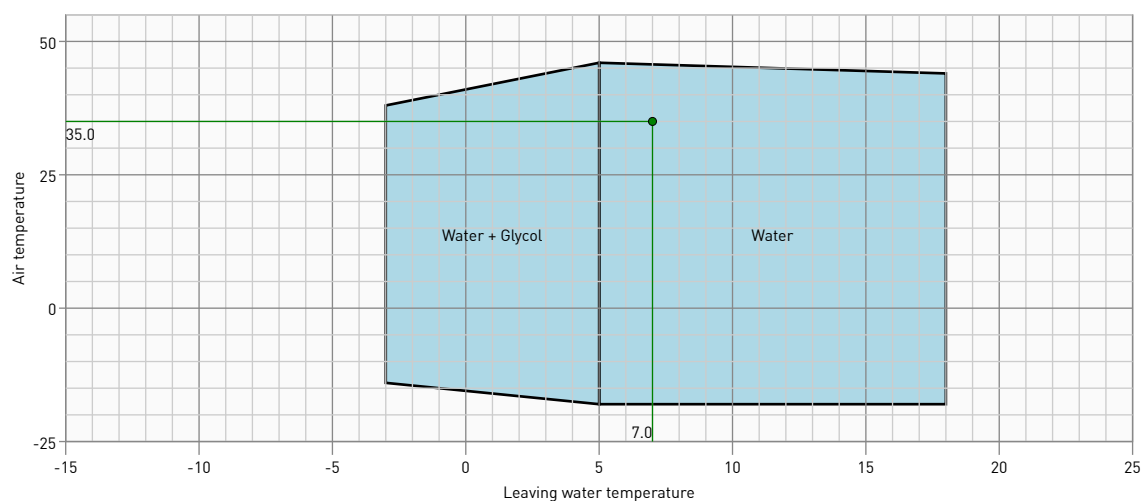


Configuration

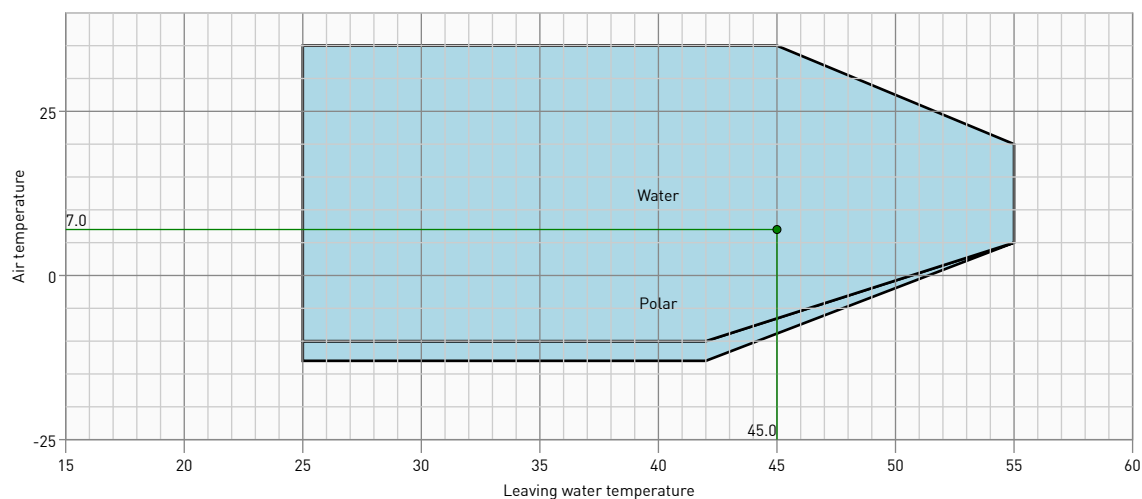
Parameter	Value
Size	450
Acoustic options	Standard
Version	Standard
Fan type	EC
Pump	Without pump
Refrigerant	R410A
EcoDesign compliant (european market)	Erp
Recovery option	No

Calculation

Cooling



Heating



Parameter	Value
Unit	ECOi-W AQUA EVO H 450
Size	450
Acoustic options	Standard
Version	Standard
Fan type	EC
Pump	Without pump
Refrigerant	R410A
EcoDesign compliant (european market)	Erp
Recovery option	No

ECOi-W AQUA EVO H

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Operating conditions	Cooling	Heating	
External air temperature	35,0	7,00	°C
Entering water temperature	12,0	40,0	°C
Leaving water temperature	7,00	45,0	°C
Fluid	Water		
Altitude	0		m
Fouling factor	0,000		

Performance	Cooling	Heating	
Capacity	420	451	kW
Integrated capacity (including defrost cycles)	-	451	kW
Power input	145	138	kW
Full load efficiency [EER/COP]	2,90	3,28	
Integrated full load efficiency (including defrost cycles)	-	3,28	
nsc/nsh*	190	142	
Seasonal efficiency [SEER/SCOP]*	4,83	3,62	

* SEER : According to commission regulation (EU) N° 2016/2281

SCOP : According to commission regulation (EU) N° 813/2013 for Low temperature application

N (°)	PL (%)	TIN (°C)	TOUT (°C)	OAT (°C)	Cc (kW)	Cpi (kW)	EER
1	100	12,0	7,00	35,0	419	144	2,91
2	75	X***	7,00	30,0	314	95,3	3,30
3	50	X***	7,00	25,0	210	53,1	3,95
4	25	X***	7,00	20,0	105	24,2	4,33

General data	Value
Power supply [V/Ph/Hz]	400/3/50
Capacity steps (%)	25/50/75/100
Startup current	689 A
Maximum running current	364 A
Maximum input power	200 kW
Number of refrigerating circuits	2
Refrigerant	R410A
Indicative refrigerant charge for the unit	118,00 kg

Compressor	Value
Number of compressors	4
Compressor type	SCROLL
Compressor startup type	D

Plant side heat exchanger	Cooling	Heating	
Number of exchangers	1		
Exchanger type	Plates		
Total fluid flow rate*	73249	78656	l/h
Minimum fluid flow rate	51480		
Pressure drop	28,8	33,2	kPa

* The plant side exchanger water-flow rate is equal to the standard rating water flow rate

Water connections	Value
Water connection type	Victaulic
Water connection inlet diameter	4"
Water connection outlet diameter	4"

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Fan				Value		
Number of fans				10		
Fan type				Axial Fans		
Maximum absorbed power per fan				1,33	kW	
Total air flow				220000	m³/h	
Condenser				Value		
Number of condensers				10		
Condenser type				Finned tubes coil		
Sound level				Value		
Sound power level				93,0	dB(A)	
Distance from sound source				10,0	m	
Sound pressure level*				60,5	dB(A)	
* Sound pressure levels refer to ISO Standards 3744 with parallelepiped shape						
Hz	125	250	500	1k	2k	4k
dB	102	94	88	87	82	76

All the data are including options

Options

101 - MBS - Modbus protocol kit for BMS (RS485) (Option)

It allows the integration of the unit with BMS with Modbus protocol through RS485 port

111 - BLD - Back light display (Option)

User Display panel mounted. Suggested for outdoor installation

121.1 - FSC - Fan Speed controlled by Condensing Pressure in cooling mode or by Air Temp in heating mode (Option)

124 - PHC - Sequence phases control (Option)

Relay detecting wrong unit cabling (phase loss or phase rotation)

126 - 3PH - Power supply without neutral (Option)

Additional transformer mounted in electrical board to avoid the use of neutral

127 - EEV - Electronic expansion valves (Option)

It allows to have high precision on superheat control

133 - Compressor envelop control (Option)

Integrated logic to protect compressor operation

139 - HM - Hour meter (Option)

Total running hours recorded for each compressors and for total unit. Also record of total scroll compressors starts

141 - CLK - Set point timer/Clock card (Option)

To schedule 4 different interval time with different active water T setpoint

142 - DL - Data logger (Option)

Record continuously the essential thermodynamic operating parameters, during the last hours. This facilitates debug and service activity on field

200 - R410A - Refrigerant R410A (Option)

Unit with full charge of refrigerant R410A

250 - PED Approval (Option)

PED Approval

400 - EEH - Antifreeze electric heater (Option)

Antifreeze electric heater to protect evaporator from freezing. It's managed by a water temperature probe

515 - BFC - Finned tubes AL/CU with Blue fins treatment (Option)

Hydrophilic treatment, covering Aluminum fins, helping draining water from coil surface. It speeds up defrost operation, thus reducing energy waste

601 - CB - Compressor box (Option)

Box to protect compressor from external environment and reduce sound emissions

800 - RP - Rubber pad (Accessory)

Rubber pad to protect the unit from direct contact with the floor

914 - Differential pressure switch (Option)

1000 - Polyethylene film (Option)

Standard packing made of a polyethylene film

1100 - crane lifting kit (Option)

Kit for crane lifting

1101 - fork lifting kit (Option)

Kit for fork lifting

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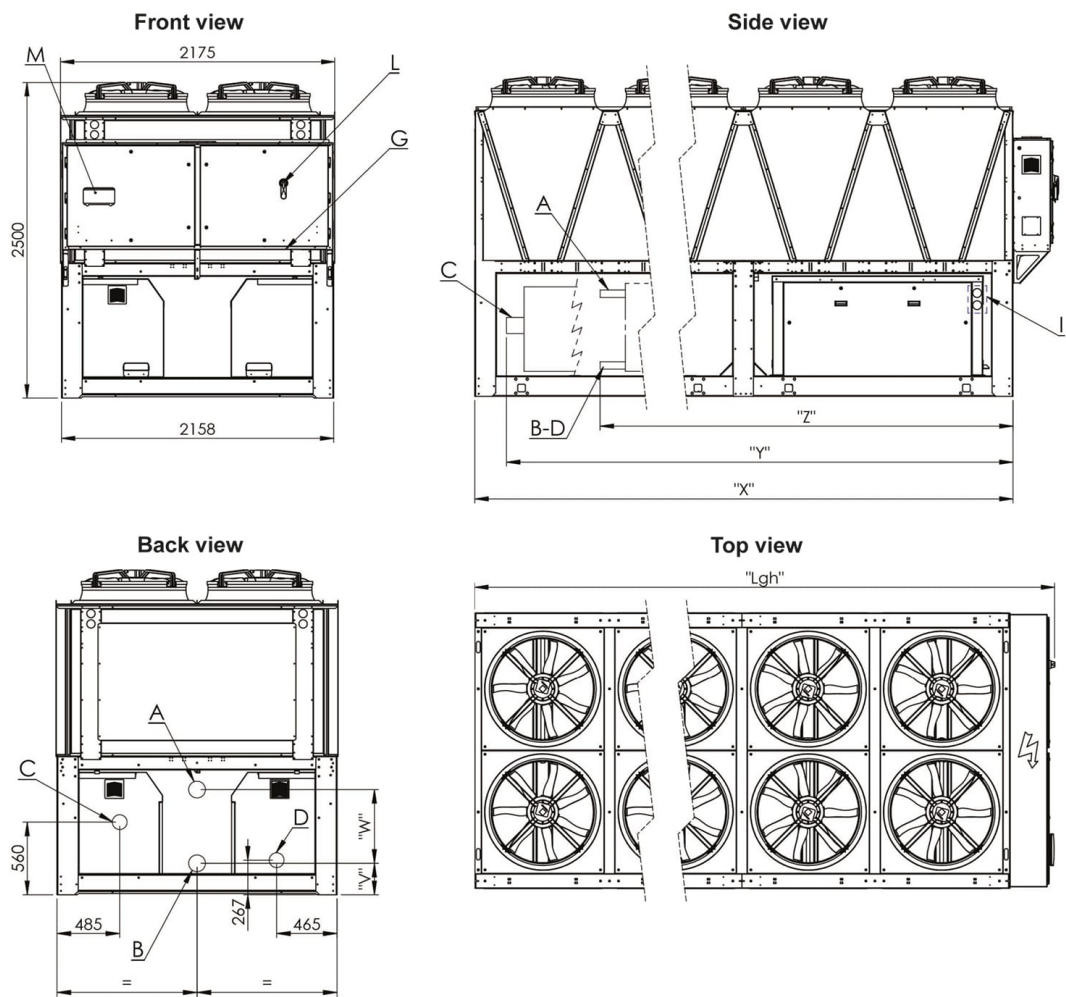
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Dimensions & weight

Dimensions



X	Footprint
Y	Tank outlet connection
Z	Standard hydraulic connection
Lgh	Total length
A	Standard inlet
B	Outlet

C	Outlet with tank
D	Inlet with pump/s
G	Electrical power supply
I	Gauge kit
L	Main Switch
M	Display

Dimensions	Value (mm)
Length	5620
Width	2175
Height	2500

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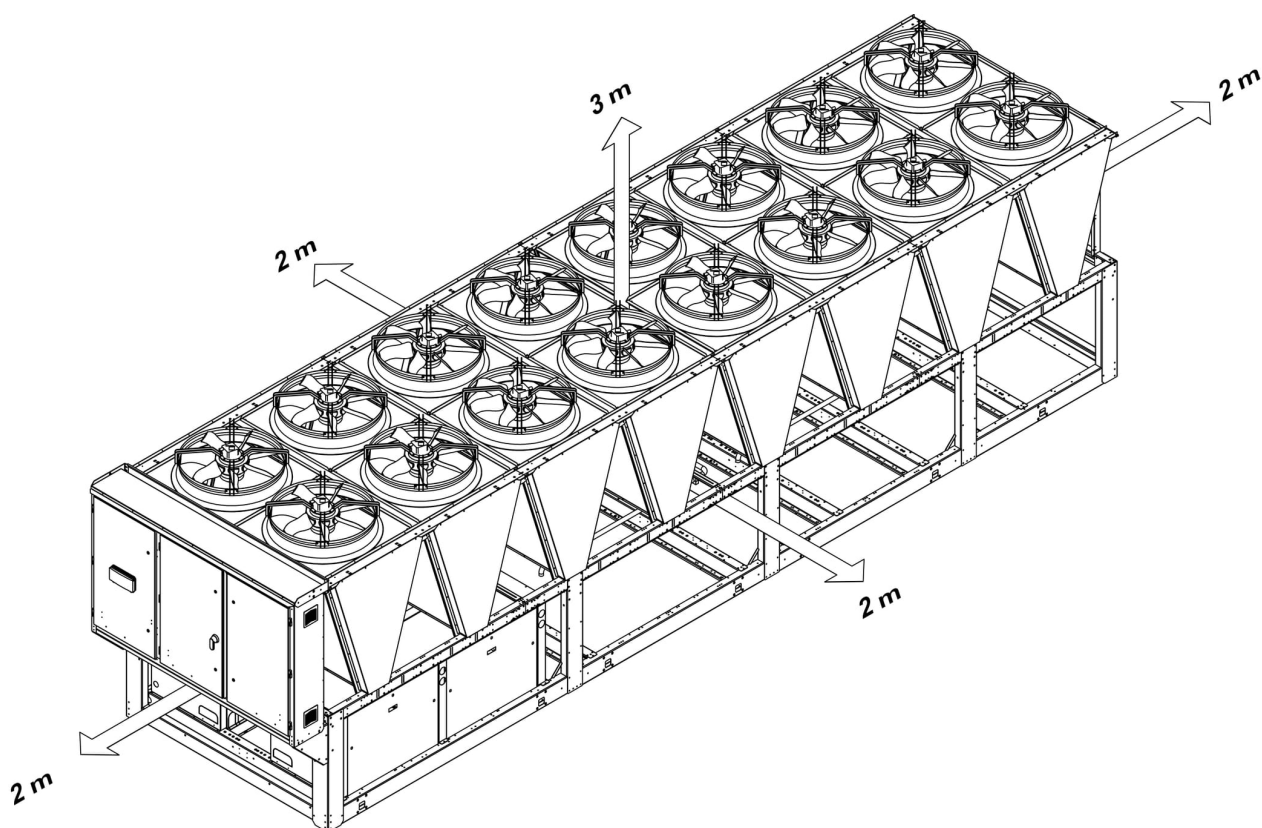
Weight

Part	Weight (kg)
Operating weight	3938.0
Shipping weight	3828.0



Space Requirements

Space Requirements (mm)



ECOi-W AQUA EVO H

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R410A

Pictures and drawings of Dimensions and Hydraulic/Electrical Connection tabs are only illustrative. They can differ from the visual shape of the selected product variant.

GENERAL DESCRIPTION

ECOi-W AQUA EVO 400-800 H EC air cooled heat pump units have been designed and optimized to operate with R410A refrigerant and scroll compressors. These units are available in eleven sizes, with a nominal capacity range from 374 to 751 kW in cooling mode and from 404 to 805 kW in heating mode. Units 400-670 are equipped with two separated refrigerant circuits, each one with two/three compressors in tandem/trio installation, and EC fan motors to get higher values of seasonal efficiency.

CABINET

The cabinet is made of heavy gauge galvanized steel. All galvanized steel components are individually painted by a special painting process before the assembly of the unit. This painting system performs a homogeneous protection to the corrosion. The painting is a polyester powder based type. The units are suitable for outdoor installation, directly on the building roof or at the ground level.

VERSION

EC version Units are equipped with the same equipment as the basic version, with additional brushless EC fan motors to ensure low energy.

REFRIGERANT CIRCUIT

Units from size 400 to size 670 are equipped with two separated refrigerant circuits. Each refrigerant circuit is equipped with liquid line and discharge line shut-off valves, filter-drier with solid core, sight glass and electronic expansion valve. Heat pump units (HP) are additionally provided with 4-way reversing valves, suction accumulators and liquid receivers.

COMPRESSOR

Compressors are of hermetic scroll type and fitted with an electronic control system ensuring protection against high temperature and excessive load. All compressors have direct-on-line starting and are mounted on rubber vibration isolators in order to minimize noise and vibration transmission.

INDOOR HEAT EXCHANGER

Indoor heat exchangers are brazed stainless steel plate type. They are insulated with a 19 mm thick closed cell polyethylene foam material and provided with Victaulic connections. They are protected by an antifreeze electric heater to ensure a good protection against freezing at low ambient temperature when the unit is switched off. Maximum working pressure is 10 bar water side and 45 bar refrigerant side.

OUTDOOR HEAT EXCHANGER

Outdoor heat exchangers are finned tubes coils. Condenser coils are made of seamless copper tubes, arranged in staggered rows, mechanically expanded into corrugated aluminum fins.

FAN MOTOR

Fan motors are axial type, 800 mm diameter, with three phase electronically commutated (EC) external rotor motor with integrated controller, profiled and sickle shaped blades, optimized bellmouth, equipped with a safety grill. They have IP54 protection grade, and thermostat protection placed in the bearings.

ELECTRICAL BOARD

The electrical board is located in a metal case externally arranged at one end of the unit. Case for the board with IP54 protection rating, complete with grille for natural air ventilation of the box.

ELECTRONIC CONTROL

A new optimized control with easy-friendly interface, can manage unit operation under different load and temperature condition, providing following functions:

- Compressor management: a) Power on/off b) Anti-cycle c) Tandem / trio unloading for high / low pressure, high temperature and/or high compressor pressure ratio
- Chilled and hot water temperature regulation (return water temperature RWT - P+I type or leaving water temperature LWT - neutral band type)
- Automatic control of suction superheating through electronic expansion valve with optimized functions (cooling, heating, start-up and defrost)
- Evaporator antifreeze protection
- Smart defrost management
- Load shedding (part load operation by digital input)
- Dynamic set-point according outdoor air temperature
- High and low pressure operating conditions management
- External interlocks management

- Remote control management: a) Unit power on / off b) Unit cool / heat operation c) Unit dynamic set-point (tension signal analogue input) d) Summary alarm signal
- Remote signaling, by dry contacts: a) Voltage presence b) Compressors in operation c) General alarm
- Hydro-kit management: start-up of pump, antifreeze heater of external tank, pump anti-sticking function
- Heat recovery management by means of RWT sensor at the heat recovery condenser

Unit controller can display all operating parameters such as:

- Return water temperature
- Leaving water temperature
- Outdoor ambient temperature
- Refrigerant discharge pressure
- Refrigerant suction pressure
- Refrigerant suction temperature
- Refrigerant discharge temperature
- Refrigerant coil temperature
- Refrigerant suction superheat
- Electronic expansion valve % opening step
- Heat recovery temperature

Unit controller can display various alarms and operation status:

- Low / High pressure
- Evaporator antifreeze
- Lack of water flow
- Compressor operation / operating hours and start-up numbers
- Pump operation / operating hours
- Compressor thermal protection
- Fan thermal protection
- Faulty sensors

SAFETY

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

Safety

- Power disconnect switch with an emergency stop function
- Phase sequence control
- High pressure switches
- Low pressure switches
- Evaporator antifreeze electric heater
- Crankcase oil electric heater
- Water differential pressure switch
- Safety valve on discharge lines

Control

- High pressure transducers
- Low pressure transducers
- Discharge gas temperature probes
- Return water temperature sensor

- Leaving water temperature sensor (with an antifreeze function)
- Suction temperature sensor (for EEV control)
- Outdoor ambient temperature sensor
- Coil temperature sensors (HP only)
- Heat recovery temperature sensor (TR only)

CONFORMITY WITH STANDARDS

Units are in conformity with the following standards:

- Machine Directive: 2006/42/EC
- Electromagnetic Compatibility Directive: 2014/30/EU
- Pressure Equipment Directive: 2014/68/EU