



## Aqu@Scop Advance Split

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

Models 005, 008, 012 & 014



2 to 16 kW



**DC INVERTER**



AIRWELL  
WESPER  
ELECTRA  
JOHNSON

## Strength Points

- Most efficient heating technology with variable speed compressor.
- Gaining of sustainable renewable thermal energy from ambient outdoor air.
- Use of **DC Inverter technology** in both compressor and outdoor fan motor to **adapt the unit capacity** to the building heat demand.
- **Energy saving** : By avoiding compressor start-up and shutdown phases, DC Inverter enables unit to run continuously while modulating the compressor output in relation to the set temperature on part load.
- **Silent running** : Most of the time, unit is running at reduced speed.
- **Quick reach of set temperature** : DC Inverter starts with maximum speed to reach set temperature as quick as possible. Once the temperature setpoint is reached, the inverter will reduce and adapt speed according to the capacity needed only.
- Variable capacity : from 30 to 110% of nominal capacity.
- Great accuracy in maintaining the desired water temperature setpoint.
- Unit optimized in heating mode for radiator, fan coil and floor applications.
- High feed water temperature for domestic hot water (DHW).
- High efficiency COP values (unit designed and developed to meet Ecodesign Lot 1 and Ecolabel requirements) :
  - Air : 2 °C / Water : 35 °C, COP > 3.1
  - Air : 7 °C / Water : 35 °C, COP > 4.1
- High performance at partial load; high SCOP and SEER values measured according to new standard prEN14825 and EN14511.
- Bi-flow electronic expansion valve ensures **optimized filling of refrigerant** in evaporator.
- Outdoor coil with **blue fins (hydrophilic coated fins)**, facilitating the flow of condensates and providing corrosion protection to maintain performance levels and increase the life time.
- Wide operating limits :
  - Min. outdoor ambient temperature of -15 °C
  - Max. leaving water temperature of 55 °C

● Outdoor unit (ODU 1) - ADVANCE SPLIT 005



● Outdoor unit (ODU 2) - ADVANCE SPLIT 008



● Outdoor units (ODU 3 & 4) - ADVANCE SPLIT 012 & 014



● Indoor units (IDU 1 & 2) - ADVANCE SPLIT 005 TO 014



# Specifications

## General

The new family **Aqu@Scop ADVANCE SPLIT R410A** covers a capacity range from **2 to 16 kW**, developed in **4 different sizes**.

This system is composed by an outdoor unit connected, through refrigerant pipes, to an indoor hydronic module that can be fitted in an hydraulic circuit to cover space heating and domestic hot water requirement of the building.

To satisfy different application, hydronic module has been developed in **2 versions** :

- First one is an **heating/cooling version** with auxiliary back-up electrical heater for "stand alone" application;
- Second one is an **heating only version** (without electrical heater) that can be fitted in an existing heating system with a 2nd heat generator (for example a fossil fuel boiler), to form a hybrid system.

The outdoor unit uses the inverter technology "**DC sinewave**" that permits to achieve a continuous variable capacity depending on building load, an important advantage considering that heat pumps run 95% of the time in part load conditions. This implements a higher seasonal efficiency SCOP, reduced CO<sub>2</sub> emission and lower yearly operating cost with a higher comfort.

The outdoor unit has been optimized for heating application, in order to reach high COP level higher than Ecolabel requirements for radiator, fan coil and floor heating applications.

The feed water temperature of the heat pump to the system can be chosen between 35 °C (LT), 45 °C and 55 °C (MT). Defrost algorithm optimization and blue fin coil on whole range are other 2 key factors that permits very high performances also at lower outdoor ambient temperature, down to -15 °C. The system is optimized for average climate at +2 °C ambient.





- The outdoor unit is available in **4 sizes** (capacity at nominal point A7W35) :

**ODU 1** (5.3 kW), **ODU 2** (8.1 kW), **ODU 3** (12 kW), **ODU 4** (14.5 kW).

- The indoor unit is available in **2 sizes** :

**IDU 1** (5.3 to 8.1 kW), **IDU 2** (12 to 14.5 kW).

Depending on matching indoor and outdoor units, the following system combinations are possible :

	IDU 1	IDU 2	IDU 1	IDU 2
				
ODU 1	●		●	
ODU 2	●		●	
ODU 3		●		●
ODU 4		●		●

## Outdoor unit

### Cabinet and structure :

The unit cabinet and structure are made of galvanized steel elements assembled through tropicalized steel screws.

All the galvanized steel parts are protected by polyester enamel, which makes the unit corrosion-proof and weatherproof.

### Compressor :

Compressor is DC Inverter rotary (size 005), twin rotary (size 008) and scroll (sizes 012 & 014) type equipped with internal motor protection.

Compressor is mounted on rubber vibration isolators and packed into sound insulation jacket, in order to eliminate vibration transmissions and noise.

Motor is of direct start type, cooled by suction gas.

### Air/Refrigerant heat exchanger :

Coil is made of copper tubes arranged in staggered rows and mechanically expanded into aluminium finned pack composed of blue fins.

### Fans :

Fans are direct coupling propeller type, equipped with plastic aerodynamic blades to ensure better balance, enhance exchange process and generate very low sound level, Lw (power) < 64 dBA.

Each fan is provided with a plastic safety guard.

Motors are DC Inverter type equipped with thermal protection.

A fan speed controller is provided to allow the unit to operate with ambient temperature from -15 to +45 °C.

### Refrigerant circuit :

Each unit is supplied with an electronic expansion valve (EEV) and reversing valve as well as other refrigerant components as shown in the functional diagrams (see section "Refrigerant flow diagrams").

The outdoor unit is burst-pressure safe and is in conformity with CE standard EN 378.

The unit is equipped with advanced driver and EEV software to eliminate inefficient superheat on the outdoor coil, to better control the variable refrigerant flow at full and part load conditions, and to increase the gain of free heat from the ambient.

The unit is shipped with full refrigerant charge to eliminate refrigerant charging on site.

The refrigerant charge is lower than 3 kg to satisfy the European F-Gas regulation.

## Specifications (continued)

### Indoor unit

Hydraulic connections are located at bottom side.

Cables leave the unit at the top.

Main components in the hydraulic module are :

- Water pump (3 speed),
- Brazed plate heat exchanger,
- 3-way valve for heating/DHW operation,
- Water expansion vessel,
- Control,
- Freeze protection,
- Electrical heater on "cooling/heating" version,
- Water pressure gauge,
- Water safety valve,
- Air vent valve.

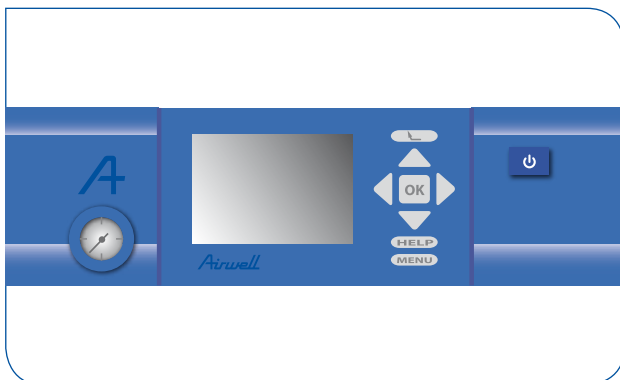
### Control features

The management system control board is fitted inside indoor unit and communicate (via bus connection) with outdoor unit through gateway.

This system control can manage following feature :

- PID control on leaving water temperature,
- Manage priority between domestic hot water and heating system need driving a 3 way water valve included into the IDU,
- Advanced user interface display,
- Manage diagnostic and logging for both IDU and ODU units,
- Hybrid configuration possible.

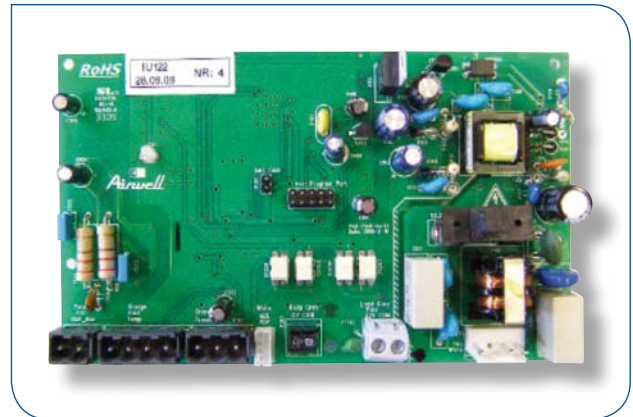
### Control panel - User interface



### Communication between indoor and outdoor units

The communication between indoor unit and outdoor unit is managed by the **AVI-board**, which is integrated in the indoor unit. On the AVI-board are connected two temperature sensors, suction gas and water, and one refrigerant pressure sensor.

The AVI board is a gateway which permits the communication between the intelligence of IDU and ODU.

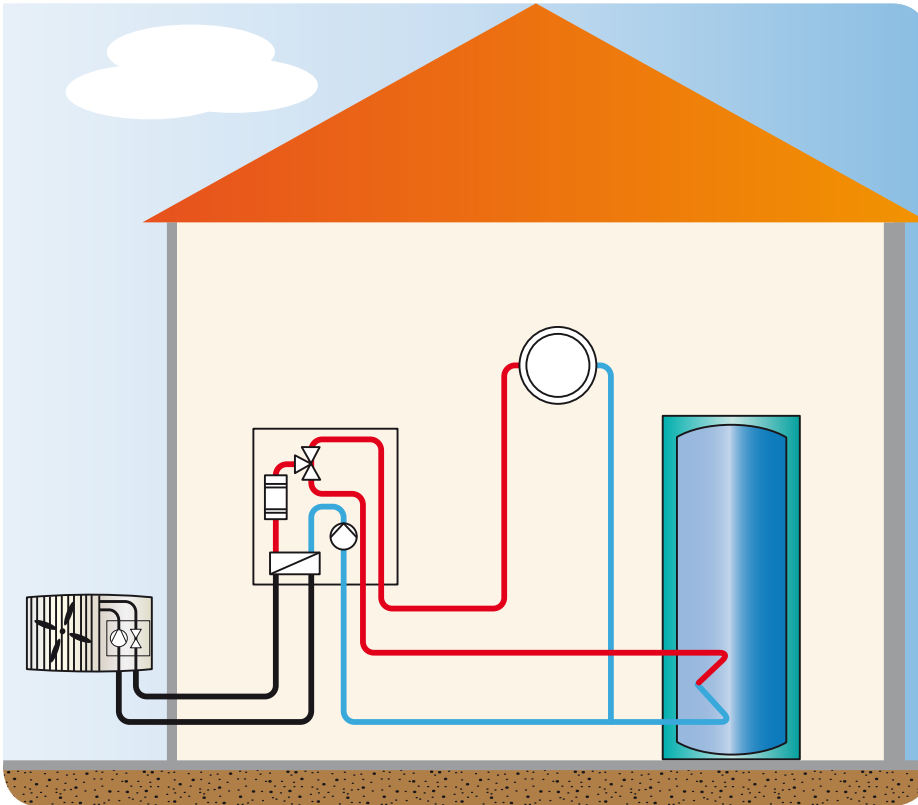


### Options and accessories

- Room thermostat,
- Domestic hot water tank,
- Electrical back up heater (Heating only).

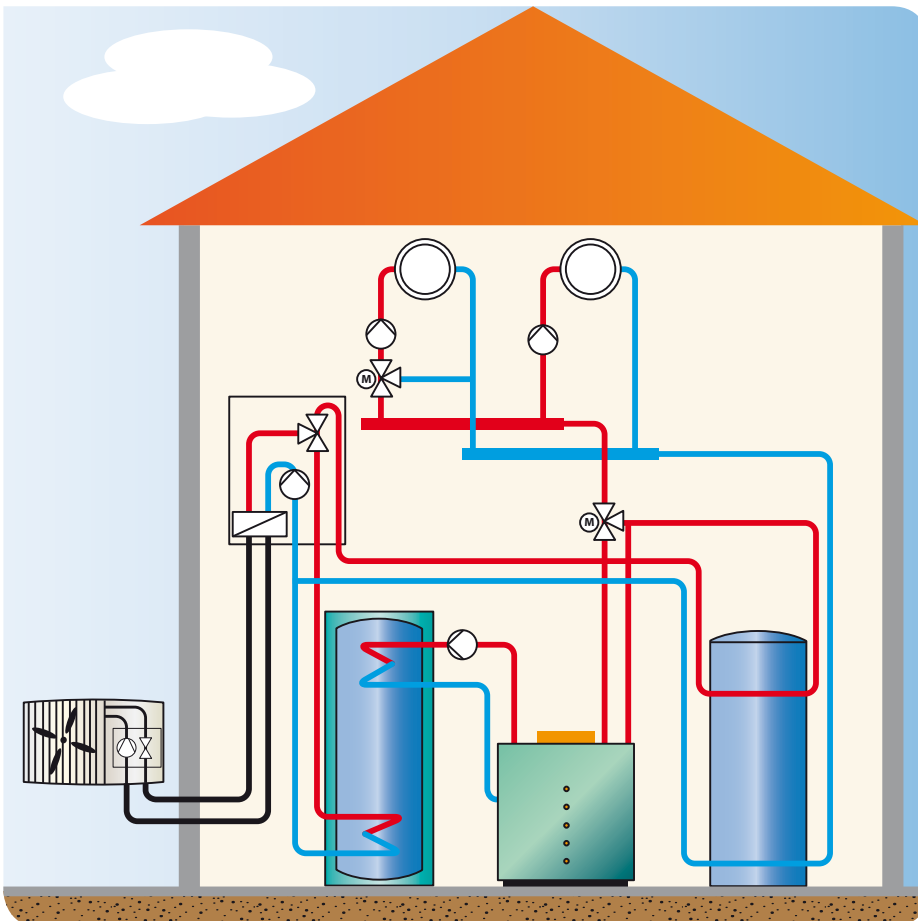
## Example of Applications

### "Stand alone" mono energetic application



**Aqu@Scop** system for space heating, domestic hot water and cooling (cooling/heating indoor unit version) for residential application with floor heating, fan coil or radiator systems or as a mixed zone system.

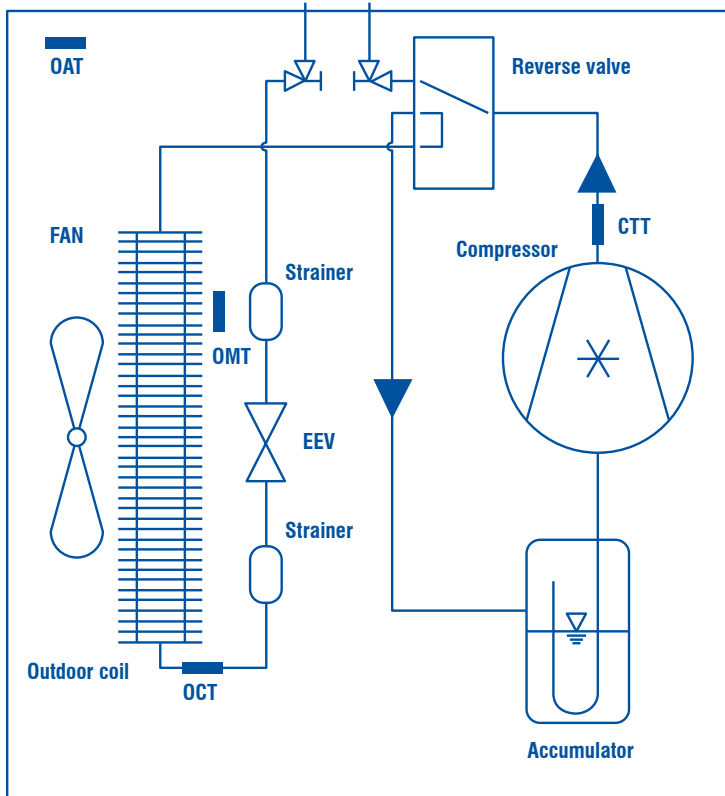
### Hybrid application with zoning



**Aqu@Scop** system for 2 zone space heating, domestic hot water (heating only IDU version) for bivalent operation in combination with a fossil fuel boiler and buffer tank.

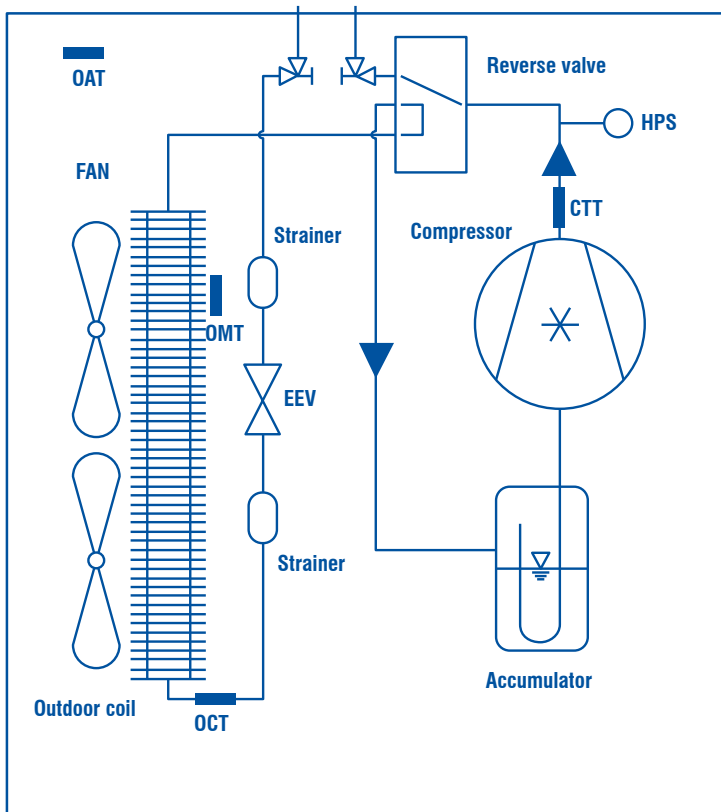
# Refrigerant Flow Diagrams of Outdoor Units

## ODU 1 and ODU 2 - Refrigerant flow direction in heating mode



<b>OCT</b>	Outdoor coil temperature
<b>OMT</b>	Outdoor coil middle temperature
<b>OAT</b>	Outdoor air temperature
<b>CTT</b>	Compressor discharge temperature

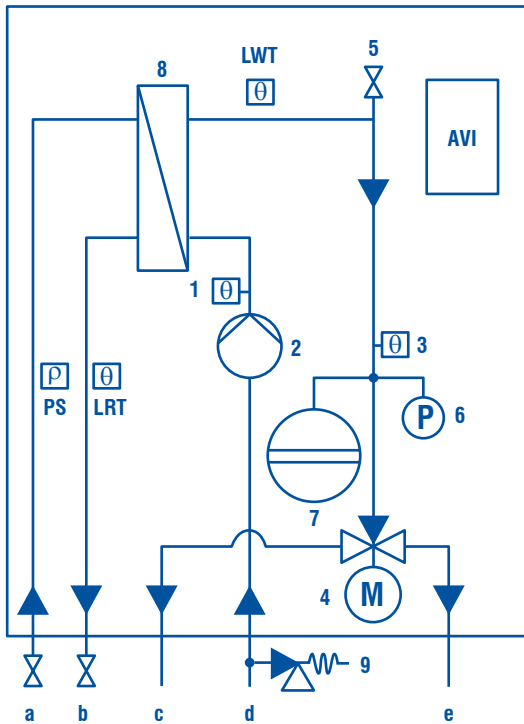
## ODU 3 and ODU 4 - Refrigerant flow direction in heating mode



<b>OCT</b>	Outdoor coil temperature
<b>OMT</b>	Outdoor coil middle temperature
<b>OAT</b>	Outdoor air temperature
<b>CTT</b>	Compressor discharge temperature
<b>HPS</b>	High pressure switch

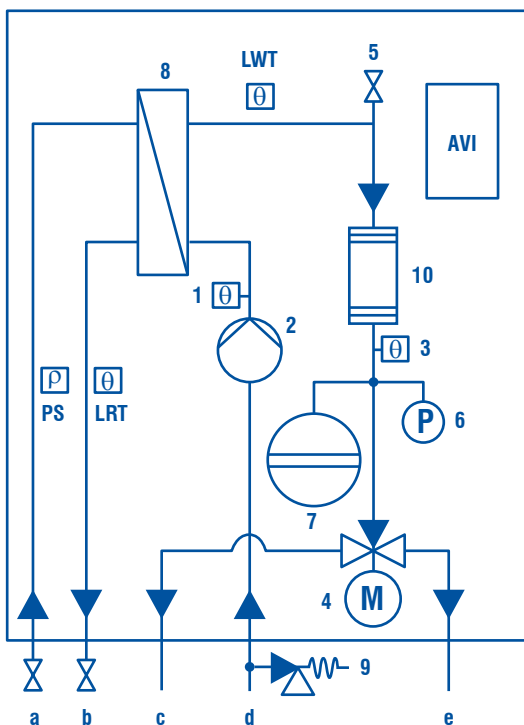
# Refrigerant and Water Flow Diagrams of Indoor Units

## Heating only



<b>1</b>	Temperature sensor (return hot water)
<b>2</b>	Pump
<b>3</b>	Temperature sensor (leaving hot water)
<b>4</b>	3-way valve (domestic hot water/space heating)
<b>5</b>	Manual air vent valve
<b>6</b>	Water pressure gauge
<b>7</b>	Expansion vessel
<b>8</b>	Indoor plate heat exchanger
<b>9</b>	Water safety valve
<b>AVI</b>	Interface gateway
<b>LWT</b>	Temperature sensor (leaving water temperature, AVI board kit)
<b>IRT</b>	Temperature sensor (inlet refrigerant temperature, AVI board kit)
<b>PS</b>	Pressure sensor (liquid line, AVI board kit)
<b>a &amp; b</b>	Refrigerant
<b>c</b>	DHW feed water
<b>d</b>	Return water
<b>e</b>	Space heating feed water

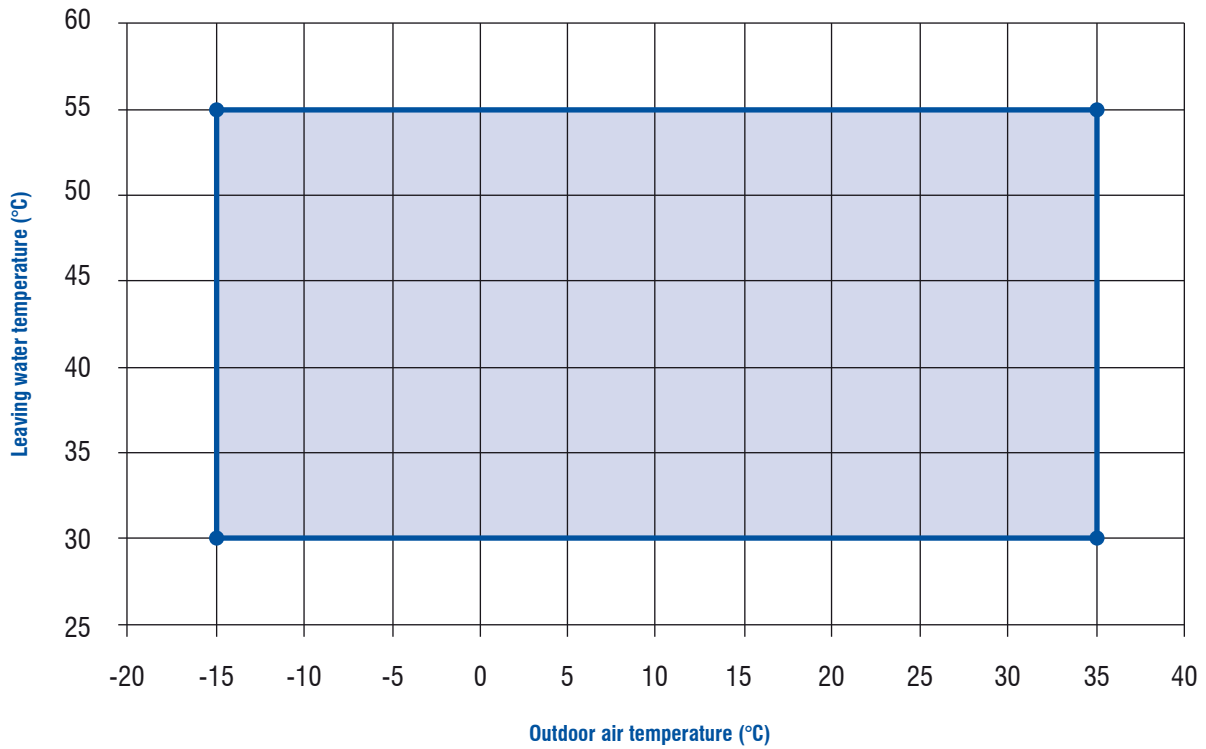
## Heating and cooling



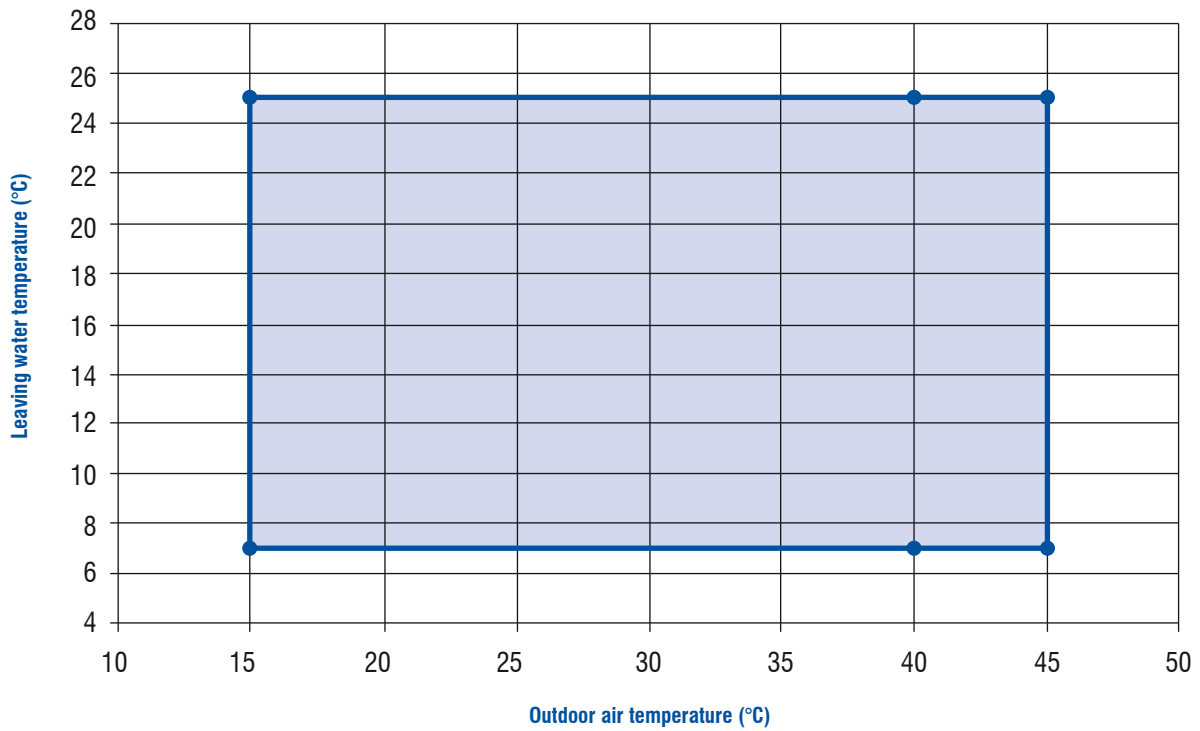
<b>1</b>	Temperature sensor (return hot water)
<b>2</b>	Pump
<b>3</b>	Temperature sensor (leaving hot water)
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<b>5</b>	Manual air vent valve
<b>6</b>	Water pressure gauge
<b>7</b>	Expansion vessel
<b>8</b>	Indoor plate heat exchanger
<b>9</b>	Water safety valve
<b>10</b>	Electrical backup heater
<b>AVI</b>	Interface gateway
<b>LWT</b>	Temperature sensor (leaving water temperature, AVI board kit)
<b>IRT</b>	Temperature sensor (inlet refrigerant temperature, AVI board kit)
<b>PS</b>	Pressure sensor (liquid line, AVI board kit)
<b>a &amp; b</b>	Refrigerant
<b>c</b>	DHW feed water
<b>d</b>	Return water
<b>e</b>	Space heating feed water

# Operating Limits

## Heating mode



## Cooling mode





## Technical Data - Outdoor Units

AQU@SCOP MODELS		ADVANCE SPLIT 005	ADVANCE SPLIT 008	ADVANCE SPLIT 012	ADVANCE SPLIT 014
OUTDOOR UNIT		ODU 1	ODU 2	ODU 3	ODU 4
Heating capacity	kW	1.2 – 5.7	2.0 – 9.5	5.3 -13.5	6.0 – 16.0
Heating capacity at nominal point A 7/W 35	kW	5.30	8.10	12.00	14.50
COP (according to EN 14511) at A 7/W 35		4.25	4.10	4.40	4.30
Cooling capacity	kW	2.4-5.0	3.0-9.0	5.3-13.5	8-15
Cooling capacity at nominal point A 35/W 18	kW	4.40	8.60	12.0	14.0
EER at A35/W18		3.61	3.62	3.80	3.61
<b>SOUND POWER</b>					
Outdoor unit (according to DIN EN 12102) at A 7/W 35	dB(A)	59	62	63	64
<b>LIMITS OF USE (HEATING)</b>					
Max leaving water temperature at A 2 °C	°C	55	55	55	55
Max leaving water temperature at A -15 °C	°C	55	55	55	55
Min. outdoor air temperature	°C	-15	-15	-15	-15
Max. outdoor air temperature at W 55	°C	35	35	35	35
<b>LIMITS OF USE (COOLING)</b>					
Max. outdoor air temperature	°C	45	45	45	45
Min. outdoor air temperature	°C	15	15	15	15
Min. leaving water temperature at A 40	°C	5	5	5	5
Max. leaving water temperature at A 40	°C	25	25	25	25
<b>UNIT</b>					
Domestic hot water		Temperature at A2 inside tank > 50 °C heat pump only			
Voltage heat pump		230 V / 1/50 Hz			
Compressor		DC Inverter			
Expansion valve		Electronic expansion valve			
Factory refrigerant charge R410A	g	1200	2150	2950	2950
Max. distance between units (as nominal refrigerant charge)	m	12.5 (single length)			
Min. distance between units (as nominal refrigerant charge)	m	3.0 (single length)			
Max. distance between units	m	25	30	30	30
Max. height difference between units	m	10	15	15	15
Condensate flow		Bottom			
Outdoor evaporator coil		Hydrophilic fins			
Outdoor fan speed		Variable			
<b>DIMENSIONS AND WEIGHT</b>					
Max. dimensions (height x length x depth)	mm	610 x 870 x 290	865 x 1040 x 340	1255 x 900 x 340	1255 x 900 x 340
Weight (including refrigerant)	kg	60	70	110	110
<b>CONNECTIONS REFRIGERANT SIDE</b>					
Liquid line		1/4"	3/8"	3/8"	3/8"
Discharge line		1/2"	5/8"	5/8"	5/8"
<b>CONFORMITY WITH STANDARDS</b>					
Standards		RoHS conform EN 14511 prEN 14825 Ecodesign Lot 1 EN 60335-1, EN60335-2-40, EN 378			

**A** : Source side outdoor air temperature.

**W** : Sink side water temperature.

## Technical Data - Indoor Units

### Heating only

AQU@SCOP MODELS		ADVANCE SPLIT 005 & 008	ADVANCE SPLIT 012 & 014
INDOOR UNIT		IDU 1	IDU 2
Heating capacity	kW	1.2 up to 9.5	5.3 up to 16
<b>HEAT EXCHANGER</b>			
Type		Plate heat exchanger	
Application		Condenser for R410A	
Number of plates		26	44
Volume inner circuit (theoretical value)	litre	1.33	2.33
Refrigerant distributor		Yes	Yes
Safety valve (heating circuit)		Open at 2.5 bar	
Manometer (heating circuit)		Integrated	
Electrical backup heater		Optional, 9 kW (3 stage)	
Heating circuit pump consumption @ stage 3/2/1	W	132/92/62 under ~ 230 V	
<b>3 WAY VALVE INTEGRATED</b>			
Function		Change from domestic water to heating circuit	
Type		~ 230 V / spring return	
Mechanical expansion vessel (capacity)	litre	10	
<b>DIMENSIONS AND WEIGHT</b>			
Height x Length x Depth	mm	850 x 480 x 360	
Weight (without water)	kg	30	35
<b>CONNECTION (WATER)</b>			
Outlet (heating site), outlet (Domestic hot water site), common inlet		G 1 ¼" (threaded)	
<b>CONNECTION (REFRIGERANT)</b>			
Liquid line		3/8"	3/8"
Discharge line		5/8"	5/8"
Color		White	
Factory charge of the refrigerant side		Nitrogen / 1 bar overpressure	
<b>CONFORMITY WITH STANDARDS</b>			
Standards		RoHS conform, EN 60335-1, EN60335-2-40, EN 378	

### Heating and cooling

AQU@SCOP MODELS		ADVANCE SPLIT 005 & 008	ADVANCE SPLIT 012 & 014
INDOOR UNIT		IDU 1	IDU 2
Heating capacity	kW	1.2 up to 9.5	5.3 up to 16
Cooling capacity	kW	2.4 up to 9.0	5.3 up to 15
<b>HEAT EXCHANGER</b>			
Type		Plate heat exchanger	
Application		Condenser/Evaporator for R410A	
Number of plates		26	44
Volume inner circuit (theoretical value)	litre	1.33	2.33
Refrigerant distributor		Yes	Yes
Safety valve (heating circuit)		Open at 2.5 bar	
Manometer (heating circuit)		Integrated	
Electrical backup heater		9 kW (3 stage)	
Heating circuit pump consumption @ stage 3/2/1	W	132/92/62 under ~ 230 V	
<b>3 WAY VALVE INTEGRATED</b>			
Function		Change from domestic water to heating circuit	
Type		~ 230 V / spring return	
Mechanical expansion vessel (capacity)	litre	10	
<b>DIMENSIONS AND WEIGHT</b>			
Height x Length x Depth	mm	850 x 480 x 360	
Weight (without water)	kg	35	40
<b>CONNECTION (WATER)</b>			
Outlet (heating site), outlet (Domestic hot water site), common inlet		G 1 ¼" (threaded)	
<b>CONNECTION (REFRIGERANT)</b>			
Liquid line		3/8"	3/8"
Discharge line		5/8"	5/8"
Color		White	
Factory charge of the refrigerant side		Nitrogen / 1 bar overpressure	
<b>CONFORMITY WITH STANDARDS</b>			
Standards		RoHS conform, EN 60335-1, EN60335-2-40, EN 378	

## Electrical Data - Outdoor Units

AQU@SCOP MODELS		ADVANCE SPLIT 005	ADVANCE SPLIT 008	ADVANCE SPLIT 012	ADVANCE SPLIT 014
OUTDOOR UNIT		ODU 1	ODU 2	ODU 3	ODU 4
OUTDOOR UNIT					
Power supply		1/N/PE/230 V~/50 Hz	1/N/PE/230 V~/50 Hz	1/N/PE/230 V~/50 Hz	1/N/PE/230 V~/50 Hz
CONTROL UNIT (ODU)					
Voltage, control unit / electronics		1/N/PE/230 V~/50 Hz	1/N/PE/230 V~/50 Hz	1/N/PE/230 V~/50 Hz	1/N/PE/230 V~/50 Hz
Max. power control unit	W	150	150	150	150
Max. power consumption internal fans	W	65	70	130	130
Fuse (internal)	A	3.5	3.5	3.15	3.15
HEAT PUMP					
Power supply		1/N/PE/230 V~/50 Hz	1/N/PE/230 V~/50 Hz	1/N/PE/230 V~/50 Hz	1/N/PE/230 V~/50 Hz
Rated current (Nominal A7/W35)	A	5	9	10	15
Starting current	A	10.5	15	10	10
Power input - Maximum	kW	1.5	3.1	4.6	5.8
Circuit breaker rating	A	20	25	25	32
Fuse	A	20	25	25	32
Cable section	mm <sup>2</sup>	3 x 2.5	3 x 2.5	3 x 4	3 x 6
Max. cable length	m	25	25	25	30
Heating power input - Nominal (A2/W35)	kW	0.92	1.87	2.24	3.25
Heating power input - Nominal (A7/W35)	kW	0.96	1.95	2.34	3.43
Cooling power input - Nominal (A35/W7)	kW	1.08	2.40	2.69	3.72
Cooling power input - Nominal (A35/W18)	kW	1.13	2.63	2.80	4.23

## Electrical Data - Indoor Units

AQU@SCOP MODELS		ADVANCE SPLIT 005 & 008	ADVANCE SPLIT 012 & 014
INDOOR UNIT		IDU 1	IDU 2
INDOOR UNIT			
Power supply		1/N/PE/230 V~/50 Hz	1/N/PE/230 V~/50 Hz
Electronics max. rated power consumption	W	1000	1000
Max. power control unit	W	5	5
Max. power consumption internal pumps	W	132	132
Fuse (internal)		T 6.3 A / 250 V	T 6.3 A / 250 V
Fuse		1 x B16A	1 x B16A
Cable section	mm <sup>2</sup>	3 x 1.5	3 x 1.5
ELECTRIC HEATER (OPTIONAL)			
Rated voltage		1/N/PE/230 V~/50 Hz or 3/N/PE/400 V~/50 Hz	1/N/PE/230 V~/50 Hz or 3/N/PE/400 V~/50 Hz
Capacity	kW	max. 9	max. 9
Fuse		3 x B16A	3 x B16A
Degree of protection		IP20	IP20
Cable section 400 V ~ (phase symmetrical/asymmetrical)	mm <sup>2</sup>	5 x 2.5	5 x 2.5
Cable section 230 V ~ (phase asymmetrical)	mm <sup>2</sup>	7 x 2.5	7 x 2.5
Max. cable length	m	25	25

## Performance Data

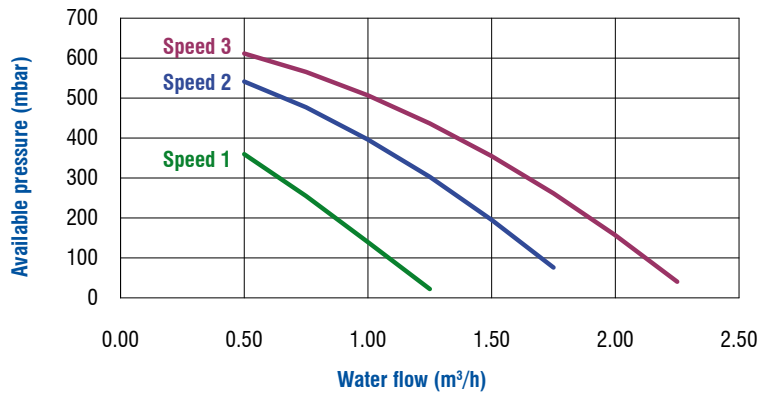
AQU@SCOP MODELS			ADVANCE SPLIT 005	ADVANCE SPLIT 008	ADVANCE SPLIT 012	ADVANCE SPLIT 014
A7W35	Nominal heating capacity	kW	5.30	8.10	12.00	14.50
	Nominal COP		4.25	4.10	4.40	4.30
	Total power input	kW	1.25	1.98	2.73	3.37
	Capacity range min - max.	kW	1.2 - 5.7	2 - 9.5	5.3 - 13.5	6.0 - 16.0
A2W35 *	Heating capacity	kW	3.50	6.20	9.00	11.00
	COP		3.15	3.20	3.25	3.20
A-7W35 *	Heating capacity	kW	3.50	5.89	8.91	9.41
	COP		2.65	2.32	2.55	2.50
A12W35	Heating capacity	kW	5.65	8.46	12.6	15.66
	COP		4.51	4.39	4.71	4.58
A-15W35 *	Heating capacity	kW	1.66	3.35	4.5	5.82
A7W55	Heating capacity	kW	3.63	5.92	9.12	12.08
	COP		2.71	2.16	2.61	2.39
A2W55	Heating capacity	kW	2.63	5.05	7.14	8.57
	COP		2.09	1.94	2.11	2.06
A-7W55 *	Heating capacity	kW	2.03	3.77	5.02	6.51
	COP		1.68	1.54	1.56	1.53
A12W55	Heating capacity	kW	3.98	6.55	10.0	13.43
	COP		2.95	2.37	2.87	2.67
A7W45	Heating capacity	kW	4.41	6.73	10.17	12.97
	COP		3.51	2.95	3.53	3.10
A35W18	Nominal cooling capacity	kW	4.40	8.60	12.00	14.00
	Nominal EER		3.61	3.62	3.80	3.61
A35W7	Cooling capacity	kW	4.00	6.20	7.50	10.10
	EER		2.80	2.80	2.80	2.60

**Note :** All data measured according to EN 14511 with pump included.

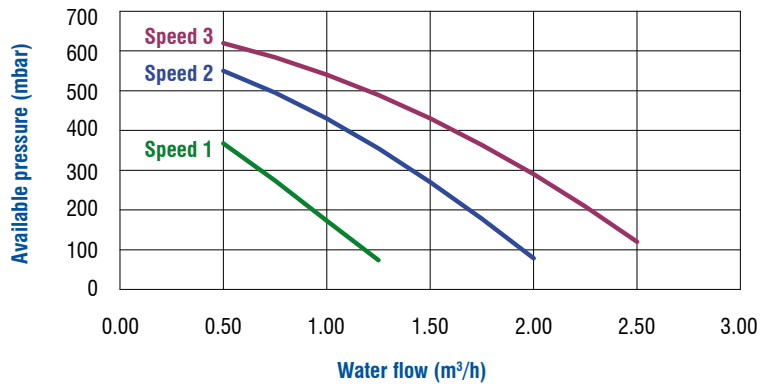
\* : With deicing.

# Heat Pump Available Pressure Curves

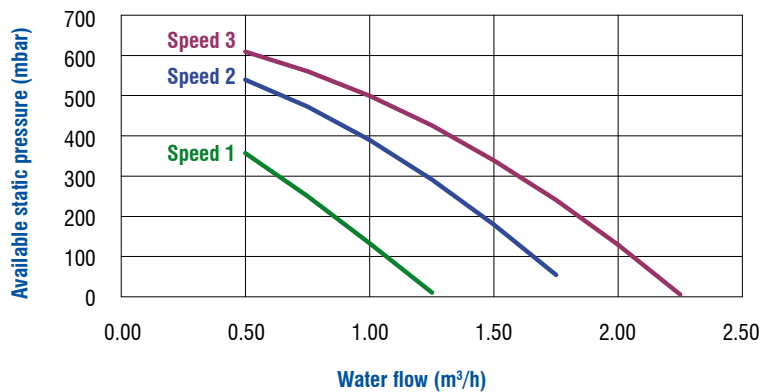
## Heating only version - Sizes 005 & 008



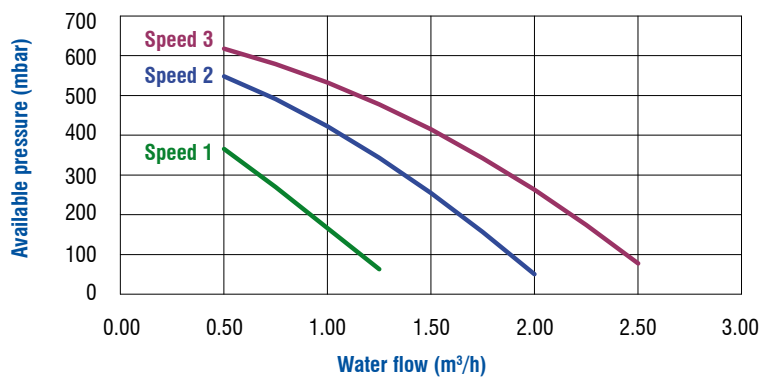
## Heating only version - Sizes 012 & 014



## Heating and cooling version - Sizes 005 & 008



## Heating and cooling version - Sizes 012 & 014



# Dimensions

## Outdoor units

ADVANCE SPLIT 005



ADVANCE SPLIT 008

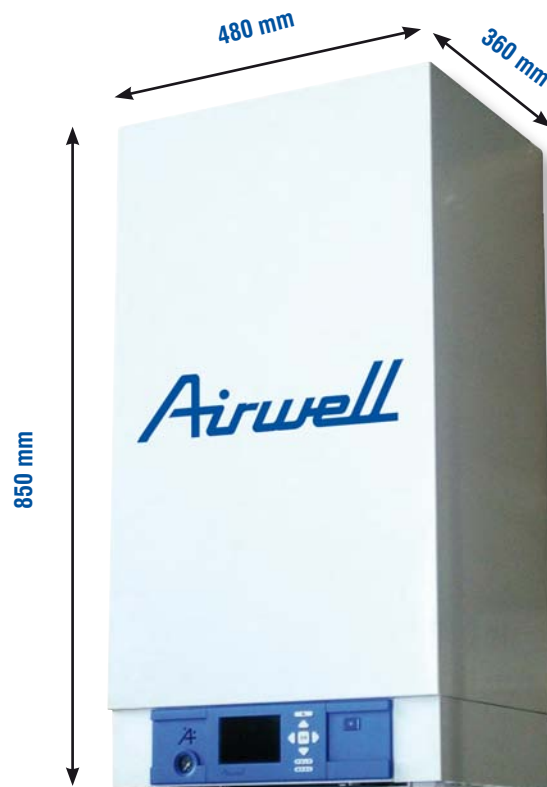


ADVANCE SPLIT 012 & 014

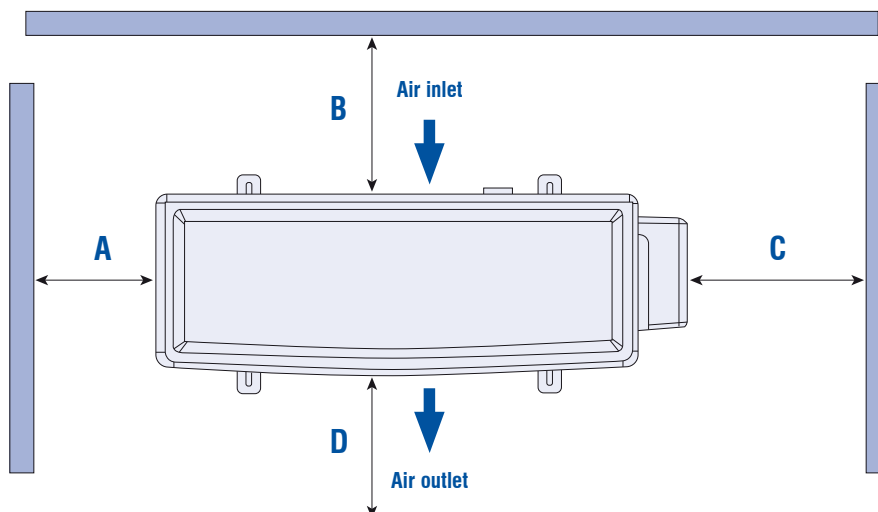


## Dimensions (continued)

### Indoor units 1 & 2 - ADVANCE SPLIT 005 to 014



## Minimum Clearances - Outdoor Units



Models	Dimensions in mm			
	A	B	C	D
ADVANCE SPLIT 005	≥ 100	≥ 100	≥ 300	≥ 1000
ADVANCE SPLIT 008	≥ 100	≥ 100	≥ 300	≥ 1000
ADVANCE SPLIT 012	≥ 100	≥ 200	≥ 300	≥ 1000
ADVANCE SPLIT 014	≥ 100	≥ 200	≥ 300	≥ 1000



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*As part of our ongoing product improvement programme, the technical data and colours of our products are subject to change without prior notice. Non contractual photos.*