Engineering Data Manual

Airwell
by Airwell Group

Aqu@Scop Advance

Air-to-Water DC **Inverter** Packaged Heat Pumps

Models 006, 012 & 016

3.9 to 19.1 kW

410A

DC INVERTER

FRENCH
DESIGN AND
MANUFACTURE

Airwell
Group

AIRWELL
WESPER
ELECTRA
JOHNSON

Strength Points

By introducing the variable speed in our packaged heat pump range, we are in perfect adequacy with the user expectations while preserving the advantages which made the success of our previous models, that is to say : Quality of manufacture, performances, life span, low noise level and control system dedicated to the heating.

Variable speed compressor :

- The capacity delivered is adapted to the demand in accordance with the water law generated by the controller.
- Soft starting without rush of current even on electric networks with reduced voltage.

Air heat exchanger optimized for heating mode :

- Counter flow configuration in heating mode.
- Corrugated fins with hydrophilic coating to delay the appearance of frost.

Electronic expansion valve managed by controller :

- Optimizes the evaporator feeding whatever the capacity.
- Protects the inverter compressor against liquid returns in order to ensure a best lubrication essential to its life span.
- Preserves the COP in de-icing phase.

Packaged unit :

- Sound insulation jacket on compressor.
- A complete hydraulic circuit : multispeed pump, flow switch, expansion tank, safety valve, pressure gauge, filter.
- Main disconnect switch.
- Additional electric heating 4 or 6 kW, standard on new residence application (optional on "R" version).

A great choice of accessories managed by controller :

- Boiler relief ("R" version).
- Wire or wireless (radiofrequency) type room terminal.
- Domestic hot water.
- 2-step additional electric heaters.
- Dual zone system (available during 2011).

Control :

The control sofware developped by our care uses at best the possibilities of the inverter compressor associated with the electronic expansion valve to maintain the leaving water temperature in conformity with the water law calculated by the controller. This water law is corrected permanently by the measurement of the room temperature. Thus, Aqu@Scop ADVANCE ensures optimum comfort at the best cost.

DC INVERTER

Specifications

The new range of **Aqu@Scop ADVANCE** heating only packaged heat pumps covers a wide capacity range comprising between **3.9 and 19.1 kW**, it is available in **3 sizes : ADVANCE 006, 012 and 016**.

The reversible model will be available during 2011.

The units are factory charged, tested and ready to be connected to the heating circuit.

They are available in **2 versions :**

- **ADVANCE :** For new construction. This version is fitted with a 2-step additional electric heater of 6 kW,
- **ADVANCE - R :** For boiler relief.

The technology "DC Sinewave" used for the Inverter compressor allows to adapt perfectly the heating production to the building needs. During more than 90% of the heating time, the compressor is running in part load conditions and allows to achieve high levels of seasonal coefficient of performance (SCOP). This technology saves the electrical consumption and maintains the comfort.

The **AQU@SCOP ADVANCE** can be connected to all type of heat emitters operating at low temperature (35 °C max.) or medium temperature (55 °C max.). The optimal dimensioning of the product according to the new European labels (+2 °C outdoor) guarantees a high level of performances even at low outdoor temperature.

Cabinet and structure

The whole cabinet and structure is made of galvanized steel coated with an oven baked polyester painting in order to increase its resistance to the external conditions. The access to the maintenance panels is facilitated by the use of ¼ turn locking fasteners.

Compressors

All the compressors are of DC Inverter type : rotary (size 006) and scroll compressors (sizes 012 & 016). They are mounted on anti-viration pads and equipped with a sound insulation jacket. The compressor driver ensures a starting without peak of current including on reduced voltage networks (190V min.).

Air heat exchanger

Composed of copper tubes and aluminium fins with hydrophilic coating for a better flowing of condensates.

Fans

The fan motors are protected by an ipsotherm against overheatings. The fan blades have an aerodynamic profile to ensure ventilation and sound performances.

Refrigerant circuit

Factory tested and equipped with bi-flow components (electronic expansion valve and filter-drier) to reduce the number of brazing surfaces (see diagram on the next page).

Hydraulic circuit

Complete hydraulic circuit containing :

- High performance brazed plate heat exchanger,
- 3-speed pump,
- Pressure gauge,
- Safety valve,
- Automatic air vent,
- Water filter (supplied loose),
- Paddle type water flow switch,
- Expansion tank (optional on ADVANCE - R),
- Two-step electric heater (ADVANCE model).

Controller

The controller ensures the management of :

- Compressor in adequacy with the water law,
- Electronic expansion valve by adjusting the superheat over all the operating range of the unit,
- Refrigerant and hydraulic protections and safeties,
- Options and accessories (domestic hot water, boiler relief, additional electric heating, …).

The parameters of the water law are factory predefined but can be adjusted at the time of commissioning.

The controller assures the heating of the domestic hot water by using the compressor or the integrated electric heater in relation to the set point of domestic hot water and outdoor conditions.

Our domestic hot water tank is recommended for this operation :

- Adapted heat exchanger surface,
- Pre-wired electrical box for machine/tank dialog.

The ELITE controller manages without additional box the selection of the most suitable heating mode (heat pump alone or heat pump + boiler) according to the outdoor conditions. The boiler bypass 3-way valve is also controlled by the controller.

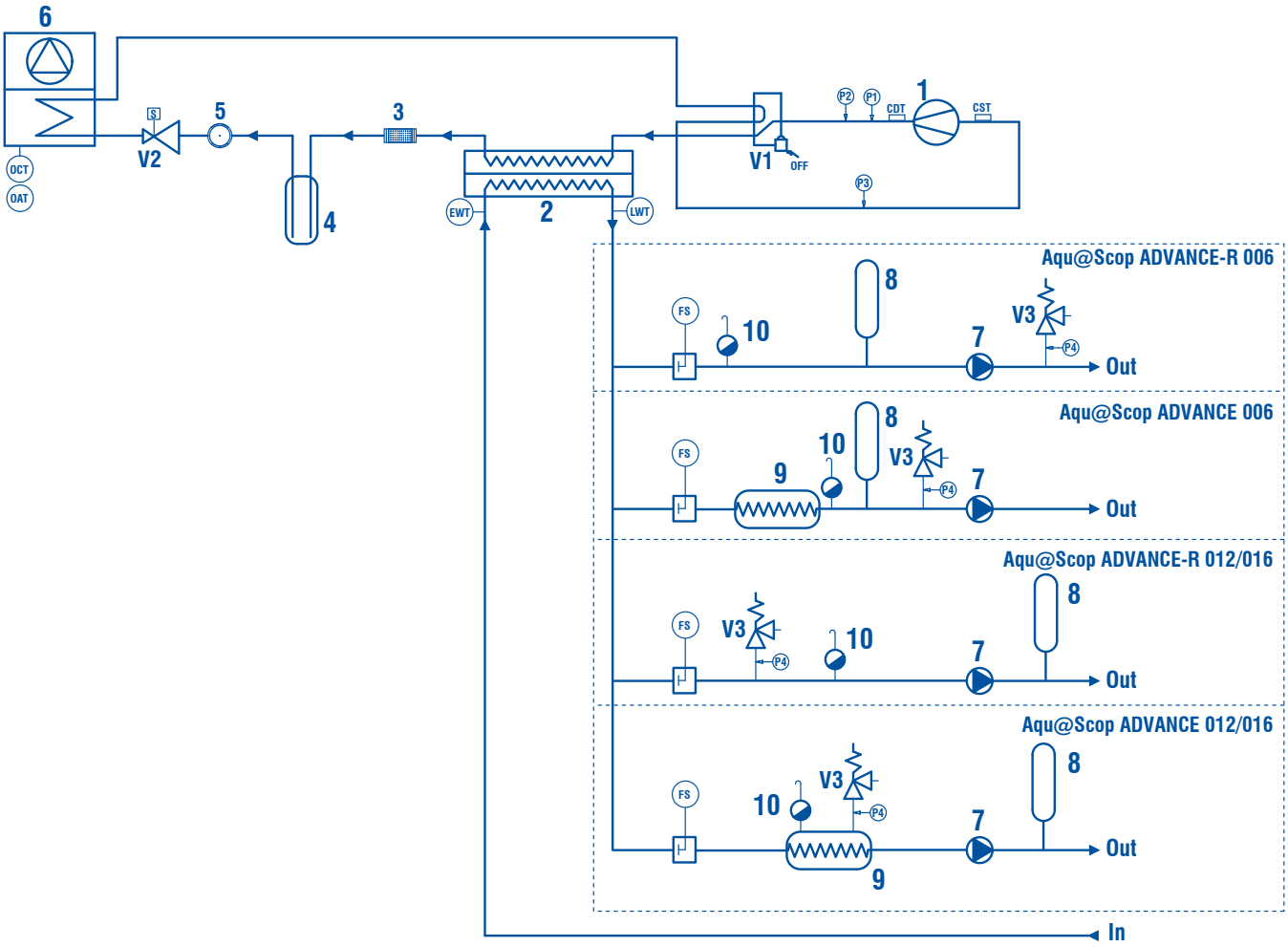
Functions accessible by the room terminal :

- Set point,
- Clock setting (hour and day),
- Occupation/Unoccupation mode,
- Antifreeze mode,
- Absence period,
- Display of fault codes.

Options and accessories

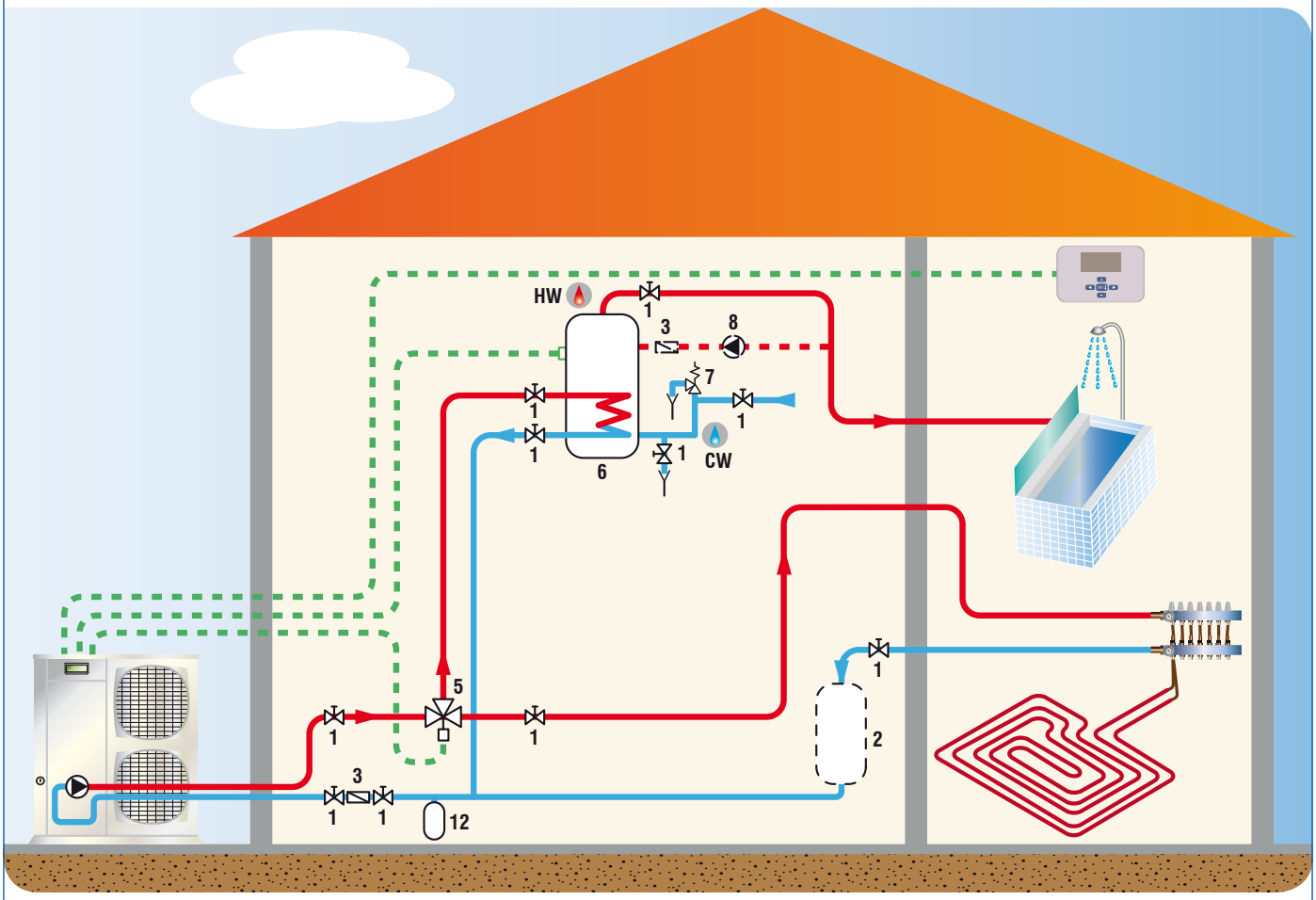
- Wire room terminal,
- Wireless (radiofrequency) room terminal,
- Shutoff valves with pressure tapping,
- Set of hoses (length 1 m),
- Water tank 140 litres,
- Anti-vibration pads,
- Decantation filter,
- Additional electric heating for boiler relief version,
- Domestic hot water tank 300 litres,
- 3-way valve for domestic hot water management.

Water and Refrigerant Circuit Diagram



1	Compressor	P1	High pressure pressostat
2	Plate heat exchanger : counter-current in heating	P2	Defrost high pressure control pressostat
3	Drier filter	P3	Evaporating pressure
4	Liquid receiver	CDT	Discharge thermostat
5	Sight glass	CST	Suction thermostat
6	Finned heat exchanger and fans	OCT	Outdoor coil temperature probe
7	Circulation pump	OAT	Air temperature probe
8	Expansion tank	LWT	Water temperature probe (outlet)
9	Electric heating	EWT	Water temperature probe (inlet)
10	Automatic air vent	FS	Flow detector
V1	Four-way valve	V3	Safety valve (3.5 bar)
V2	Electronic expansion valve	P4	Water pressure gauge

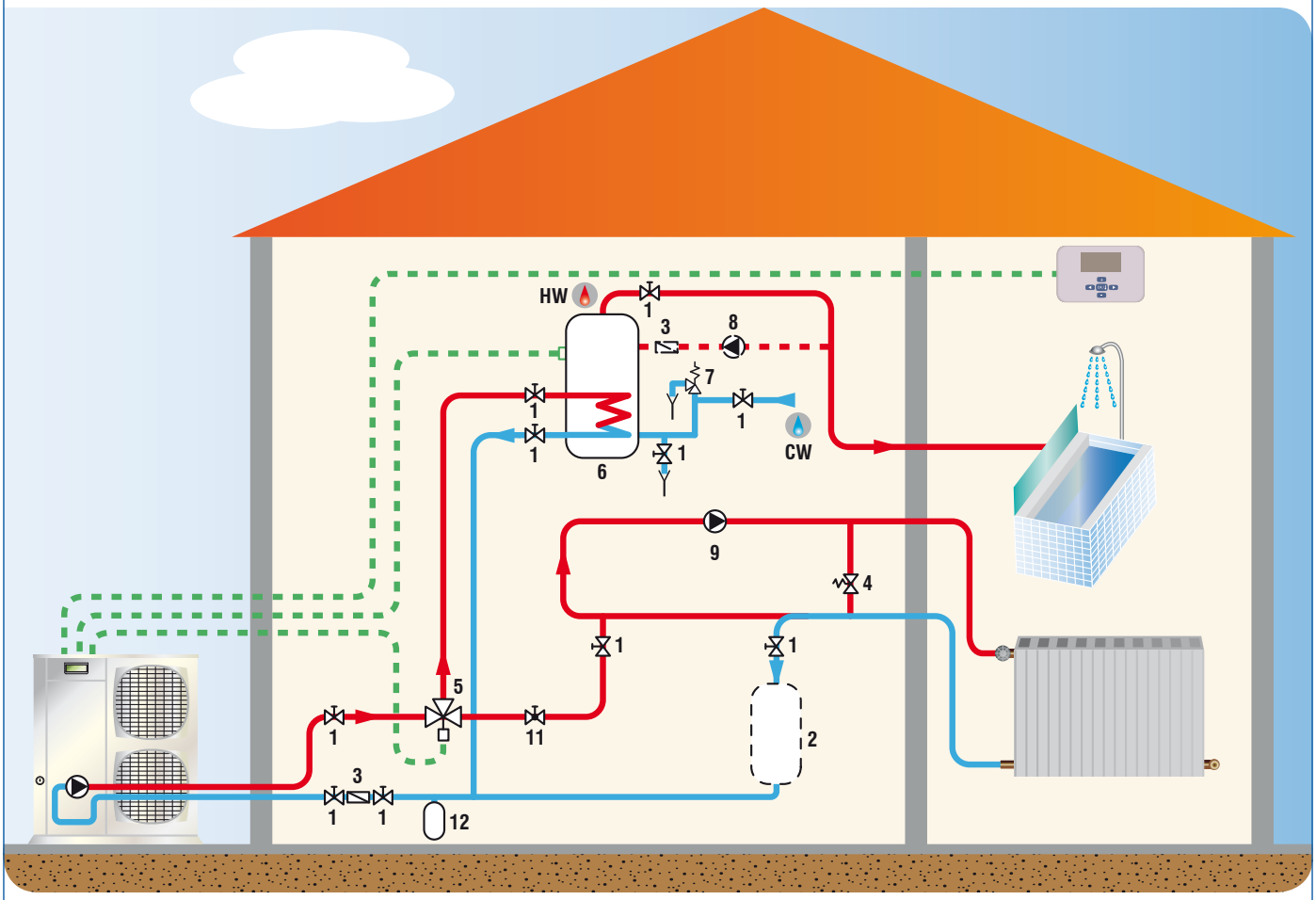
Applications - Heating circuit directly connected to under-floor heating



The pump integrated into the unit ensures the water flow in the installation. None of the adjustment device will interfere with the water flow.

1	Stop valves	7	Safety device
2	Buffer tank (optional)	8	Recycling circulating pump (optional)
3	Filter or sludge trap	12	Additional expansion tank (if required)
5	Domestic hot water 3-way valve		HW : hot water
6	Domestic hot water tank		CW : cold water

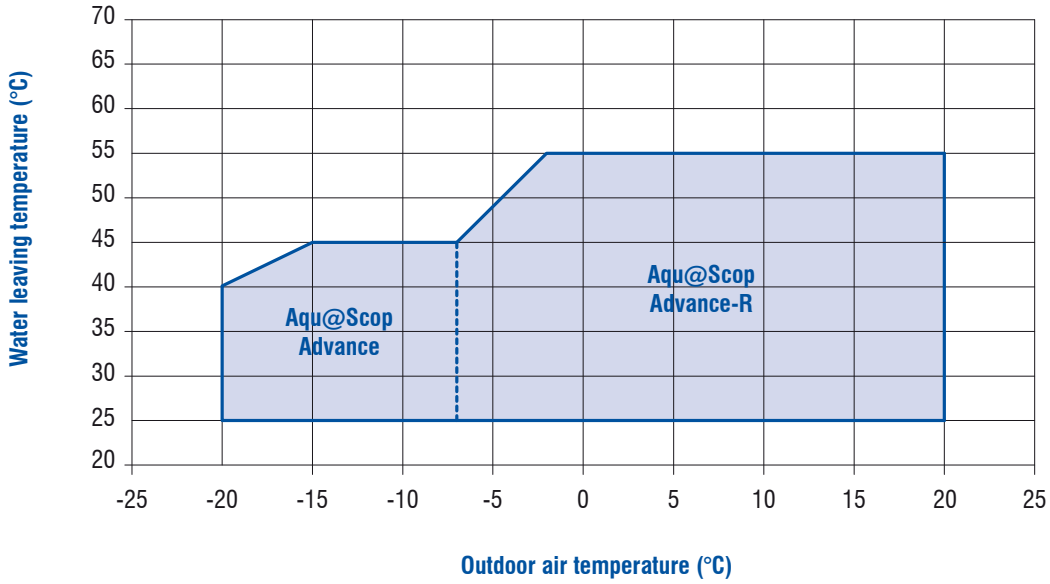
Applications - Heating circuit and heat pump circuit dissociated



The pump integrated into the unit ensures the water flow in the primary loop. The water flow in the heating circuit is secured by a second circulating pump. The adjustment devices have no influence on the heat pump water flow. The buffer volume (2) completes the water volume in circulation.

1	Stop valves	8	Recycling circulating pump (optional)
2	Buffer tank (optional)	9	Circulating pump
3	Filter or sludge trap	11	Flow adjustment valve
4	Load bypass valve	12	Additional expansion tank (if required)
5	Domestic hot water 3-way valve		HW : hot water
6	Domestic hot water tank		CW : cold water
7	Safety device		

Operating Limits in Heating Mode with Full Capacity



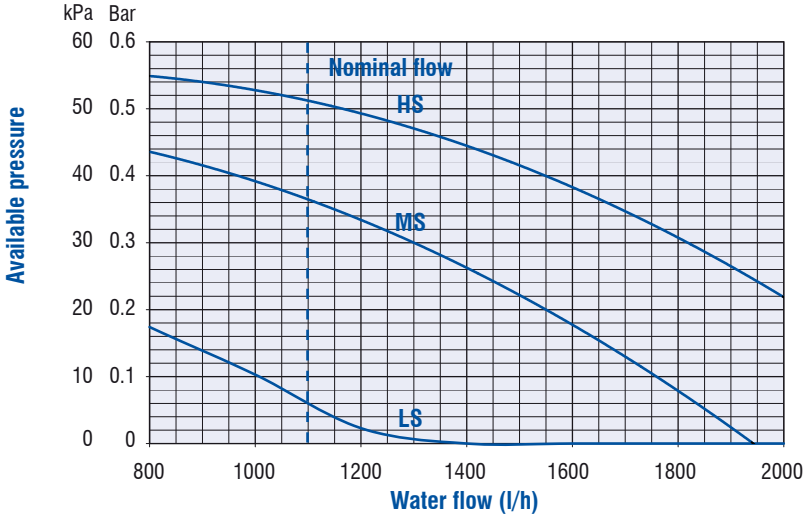
Performance Data

Models		ADVANCE 006	ADVANCE 012	ADVANCE 016
AIR CONDITIONS 7 °C DRY BULB / 6 °C WET BULB - WATER OUT 35 °C				
Heating capacity (mini-nominal *- maxi.)	W	3920 - **6725** - 8800	5680 - **10760** - 12950	7660 - **15470** - 19080
Power input *	W	1605	2670	3720
COP *		4.19	4.03	4.16
AIR CONDITIONS 2 °C DRY BULB / 1 °C WET BULB - WATER OUT 35 °C				
Heating capacity (mini-nominal *- maxi.)	W	2590 - **4960** - 7250	4520 - **8560** - 10870	5660 - **11770** - 14200
Power input *	W	1575	2642	3588
COP *		3.15	3.24	3.28
AIR CONDITIONS -7 °C DRY BULB / -8 °C WET BULB - WATER OUT 35 °C				
Heating capacity (nominal *- maxi.)	W	**3700** - 5600	**6900** - 8860	**9080** - 11160
Power input *	W	1516	2650	3620
COP *		2.44	2.60	2.51
AIR CONDITIONS 7 °C DRY BULB / 6 °C WET BULB - WATER OUT 45 °C				
Heating capacity	W	8718	12430	16873
Power input *	W	2910	4403	5620
COP *		3.00	2.82	3.00
AIR CONDITIONS 2 °C DRY BULB / 1 °C WET BULB - WATER OUT 45 °C				
Heating capacity	W	6612	10334	13411
Power input *	W	2664	4351	5364
COP *		2.48	2.38	2.50
AIR CONDITIONS -7 °C DRY BULB / -8 °C WET BULB - WATER OUT 45 °C				
Heating capacity	W	5364	8101	10115
Power input *	W	2627	4260	5043
COP *		2.04	1.90	2.01
HYDRAULIC CIRCUIT				
Refrigerant type	l/h	1100	1850	2600
Refrigerant charge		Plates		
Compressor	gas	1"F	1"F	1"F
Expansion valve	litres	3	5	5
REFRIGERANT CIRCUIT				
Refrigerant type		R410A		
Refrigerant charge	kg	2.0	2.9	3.6
Compressor		INVERTER ROTARY	INVERTER SCROLL	INVERTER SCROLL
Expansion valve		Electronic		
ELECTRICAL CONNECTIONS				
Supply voltage		230V / 1P / 50 Hz		
Fuse	A	40 / 25 (-R)	63 / 32 (-R)	63 / 32 (-R)
Electric heater (optional)	kW	4 (2+2)	6 (2+4)	6 (2+4)
SOUND DATA				
Sound power levels	dBA	63.5	65	65.5
DIMENSIONS AND WEIGHT				
Length	mm	1232	1232	1232
Depth	mm	401	401	401
Height	mm	905	1307	1307
Weight	kg	125	175	185

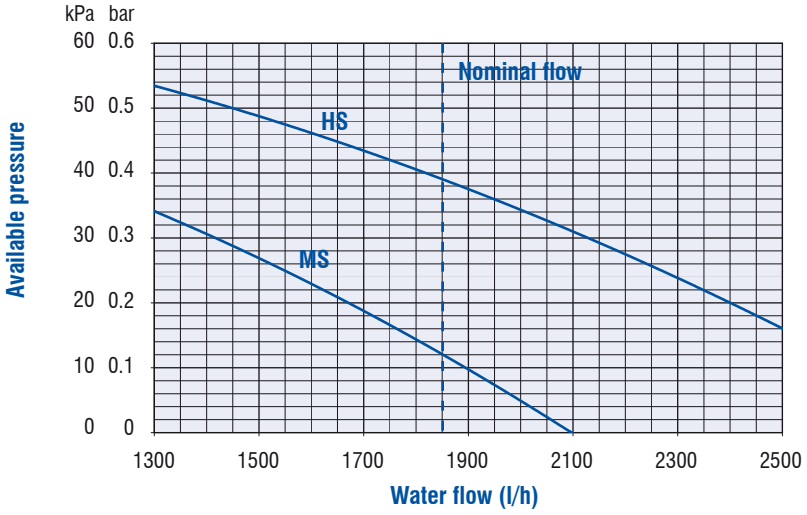
* According to EN 14511

Heat Pump Available Pressure / Water Flow Curves

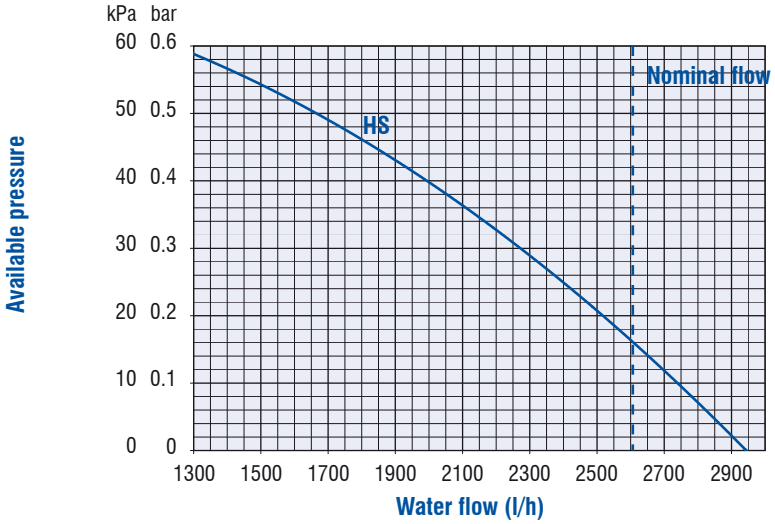
Aqu@Scop Advance 006



Aqu@Scop Advance 012



Aqu@Scop Advance 016 *

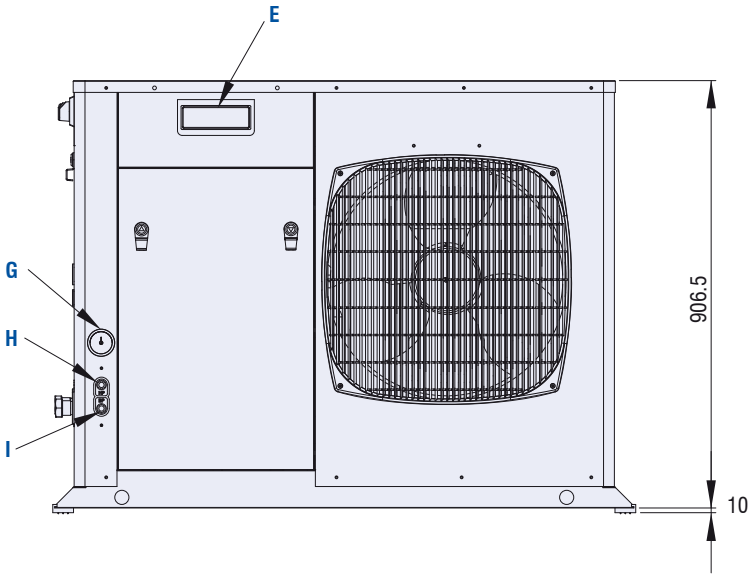


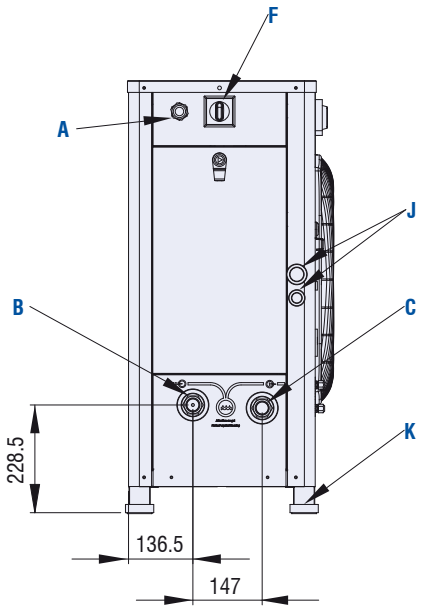
* This drawing is not applicable if heating water circuit pressure drop is higher than 20 kPa

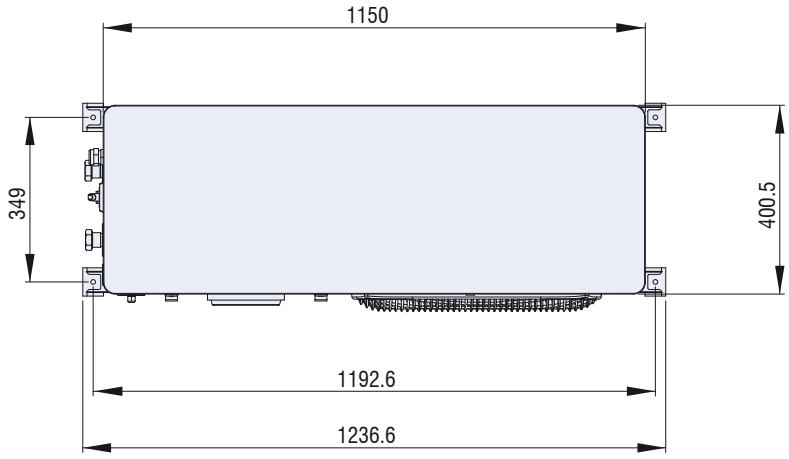
Pump absorbed power

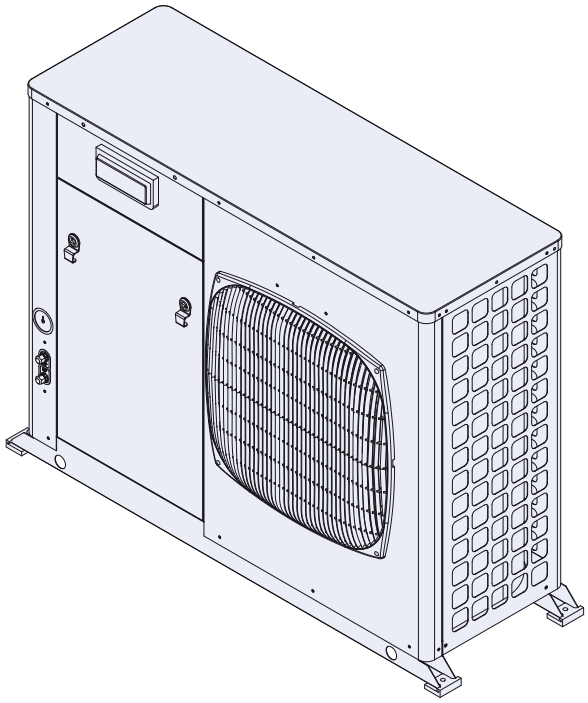
Models		ADVANCE 006	ADVANCE 012	ADVANCE 016
Absorbed power	W	110	120	150

Dimensions - Aqu@Scop Advance 006



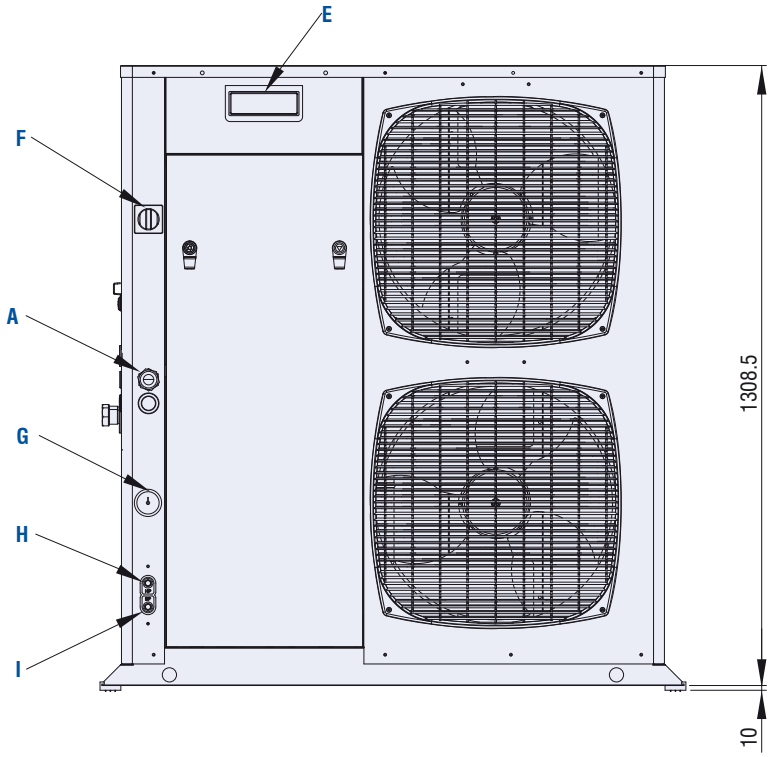


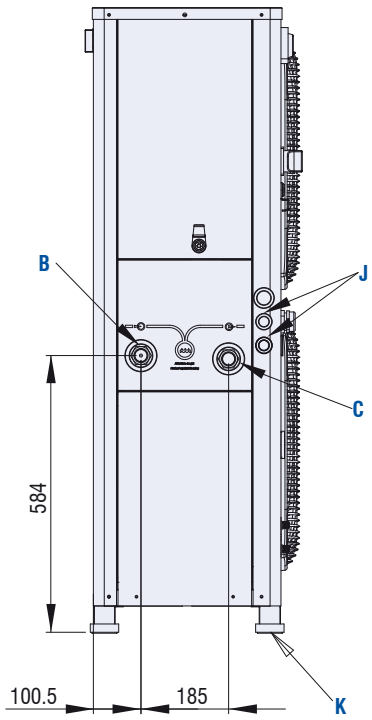


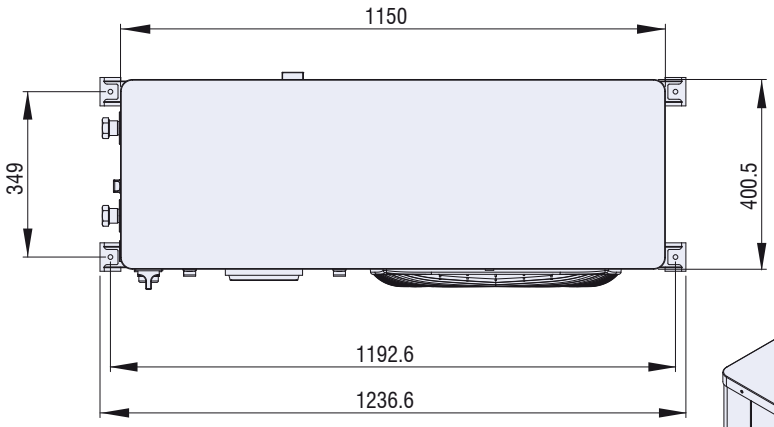


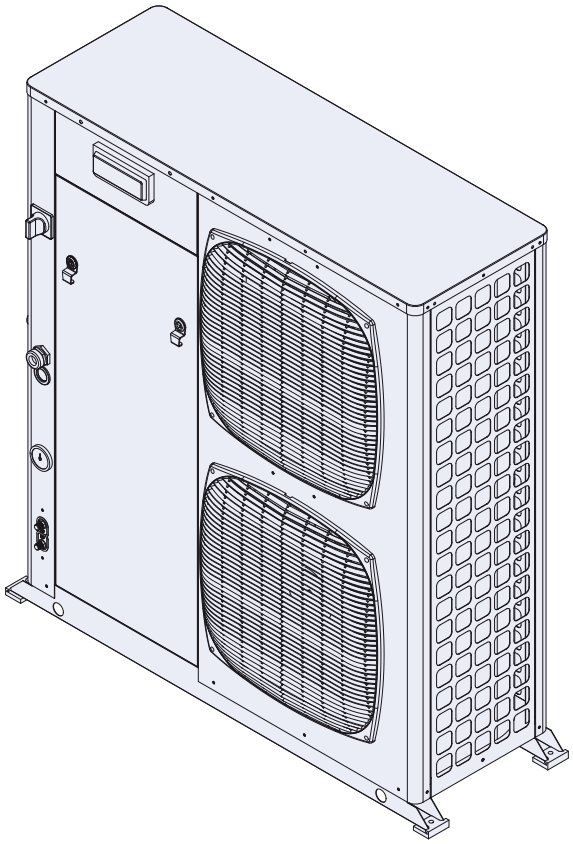
A	Power supply
B	Water in 1" gas female
C	Water out 1" gas female
E	Display
F	Main disconnect switch
G	Water pressure gauge
H	High pressure tap
I	Low pressure tap
J	Remote control
K	Anti-vibration pads

Dimensions - Aqu@Scop Advance 012 & 016









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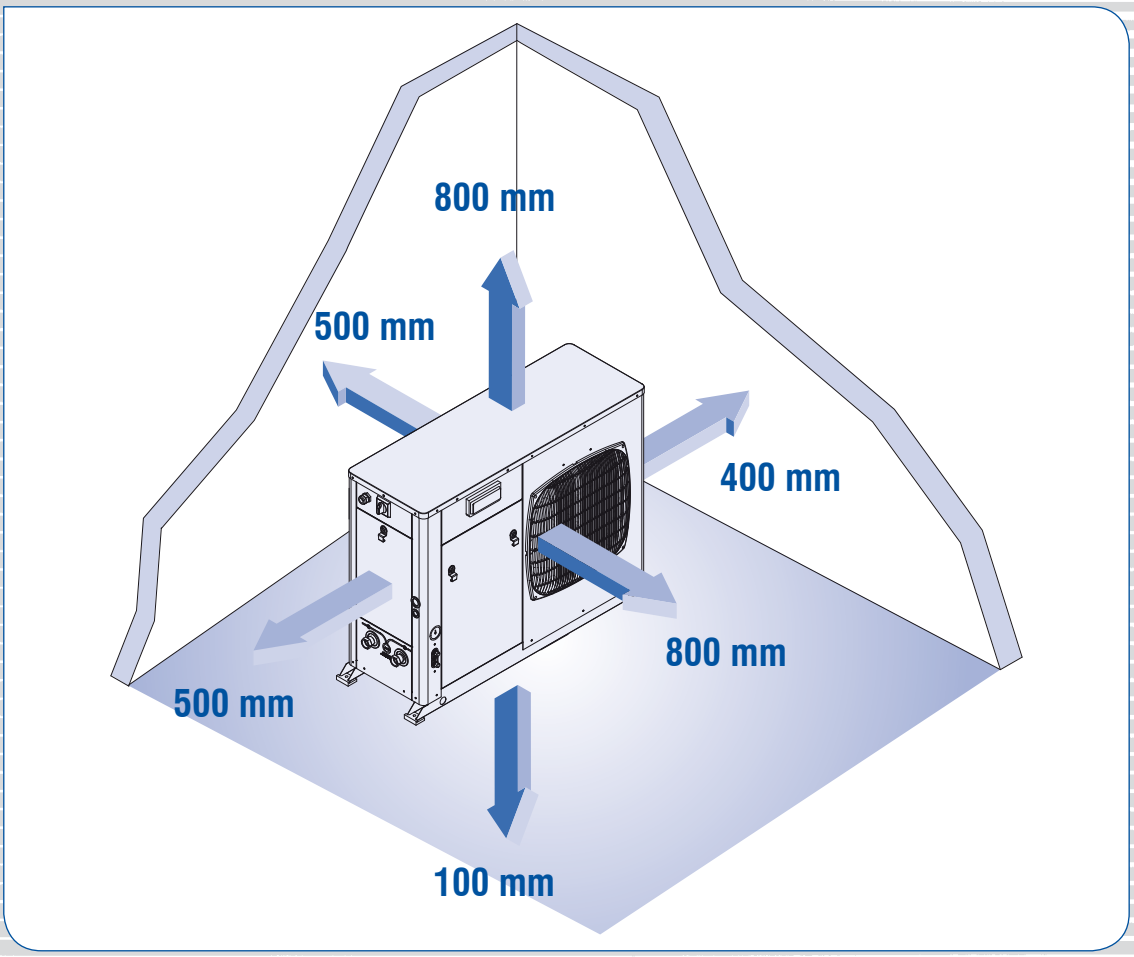
Minimum Clearances - Aqu@Scop Advance



Ref. : **EDM AQHAM-A.3GB/07.12** - Supersedes : EDM AQHAM-A.2GB/11.10

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