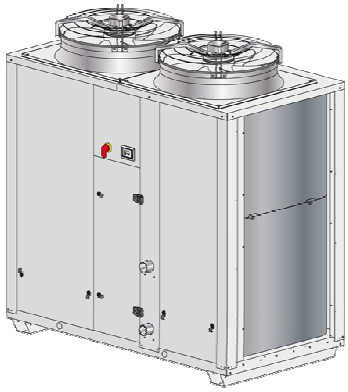
Air-to-Water Reverse Cycle Heat Pump			
Unit Model	AQAH 125	Unit Reference	01



Features and Benefits

- R410A refrigerant.
- Units are optimized for partial load operation.
- High ESEER.
- 2 compressors fitted in tandem for all the range with two capacity steps on sizes 25 to 45 and three capacity steps on sizes 55 to 125, with an immediate return on investment versus the inverter units.
- Low noise version supplied as standard, extra low noise version for the XLS units.
- "Night Mode" for energy savings and even more reduced noise level in night operation.
- Water law is standard for energy savings.
- Refrigerant circuit is completely closed in a separate compartment in order to reduce noise level (sizes 25 to 40).
- 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 heat pump mode down to external temperature of -15 °C.
- Fan speed control for low ambient operation in cooling mode down to -10 °C.
- ModBus interface available (reading).
- Phase sequence monitor supplied as standard.
- User-friendly microprocessor ILTC II controller that allows to reduce the need of an external water tank in most of 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 for sizes 25 to 40 and 2.5 litres per kW for sizes 45 to 125.
- Unique defrosting logic (optimized/improved interval).
- Double water set point.
- Water filter (not fitted) and water flow switch (factory fitted) are supplied as standard.
- "Plug and play" hydraulic kit is standard on sizes 25 to 40 and optional on sizes 45 to 125.
- Automatic air vent.
- Victaulic connection on internal components ensuring a perfect sealing and facilitating service operations.
- Double 3/8" valve on water pipes for pressure measurement.
- EC fan motor for a high efficiency version and an energy ratio increase.
- Small footprint, allowing shipping and handling costs to be saved, units find easily a place to be installed.

Specifications

General

The new Aqu@Logic II AQAL/AQAH 25 to 125 have been designed and optimized to operate with R410A refrigerant fluid. They are of single refrigerant circuit type.

They are available in cooling only (AQAL) and heat pump (AQAH) versions.

Each versions consists of 11 sizes (25, 30, 35, 40, 45, 55, 65, 75, 90, 105 & 125) and covers a nominal cooling capacity range from 25.0 to 122 kW and a nominal heating capacity range from 26.9 to 120 kW.

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

The general operation status of the machine is continuously under the control of an ILTC II microprocessor based controller.

The AQAL and AQAH units can operate without water tank, thanks to the ILTC II microprocessor 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 requested in cooling mode (for sizes 25 to 40) is 3.5 litres of buffer volume per kW and 2.5 litres per kW for sizes 45 to 125.

In heating mode, 12.5 litres of buffer volume per kW are recommended in order to guarantee homogeneous temperatures during the defrosting cycles (comfort and energy savings).

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

AQAL and AQAH units can be supplied in several versions :

- STD (Standard) version : Includes a low noise (LS) acoustical performance.
- XLS (Extra low noise) version : Obtained by the installation of acoustic box around compressors.
- HE (High Efficiency) version : This version is equipped with EC motors that allow the unit to deliver high performance in terms of energy savings.

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 the assembly of the unit.

This painting system performs a homogeneous protection to the corrosion. The painting is a polyester powder based type, coloured in RAL 9001.

The units AQAL/AQAH are suitable for outdoor installation, directly on the building roof or at the ground level.

Compressors

Each unit is equipped with two scroll compressors fitted on a rail and assembled together to form tandem compressors.

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

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

A phase sequence monitor is supplied as standard.

Evaporator

The evaporator is consisting 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.

Condenser

The condenser is a finned coil constructed with seamless copper tubes mechanically expanded into aluminium fins.

The condenser is largely dimensioned in order to optimize performance and defrosting cycles.

The condenser can be equipped, as optional, a protective grille to prevent shocks.

Condenser fans and motors

Each unit has one or two axial fan, with 2 speeds. According to the version, the fan is cabled in order to have high speed (700 to 900 rpm) for Standard version and low speed (530 to 680 rpm) to reduce the sound level for XLS version.

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

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

All fans are fitted with a protective grille on top.

Refrigerant circuit

All units have one refrigerant circuit consisting of : scroll tandem compressors, plate heat exchanger, thermostatic 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, by removing an access panel, without disturbing the unit operating conditions.

A set of LP and HP gauges can be factory fitted as optional.

All refrigerant components are shown in the functional diagrams illustrated in the next pages, section "Refrigerant flow diagrams".

Hydraulic circuit

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

- BASIC unit : Unit without pump, the hydraulic circuit contains the following components : supplied loose water filter, mounted water flow switch, water safety valve, automatic air vent, optional field-installed in/out 3/8" water valves.

All water piping is covered with thermal insulation.

- 1P : One pump unit having the same equipment as BASIC unit + a pump with 150 kPa external static pressure. An air vent is provided for this configuration.
- 2P : Two pump unit (from size 45) having the same equipment as BASIC unit + 2 pumps with 150 kPa external static pressure. Each pump can be isolated and replaced with the aid of two valves. A non-return valve is fitted to prevent a pump from pumping water in the discharge piping of another pump. An air vent is also provided for this configuration.

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

The hydraulic connections are of male gas threaded type; for the connection diameters, please refer to the physical data tables on the next pages.

As optional, a buffer tank of 100 litres can be mounted on sizes 25 to 40, and a tank of 300 litres on sizes 45 to 125.

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.
A plexiglas cover protects the control from shocks and bad weather.
The AQAL/AQAH chillers are equipped with a microprocessor based control with a new ILTC II logic that implements an intelligent control with anticipation of needs, either on entering water temperature, or on leaving water temperature.
The main features of this control system are :
- User-friendly : with only 3 buttons and a tree logic, it is possible to control the unit easily,
- Reliable : all indications on the display are visible in every 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.

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.

Conformity with standards
All AQAL/AQAH units are in compliance with the following standards :
- Machine Directive : 2006/42/EC
- Low Voltage Directive : 2006/95/EC
- Electromagnetic Compatibility Directive : 2004/108/EC
- Pressure Equipment Directive : 97/23/EC

Factory-installed options
- Condenser protective grille.
- Reinforced acoustic insulation (XLS version).
- Coil with epoxy treatment.
- LP/HP gauges.
- Power supply without neutral kit.
- Lack of water pressure switch.
- Without pump kit (sizes 25 to 40)
- 1-pump hydraulic kit (sizes 45 to 125).
- 2-pump hydraulic kit (sizes 45 to 125).
- Fan speed control kit (for operation with low ambient temperature down to -10 °C).
- Buffer tank 100 litres (sizes 25 to 40)
- Buffer tank 300 litres (sizes 45 to 125)

Field-installed accessories
- Anti-vibration rubber pads.
- ModBus protocol kit for BMS.
- In/Out valve kit.

Unit Options

	Anti Vibration		X	Remote heat/cool switch
X	Rubber anti-vibration pads			**Indoor HE Options**
	Electrical & Command		X	Antifreeze electric heater
X	Remote On/Off control			**Outdoor HE Options**
X	General fault relay			Epoxy treatment for aluminium fins
X	Set point compensation in function of outdoor temperature			Blygold treatment for aluminum fins
X	ModBus protocol kit		X	Blue fin treatment
	Low ambient temperature operation kit (-10°C)			Coil guards
X	Sequence phase control			**Refrigerant circuit**
X	Main switch		X	R410A Refrigerant
	Compressor soft starter			HP & LP gauges

Hydraulic Options

	Buffer Tanks			Water filter (supplied loose)
X	Water tank 300 litres			**Pumps**
	Hydraulic kit accessories			Without pump kit (45-125)
	Water flow switch		X	Single pump kit (45-125)
	Lack of water pressure switch			Double pump kit (45-125)
	In/Out shut-off valves (supplied loose)			

Air-to-Water Reverse Cycle Heat Pump					
Unit Series	AQAH 125	Unit Model	AQAH 125	Unit Reference	01

PERFORMANCE	VALUE	UNIT
COOLING		
Capacity*	121,9	kW
Power Input*	46,35	kW
EER*	2,63	kW/kW
ESEER**	3,83	kW/kW
Energy Efficiency Class**	D	
GENERAL		
Power supply	400V/3ph +N/50Hz	V/Ph/Hz
Startup type	direct	
Nominal running current	84	A
Maximum running current	103,5	A
Startup current	351,5	A
Refrigerant	R410A	
Number of refrigerant circuits	1	
Refrigerant Charge	33	kg
COMPRESSOR		
Number/Type	2/Scroll	
Capacity Steps	0/33-67/100	%
Crankcase Heater	90/140	W
EVAPORATOR		
Number/Type	1/Plate	
Fluid In/Out temperature (cooling mode)	12/7	˚C
Water flow rate (cooling mode)	5,82	l/s
Pressure drop fluid side (cooling mode)	45,06	kPa
Fluid In/Out temperature (heating mode)	40/45	˚C
Water flow rate (heating mode)	5,69	l/s
Pressure drop fluid side (heating mode)	43,09	kPa
Fluid	Water	
Glycol	0	%
Fouling Factor	0,044	m² ˚C/kW
Water volume	10,8	litres
Antifreeze electric heater	2 x 30	W

PERFORMANCE	VALUE	UNIT
HEATING		
Capacity*	119,1	kW
Power Input*	45,4	kW
COP*	2,62	kW/kW
Energy Efficiency Class**	D	
CONDENSER		
Number/Type	2/Coil	
Outdoor Air Temperature (cooling mode)	35	˚C
Outdoor Air Temperature (heating mode)	7	˚C
Fouling factor	0,044	m² ˚C/kW
Frontal Area	6,4	m²
Number of Rows	3	
FANS		
Number/Type	A/2	
Rotational Speed	860	rpm
Altitude	0	m
Air flow Rate	42000	m3/h
Absorbed power per fan	2,1	kW
WATER CONNECTIONS		
Connection type	Male Gas Threaded	
In/Out diameter	2"1/2/2"1/2	inches
DIMENSIONS AND WEIGHTS		
Length	2180	mm
Width	1160	mm
Height	2286	mm
Operating Weight	1020	kg
Shipping Weight		kg

(*) According to EN14511
(**) According to Eurovent Rating Standard

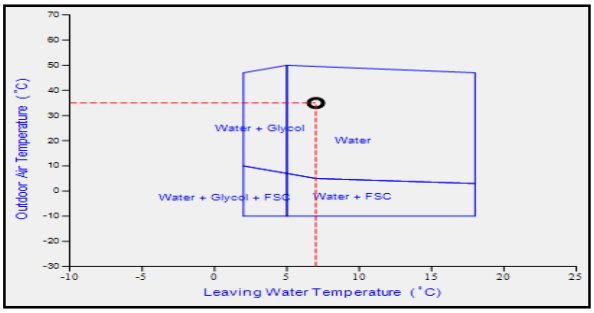
SOUND DATA

OCTAVE BAND SOUND POWER LEVEL						
Hz	125	250	500	1000	2000	4000
dB	73	75	76	76	76	71

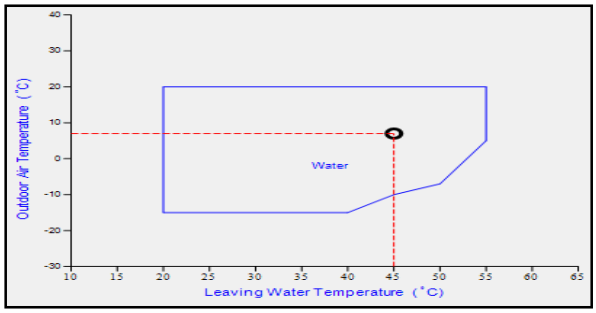
Total Sound Power Level	82	dB(A)
Distance from the sound source		m
Total Sound Pressure level *		dB(A)

(*) Sound pressure levels refer to ISO Standard 3744 with parallelpiped shape

OPERATING LIMITS WITH WORKING POINTS



Cooling Mode

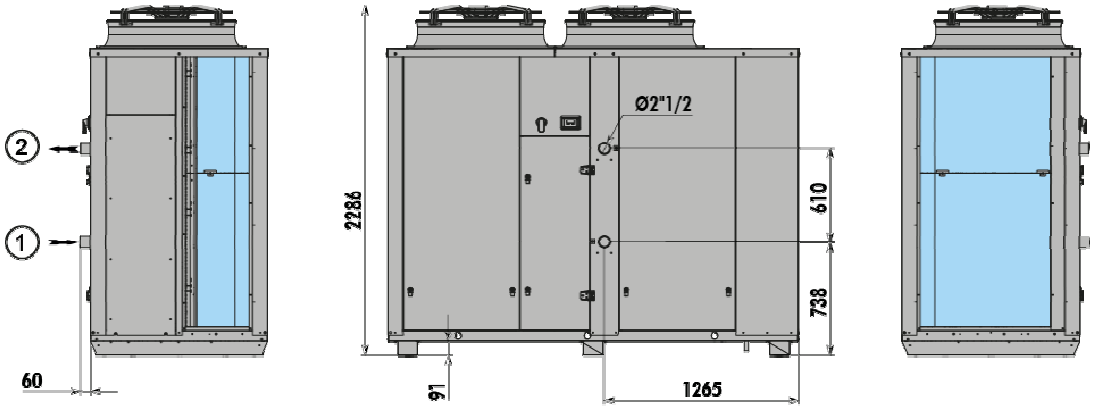


Heating Mode

HYDRAULIC KIT DATA

PERFORMANCE	VALUE	UNIT
PUMP DATA		
Nominal Power	2.2	kW
Maximum running current	4.5	A
Nominal static pressure	195	kPa
Nominal water flow rate	20900	l/s
WATER TANK DATA		
Capacity	300	L
Electric Heater	-	kW
DIMENSIONS		
Length	-	mm
Width	-	mm
Height	-	mm
WEIGHT		
Operating weight	396	Kg

Unit Dimensional Drawings



① Water Inlet

② Water outlet