Chiller

AQL/AQH 20 to 35

Air Cooled Water Chillers
Cooling Only and Heat Pump
Engineering Data Manual

R410A

19.1 to 35.9 kW

17.0 to 33.1 kW

systemair

Key Points

- R410A refrigerant.
- Simpler refrigerant circuit layout.
- Great accessibility to internal components for service operations.
- New display on external panel allowing the complete control of the unit.
- Sight glass inspection hole allowing to check the sight glass without removing any panel.
- Operating limits of the unit stored in the flash memory of the control logic.
- Wide operating limits.
- High temperature operation up to 50 °C.
- Less noisy compared to the unit with R407C.
- Pump equipped as standard.
- "No pump" kit (accessory) that allows to switch from a pump equipped unit to a no pump unit.
- New gauge kit, easier to install.
- Fan speed control (accessory) for low ambient operation in cooling mode.
- Units are suitable for low water temperature applications with leaving water temperature of -8 °C (min.).
- ModBus interface.
- Phase sequence monitor supplied as standard.
- User-friendly microprocessor based control.
- ILTC (Intelligent Liquid Temperature Control) controller that allows to reduce the use of an external water tank.
- Return and leaving water temperature control logic.
- For safety during service operations, special valves dedicated to R 410A are available on the refrigerant system. These valves, of 5/16" flare SAE type, are mounted on the liquid line inside and on the lateral panel of the unit. This facilitates the access to the high and low sides of the refrigerant circuit in order to do pressure measurement.
- Double water set point.
- Rubber pads supplied as standard.
- Water filter supplied as standard.

Specifications

General

The new **Aqu@Logic** air cooled water chillers have been designed and optimized to operate with **R410A** refrigerant fluid. They are available in **cooling only (AQL)** and **heat pump (AQH)** versions.

Each version consists of **4 sizes** and covers a nominal cooling capacity range from **19.1 to 35.9 kW** and a nominal heating capacity range from **17.0 to 33.1 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 **ITLC** microprocessor based controller.

The AQL and AQH units can operate **without water tank**, thanks to the ILTC microprocessor that implements an **auto-adaptive control logic** ensuring a total protection of the compressors at different load or water volume conditions. The minimum water volume requested is **2.5 l/kW**. However, an external water tank can be supplied as accessory for field installation.

All units have a **pump on board** as standard, but they can be supplied with a "no pump" kit as accessory which allows installers to remove the integrated pump in order to use an external pump.

A **fan speed controller** can be supplied loose as field-installed accessory to authorize the unit to operate in cooling mode at low ambient temperature (-10 °C min.).

Conformity with standards

The AQL/AQH units are in conformity 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

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, coloured in **RAL 9001**.

The units 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 soft start system can be supplied as optional, whereas 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 a **35 W anti-freeze 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 46 bar at refrigerant side.

Air cooled condenser coil

The condenser coil is composed of **internally grooved** copper tubes mechanically expanded into corrugated aluminium fins.

The air cooled condenser is supplied with a **grille** to protect the coil from shocks.

Specifications (continued)

Condenser fans

Each unit has two axial fans with 610 mm of diameter. The fans are placed directly in front of the coil in order to increase air flow and heat transfer between air and refrigerant. They are fitted with protective grilles.

The condenser fans have **2 speeds** : 630 rpm for normal operating conditions and 450 rpm for night mode in order to generate low noise levels.

The fan motors have IP54 grade and are equipped with a thermal overload protection.

A pressure actuated fan speed controller can be supplied as an option to allow the unit to operate in cooling mode at ambient temperature down to -10 °C.

Refrigerant circuit

All units have one refrigerant circuit consisting of scroll compressors, plate heat exchanger, thermostatic expansion valve, 4-way reverse cycle valve (heat pump version only) and coil.

A hole is provided on one side of the unit in order to do inspection on refrigerant via a sight glass during service operations without removing any panel.

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

Hydraulic circuit

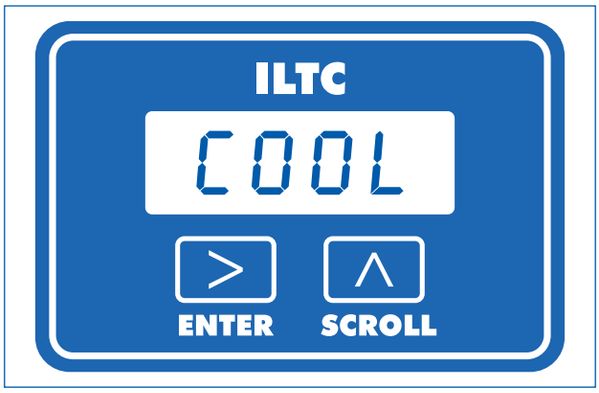
All units are supplied with a **circulating pump** as standard. The head of the pump is insulated with 10 mm insulation to avoid condensation on it.

A **water filter** is also supplied as standard.

A safety valve and an expansion tank are located on the suction side of the pump. Both high and low pressure sides are equipped with 3/8" fittings which allow water to be drained and manometer to be connected during service operations.

Water connections are of 1" 1/2 male gas threaded type.

Control panel



The control panel contains an electrical board with keyboard and display for the visualization of the operating parameters and alarms. This control panel is accessible from outside because it is placed on an external panel. A Plexiglas cover protects the control from external agent.

The AQL/AQH chillers are equipped with a microprocessor based control with ILTC logic that implements an intelligent control on either **entering water temperature** or **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,
- Test procedure,
- Night mode,
- Alarm visualization with a logging of the last 10 alarms,
- Remote ON/OFF switching,
- Compressors 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 (ModBus protocol in RS485),
- Compressor operating limits stored in a flash memory.

Safety and control devices

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

Safety :

- Fan motor overload protection,
- Compressor motor overload protection,
- Water differential pressure switch,
- High pressure switch,
- High and low pressure transducers,
- Evaporator antifreeze electric heater,
- Crankcase oil electric heater.

Control :

- Entering water temperature sensor,
- Leaving water temperature sensor,
- Coil temperature sensor,
- Discharge temperature sensor,
- Air temperature sensor,
- Suction and discharge pressure transducers.

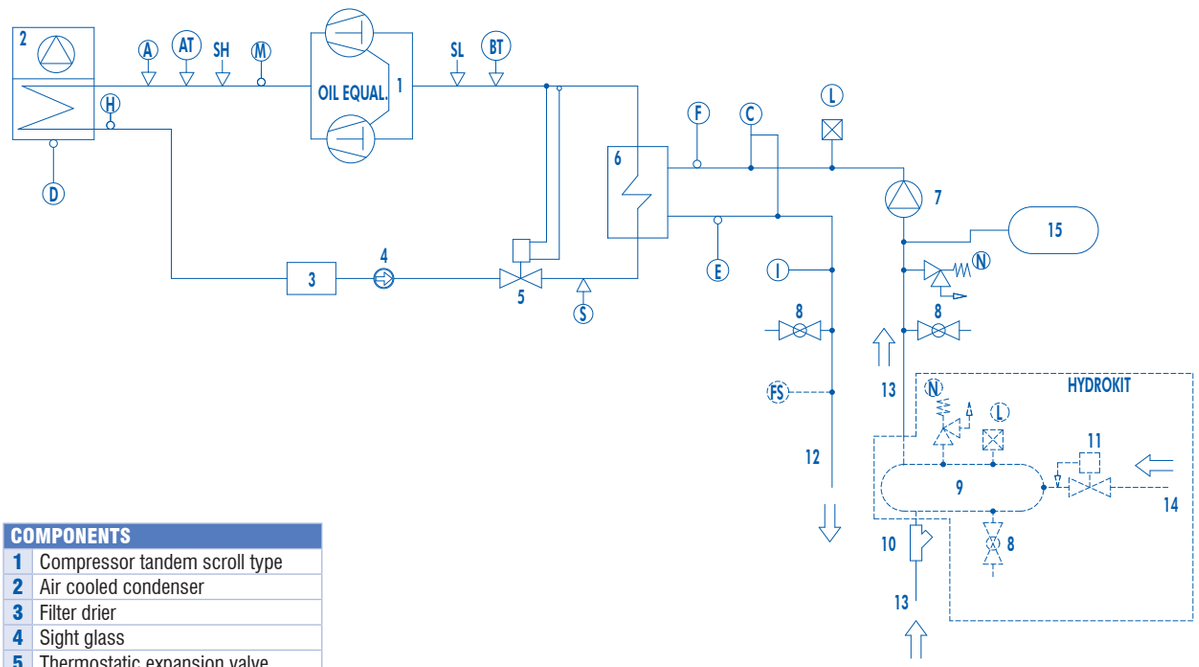
Factory-installed option

- Coil with blue fins,
- Coil with "Fin Guard Silver" treatment,
- Coil with black epoxy treatment,
- Soft starter.

Field-installed accessories

- Fan speed control kit,
- No pump kit,
- Gauge kit,
- Hydro kit 112 litres,
- Flow switch,
- In/out valve kit,
- Remote On/Off control,
- ModBus protocol kit for BMS,
- Power factor correction capacitors,
- Sequencer for up to 4 chillers installation.

Refrigerant Flow Diagram - AQL R410A

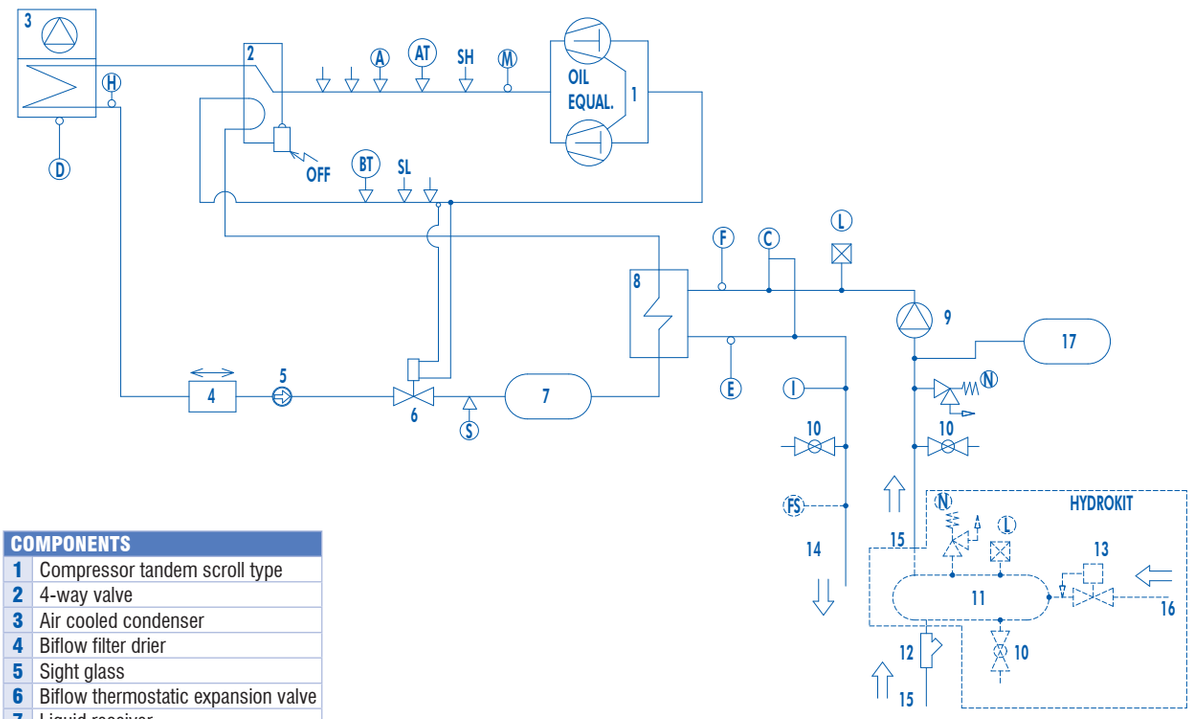


COMPONENTS	
1	Compressor tandem scroll type
2	Air cooled condenser
3	Filter drier
4	Sight glass
5	Thermostatic expansion valve
6	Plate heat exchanger
7	Pump
8	Drain valve
9	Water buffer tank
10	Water filter (supplied loose)
11	Automatic water charging valve
12	Water outlet
13	Water inlet
14	Water charging line
15	Pressure expansion tank

SAFETY/CONTROL DEVICES			
A	High pressure switch	H	Defrost temperature sensor
AT	High pressure transducer	I	Hydrometer
BT	Low pressure transducer	L	Vent valve
C	Water differential pressure switch	M	Discharge temperature sensor
D	Air temperature sensor	N	Water safety valve
E	Outlet water temperature sensor	S	5/16" Shrader valve (charging point)
F	Inlet water temperature sensor	SH	5/16" high pressure Shrader valve
FS	Flow switch	SL	5/16" low pressure Shrader valve

↓	Pipe connection with Shrader valve
--------	Optional parts
O	Sensors

Refrigerant Flow Diagram - AQH R410A



COMPONENTS	
1	Compressor tandem scroll type
2	4-way valve
3	Air cooled condenser
4	Biflow filter drier
5	Sight glass
6	Biflow thermostatic expansion valve
7	Liquid receiver
8	Plate heat exchanger
9	Pump
10	Drain valve
11	Water buffer tank
12	Water filter (supplied loose)
13	Automatic water charging valve
14	Water outlet
15	Water inlet
16	Water charging line
17	Pressure expansion tank

SAFETY/CONTROL DEVICES			
A	High pressure switch	H	Defrost temperature sensor
AT	High pressure transducer	I	Hydrometer
BT	Low pressure transducer	L	Vent valve
C	Water differential pressure switch	M	Discharge temperature sensor
D	Air temperature sensor	N	Water safety valve
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F	Inlet water temperature sensor	SH	5/16" high pressure Shrader valve
FS	Flow switch	SL	5/16" low pressure Shrader valve

	Pipe connection with Shrader valve
--------	Optional parts
O	Sensors

Operating Limits

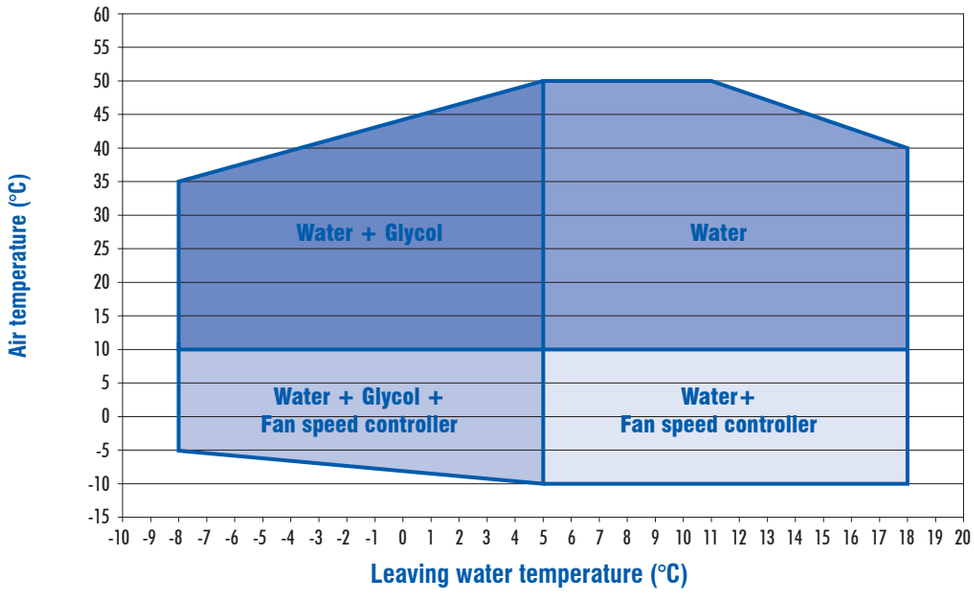
AQL/AQH in cooling mode			20		25		30		35	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Water	Water outlet temperature *	°C	-8	18	-8	18	-8	18	-8	18
	Water ΔT	K	3	8	3	8	3	8	3	8
	Flow rate	l/h	2053	5475	2677	7138	3322	8858	3859	10291
	Max. operating pressure	barg	3							
Air temperature **		°C	-10	50	-10	50	-10	50	-10	50
Optimal water volume		l	48		62		77		90	

* Below 5 °C, glycol is required.
** -10 °C is given for unit with fan speed controller (optional). Without fan speed controller, the limit is 10 °C.

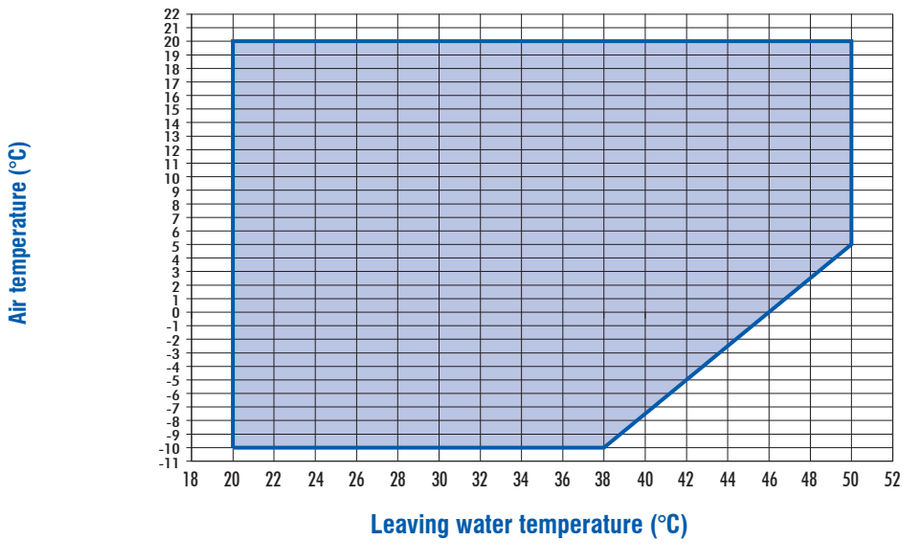
AQH in heating mode			20		25		30		35	
			Min .	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Water	Water outlet temperature	°C	20	50	20	50	20	50	20	50
	Water ΔT	K	3	8	3	8	3	8	3	8
	Flow rate	l/h	1914	5103	2494	6651	3096	8256	3601	9603
	Max. operating pressure	barg	3							
Air temperature *		°C	-10	20	-10	20	-10	20	-10	20

* Refer to diagram below.

AQL/AQH in cooling mode



AQH in heating mode



Correction factors

Fouling factors - Evaporator

Fouling factor (m^2.°C/kW)	Cooling capacity factor	Power input factor
0.044	1.000	1.000
0.088	0.987	0.995
0.176	0.964	0.985
0.352	0.915	0.962

Fouling factors - Condenser

Fouling factor (m^2.°C/kW)	Cooling capacity factor	Power input factor
0.044	1.000	1.000
0.088	0.987	1.023
0.176	0.955	1.068
0.352	0.910	1.135

Correction factors for water ΔT different from 5 K

Models	Water temperature in/out	Cooling capacity (kW)	Power input (kW)
AQL - AQH	17/7(10)	95%	98%
	14/7(7)	97%	99%
	12/7(5)	100%	100%
	10/7 (3)	103%	101%

Altitude factors

Altitude (m)	Cooling capacity factor	Power input factor
0	1.000	1.000
600	0.987	1.010
1200	0.973	1.020
1800	0.958	1.030
2400	0.943	1.040

Physical Data - AQL R410A

AQL SIZES		20	25	30	35
Cooling capacity	kW	19.1	24.9	30.9	35.9
Power input (compressor)	kW	5.50	7.51	10.0	11.2
Total EER *		3.13	3.07	2.92	3.04
Energy class		A	B	B	B
ESEER		4.86	4.29	4.37	4.08
IPLV		5.10	4.50	4.59	4.28
Number of refrigerant circuits		1	1	1	1
Part load steps	%	0-50-100	0-50-100	0-50-100	0-50-100
Power supply		400V/3+N/50Hz	400V/3+N/50Hz	400V/3+N/50Hz	400V/3+N/50Hz
Startup type		Direct	Direct	Direct	Direct
REFRIGERANT					
Type		R410A			
Charge	kg	5.7	7.2	7.2	8.0
COMPRESSORS					
Number		2	2	2	2
Type		Scroll	Scroll	Scroll	Scroll
Crankcase heater	W	70	70	70	70
EVAPORATOR					
Number		1	1	1	1
Type		Plate	Plate	Plate	Plate
Antifreeze heater	W	35	35	35	35
COIL					
Number		1	1	1	1
Frontal surface	l x h	986 x 1500	1350 x 1500	1350 x 1500	1350 x 1500
Number of rows		2	2	2	3
FANS					
Number		2	2	2	2
Air flow	m^3/h	11300	13000	13000	12500
Speed	rpm	630	630	630	630
Power input	kW	0.6	0.6	0.6	0.6
PUMP					
Number		1	1	1	1
Power input	kW	Refer to corresponding performance curves			
Static head pressure	kPa	Refer to corresponding performance curves			
WATER CONNECTIONS					
Type		Male gas threaded			
Inlet diameter	inch	1" 1/2	1" 1/2	1" 1/2	1" 1/2
Outlet diameter	inch	1" 1/2	1" 1/2	1" 1/2	1" 1/2
Water drain connection	inch	3/8"	3/8"	3/8"	3/8"
WEIGHT					
Shipping	kg	283	301	308	322
Operating	kg	276	294	302	316
DIMENSIONS					
Length	mm	1477	1477	1477	1477
Width	mm	538	538	538	538
Height	mm	1625	1625	1625	1625
ACOUSTICAL DATA (NORMAL MODE)					
Sound power level	dB(A)	74	75	75	75
Sound pressure level at 10 metres	dB(A)	43	44	44	44

* Gross values.

Physical Data - AQH R410A

AQH SIZES		20	25	30	35
Cooling capacity	kW	17.8	23.2	28.8	33.5
Power input (compressor)	kW	5.83	7.69	10.2	11.5
Total EER*		2.77	2.80	2.67	2.77
Energy class		C	C	D	C
ESEER		4.73	4.06	4.13	3.86
IPLV		4.97	4.26	4.34	4.05
Heating capacity	kW	17.0	23.6	29.0	33.1
Power input (compressor)	kW	4.70	7.14	8.91	10.4
COP*		3.21	3.05	3.05	3.02
Number of refrigerant circuit		1	1	1	1
Part load steps	%	0-50-100	0-50-100	0-50-100	0-50-100
Power supply		400V/3+N/50Hz	400V/3+N/50Hz	400V/3+N/50Hz	400V/3+N/50Hz
Startup type		Direct	Direct	Direct	Direct
REFRIGERANT					
Type		R410A			
Charge	kg	5.6	7.5	7.6	8.1
COMPRESSORS					
Number		2	2	2	2
Type		Scroll	Scroll	Scroll	Scroll
Crankcase heater	W	70	70	70	70
EVAPORATOR					
Nombre		1	1	1	1
Type		Plate	Plate	Plate	Plate
Antifreeze heater	W	35	35	35	35
COIL					
Number		1	1	1	1
Frontal surface	l x h	986 x 1500	1350 x 1500	1350 x 1500	1350 x 1500
Number of rows		2	2	2	3
FANS					
Number		2	2	2	2
Air flow	m^3/h	11300	13000	13000	12500
Speed	rpm	630	630	630	630
Power input	kW	0.6	0.6	0.6	0.6
PUMP					
Number		1	1	1	1
Power input	kW	Refer to corresponding performance curves			
Static head pressure	kPa	Refer to corresponding performance curves			
WATER CONNECTIONS					
Type		Male gas threaded			
Inlet diameter	inch	1" 1/2	1" 1/2	1" 1/2	1" 1/2
Outlet diameter	inch	1" 1/2	1" 1/2	1" 1/2	1" 1/2
Water drain connection	inch	3/8"	3/8"	3/8"	3/8"
WEIGHT					
Shipping	kg	296	314	322	337
Operating	kg	289	307	316	331
DIMENSIONS					
Length	mm	1477	1477	1477	1477
Width	mm	538	538	538	538
Height	mm	1625	1625	1625	1625
ACOUSTICAL DATA (NORMAL MODE)					
Sound power level	dB(A)	74	75	75	75
Sound pressure level at 10 metres	dB(A)	43	44	44	44

* Gross values.

Electrical Data

Units *

Sizes		20	25	30	35
Max. power input **	kW	10.1	13.6	15.8	18.0
Max. current input **	A	21.5	25.5	35.3	35.3
Start-up current	A	62	80	94	121

* Data given for unit with one pump.
** Data given for compressor at maximum conditions.

Compressors

Sizes		Power input at max. conditions per compressor (kW)	Current at max. conditions per compressor FLA (A)	Startup current LRA (A)	Factor power nominal conditions	Crankcase heater (W)
20	COMP 1	4.3	8.0	48.0	0.78	70
	COMP 2	4.3	8.0	48.0	0.78	70
25	COMP 1	6.1	10.0	64.0	0.79	70
	COMP 2	6.1	10.0	64.0	0.79	70
30	COMP 1	7.2	15.0	74.0	0.84	70
	COMP 2	7.2	15.0	74.0	0.84	70
35	COMP 1	8.3	15.0	101.0	0.77	70
	COMP 2	8.3	15.0	101.0	0.77	70

Fans (230V/1/50Hz)

Sizes	Number of fans	Nominal power per fan (kW)	Max. running current per fan (A)	Total fan power (kW)	Total max. fan current (A)
20	2	0.3	1.8	0.6	3.6
25	2	0.3	1.8	0.6	3.6
30	2	0.3	1.8	0.6	3.6
35	2	0.3	1.8	0.6	3.6

Pump (400V/3/50Hz)

Sizes	Nominal power (kW)	Max. running current (A)
20	0.69	1.5
25	0.69	1.5
30	0.82	1.7
35	0.82	1.7

Acoustical Data

Sound pressure level Lw-dB(A) - Normal mode

AQL/AQH models	Frequency in octave band (Hz)								Lw(A) Total dB
	63	125	250	500	1000	2000	4000	8000	
20	71.1	78.8	73.5	71.7	68.9	66.7	58.0	48.0	**74**
25	70.3	85.9	72.4	72.0	70.2	65.6	57.1	49.5	**75**
30	72.0	75.4	74.2	72.6	70.2	67.1	59.5	51.6	**75**
35	72.9	76.2	74.4	73.2	70.7	65.2	58.6	48.2	**75**

Sound pressure level Lp-dB(A) - Normal mode

AQL/AQH models	Frequency in octave band (Hz)								Lp(A) Total dB
	63	125	250	500	1000	2000	4000	8000	
20	39.6	47.3	42.0	40.2	37.4	35.2	26.5	16.5	**43**
25	38.8	54.4	40.9	40.5	38.7	34.1	25.6	18.0	**44**
30	40.5	43.9	42.7	41.1	38.7	35.6	28.0	20.1	**44**
35	41.4	44.7	42.9	41.7	39.2	33.7	27.1	16.7	**44**

Sound power level Lw-dB(A) - Night mode

AQL/AQH models	Frequency in octave band (Hz)								Lw(A) Total dB
	63	125	250	500	1000	2000	4000	8000	
20	65.2	74.9	66.7	66.8	62.0	59.6	53.7	43.8	**68**
25	67.2	70.2	68.4	69.1	68.4	63.7	55.0	50.0	**72**
30	72.3	72.9	70.7	69.7	67.0	63.7	57.8	52.3	**72**
35	75.3	72.8	71.7	69.9	67.9	62.0	54.8	46.6	**72**

Sound pressure level Lp-dB(A) - Night mode

AQL/AQH models	Frequency in octave band (Hz)								Lp(A) Total dB
	63	125	250	500	1000	2000	4000	8000	
20	33.7	43.4	35.2	35.3	30.5	28.1	22.2	12.3	**37**
25	35.7	38.7	36.9	37.6	36.9	32.2	23.5	18.5	**41**
30	40.8	41.4	39.2	38.2	35.5	32.2	26.3	20.8	**41**
35	43.8	41.3	40.2	38.4	36.4	30.5	23.3	15.1	**41**

Note : Sound pressure levels are calculated at a distance of 10 meters. Factor of direction Q=2. Tolerance 2dB.

Performance Data - AQL R410A

AQL sizes	LWT (°C)	Ambient air temperature (°C)																	
		25		30		32		35		40		43		46		48		50	
		Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)
AQL 20	5	20.1	4.46	19.1	4.92	18.7	5.12	18.0	5.42	16.9	5.93	16.2	6.28	15.4	6.64	15.0	6.89	14.5	7.20
	7	21.3	4.56	20.2	5.02	19.7	5.22	**19.1**	**5.52**	17.9	6.03	17.1	6.39	16.3	6.74	15.8	6.99	15.3	7.25
	9	22.4	4.61	21.3	5.07	20.8	5.27	20.1	5.57	18.9	6.13	18.1	6.49	17.3	6.84	16.7	7.15	16.2	7.35
	11	23.6	4.71	22.4	5.17	22.0	5.37	21.2	5.68	19.9	6.23	19.1	6.59	18.2	6.99	17.6	7.25	17.1	7.45
	13	24.8	4.81	23.6	5.27	23.1	5.47	22.3	5.78	21.0	6.34	20.1	6.69	19.3	7.10	18.6	7.35		
	15	26.1	4.92	24.8	5.37	24.3	5.57	23.5	5.88	22.1	6.44	21.1	6.79						
	17	27.4	5.02	26.1	5.47	25.5	5.68	24.6	5.98	23.2	6.54								
	18	27.9	5.05	26.6	5.51	26.0	5.71	25.1	6.01	23.6	6.59								
AQL 25	5	26.2	6.01	25.0	6.63	24.4	6.90	23.5	7.31	22.1	8.00	21.2	8.48	20.1	8.95	19.6	9.30	18.9	9.71
	7	27.8	6.15	26.3	6.77	25.7	7.04	**24.9**	**7.45**	23.4	8.13	22.3	8.61	21.3	9.09	20.7	9.43	20.0	9.77
	9	29.3	6.22	27.8	6.84	27.2	7.11	26.2	7.52	24.6	8.27	23.6	8.75	22.6	9.23	21.8	9.64	21.2	9.91
	11	30.8	6.36	29.3	6.97	28.7	7.25	27.7	7.66	26.0	8.41	24.9	8.89	23.8	9.43	23.0	9.77	22.3	10.05
	13	32.4	6.49	30.8	7.11	30.1	7.38	29.1	7.79	27.3	8.54	26.2	9.02	25.1	9.57	24.3	9.91		
	15	34.1	6.63	32.4	7.25	31.7	7.52	30.6	7.93	28.8	8.68	27.6	9.16						
	17	35.7	6.77	34.0	7.38	33.3	7.66	32.2	8.07	30.2	8.82								
	18	36.4	6.81	34.7	7.43	33.9	7.70	32.8	8.11	30.8	8.89								
AQL 30	5	32.5	8.10	31.0	8.93	30.2	9.29	29.2	9.85	27.4	10.77	26.2	11.41	25.0	12.05	24.2	12.51	23.4	13.07
	7	34.4	8.28	32.6	9.11	31.9	9.48	**30.9**	**10.03**	29.0	10.95	27.7	11.59	26.5	12.24	25.6	12.70	24.8	13.16
	9	36.3	8.37	34.4	9.20	33.7	9.57	32.5	10.12	30.5	11.13	29.3	11.78	28.0	12.42	27.1	12.98	26.2	13.34
	11	38.2	8.56	36.3	9.39	35.6	9.75	34.3	10.31	32.2	11.32	30.9	11.96	29.5	12.70	28.6	13.16	27.7	13.53
	13	40.2	8.74	38.2	9.57	37.4	9.94	36.1	10.49	33.9	11.50	32.5	12.15	31.2	12.88	30.1	13.34		
	15	42.3	8.93	40.2	9.75	39.3	10.12	38.0	10.67	35.7	11.69	34.2	12.33						
	17	44.3	9.11	42.2	9.94	41.3	10.31	39.9	10.86	37.5	11.87								
	18	45.2	9.17	43.0	10.00	42.0	10.37	40.7	10.92	38.2	11.96								
AQL 35	5	37.8	9.01	36.0	9.93	35.2	10.34	33.9	10.95	31.9	11.98	30.5	12.69	29.1	13.41	28.2	13.92	27.2	14.54
	7	40.0	9.21	38.0	10.14	37.1	10.54	**35.9**	**11.16**	33.7	12.18	32.2	12.90	30.8	13.62	29.8	14.13	28.8	14.64
	9	42.2	9.32	40.0	10.24	39.2	10.65	37.8	11.26	35.5	12.39	34.1	13.10	32.6	13.82	31.5	14.44	30.5	14.84
	11	44.4	9.52	42.2	10.44	41.4	10.85	39.9	11.47	37.5	12.59	35.9	13.31	34.3	14.13	33.2	14.64	32.2	15.05
	13	46.7	9.73	44.4	10.65	43.5	11.06	42.0	11.67	39.4	12.80	37.8	13.51	36.3	14.33	35.0	14.84		
	15	49.2	9.93	46.7	10.85	45.7	11.26	44.2	11.88	41.5	13.00	39.8	13.72						
	17	51.5	10.14	49.1	11.06	48.0	11.47	46.4	12.08	43.6	13.21								
	18	52.5	10.20	50.0	11.12	48.9	11.53	47.3	12.15	44.4	13.31								

* Compressors only.
LWT : Leaving water temperature.

Performance Data - AQH R410A

Cooling mode

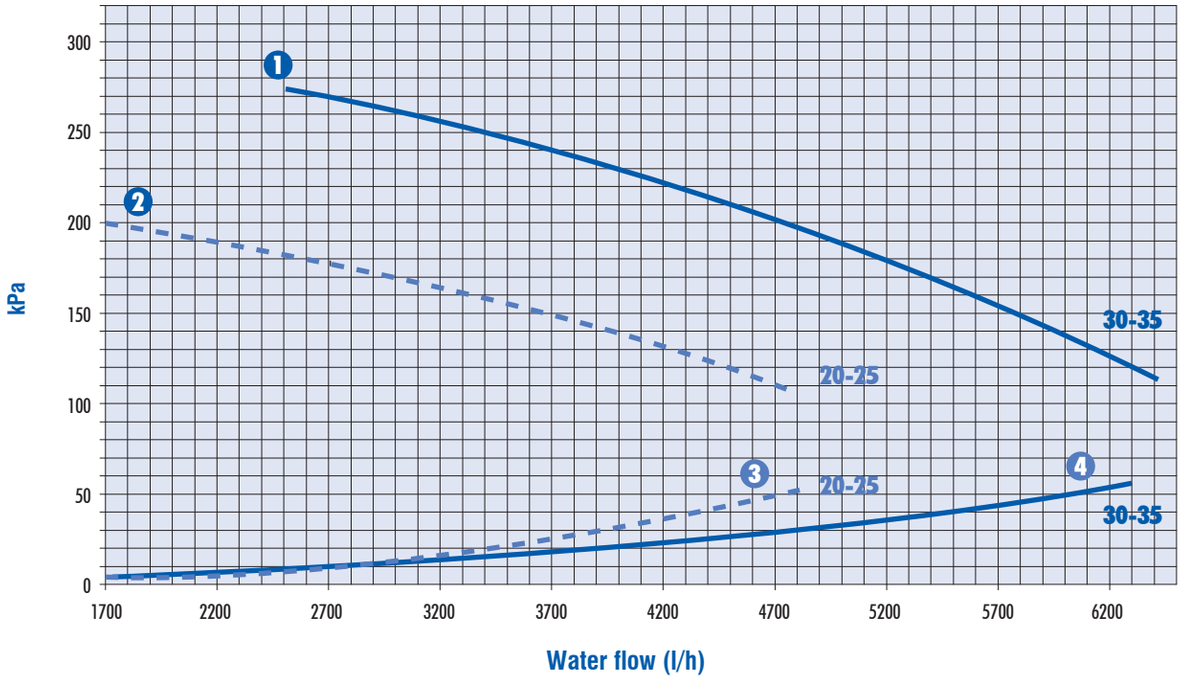
AQH sizes	LWT (°C)	Ambient air temperature (°C)																	
		25		30		32		35		40		43		46		48		50	
		Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)	Cool. cap. (kW)	Input power* (kW)
AQH 20	5	18.7	4.70	17.8	5.18	17.4	5.40	16.8	5.72	15.8	6.25	15.1	6.63	14.4	7.00	14.0	7.27	13.5	7.59
	7	19.8	4.81	18.8	5.29	18.4	5.51	**17.8**	**5.83**	16.7	6.36	16.0	6.73	15.2	7.11	14.7	7.38	14.3	7.64
	9	20.9	4.86	19.8	5.35	19.4	5.56	18.7	5.88	17.6	6.47	16.9	6.84	16.1	7.22	15.6	7.54	15.1	7.75
	11	22.0	4.97	20.9	5.45	20.5	5.67	19.8	5.99	18.6	6.57	17.8	6.95	17.0	7.38	16.4	7.64	16.0	7.86
	13	23.2	5.08	22.0	5.56	21.5	5.77	20.8	6.09	19.5	6.68	18.7	7.06	18.0	7.48	17.3	7.75		
	15	24.4	5.18	23.2	5.67	22.6	5.88	21.9	6.20	20.6	6.79	19.7	7.16						
	17	25.5	5.29	24.3	5.77	23.8	5.99	23.0	6.31	21.6	6.90								
	18	26.0	5.33	24.8	5.81	24.2	6.02	23.4	6.34	22.0	6.95								
AQH 25	5	24.5	6.21	23.3	6.84	22.7	7.12	21.9	7.55	20.6	8.25	19.7	8.74	18.8	9.24	18.2	9.59	17.6	10.01
	7	25.9	6.35	24.5	6.98	24.0	7.26	**23.2**	**7.69**	21.8	8.39	20.8	8.89	19.9	9.38	19.2	9.73	18.6	10.08
	9	27.3	6.42	25.9	7.05	25.3	7.33	24.5	7.76	23.0	8.53	22.0	9.03	21.1	9.52	20.4	9.94	19.7	10.22
	11	28.7	6.56	27.3	7.19	26.7	7.47	25.8	7.90	24.2	8.67	23.2	9.17	22.2	9.73	21.5	10.08	20.8	10.37
	13	30.2	6.70	28.7	7.33	28.1	7.62	27.1	8.04	25.5	8.81	24.5	9.31	23.4	9.87	22.6	10.22		
	15	31.8	6.84	30.2	7.47	29.5	7.76	28.6	8.18	26.8	8.96	25.7	9.45						
	17	33.3	6.98	31.7	7.62	31.0	7.90	30.0	8.32	28.2	9.10								
	18	34.0	7.03	32.3	7.66	31.6	7.94	30.6	8.37	28.7	9.17								
AQH 30	5	30.3	8.24	28.9	9.08	28.2	9.45	27.2	10.02	25.5	10.95	24.5	11.61	23.3	12.26	22.6	12.73	21.8	13.29
	7	32.1	8.42	30.4	9.27	29.7	9.64	**28.8**	**10.20**	27.0	11.14	25.8	11.79	24.7	12.45	23.9	12.92	23.1	13.39
	9	33.9	8.52	32.1	9.36	31.4	9.74	30.3	10.30	28.5	11.33	27.3	11.98	26.1	12.64	25.2	13.20	24.5	13.57
	11	35.6	8.71	33.9	9.55	33.2	9.92	32.0	10.48	30.0	11.51	28.8	12.17	27.5	12.92	26.6	13.39	25.8	13.76
	13	37.5	8.89	35.6	9.74	34.8	10.11	33.7	10.67	31.6	11.70	30.3	12.36	29.1	13.11	28.1	13.57		
	15	39.4	9.08	37.5	9.92	36.6	10.30	35.4	10.86	33.3	11.89	31.9	12.54						
	17	41.3	9.27	39.3	10.11	38.5	10.48	37.2	11.05	34.9	12.08								
	18	42.1	9.33	40.1	10.17	39.2	10.55	37.9	11.11	35.6	12.17								
AQH 35	5	35.3	9.31	33.6	10.26	32.8	10.68	31.7	11.31	29.7	12.37	28.5	13.11	27.1	13.85	26.3	14.38	25.4	15.02
	7	37.4	9.52	35.4	10.47	34.6	10.89	**33.5**	**11.53**	31.4	12.58	30.1	13.32	28.7	14.06	27.8	14.59	26.9	15.12
	9	39.4	9.62	37.4	10.57	36.6	11.00	35.3	11.63	33.1	12.80	31.8	13.54	30.4	14.28	29.4	14.91	28.5	15.33
	11	41.5	9.83	39.4	10.79	38.6	11.21	37.2	11.84	35.0	13.01	33.5	13.75	32.0	14.59	31.0	15.12	30.1	15.54
	13	43.6	10.05	41.5	11.00	40.5	11.42	39.2	12.05	36.8	13.22	35.3	13.96	33.8	14.80	32.7	15.33		
	15	45.9	10.26	43.6	11.21	42.6	11.63	41.2	12.27	38.7	13.43	37.1	14.17						
	17	48.1	10.47	45.8	11.42	44.8	11.84	43.3	12.48	40.7	13.64								
	18	49.0	10.54	46.7	11.49	45.6	11.91	44.1	12.55	41.4	13.75								

Heating mode

AQH sizes	LWT (°C)	Ambient air temperature (°C)													
		-5		-3		0		5		7		10		15	
		Heating cap. (kW)	Input power* (kW)	Heating cap. (kW)	Input power* (kW)	Heating cap. (kW)	Input power* (kW)	Heating cap. (kW)	Input power* (kW)	Heating cap. (kW)	Input power* (kW)	Heating cap. (kW)	Input power* (kW)	Heating cap. (kW)	Input power* (kW)
AQH 20	30	12.7	3.35	13.5	3.35	14.7	3.40	16.8	3.40	17.7	3.40	19.3	3.44	22.3	3.44
	35	12.7	3.76	13.4	3.76	14.5	3.76	16.6	3.76	17.5	3.80	19.0	3.80	21.8	3.85
	40	12.6	4.16	13.3	4.16	14.4	4.20	16.4	4.20	17.2	4.20	18.6	4.25	21.4	4.25
	45					14.3	4.70	16.1	4.70	**17.0**	**4.70**	18.3	4.70	20.9	4.74
	50							15.9	5.28	16.7	5.28	18.0	5.28	20.4	5.28
AQH 25	30	17.7	5.10	18.7	5.10	20.4	5.17	23.3	5.17	24.6	5.17	26.8	5.23	30.9	5.23
	35	17.6	5.71	18.6	5.71	20.2	5.71	23.0	5.71	24.3	5.78	26.4	5.78	30.3	5.85
	40	17.5	6.32	18.4	6.32	20.0	6.39	22.7	6.39	23.9	6.39	25.9	6.46	29.6	6.46
	45					19.8	7.14	22.4	7.14	**23.6**	**7.14**	25.5	7.14	29.0	7.21
	50							22.1	8.02	23.2	8.02	25.0	8.02	28.4	8.02
AQH 30	30	21.7	6.37	23.0	6.37	25.1	6.45	28.7	6.45	30.3	6.45	32.9	6.54	38.0	6.54
	35	21.6	7.13	22.8	7.13	24.8	7.13	28.3	7.13	29.9	7.21	32.4	7.21	37.2	7.30
	40	21.5	7.89	22.7	7.89	24.6	7.98	28.0	7.98	29.4	7.98	31.8	8.06	36.4	8.06
	45					24.4	8.91	27.5	8.91	**29.0**	**8.91**	31.3	8.91	35.7	9.00
	50							27.2	10.01	28.5	10.01	30.7	10.01	34.9	10.01
AQH 35	30	24.8	7.44	26.3	7.44	28.6	7.54	32.7	7.54	34.6	7.54	37.6	7.64	43.4	7.64
	35	24.7	8.33	26.1	8.33	28.3	8.33	32.3	8.33	34.1	8.43	37.0	8.43	42.5	8.53
	40	24.5	9.23	25.9	9.23	28.0	9.33	32.0	9.33	33.6	9.33	36.4	9.42	41.6	9.42
	45					27.9	10.42	31.5	10.42	**33.1**	**10.42**	35.8	10.42	40.8	10.52
	50							31.1	11.71	32.5	11.71	35.1	11.71	39.9	11.71

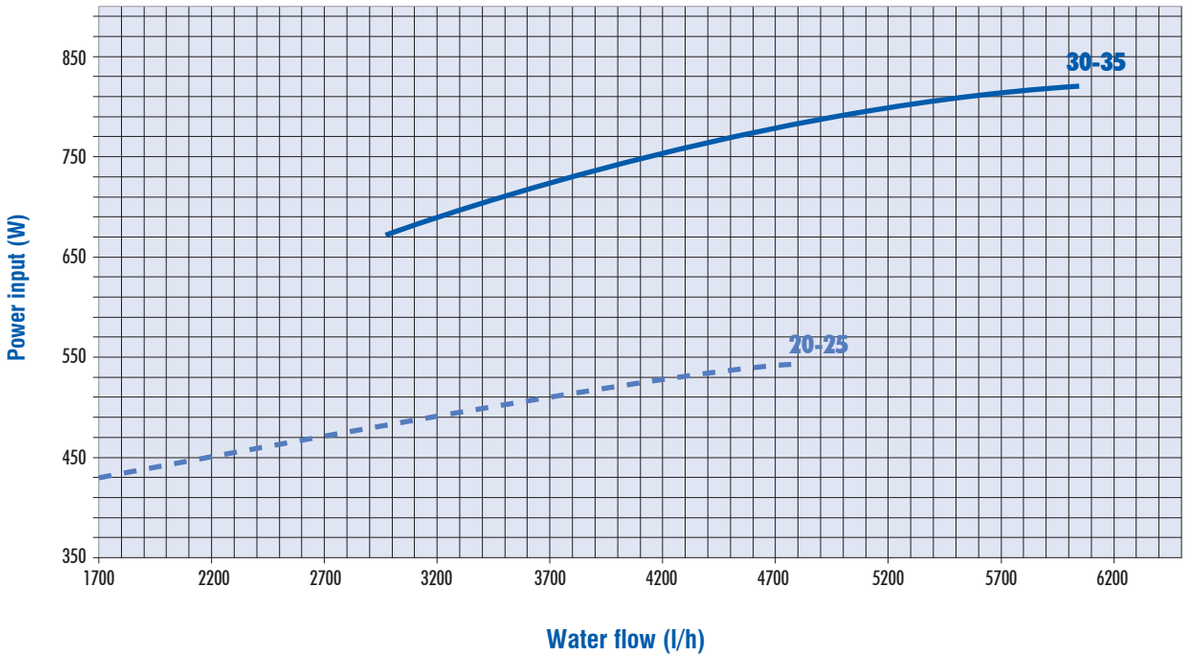
* Compressors only.
LWT : Leaving water temperature.

Pump and Plate Heat Exchanger Curves - AQL/AQH R410A



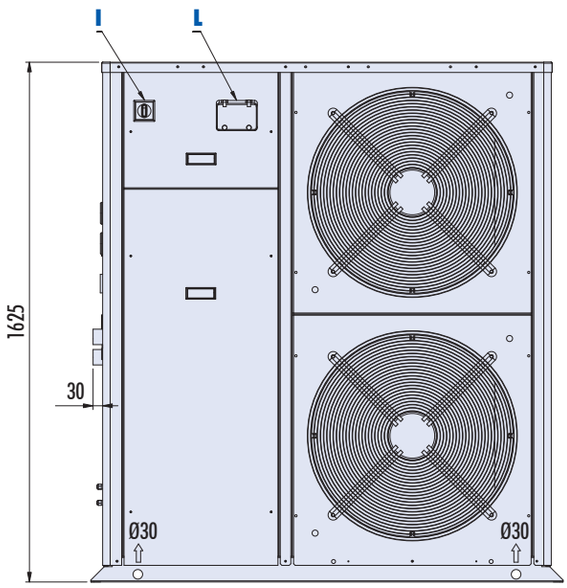
1 and 2 unit external static pressure curves.

3 and 4 plate heat exchanger water pressure drop curves.

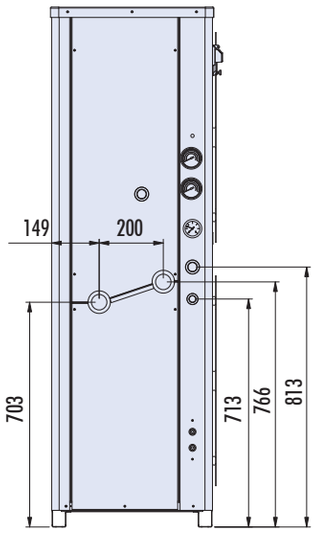


Dimensions - AQL/AQH R410A 20 to 35

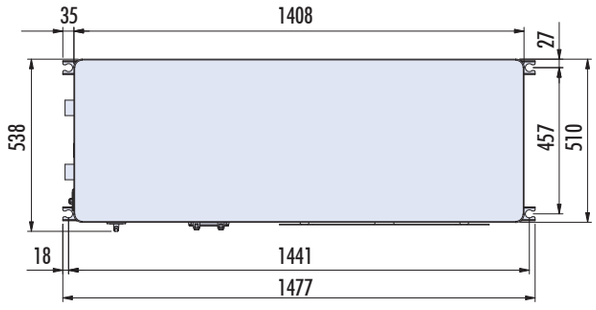
Front view

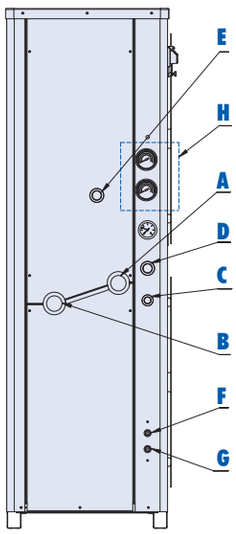


Side view



Top view



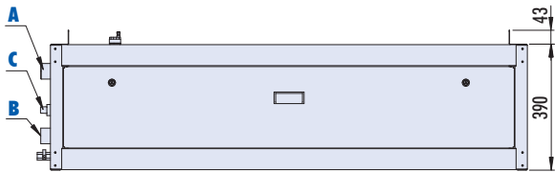


A	Water inlet Ø1 1/2" gas male
B	Water outlet Ø1 1/2" gas male
C	Auxiliary lines
D	Electrical power supply
E	Sight glass inspection
F	High pressure tap
G	Low pressure tap
H	Gauge kit (optional)
I	Main switch
L	Control keypad/display

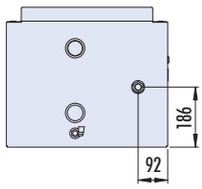
Dimensions in mm.

Dimensions - External Hydrokit for AQL/AQH R410A 20 to 35

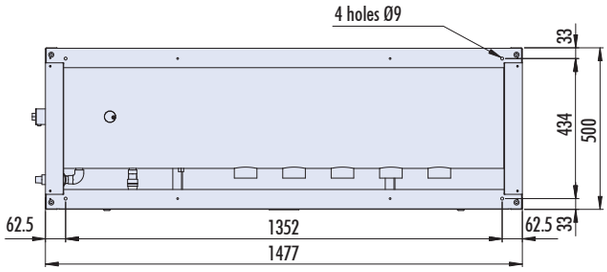
Front view

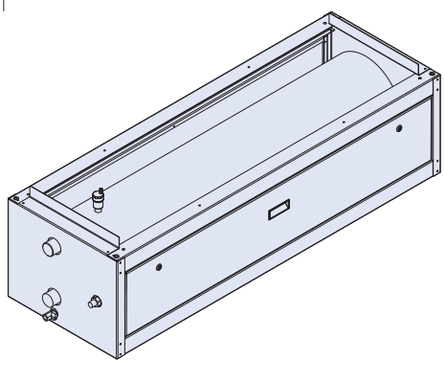


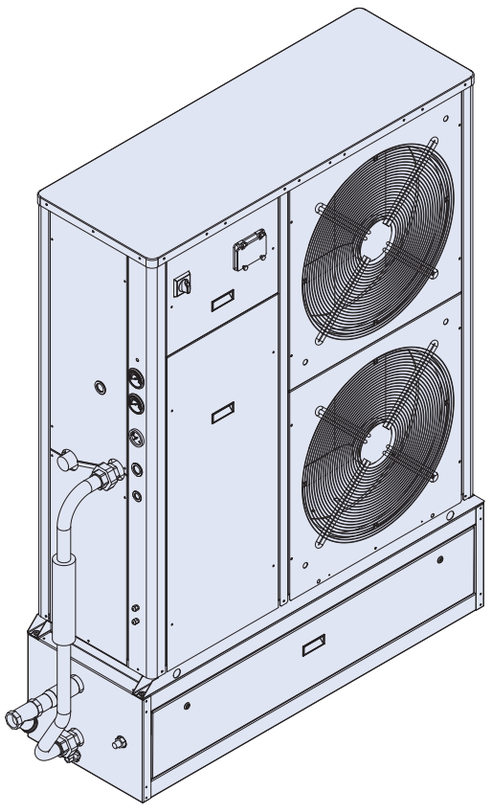
Side view



Top view



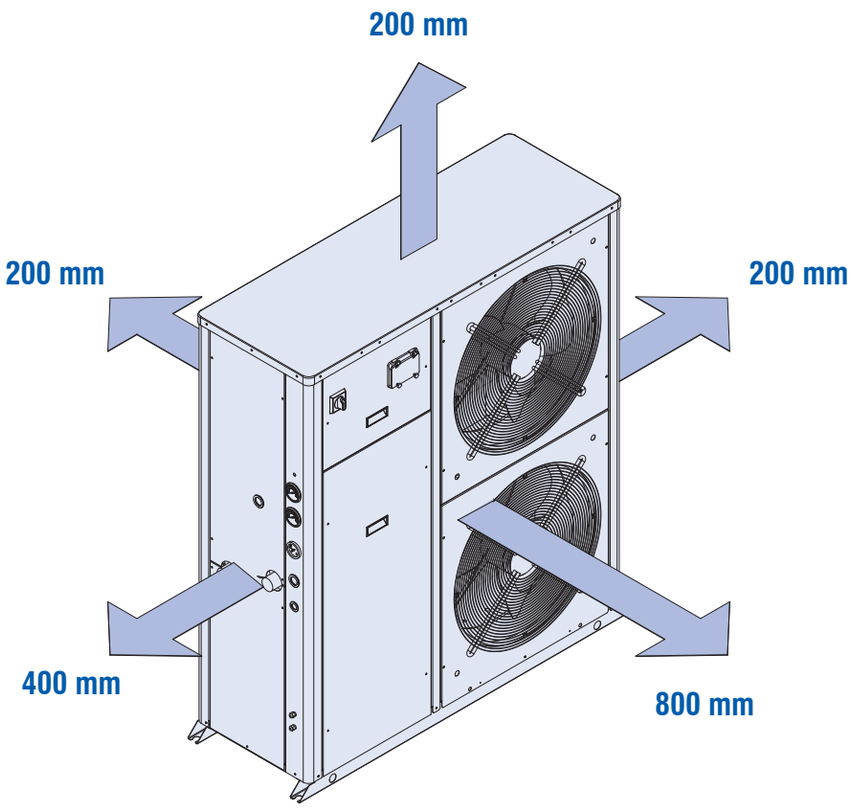




A	Water inlet Ø1 ½" gas male
B	Water outlet Ø1 ½" gas male
C	Tank fill Ø1/2" gas male

Dimensions in mm.

Space requirements - AQL/AQH R410A 20-35



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