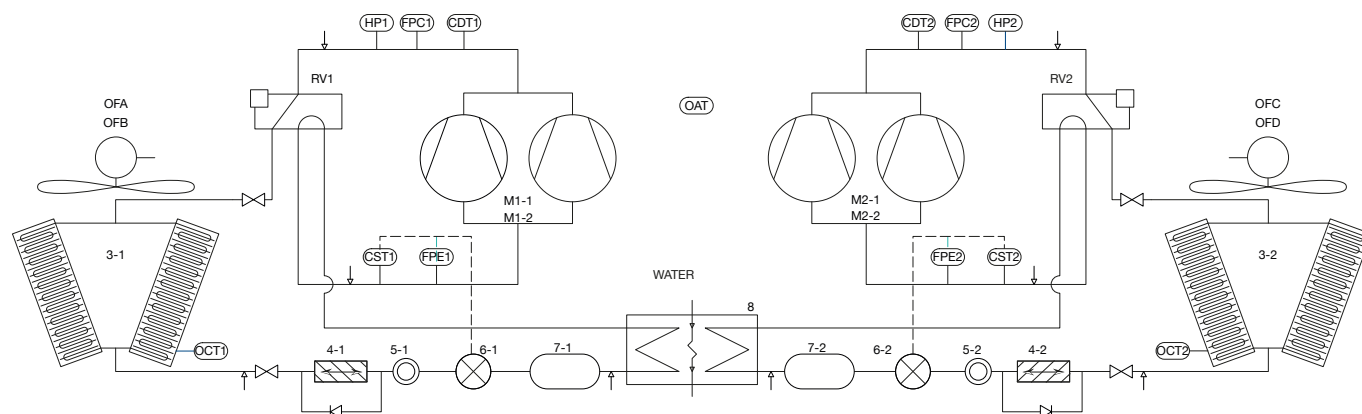
Std: Standard Item Included

•: Optional Item that can be selected

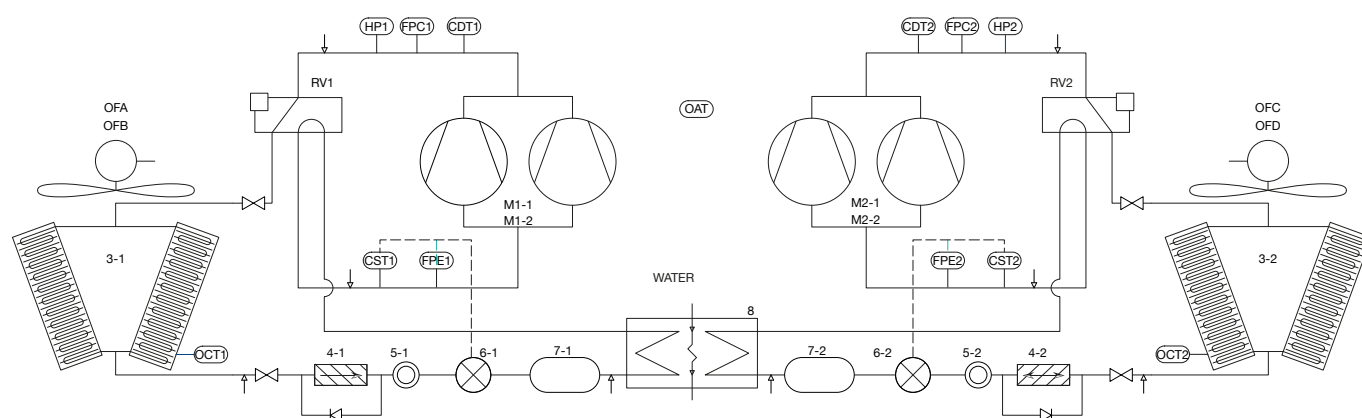
SO: Special Order Item

6. Refrigerant Flow Diagram

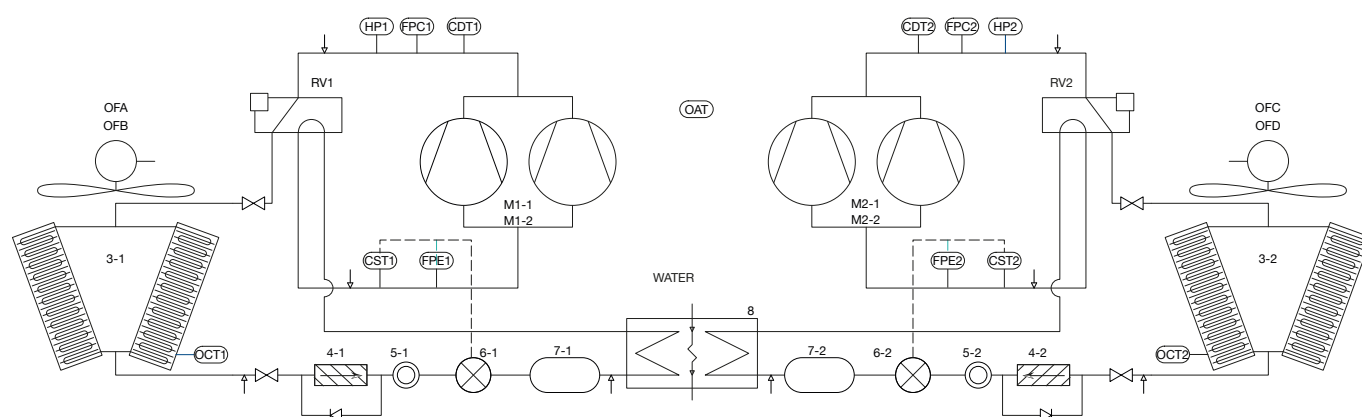
6.1. 140 and 150 heat pump models



6.2. 170 heat pump model



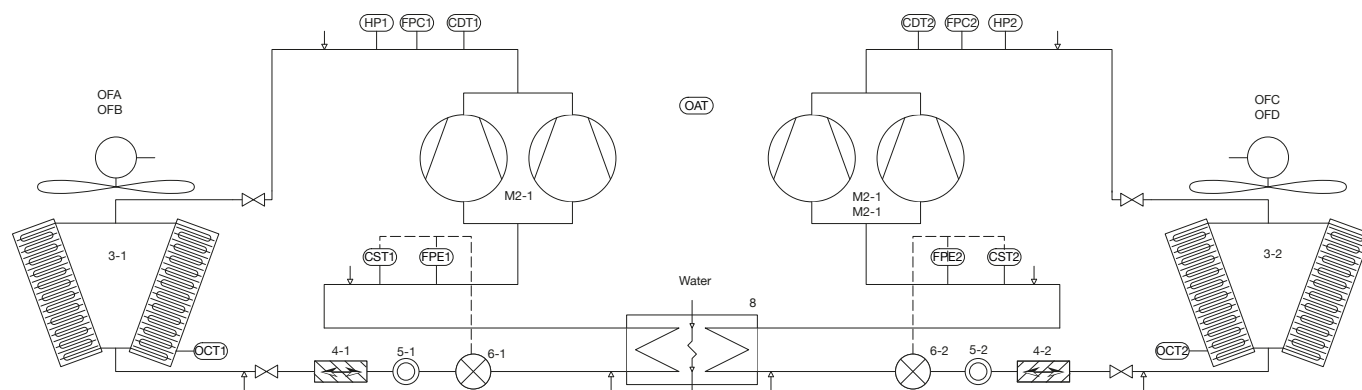
6.3. 190 and 210 heat pump models



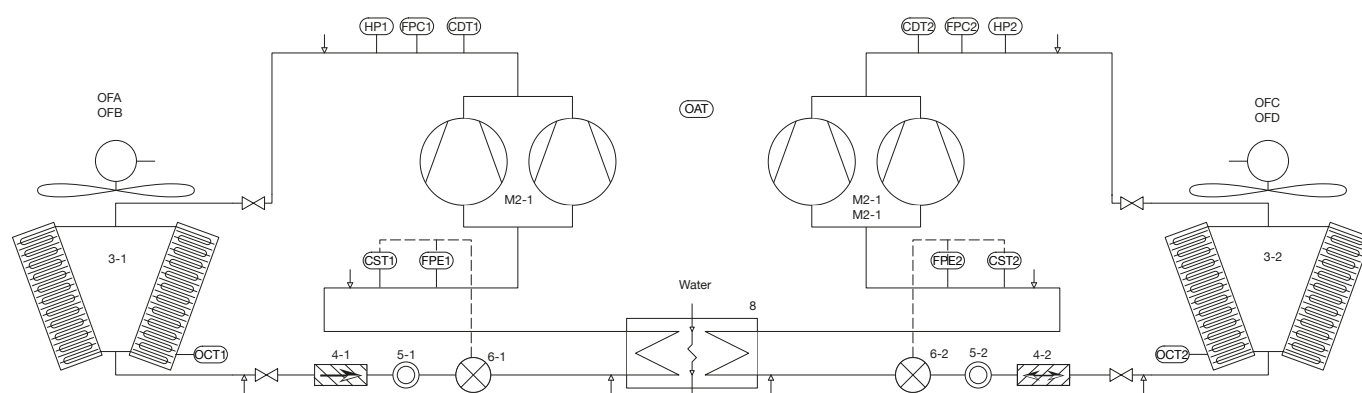
Components	
M1-1/M1-2 M2-1/M2-2	Tandem scroll compressors
RV1 / RV2	Cycle reversing valve
3	Air condenser
4	Filter drier
5	Sight glass
6	Electronic expansion valve
7	liquid receiver
8	Plate heat exchanger

Safety/control devices	
FPC1 / FPC2	High pressure transducer
HP1 / HP2	High pressure switch
CDT1 / CDT2	Discharge temperature sensor
FPE1 / FPE2	Low pressure transducer
CST1 / CST2	Suction temperature sensor
OAT	Outdoor air temperature sensor
OCT1 / OCT2	Condenser outdoor temperature sensor
↓	Pressure tapping point 5/16"

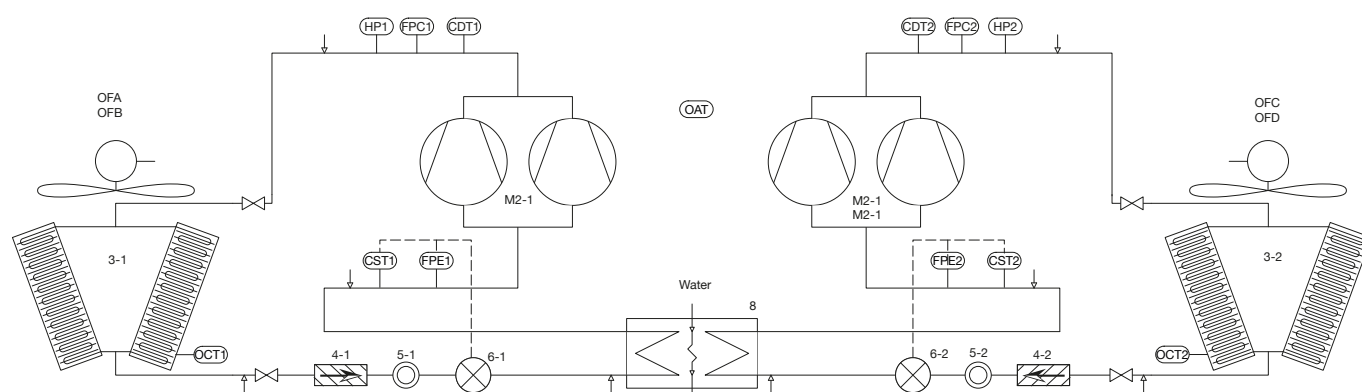
6.4. 140 and 150 cooling only models



6.5. 170 cooling only model



6.6. 190 and 210 cooling only models

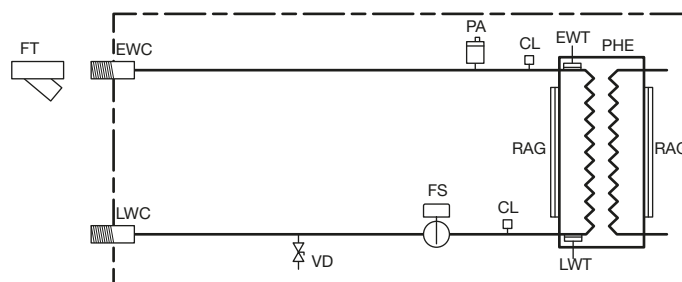


Components	
M1-1/M1-2 M2-1/M2-2	Tandem scroll compressors
3	Air condenser
4	Filter drier
5	Sight glass
6	Electronic expansion valve
8	Plate heat exchanger

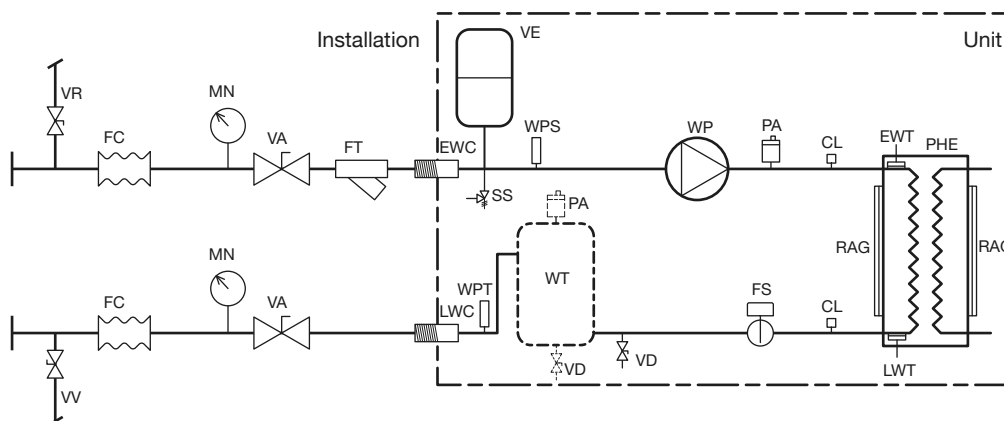
Safety/control devices	
FPC1 / FPC2	High pressure transducer
HP1 / HP2	High pressure switch
CDT1 / CDT2	Discharge temperature sensor
FPE1 / FPE2	Low pressure transducer
CST1 / CST2	Suction temperature sensor
OAT	Outdoor air temperature sensor
OCT1 / OCT2	Condenser outdoor temperature sensor
↓	Pressure tapping point 5/16"

7. Hydraulic Circuit Diagram

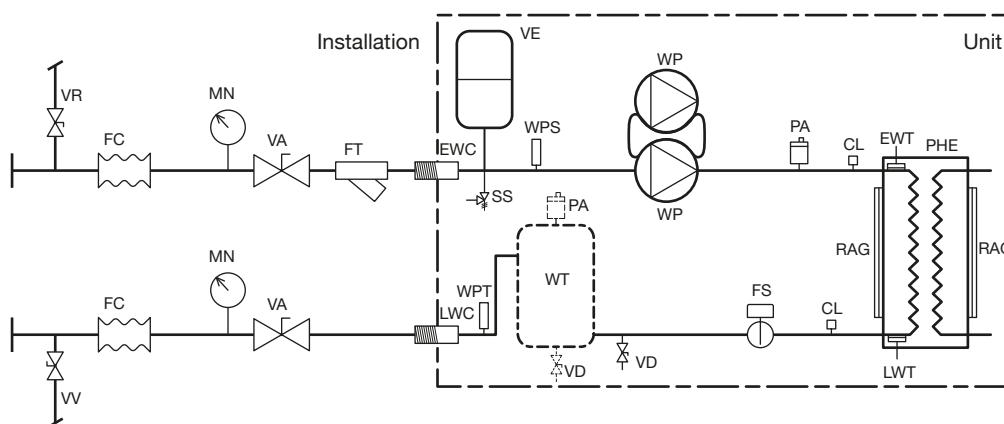
7.1. Without pump version



7.2. Recommended installation - Single pump version



7.3. Recommended installation - Double pump version



Recommended installation	
VA	Globe valve (optional)
VV	Drain valve
FC	Flexible connection
VR	Water charging valve
MN	Manometer

Hydraulic Circuit	
FT	Filter (supplied loose)
EWC/LWC	Inlet/Outlet male connection - Victaulic 2"1/2'
VE	Pressure expansion tank
WPS	Low water pressure switch (optional)
SS	Safety valve
WP	Pump
PA	Automatic air vent
CL	Pressure tap 3/8"
EWT	Inlet water temperature sensor
LWT	Outlet water temperature sensor
PHE	Plate heat exchanger
RAG	Antifreeze heater
FS	Flow switch
VD	Drain valve
WT	Buffer tank
WPT	Pressure transducer (optional)

8. Energy performance

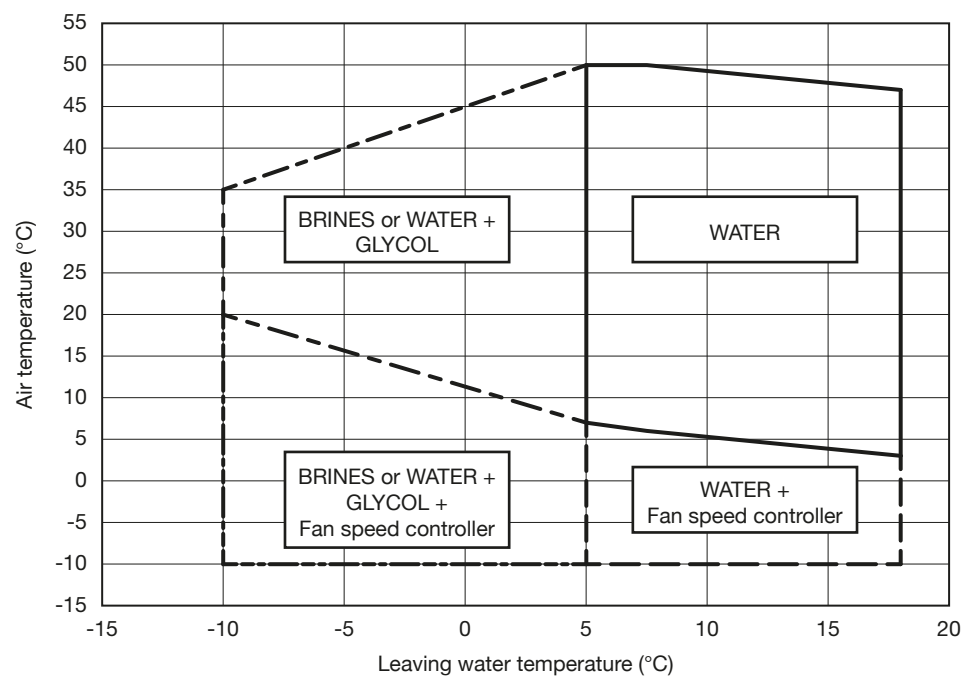
8.1. Energy class

ECOi-W	140	150	170	190	125
SCOP *	3,32	3,36	3,31	3,29	3,23

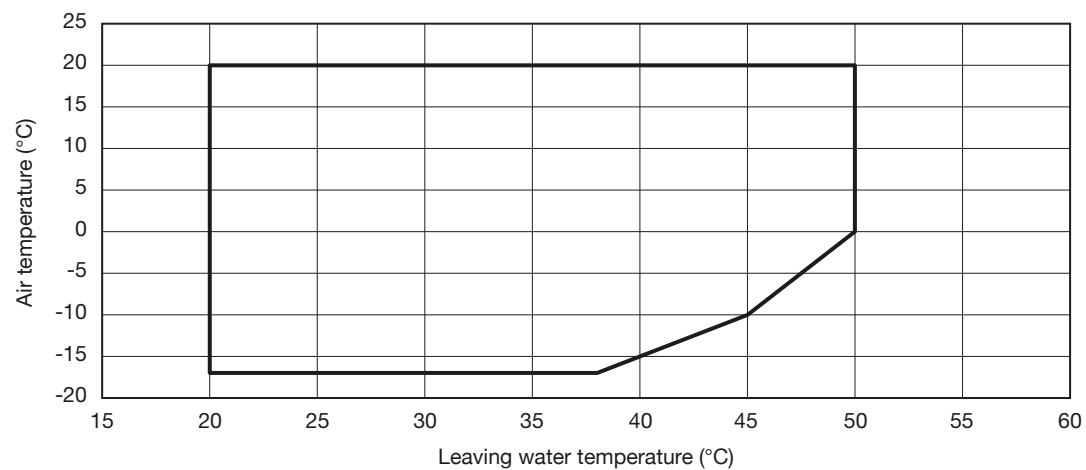
Seasonal space heating energy efficiency class according to the Delegated Regulation No. 811/2013 of the European Commission. ** Considered at nominal unit capacity.

9. Operating Limits

9.1. Cooling mode



9.2. Heating mode



* 55°C can be achieved with periodic operation.
Please contact your local Panasonic sales or service representative for full details.

10. Correction Factors

10.1. Fouling factors - Evaporator

Fouling factor (m ² , °C/kW)	Capacity	Power input
0,044	1,000	1,000
0,088	0,987	0,995
0,176	0,964	0,985
0,352	0,915	0,962

10.2. Fouling factors - Condenser

Fouling factor (m ² , °C/kW)	Capacity	Power input
0,044	1,000	1,000
0,088	0,987	1,023
0,176	0,955	1,068
0,352	0,910	1,135

10.3. Altitude factors

Altitude (m)	Capacity	Power input
0	1,000	1,000
600	0,987	1,010
1,200	0,973	1,020
1,800	0,958	1,030
2,400	0,943	1,040

10.4. Correction factors - Ethylene glycol

% Glycol	Freezing point (°C)	Capacity	Power input	Water flow	Pressure drop
0	0	1,000	1,000	1,000	1,000
10	-4	0,995	0,998	1,015	1,070
20	-10	0,985	0,995	1,050	1,160
30	-17	0,970	0,985	1,085	1,235
45	-30	0,949	0,977	1,169	1,368

Warning!

Ethylene glycol is toxic to the environment. Moreover, it is not suitable for heating with domestic hot water production by simple exchange.

10.5. Correction factors - Propylene glycol

% Glycol	Freezing point (°C)	Capacity	Power input	Water flow	Pressure drop
0	0	1,00	1,00	1,00	1,00
10	-3	0,991	0,994	1,005	1,112
20	-7	0,977	0,991	1,030	1,175
30	-13	0,945	0,975	1,067	1,290
45	-27	0,894	0,962	1,162	1,520

11. Physical Data - ECOi-W

Models			140	150	170	190	210
Standard without buffer tank			U-140CWNB	U-150CWNB	U-170CWNB	U-190CWNB	U-210CWNB
With buffer tank			U-140CWBL	U-150CWBL	U-170CWBL	U-190CWBL	U-210CWBL
Power supply			400V / 3~ N / 50Hz				
Cooling	Capacity	kW	125,4	137,6	150,9	175,8	195,4
	Power input	kW	43,55	47,77	52,73	64,83	72,54
	Total EER 100% ^{*1}	—	2,88	2,88	2,86	2,71	2,69
	Energy class EER ^{*2}	—	C	C	C	C	D
	SEER ^{*2}	—	3,87	3,87	3,91	3,69	3,68
	η_{sc} ^{*2}	—	152	152	153	145	144
	Energy class SEER	—	C	C	C	C	D
Heating	Capacity	kW	143,7	153,7	170,1	194,9	217,6
	Power input	kW	45,8	50,2	55,4	67,5	78,3
	Total COP 100% ^{*1}	—	3,14	3,06	3,07	2,89	2,78
	Energy class COP ^{*2}	—	B	B	B	C	D
	SCOP ^{*2}	—	3,32	3,36	3,31	3,29	3,23
	η_{sh} ^{*2}	—	138	145	165	185	195
	Energy class SCOP ^{*2}	—	A+	A+	A+	A+	A+
Startup type			Direct	Direct	Direct	Direct	Direct
Maximum operating current		A	108	119	136	153	170
Startup current (without Soft Starter)		A	251	262	324	341	396
Startup current (with Soft Starter)		A	130	141	161	178	201
Refrigerant	Type		R410A	R410A	R410A	R410A	R410A
	Number of refrigerant circuit		2	2	2	2	2
	Charge ^{*3}	kg	24,70 / 24,70	24,70 / 24,70	24,70 / 33,30	33,30 / 33,30	33,30 / 33,30
Compressors	Number		4	4	4	4	4
	Type		Scroll	Scroll	Scroll	Scroll	Scroll
	Part load steps	%	0/24/26/48/50 52/74/76/100	0/23/27/46/50 54/73/77/100	0/20/24/44/45 55/69/80/100	0/22/28/44/50 56/72/78/100	0/19/31/38/50 62/69/81/100
	Crankcase heater	W	66+66+66+66	66+66+66+66	66+66+82+66	82+66+82+66	95+66+95+66
Evaporator	Number		1	1	1	1	1
	Type		Plate	Plate	Plate	Plate	Plate
Water flow	Cooling	m³/h	21,56	23,65	25,95	30,24	33,62
	Heating	m³/h	33	39	24	32	40
Water pressure drop	Cooling	kPa	24,73	26,45	29,58	33,52	37,44
	Heating	kPa	44	50	31	41	50
Water volume		l	8,49	8,49	12,21	12,21	12,21
Antifreeze heater		W	60	60	120	120	120
Coil	Number		4	4	4	4	4
	Frontal surface	m²	11,88	11,88	11,88	11,88	11,88
	Number of rows		2 + 2	2 + 2	2 + 3	3 + 3	3 + 3
Fan	Number		4	4	4	4	4
	Standard	Air flow	m³/h	56000	56000	71000	86000
		Rotational speed	tr/mn	900	900	900	900
		Power input each fan	W	940	940	940 - 1650	1650
Water connections	Type		Victaulic connection				
	Inlet diameter	Inch	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2
	Outlet diameter	Inch	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2
Buffer tank (optional)	Volume	L	300	300	300	300	300
Dimensions without buffer tank	Length	mm	2856	2856	2856	2856	2856
	Width	mm	2210	2210	2210	2210	2210
	Height	mm	2295	2295	2321	2321	2321
Dimensions with buffer tank	Length	mm	3666	3666	3666	3666	3666
	Width	mm	2210	2210	2210	2210	2210
	Height	mm	2295	2295	2321	2321	2321
Weight	Dry weight - Without buffer tank	kg	1577	1597	1687	1777	2087
Acoustical data	Sound power level	dB(A)	85,4	85,4	87,0	88,1	88,1
	Sound pressure level *	dB(A)	53,4	53,4	55,0	56,1	56,1

* Sound pressure levels calculated at 10 meters. Sound pressure levels refer to ISO standard 3744 with parallelepiped shape.

*1 According to EN 14511-3:2011.

*2 According to Eurovent.

*3 Indicatives values - see nameplate.

Physical Data - ECOi-W

Models			140	150	170	190	210
Standard without buffer tank			U-140CVNB	U-150CVNB	U-170CVNB	U-190CVNB	U-210CVNB
With buffer tank			U-140CVBL	U-150CVBL	U-170CVBL	U-190CVBL	U-210CVBL
Power supply			400V / 3~ N / 50Hz				
Cooling	Capacity	kW	134.0	147.0	161.2	187.8	208.8
	Power input	kW	44.20	49.00	53.70	65.80	72.30
	Total EER 100% ^{*1}	—	3.0	3.0	3.0	2.9	2.9
	Energy class EER ^{*2}	—	B	B	B	C	C
	SEER ^{*2}	—	4.35	4.31	4.40	4.23	4.22
	η_{sc} ^{*2}	—	171	169	173	166	166
	Energy class SEER	—	A	A	A	A	A
Startup type			Direct	Direct	Direct	Direct	Direct
Maximum operating current		A	108	119	136	153	170
Startup current (without Soft Starter)		A	251	262	324	341	396
Startup current (with Soft Starter)		A	130	141	161	178	201
Refrigerant	Type		R410A	R410A	R410A	R410A	R410A
	Number of refrigerant circuit		2	2	2	2	2
	Charge ^{*3}	kg	19,55 / 19,55	19,55 / 19,55	19,55 / 19,55	19,55 / 19,55	29,60 / 29,60
Compressors	Number		4	4	4	4	4
	Type		Scroll	Scroll	Scroll	Scroll	Scroll
	Part load steps	%	"0/24/26/48/50 52/74/76/100"	"0/23/27/46/50 54/73/77/100"	"0/20/24/44/45 55/69/80/100"	"0/22/28/44/50 56/72/78/100"	"0/19/31/38/50 62/69/81/100"
	Crankcase heater	W	66+66+66+66	66+66+66+66	66+66+82+66	82+66+82+66	95+66+95+66
Evaporator	Number		1	1	1	1	1
	Type		Plate	Plate	Plate	Plate	Plate
Water flow	Cooling	m³/h	23.10	25.30	27.80	32.30	36.00
Water pressure drop	Cooling	kPa	37.00	44.70	27.40	37.00	45.00
Water volume		l	8.49	8.49	12.21	12.21	12.21
Antifreeze heater		W	60	60	120	120	120
Coil	Number		4	4	4	4	4
	Frontal surface	m²	11,88	11,88	11,88	11,88	11,88
	Number of rows		2 + 2	2 + 2	2 + 3	3 + 3	3 + 3
Fan	Number		4	4	4	4	4
	Standard	Air flow	m³/h	56000	56000	71000	86000
		Rotational speed	tr/mn	900	900	900	900
		Power input each fan	W	940	940	940 - 1650	1650
Water connections	Type		Victaulic connection				
	Inlet diameter	Inch	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2
	Outlet diameter	Inch	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2
Buffer tank (optional)	Volume	L	300	300	300	300	300
Dimensions without buffer tank	Length	mm	2856	2856	2856	2856	2856
	Width	mm	2210	2210	2210	2210	2210
	Height	mm	2295	2295	2321	2321	2321
Dimensions with buffer tank	Length	mm	3666	3666	3666	3666	3666
	Width	mm	2210	2210	2210	2210	2210
	Height	mm	2295	2295	2321	2321	2321
Weight	Dry weight - Without buffer tank	kg	1577	1597	1687	1777	2087
Acoustical data	Sound power level	dB(A)	85,4	85,4	87,0	88,1	88,1
	Sound pressure level *	dB(A)	53,4	53,4	55,0	56,1	56,1

* Sound pressure levels calculated at 10 meters. Sound pressure levels refer to ISO standard 3744 with parallelepiped shape.

*1 According to EN 14511-3:2011.

*2 According to Eurovent.

*3 Indicatives values - see nameplate.

12. Weight

Sizes		140	150	170	190	210
H - without pump	kg	1577	1597	1687	1777	2087
Single pump LP	kg	90	90	90	93	93
Single pump HP	kg	122	122	122	131	131
Double pump LP	kg	106	106	106	106	106
Double pump HP	kg	150	150	150	150	150
Buffer tank (dry weight)	kg	132	132	132	132	132

13. Electrical Data

13.1. Unit without pump with Standard condenser fans

Sizes		140	150	170	190	210
Power supply		400V / 3~ N / 50Hz				
Maximum current	A	108	119	136	153	170
Fuse rating aM	A	125	125	160	160	200
Total starting current (without Soft starter)	A	251	262	324	341	396
Total starting current (with Soft starter)	A	130	141	161	178	201

13.2. Unit with pump

Sizes			140	150	170	190	210
Power supply			400V / 3~ N / 50Hz				
Maximum current	LP	A	115	125	142	159	176
	HP	A	119	130	146	163	180
Fuse rating aM	LP	A	125	160	160	200	200
	HP	A	125	160	160	200	200
Total starting current (without Soft starter)	LP	A	257	268	331	347	403
	HP	A	262	272	335	352	407
Total starting current (with Soft starter)	LP	A	136	147	168	184	208
	HP	A	141	151	172	189	212

13.3. Single pump LP (400V/3/50Hz)

Sizes	Nominal power (kW)	Maximum current (A)
140	3,0	6,35
150	3,0	6,35
170	3,0	6,35
190	3,0	6,35
210	3,0	6,35

13.4. Double pump HP (400V/3/50Hz)

Sizes	Nominal power (kW)	Maximum current (A)
140	5,5	10,40
150	5,5	10,40
170	5,5	10,40
190	5,5	10,40
210	5,5	10,40

14. Performance Data

14.1. Cooling mode

Models	LWT (°C)	Condenser entering air temperature (°C)													
		20		25		30		35		40		45		47	
		Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)	Cooling capacity (kW)	Power input (kW)
140	5	138,2	34,1	132,1	38,3	125,3	41,9	117,8	43,5	109,0	45,3	94,6	45,2	86,4	44,0
	7	147,1	34,1	140,6	38,4	133,4	42,0	125,4	43,6	116,0	45,4	100,7	45,3	92,0	44,1
	10	169,5	34,3	162,0	38,6	153,7	42,1	144,5	43,8	133,7	45,6	116,0	45,5	106,0	44,3
	15	186,1	34,6	177,9	38,9	168,8	42,5	158,7	44,1	146,8	46,0	127,4	45,9	116,4	44,7
	18	195,3	34,7	186,6	39,1	177,1	42,7	166,4	44,3	154,0	46,2	133,6	46,1	122,1	44,9
150	5	151,6	37,3	144,9	42,0	137,5	45,8	129,3	47,7	119,6	49,6	103,8	49,6	94,8	48,1
	7	161,4	37,4	154,3	42,1	146,4	46,0	137,6	47,8	127,3	49,7	110,5	49,8	100,9	48,3
	10	186,0	37,6	177,8	42,3	168,7	46,2	158,6	47,9	146,7	49,9	127,3	49,9	116,3	48,5
	15	204,2	37,9	195,2	42,7	185,2	46,7	174,1	48,4	161,0	50,3	139,7	50,3	127,7	48,9
	18	214,2	38,1	204,7	42,8	194,3	46,8	182,6	48,6	168,9	50,6	146,6	50,6	134,0	49,3
170	5	166,3	41,2	158,9	46,4	150,8	50,7	141,7	52,6	131,1	54,8	113,8	54,7	104,0	53,2
	7	177,0	41,3	169,2	46,5	160,5	50,8	150,9	52,7	139,6	54,9	121,1	54,9	110,7	53,4
	10	204,0	41,5	194,9	46,7	185,0	51,0	173,9	53,0	160,8	55,2	139,6	55,1	127,5	53,6
	15	223,9	41,9	214,0	47,1	203,1	51,5	190,9	53,4	176,6	55,7	153,2	55,6	140,0	54,1
	18	234,9	42,1	224,5	47,4	213,1	51,7	200,3	53,7	185,2	55,9	160,8	55,8	146,9	54,3
190	5	193,7	50,7	185,1	57,1	175,7	62,3	165,1	64,7	152,7	67,4	132,6	67,3	121,1	65,4
	7	206,2	50,8	197,1	57,2	187,0	62,4	175,8	64,8	162,6	67,5	141,1	67,4	128,9	65,6
	10	237,6	51,0	227,1	57,4	215,5	62,7	202,6	65,1	187,4	67,8	162,6	67,7	148,6	65,9
	15	260,9	51,5	249,3	58,0	236,6	63,3	222,4	65,7	205,7	68,4	178,5	68,3	163,1	66,5
	18	273,7	51,7	261,6	58,2	248,2	63,6	233,3	66,0	215,8	68,7	187,3	68,7	171,1	66,8
210	5	215,4	56,7	205,8	63,8	195,3	69,7	183,6	72,4	169,8	75,4	147,4	75,3	134,7	73,2
	7	229,3	56,8	219,1	64,0	207,9	69,9	195,4	72,5	180,8	75,5	156,9	75,5	143,4	73,4
	10	264,2	57,1	252,5	64,3	239,6	70,2	225,2	72,9	208,3	75,9	180,8	75,8	165,2	73,7
	15	290,1	57,6	277,2	64,8	263,1	70,8	247,3	73,5	228,7	76,6	198,5	76,5	181,4	74,4
	18	304,3	57,9	290,8	65,1	276,0	71,1	259,4	73,9	239,9	76,9	208,2	76,8	190,3	74,7

Performance according to EN 14511-3:2011 (without pump).

LWT : Leaving Water Temperature.

14.2. Heating mode

Models	LWT (°C)	Evaporator entering air dry temperature (wet bulb temperature) (°C)																	
		-15 (-16)			-10 (-11)			-7 (-8)			2 (1)			7 (6)			12 (11)		
		Heating capacity (kW)		Power input (kW)	Heating capacity (kW)		Power input (kW)	Heating capacity (kW)		Power input (kW)	Heating capacity (kW)		Power input (kW)	Heating capacity (kW)		Power input (kW)	Heating capacity (kW)		Power input (kW)
		With deicing	Without deicing		With deicing	Without deicing		With deicing	Without deicing		With deicing	Without deicing		With deicing	Without deicing		With deicing	Without deicing	
140	30	80.5	82.1	31.3	89.4	93.5	33.2	98.5	103.4	33.8	129.5	136.7	35.7	155.7	155.7	37.2	180.5	180.5	37.4
	35	78.8	80.4	33.2	87.7	91.7	35.6	95.8	100.6	36.0	124.8	131.7	37.8	151.7	151.7	39.5	174.6	174.6	39.5
	40	77.2	78.7	35.0	86.4	90.3	38.8	93.6	98.3	39.3	120.0	126.6	40.9	147.7	147.7	42.3	169.7	169.7	42.2
	45				84.9	88.7	41.7	91.4	96.0	43.1	115.2	121.5	44.6	143.7	143.7	45.7	164.8	164.8	45.7
	50										113.5	119.7	50.5	139.7	139.7	50.0	159.2	159.2	49.5
150	30	85.7	87.4	34.0	95.2	99.5	36.1	104.8	110.0	36.7	137.9	145.4	38.7	165.7	165.7	40.4	192.1	192.1	40.7
	35	84.0	85.7	36.1	93.5	97.7	38.8	102.1	107.2	39.3	133.1	140.4	41.2	161.7	161.7	43.1	186.2	186.2	43.1
	40	82.4	84.0	38.3	92.3	96.4	42.5	100.0	104.9	43.0	128.1	135.2	44.8	157.7	157.7	46.3	181.2	181.2	46.2
	45				90.8	94.9	45.7	97.8	102.7	47.4	123.2	130.0	49.0	153.7	153.7	50.3	176.3	176.3	50.2
	50										121.6	128.3	55.8	149.7	149.7	55.3	170.6	170.6	54.7
170	30	94.1	96.0	37.2	104.6	109.3	39.6	115.2	120.9	40.3	151.5	159.8	42.5	182.1	182.1	44.3	211.1	211.1	44.6
	35	92.5	94.4	39.7	103.0	107.6	42.6	112.5	118.1	43.2	146.6	154.6	45.3	178.1	178.1	47.3	205.0	205.0	47.3
	40	91.0	92.8	42.1	101.9	106.5	46.8	110.3	115.9	47.3	141.5	149.2	49.3	174.1	174.1	51.0	200.1	200.1	50.8
	45				100.5	105.1	50.4	108.2	113.6	52.3	136.3	143.8	54.1	170.1	170.1	55.5	195.1	195.1	55.4
	50										134.9	142.3	61.7	166.1	166.1	61.1	189.3	189.3	60.5
190	30	107.0	109.1	44.2	118.9	124.2	46.9	130.9	137.4	47.8	172.1	181.6	50.4	206.9	206.9	52.5	239.8	239.8	52.9
	35	105.4	107.5	47.4	117.3	122.6	50.9	128.1	134.5	51.5	167.0	176.2	54.1	202.9	202.9	56.5	233.6	233.6	56.5
	40	103.9	106.0	50.6	116.4	121.6	56.3	126.1	132.4	57.0	161.6	170.5	59.3	198.9	198.9	61.3	228.6	228.6	61.2
	45				115.2	120.3	61.0	124.0	130.2	63.5	156.2	164.8	65.7	194.9	194.9	67.3	223.5	223.5	67.3
	50										155.0	163.6	75.7	190.9	190.9	75.0	217.6	217.6	74.3
210	30	118.6	121.0	50.5	131.9	137.8	53.6	145.2	152.4	54.6	191.0	201.5	57.6	229.6	229.6	60.0	266.1	266.1	60.5
	35	117.2	119.5	54.5	130.4	136.3	58.5	142.4	149.5	59.2	185.6	195.8	62.1	225.6	225.6	64.9	259.6	259.6	64.9
	40	115.7	118.0	58.4	129.6	135.5	65.1	140.4	147.4	65.8	180.0	189.9	68.5	221.6	221.6	70.9	254.6	254.6	70.7
	45				128.5	134.3	70.8	138.4	145.3	73.8	174.4	184.0	76.4	217.6	217.6	78.3	249.5	249.5	78.2
	50										173.4	183.0	88.7	213.6	213.6	87.9	243.4	243.4	87.1

Performance according to EN 14511-3:2011 (without pump).

LWT : Leaving Water Temperature.

15. Acoustical Data

15.1. Sound power level Lw-dB - Without pump

Models	Frequency in octave band (Hz)						Lw global dB(A)	Sound pressure level dB(A) *
	125	250	500	1000	2000	4000		
140	77	79	82	81	79	74	85,4	53,4
150	77	79	82	81	79	74	85,4	53,4
170	79	81	83	82	81	76	87,0	55,0
190	81	82	83	83	83	77	88,1	56,1
210	81	82	83	83	83	77	88,1	56,1

15.2. Sound power level Lw-dB - With pump LP

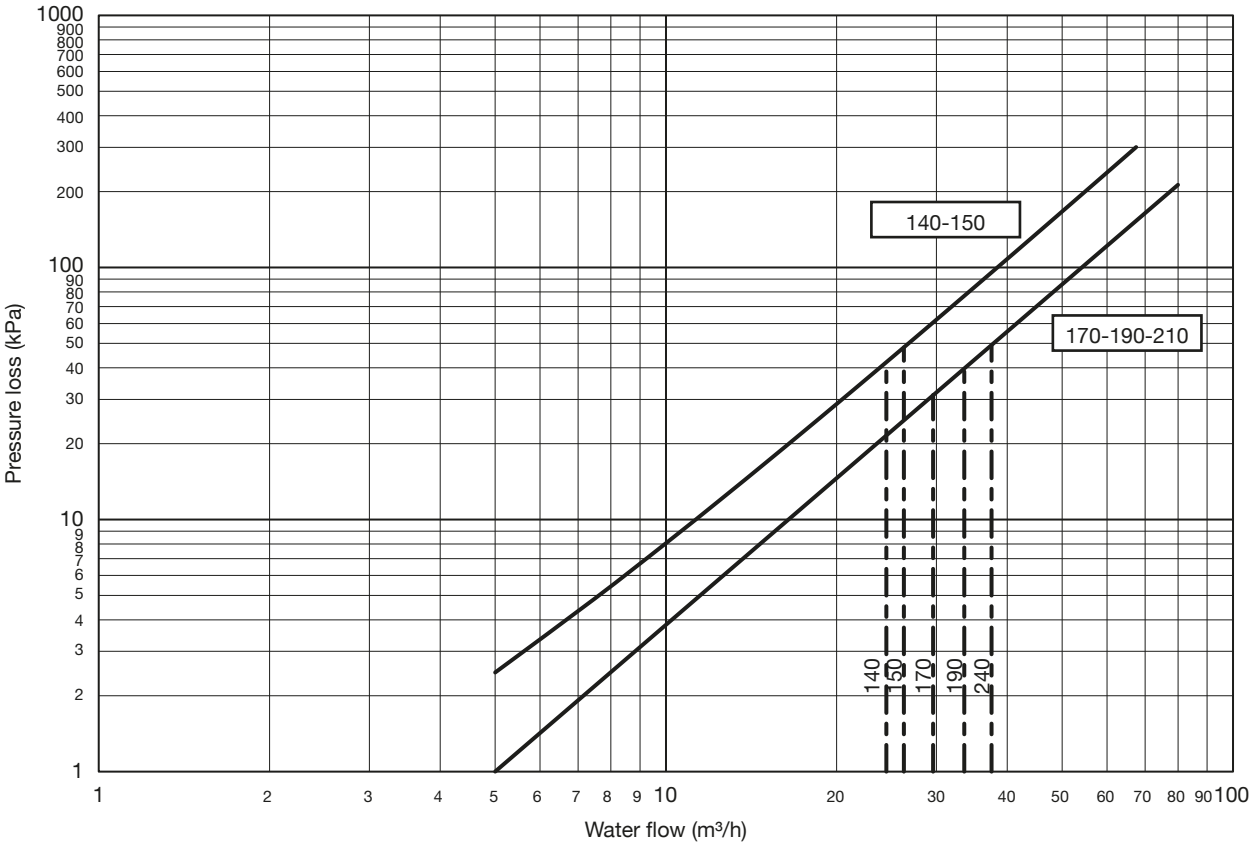
Models	Frequency in octave band (Hz)						Lw global dB(A)	Sound pressure level dB(A) *
	125	250	500	1000	2000	4000		
140	77	79	82	81	80	77	86,1	54,1
150	77	79	82	81	80	77	86,1	54,1
170	79	81	83	82	82	78	87,5	55,5
190	81	82	83	83	83	79	88,5	56,5
210	81	82	83	83	83	79	88,5	56,5

15.3. Sound power level Lw-dB - With pump HP

Models	Frequency in octave band (Hz)						Lw global dB(A)	Sound pressure level dB(A) *
	125	250	500	1000	2000	4000		
140	77	79	82	81	80	77	86,1	54,1
150	77	79	82	81	80	77	86,1	54,1
170	79	81	83	82	82	78	87,5	55,5
190	81	82	83	83	83	79	88,5	56,5
210	81	82	83	83	83	79	88,5	56,5

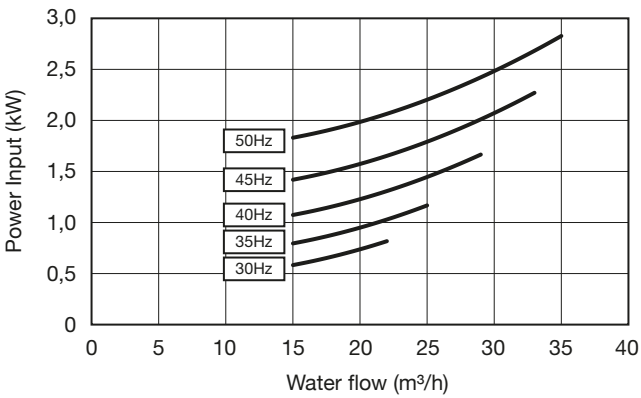
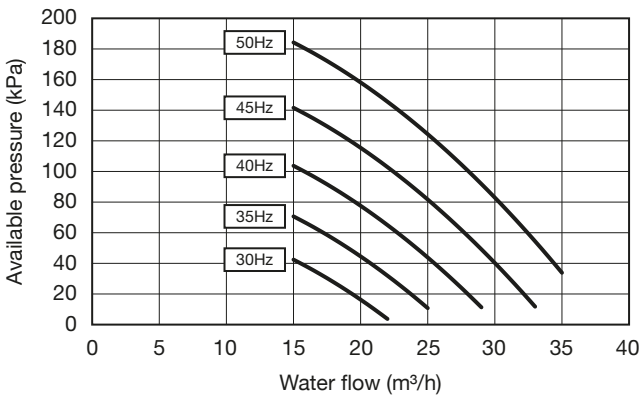
* Sound pressure levels calculated at 10 meters. Sound pressure levels refer to ISO standard 3744 with parallelepiped shape.

16. Water Pressure Drop of Plate Heat Exchanger

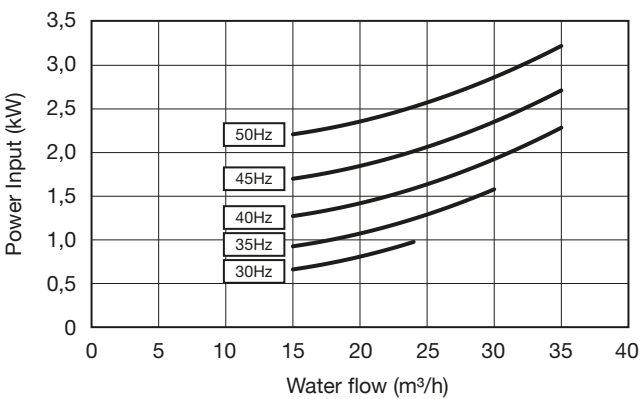
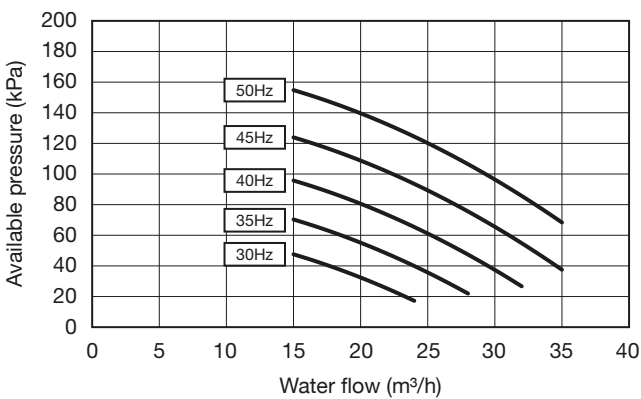


17. Water Pump Curves

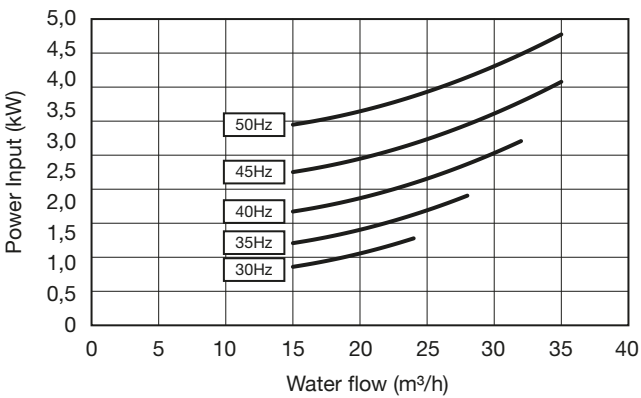
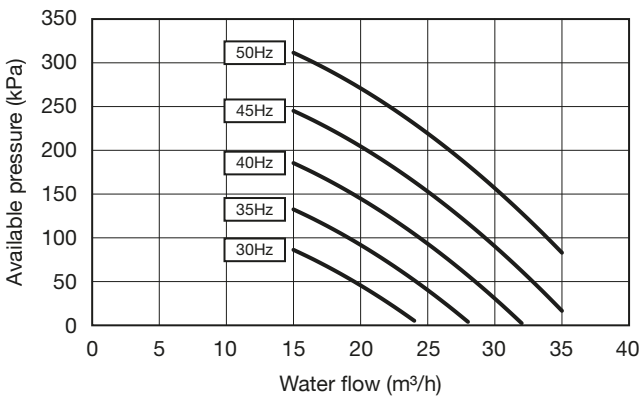
17.1. ECOi-W 140 - 150 - 170 - Standard pump



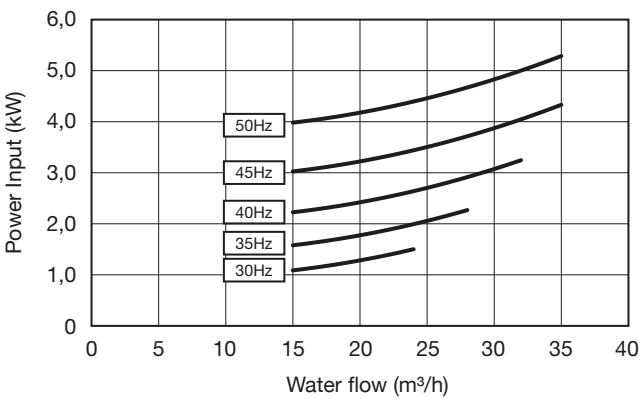
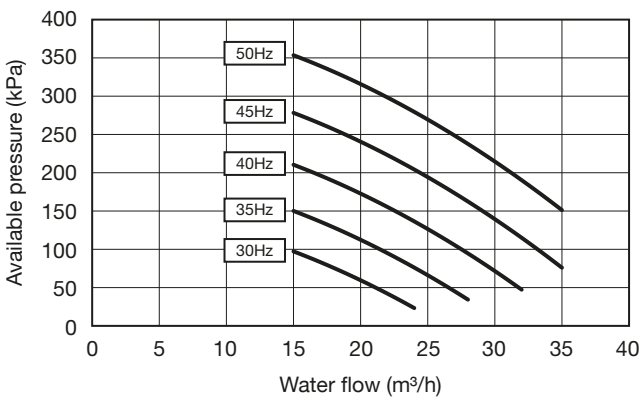
17.2. ECOi-W 190 - 210 - Standard pump



17.3. ECOi-W 140 - 150 - 170 - 190 - High pressure pump

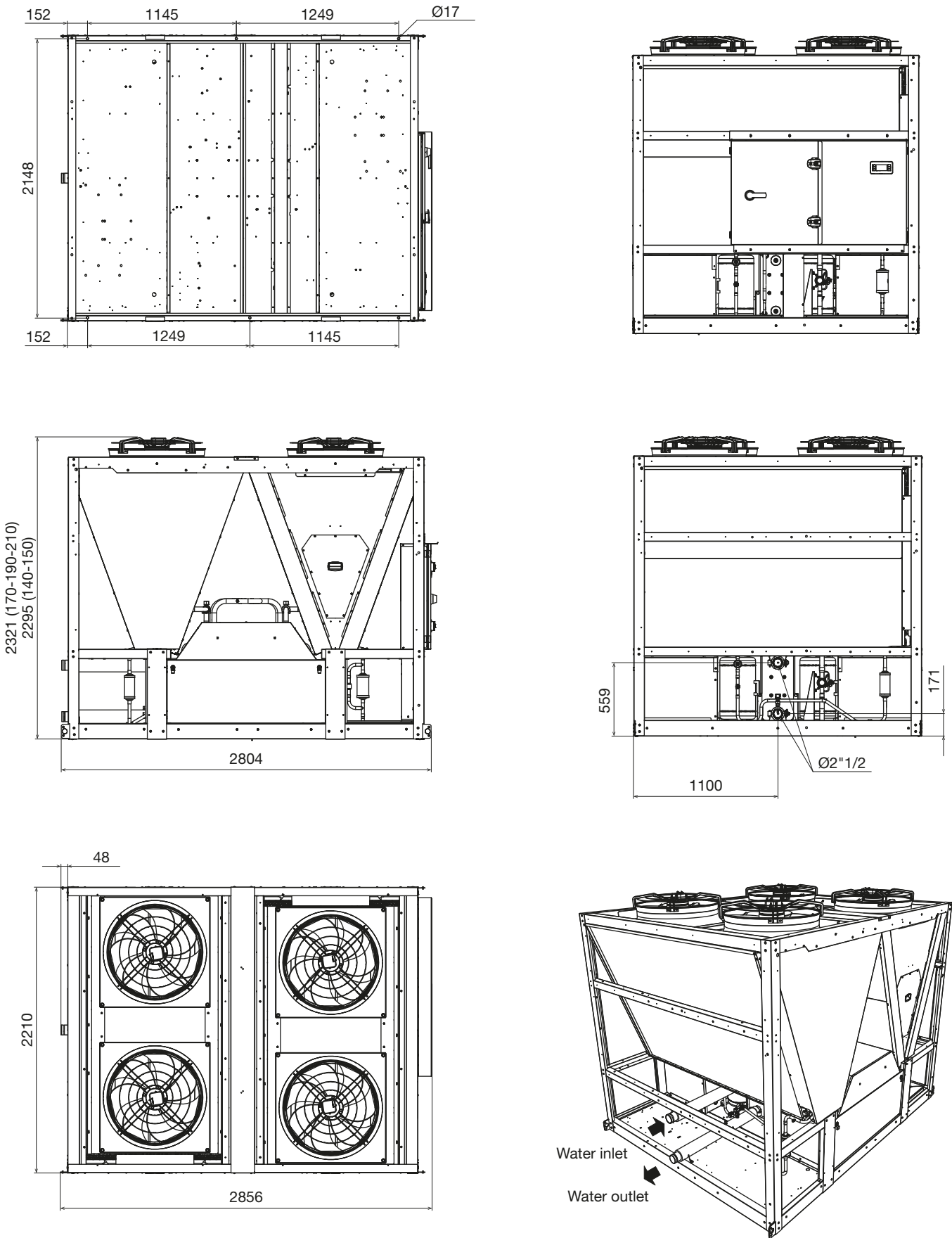


17.4. ECOi-W 210 - High pressure pump

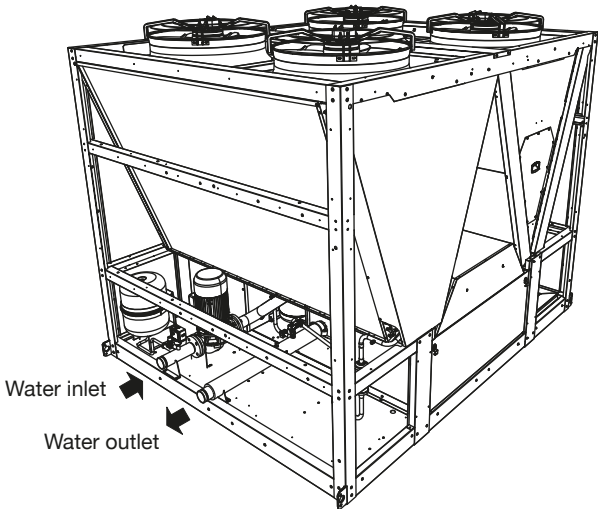
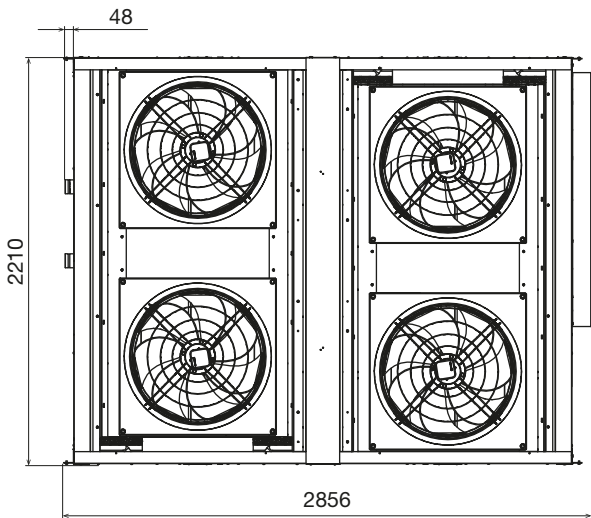
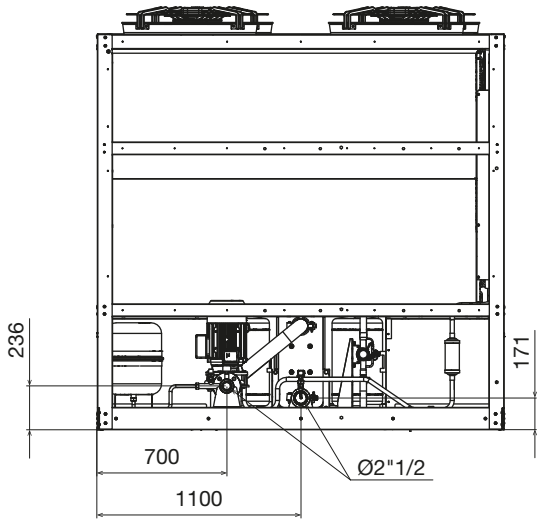
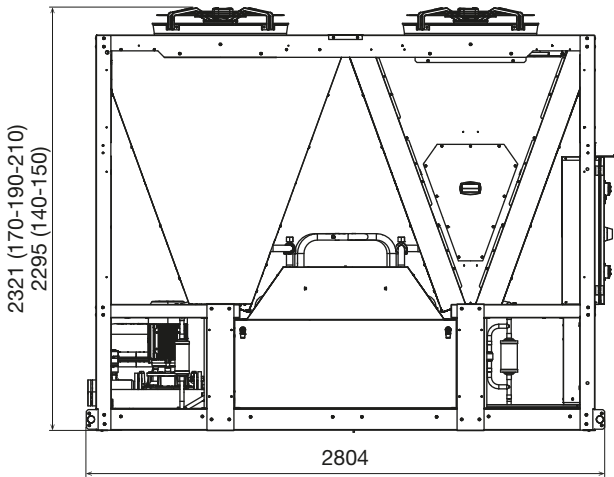
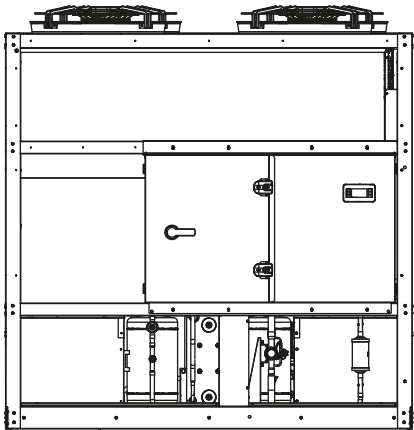
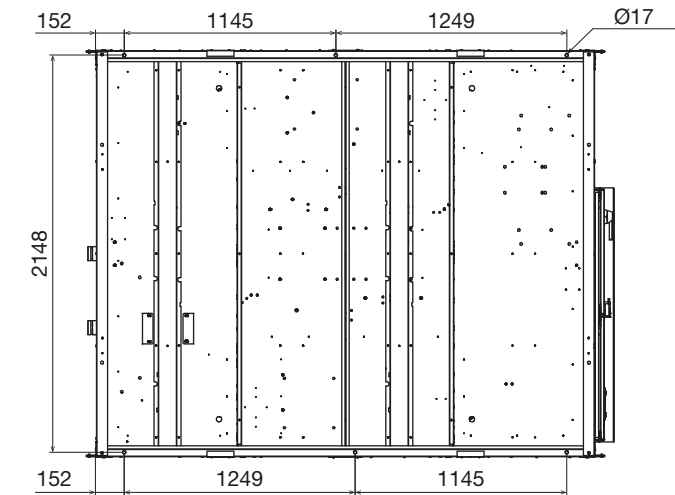


18. Dimensions (mm)

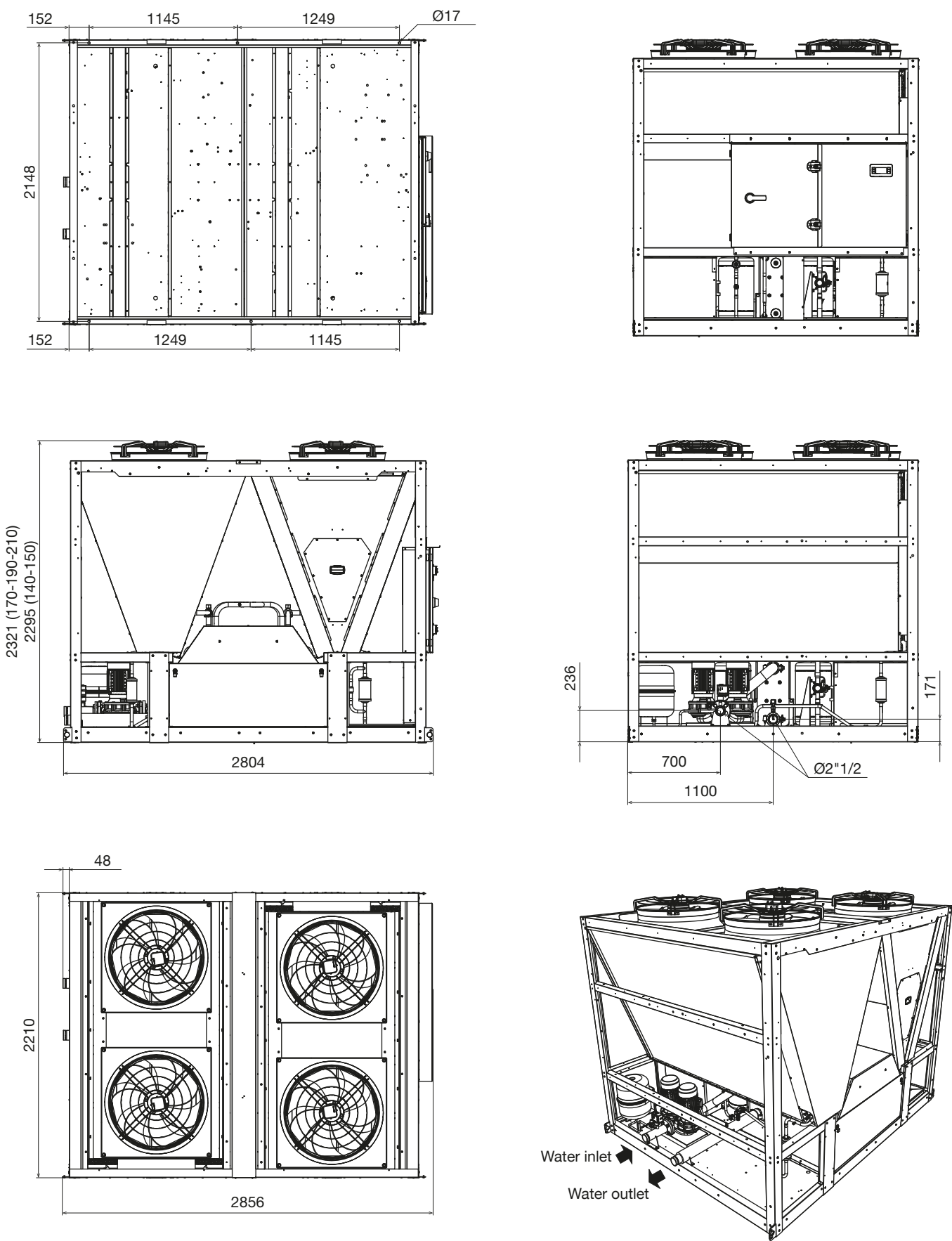
18.1. ECOi-W 140 to 210 without pump



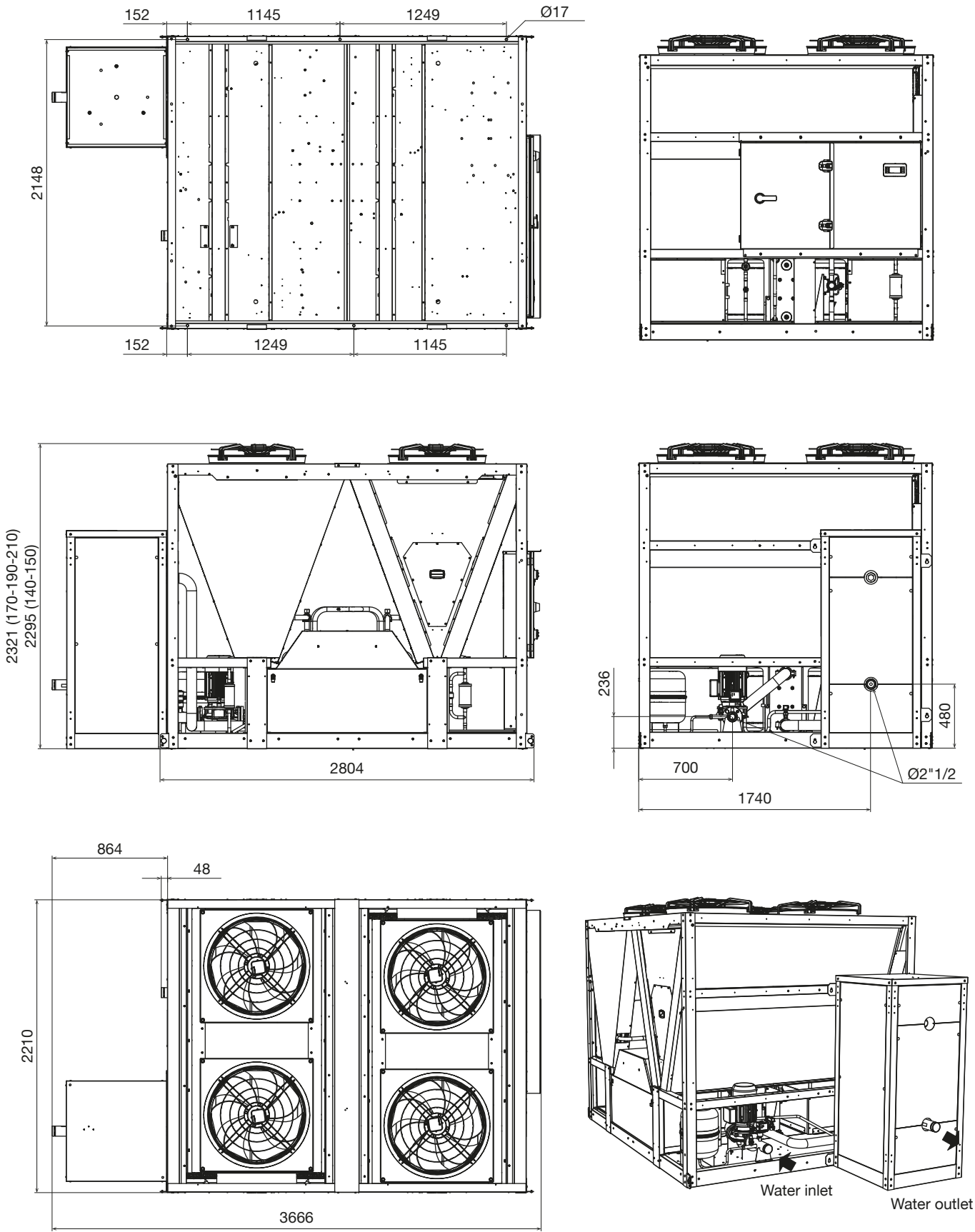
18.2. ECOi-W 140 to 210 with 1 pump



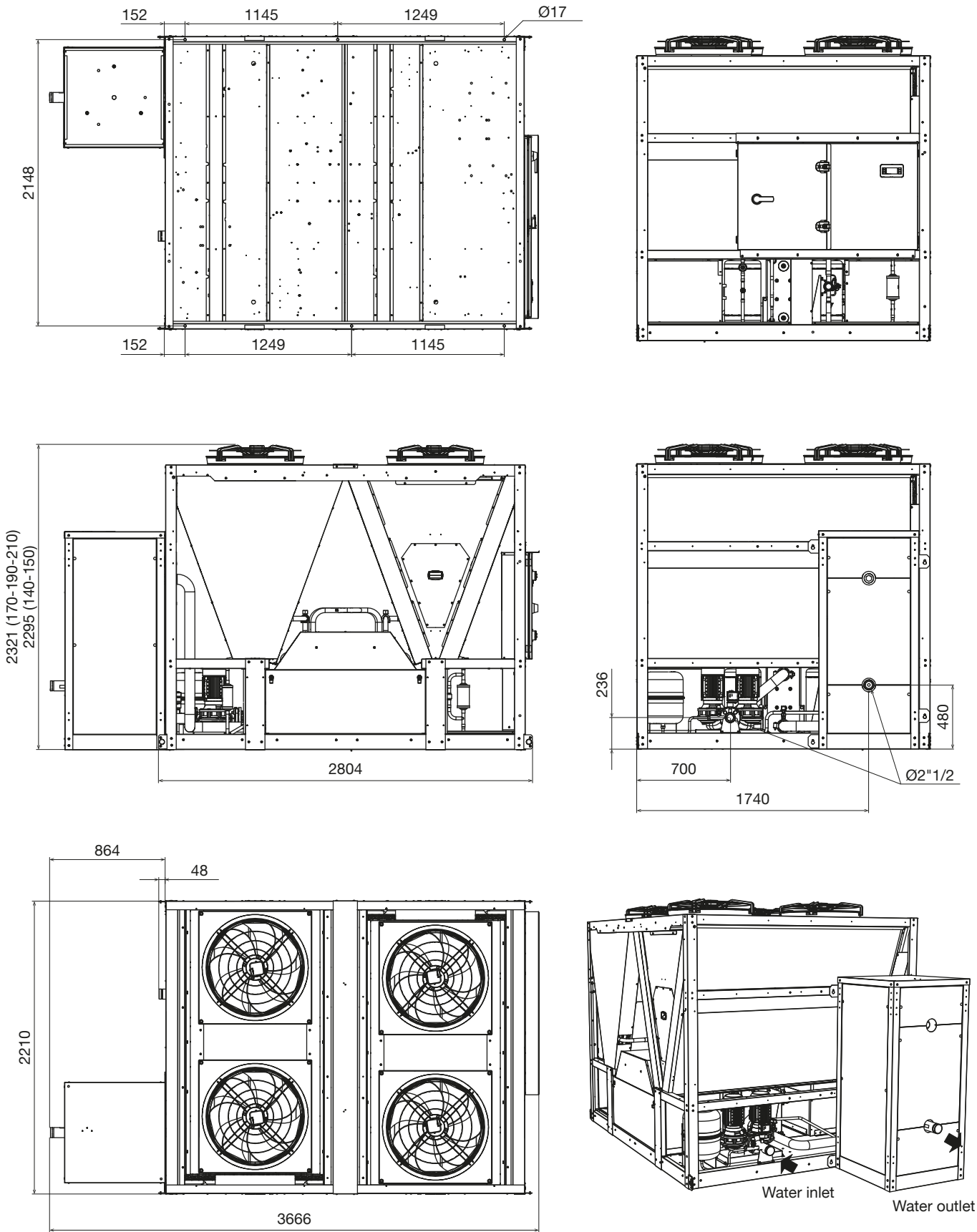
18.3. ECOi-W 140 to 210 with 2 pumps



18.4. ECOi-W 140 to 210 with 1 pump and buffer tank

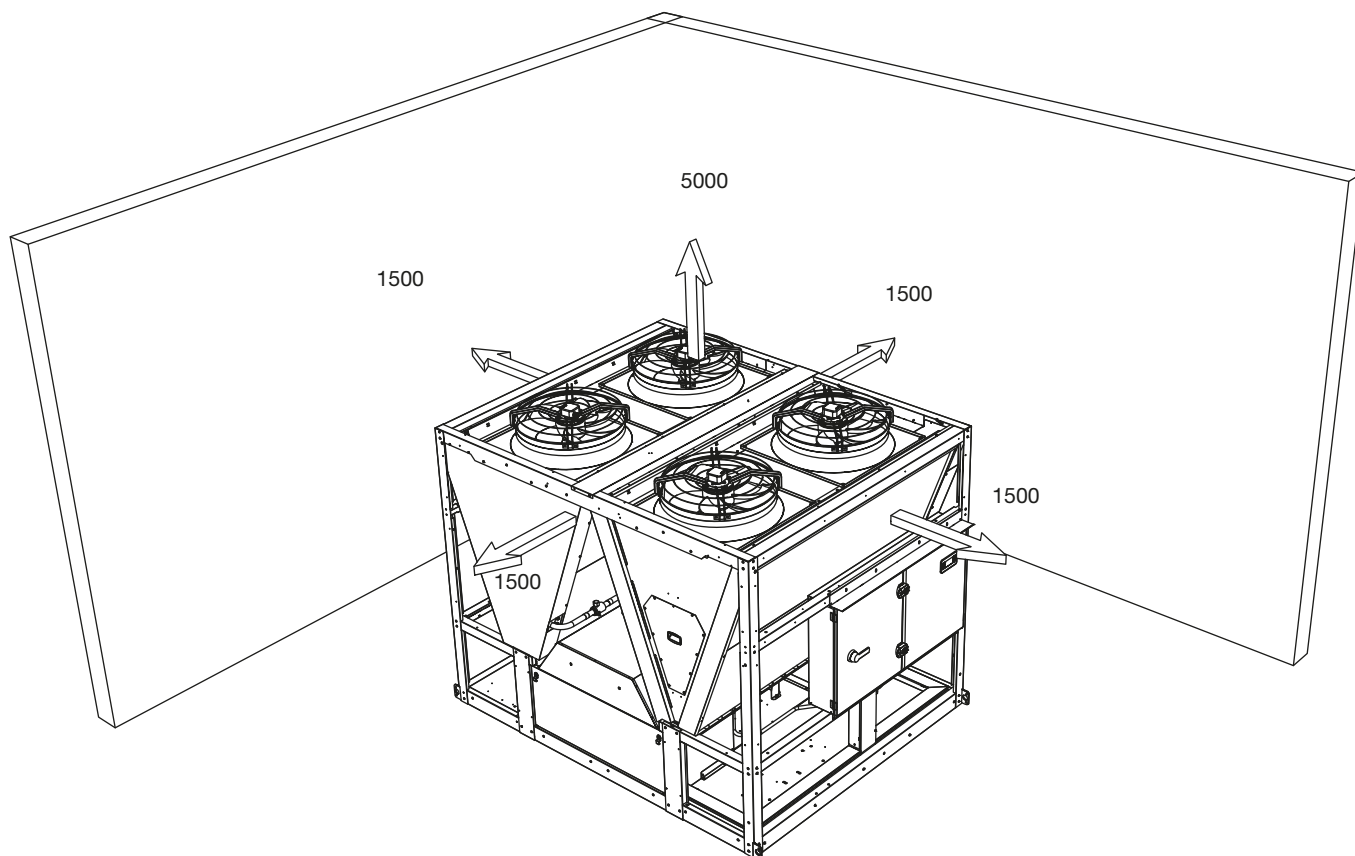


18.5. ECOi-W 140 to 210 with 2 pumps and buffer tank

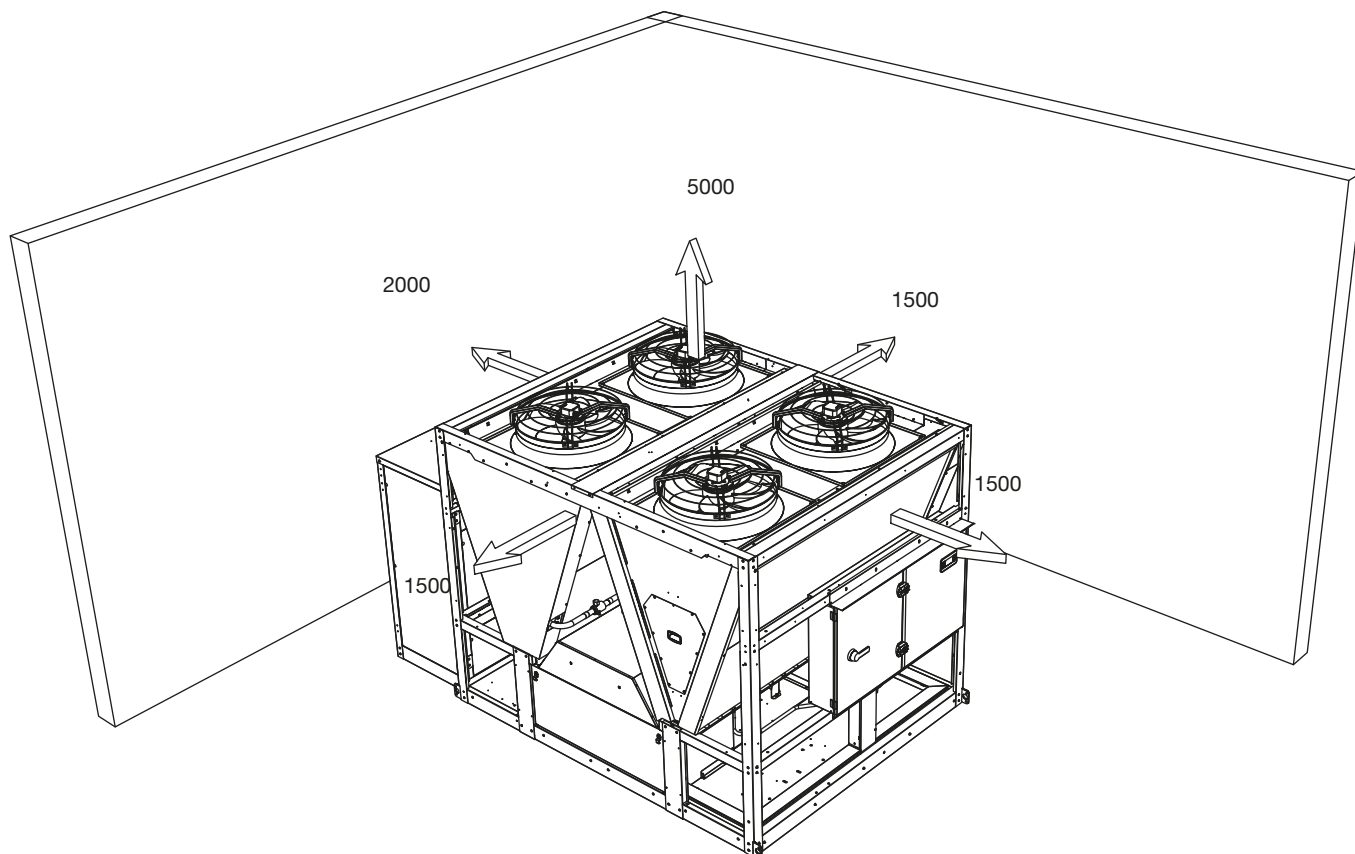


19. Space Requirements (mm)

19.1. ECOi-W 140 to 210 without buffer tank

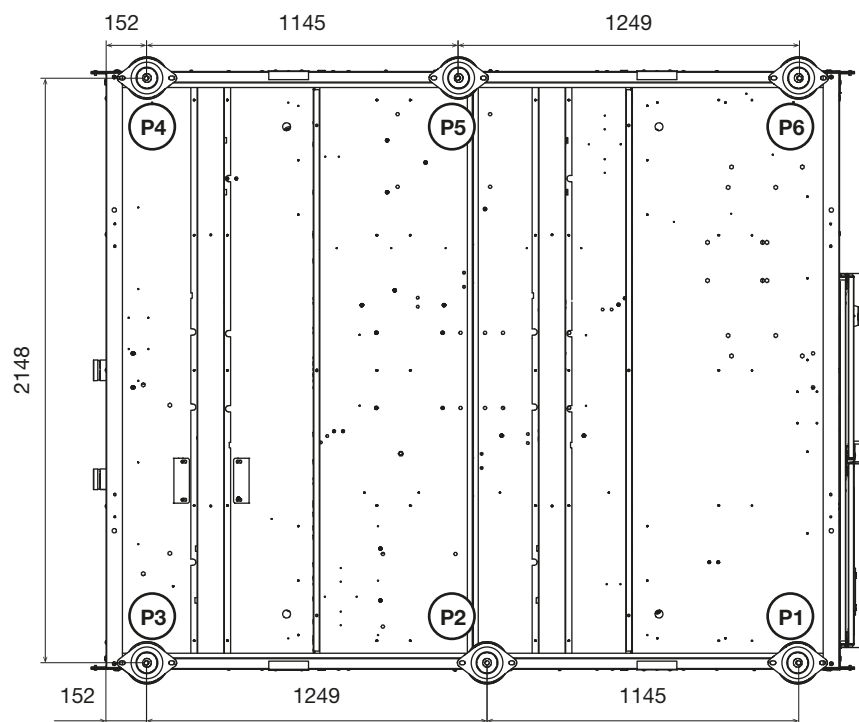


19.2. ECOi-W 140 to 210 with buffer tank



20. Mass distributions

20.1. ECOi-W 140 to 210 without buffer tank



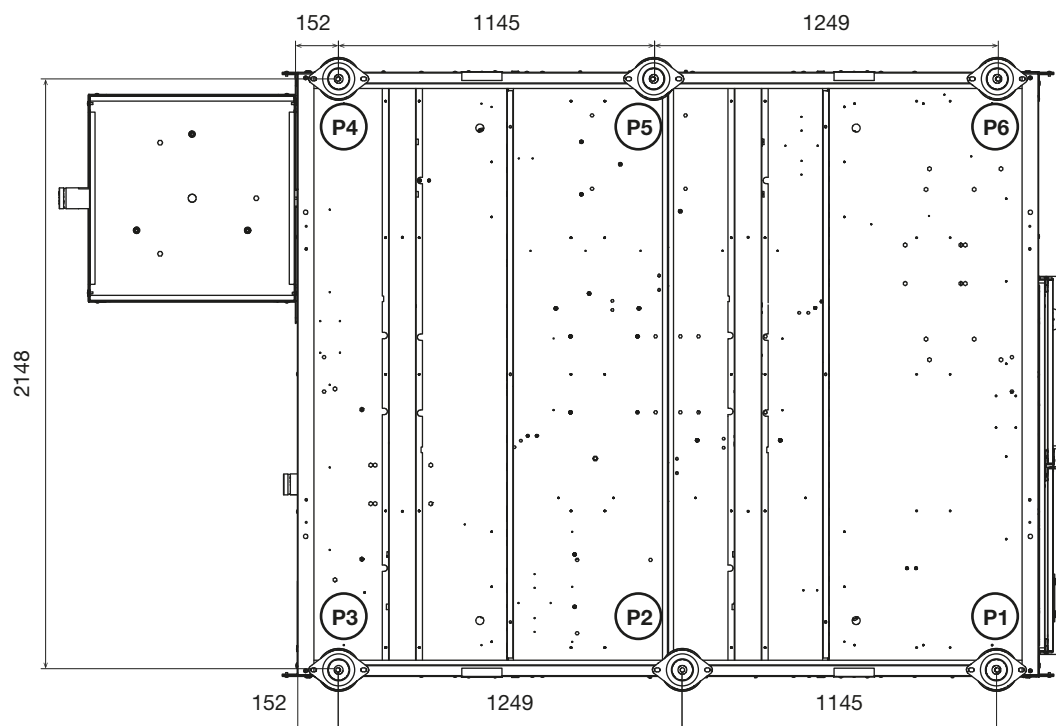
	Rubber pads						
	M	P1	P2	P3	P4	P5	P6
	kg	kg	kg	kg	kg	kg	kg
140.HB	1440	270	250	220	210	230	260
140.H1BP	1530	280	270	260	230	240	250
140.H1HP	1560	280	280	270	240	240	250
140.H2BP	1550	280	270	270	240	240	250
140.H2HP	1590	280	280	280	250	250	240
150.HB	1440	270	250	220	210	230	260
150.H1BP	1530	280	270	260	230	240	250
150.H1HP	1560	280	280	270	240	240	250
150.H2BP	1550	280	270	270	240	240	250
150.H2HP	1590	280	280	290	250	250	250
170.HB	1530	300	270	250	210	240	260
170.H1BP	1630	300	300	290	240	250	250
170.H1HP	1660	300	300	300	250	250	250
170.H2BP	1640	300	300	300	240	250	250
170.H2HP	1690	310	310	310	260	250	250
190.HB	1600	300	280	250	230	260	280
190.H1BP	1700	310	300	290	260	270	280
190.H1HP	1740	310	310	310	270	270	270
190.H2BP	1710	310	300	300	260	270	270
190.H2HP	1760	310	310	310	280	270	270
210.HB	1870	340	320	290	280	300	330
210.H1BP	1960	400	340	280	250	310	370
210.H1HP	2000	420	350	280	250	320	380
210.H2BP	1970	350	340	340	310	310	320
210.H2HP	2020	350	350	360	320	320	320

	Spring damper						
	M	P1	P2	P3	P4	P5	P6
	kg	kg	kg	kg	kg	kg	kg
140.HB	1590	300	280	250	230	260	280
140.H1BP	1680	300	300	290	260	260	270
140.H1HP	1720	300	310	310	270	270	270
140.H2BP	1700	310	300	290	260	270	270
140.H2HP	1740	310	310	310	270	270	270
150.HB	1610	300	280	250	230	260	280
150.H1BP	1700	310	300	290	260	270	270
150.H1HP	1740	310	310	310	270	270	270
150.H2BP	1720	310	300	300	260	270	280
150.H2HP	1760	310	310	310	270	270	270
170.HB	1710	320	300	270	250	270	300
170.H1BP	1800	330	320	310	270	280	290
170.H1HP	1830	330	330	330	280	280	280
170.H2BP	1810	330	320	310	280	280	290
170.H2HP	1860	330	330	330	290	290	290
190.HB	1800	340	310	280	260	290	320
190.H1BP	1890	340	330	330	290	300	300
190.H1HP	1930	340	340	340	300	300	300
190.H2BP	1900	340	340	330	290	300	310
190.H2HP	1950	350	350	350	300	300	300
210.HB	2110	400	360	330	310	340	370
210.H1BP	2200	400	390	380	340	340	350
210.H1HP	2240	400	400	400	350	350	350
210.H2BP	2210	400	390	380	340	350	360
210.H2HP	2260	400	400	400	350	350	350

HB: No Pump.
H1BP: Single Pump Low Pressure.
H1HP: Single Pump High Pressure.

H2BP: Double Pump Low Pressure.
H2HP: Double Pump High Pressure.

20.2. ECOi-W 140 to 210 with buffer tank



	Rubber pads						
	M	P1	P2	P3	P4	P5	P6
	kg	kg	kg	kg	kg	kg	kg
140.HB	1590	300	270	250	230	260	280
140.H1BP	1680	310	300	290	260	270	280
140.H1HP	1720	310	300	300	270	270	270
140.H2BP	1700	310	300	290	260	270	270
140.H2HP	1740	310	310	310	270	270	270
150.HB	1610	300	280	250	230	260	290
150.H1BP	1700	310	300	290	260	270	280
150.H1HP	1740	310	310	300	270	270	280
150.H2BP	1720	310	300	300	260	270	280
150.H2HP	1760	310	310	310	280	280	270
170.HB	1710	330	300	280	240	270	290
170.H1BP	1800	330	320	320	270	270	280
170.H1HP	1830	330	330	330	280	280	280
170.H2BP	1810	330	330	320	270	280	280
170.H2HP	1860	330	340	340	280	280	280
190.HB	1800	330	310	280	270	290	320
190.H1BP	1890	340	330	320	290	300	310
190.H1HP	1930	340	340	340	300	300	300
190.H2BP	1900	340	330	330	300	300	310
190.H2HP	1950	340	340	350	310	310	300
210.HB	2110	380	360	330	320	340	370
210.H1BP	2200	440	380	320	290	350	410
210.H1HP	2240	460	390	320	290	360	420
210.H2BP	2210	390	390	380	350	350	360
210.H2HP	2260	390	400	400	360	360	360

	Spring damper						
	M	P1	P2	P3	P4	P5	P6
	kg	kg	kg	kg	kg	kg	kg
140.HB	2030	240	240	440	530	290	290
140.H1BP	2120	250	260	490	550	290	290
140.H1HP	2160	250	260	500	560	300	280
140.H2BP	2140	250	260	490	560	300	290
140.H2HP	2180	250	270	510	570	300	290
150.HB	2050	240	240	450	530	290	290
150.H1BP	2140	250	260	490	560	300	290
150.H1HP	2170	250	260	510	570	300	290
150.H2BP	2160	250	260	490	560	300	290
150.H2HP	2200	250	270	510	580	300	290
170.HB	2150	260	250	470	560	310	310
170.H1BP	2240	260	270	510	580	310	300
170.H1HP	2270	260	280	530	590	310	300
170.H2BP	2250	260	270	520	590	310	300
170.H2HP	2300	270	280	540	600	310	300
190.HB	2240	270	270	480	580	320	320
190.H1BP	2330	270	280	530	610	320	310
190.H1HP	2370	270	290	550	620	320	310
190.H2BP	2340	270	280	540	610	320	310
190.H2HP	2390	280	290	560	620	330	310
210.HB	2550	300	300	550	660	360	360
210.H1BP	2640	310	320	600	690	370	350
210.H1HP	2680	310	330	620	700	370	350
210.H2BP	2650	310	320	610	690	370	360
210.H2HP	2700	310	330	630	710	370	350

HB: No Pump.
H1BP: Single Pump Low Pressure.
H1HP: Single Pump High Pressure.

H2BP: Double Pump Low Pressure.
H2HP: Double Pump High Pressure.

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