

AQUASNAP®

30AWH-R

Reversible air-to-water
heat pump

Nominal heating capacity:
4-16kW^①

Nominal cooling capacity:
4-14kW^②



Simple, reliable
High efficiency heat pump
Built-in hydraulic module

The 30AWH 04R-16R air-to-water heat pump is designed for heating and cooling applications in new and existing individual homes and small businesses.

When installed alone, the 30AWH 04R-16R is compatible with low to medium temperature emitters (underfloor heating, fan coil units, water cassettes, radiators, mixed installations, etc.).

The 30AWH 04R-16R heat pump is also compatible with medium to high temperature emitters for boiler back up operation.

The 30AWH 04R-16R heat pump is installed outdoors in an open area.

Each device is tested in the factory and delivered ready for operation.



① @ condition outdoor air temperature +7°C, water inlet/outlet temperature +30°C/+35°C

② @ condition outdoor air temperature +35°C, water inlet/outlet temperature +23°C/+18°C

Ranges

The 30AWH 04R-16R range of reversible heat pumps comprises 7 single-phase models and 3 three-phase models.

Description

Operation in heating mode with an outdoor temperature of -25°C to 43 °C.

Operation in cooling mode with an outdoor temperature of -5°C to 50 °C.

If the heat pump is the only source of heat:

Below the equilibrium temperature, heating must be provided by another heating source or using an additional electrical supply actuated by the 30AWH 04R-16R heat pump.

If the heat pump is used with back up operation: it operates down to the equilibrium point (temperature below which the heat pump can no longer keep up with heating requirements); below this point, the heat pump and boiler run together.

Conformity

EMC: Electromagnetic Compatibility directive 2014/30/EU.

RoHS: Restriction of Hazardous Substances directive 2011/65/EU.

Ecodesign 2009/125/EC.

Machinery 2006/42/EC.

Pressure Equipment Directive (PED) 2014/68/UE.

REACH regulation (EC) No. 1907/2006.

Description of the main components

The new 30AWH 04R-16R air-to-water reversible heat pumps, with Inverter technology, have been designed for residential applications and for light commercial installations. They offer excellent energy efficiency and quiet operation.

These units integrate : ecological R32 refrigerant fluid with low Global Warming Potential (GWP), Twin Rotary DC Inverter compressors, a low-noise fan with an electronic control.

Ecodesign is the European environmental design directive, aimed at improving the energy efficiency of energy-related products (ErP) through regulation. Carrier supports initiatives to reduce the environmental impact of its products.



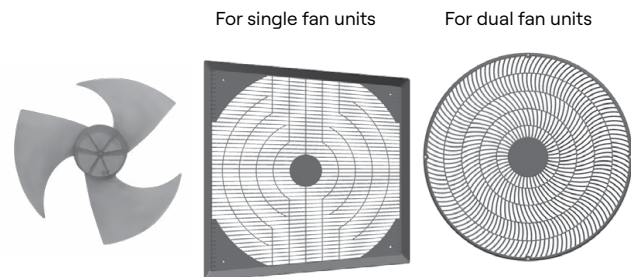
Specifications

- A vast operating range, both in cooling and heating mode, offering great performance across a broad range of temperatures.
- Twin Rotary DC Inverter compressors with pulse amplitude modulation (PAM) and pulse wave modulation (PWM) for increased reliability, reduced energy consumption and operation without vibrations, whatever the operating conditions.
- Variable speed fans with a low air-resistance blade design, ensuring better distribution of air at exceptionally low sound levels.
- Pre-configured or customisable water laws, for stable power levels which correspond to the losses.
- The option to connect and integrate the unit into existing heat sources or into an auxiliary heating source (approach with a single or dual energy source), which allows for increased savings and optimal comfort, no matter the weather conditions.
- Inlet and outlet connections to the three-way valve, to enable connection to a domestic hot water buffer tank, increase the flexibility of use, regardless of the application.
- A water outlet temperature of up to 62 °C for heating and domestic hot water in residential applications.
- For enhanced safety, an incoming alarm signal might stop the unit running, and is compatible with external safety devices.
- Outgoing signal making it possible to control the operation of a customer's accelerator pump or additional pump to increase the versatility of the installation.

Advanced technology

- Electronic system management: several sensors placed in key positions within the refrigerant circuit detect the operating status of the system. The micro-controls receive signals sent by the sensors; these are managed using advanced control algorithms and optimise the refrigerant flow rate and the operation of all the main components – the compressor, the fan motors, and the electronic expansion valve.
- The electronic expansion valve is an electronic dual-flow expansion device, which optimises the volume of refrigerant fluid present in the circuit and overheating, preventing the fluid from returning to the compressor. This device further improves system performance and reliability.
- The air management system, which comprises the axial flow fan, the orifice and the air discharge grille, guarantees minimised sound levels.

Axial fan blade and low pressure drop grille



- The coil has a blue hydrophilic coating which allows water to migrate more easily to the exchanger using gravity.
In particular, this innovation enables:
 - The frosting time to be increased by reducing the accumulation of frost on the coil.
 - Better defrosting by improving the flow of water over the fins
 Operation in heating mode is thereby improved.

Advanced performances

- The 30AWH 04R-16R heat pump offers extremely high energy efficiency, both in heating mode and in cooling mode, thereby guaranteeing significant energy savings.
- Year-round comfort – the advanced technology used in the 30AWH 04R-16R heat pump provides users with optimised levels of comfort, in terms of water temperature regulation and the low sound level.
The required temperature is obtained rapidly, and kept constant, without any fluctuations. The 30AWH 04R-16R heat pump offers optimised levels of comfort in both winter and summer.
- The 30AWH 04R-16R heat pump can operate at low ambient temperatures in cooling mode (from outdoor temperatures of -5 °C to 50 °C).
To ensure the comfort of users, the units operate down to an outdoor temperature of -25 °C in heating mode, while in summer, they can produce hot water up to 62 °C for domestic hot water applications.

Features and benefits

Environmental care

- R32 refrigerant with low GWP.
- R32: low environmental impact (ozone depletion potential = 0, and Global Warming Potential = 675).
- Highly efficient, it enables a high energy efficiency ratio (COP and EER) to be obtained.
- The components of the 30AWH 04R-16R heat pumps are free from hazardous substances.
- The packaging offers increased protection during transport and handling, and is recyclable.

Quick and simple to install and maintain

- Easy access to all internal components: simply to remove the entire front panel, in order to access all of the components.
- 6 bar safety valve fitted as standard.
- Internal five-litre expansion vessel.
- Protection against high refrigerant temperatures.
- Water flow controller to ensure that the circuits contain enough water to operate correctly.
- Several options for the electrical cable outlets: prepunched holes in the casing panels enable the cable to be fed via the plate.
- The built-in hydraulic module reduces the space required and simplifies installation. Simply connect up all the connections: electrical, water supply, and return pipes.
- The mounting brackets have a specially designed shape to ensure that the unit is safely and securely attached to its base.

Twin Rotary DC Inverter compressors

- Advanced technology, which offers maximum energy efficiency, with high capacity available under peak conditions, and optimised efficiency at low and moderate compressor speeds. The 30AWH 04R-16R heat pump uses IPDU (intelligent power drive unit) hybrid inverter technology, which combines two electronic control logics: pulse amplitude modulation (PAM) and pulse width modulation (PWM) to ensure the compressor provides optimised operation under all conditions, to minimise temperature fluctuations, and ensure perfect control of individual comfort, whilst significantly reducing energy consumption:
 - PAM: the pulse amplitude modulation of the direct current controls the compressor under maximum load conditions (start-up and peak load), which increases the voltage at a fixed frequency. The compressor runs at a high speed to quickly reach the desired temperature.
 - PWM: the pulse width modulation of the direct current controls the compressor at partial load conditions, adjusting the frequency at fixed voltage. The compressor speed is adjusted with precision, and the system offers an enhanced level of comfort (no fluctuations in temperature) in operating conditions with exceptional efficiency.
- The compressor frequency is increased continuously up to the maximum level. This ensures there are no current peaks during the start-up phase, and provides a secure connection to a single-phase current supply, even for large capacity systems.
- The two rotating compression cylinders, offset from one another by 180°, and the brushless DC motor with a perfectly balanced shaft, ensure that vibrations and noise are reduced to a minimum, even at very low operating speeds. This gives a very wide operating range between the minimum capacity and the maximum capacity in continuous operation, which guarantees that the system is always optimised and provides maximum comfort at exceptionally high levels of energy efficiency.
- The two rotating compression cylinders, the low vibrations and the low load imposed on the shaft ensure the compressor offers the best possible reliability and a long and trouble-free service life.
- All two-cylinder rotary compressors with a brushless DC inverter motor are equipped with crankcase heaters as standard.
- A double protective screen soundproofs the compressor, further reducing the sound levels.

Features and benefits

Absolute reliability

- Exceptional endurance tests:
 - All the units undergo tests at various stages of their manufacture to ensure tightness of the circuits, electrical conformity, and to check the water and refrigerant pressure.
 - At the end of production, the unit's operating parameters are thoroughly tested.
 - Corrosion resistance test.
 - Accelerated ageing test on the critical components and on the fully-assembled units, simulating thousands of hours of continuous operation.
 - Impact testing on the packaging, to ensure that the units are suitably protected against accidental impacts.
 - Numerous, comprehensive test on-site.

Economical operation

- High energy efficiency:
 - The exceptionally high energy efficiency of 30AWH 04R-16R heat pumps is the result of a long selection and optimisation process.
 - The use of ambient air as the main energy source in residential heating applications considerably reduces energy consumption and CO₂ emissions.
 - Sleep mode, with reduced compressor speed at night, provides a low operating sound level, and significant reductions in energy consumption.

Inverter module board with embedded refrigerant cooling.

- 30AWH 04R-16R is equipped with refrigerant cooling solution to protect PCB from overheating. This function is highly reliable thanks to enhanced and built-in refrigerant solution.

System Control

System control associate with compressor and fan variable frequency driver combines intelligence with operating simplicity.

The control constantly monitors all machine parameters and precisely manages the operation of compressor, expansion devices, fans and of the water heat exchanger water pump for optimum energy efficiency.

Ease-of-use

- System control can be associated with a new User interface (wired controller) which allow an easy access to the configuration parameters (frequency compressor, refrigerant circuit temperature, sets points, air temp, entering water temp, alarm report...).
- This user interface is also very intuitive in its use. It allows reading and easy selection of the operating mode. The functions are represented by icons on the touch screen.

To facilitate the use of this interface, 2 levels of access are available: end user, installer.

Key features

- Heating and cooling mode.
- Predefined climatic curves (12) or customized climatic curve (Water temperature setpoint control).
- Air temperature set point control.
- Scheduling mode.
- Low noise level or night mode.
- Antifreeze protection.
- Backup electric heater controlled.
- Backup by oil or gas boiler.
- Hydraulic module with control of the flow rate.
- Managed additional pumps.
- Manage domestic hot water with or without:
 - Anti-legionella mode.
 - Auxiliary heater in the DHW tank.
- ModBUS Protocol.

Choice of control

Three options are available to actuate the 30AWH 04R-16R heat pump :

- User interface wired controller.
- Dry contact.
- ModBus protocol.

User Interface Wired controller



This interface can be installed up to 10 m away.

The wired controller has an internal sensor to measure the room temperature.

Regulation can be based on the room air temperature.

Modbus

Direct access with Modbus connection to set, configure and monitor the 30AWH 04R-16R unit.

Features and benefits

Large choice of input contacts:

- Remote On/Off contact.
- Remote Heat/Cool Contact: This switch is used to select the Cooling Mode (contact opened) or the Heating Mode (contact closed).
- Remote Economic Contact: This switch is used to select the regular Home Mode when contact is opened or the Economic Away Mode when contact is closed.
- Safety Input Contact: This switch is normally closed type, according to configuration it is used either to stop the unit, to ban the Heating Mode or to ban the Cooling Mode when contact is opened.

Several functions can be configured by the installer. They allow to adapt to the environment of the machine:

- Power Limitation / Night Mode: This switch is used to reduce the compressor maximum frequency to avoid noise.
- Loadshed Request: If the General Purpose Contact, configured to "Loadshed Request", is closed then unit shall be loadshed the electrical heater output and gas boiler signal output.
- DHW Priority : When this input is closed or DHW temperature is lower than set-point (need DHW sensor delivered in accessory bag), the unit is switching to Domestic Hot Water production regardless of the Space Heating demand and the current DHW schedule.
- Anti-Legionella Cycle Request : When this input is closed, the Domestic Hot Water production is requested with the Anti-Legionella setpoint.

Output remote contact available

Three output contacts can be chosen on the board, based on the desired configuration:

Status: Alarm, Standby, Cooling Mode, Heating Mode, DHW Mode, defrost mode, unit under Modbus control.

Technical characteristics

30AWH 04R-16R				4R	6R	8R	10R	12R	14R	16R	12R (3ph)	14R (3ph)	16R (3ph)
Heating													
Standard unit Full load performances*	HA1	Nominal capacity	kW	4,00	6,00	8,00	10,00	12,00	14,00	16,00	12,00	14,00	16,00
		COP	kW/kW	4,80	4,50	4,75	4,50	4,80	4,70	4,65	4,80	4,70	4,65
	HA2	Nominal capacity	kW	4,00	6,00	8,00	10,00	12,00	14,00	16,00	12,00	14,00	16,00
		COP	kW/kW	3,50	3,45	3,60	3,50	3,55	3,55	3,50	3,55	3,55	3,50
	HA3	Nominal capacity	kW	4,00	5,80	7,70	9,50	11,50	12,00	13,50	11,50	12,00	13,50
		COP	kW/kW	2,59	2,70	2,85	2,68	2,85	2,75	2,70	2,85	2,75	2,70
Standard unit Seasonal energy efficiency **	HA1	SCOP _{30/35 °C}	kWh/kWh	4,73	4,75	4,90	4,98	4,91	4,94	4,78	4,91	4,94	4,78
		ηs heat _{30/35 °C}	%	186%	187%	193%	196%	193%	195%	188%	193%	195%	188%
		P _{rated}	kW	4,00	6,05	8,09	9,73	11,94	14,03	14,79	11,94	14,03	14,79
		Energy labelling		A+++	A+++	A+++	A+++	A+++	A+++	A+++	A+++	A+++	A+++
	HA3	SCOP _{47/55 °C}	kWh/kWh	3,22	3,25	3,36	3,41	3,39	3,42	3,36	3,39	3,42	3,36
		ηs heat _{47/55 °C}	%	126%	127%	131%	134%	133%	134%	131%	133%	134%	131%
		P _{rated}	kW	4,01	5,59	7,61	9,09	11,96	11,99	13,06	11,96	11,99	13,06
		Energy labelling		A++	A++	A++	A++	A++	A++	A++	A++	A++	A++
Cooling													
Standard unit Full load performances (*)	CA1	Nominal capacity	kW	4,00	5,00	6,50	8,00	10,50	12,00	14,00	10,50	12,00	14,00
		EER	kW/kW	2,85	2,75	2,90	3,00	2,75	2,70	2,65	2,75	2,70	2,65
	CA2	Nominal capacity	kW	4,00	5,50	7,00	9,00	11,00	13,50	14,50	11,00	13,50	14,50
		EER	kW/kW	3,85	4,00	4,40	4,00	4,00	3,90	3,80	4,00	3,90	3,80
Standard unit Seasonal energy efficiency**	SEER _{12/7 °C} Comfort low temp.		kWh/kWh	4,52	4,51	4,79	4,89	5,04	5,05	5,06	5,04	5,05	5,06
	ηs cool _{12/7 °C}		%	178%	177%	189%	193%	199%	199%	199%	199%	199%	199%
Sound levels													
Standard unit													
Sound power level ②			dB(A)	61	64	65	66	69	69	70	69	69	70
Sound pressure level at 10 m③			dB(A)	50	53	54	55	56	56	58	56	56	58
Dimensions													
Length			mm	1335	1335	1335	1335	1302	1302	1302	1302	1302	1302
Width			mm	475	475	475	475	465	465	465	465	465	465
Height			mm	875	875	875	875	1517	1517	1517	1517	1517	1517
Operating weight①													
Standard unit			kg	109	109	120	126	165,5	167,7	167,7	180,9	182,9	182,9

* In accordance with standard EN14511-3:2022.

** In accordance with standard EN14825:2022, average climate

HA1 Heating mode conditions: Water heat exchanger water entering/leaving temperature 30°C/35°C, outside air temperature tdb/twb = 7°C db/6°C wb, evaporator fouling factor 0 m². k/W

HA2 Heating mode conditions: Water heat exchanger water entering/leaving temperature 40°C/45°C, outside air temperature tdb/twb = 7°C db/6°C wb, evaporator fouling factor 0 m². k/W

HA3 Heating mode conditions: Water heat exchanger water entering/leaving temperature 47°C/55°C, outside air temperature tdb/twb = 7°C db/6°C wb, evaporator fouling factor 0 m². k/W

CA1 Cooling mode conditions: evaporator water inlet/outlet temperature 12 °C/7 °C, outdoor air temperature 35 °C, evaporator fouling factor 0 m². k/W

CA2 Cooling mode conditions: evaporator water inlet/outlet temperature 23 °C/18 °C, outdoor air temperature 35 °C, evaporator fouling factor 0 m². k/W

η_s heat_{30/35 °C} & SCOP_{30/35 °C} Values calculated in accordance with standard EN14825:2022

η_s heat_{47/55 °C} & SCOP_{47/55 °C} Values in bold comply with Ecodesign Regulation (EU) No. 813/2013 for heating application

η_s cool_{12/7 °C} & SEER_{12/7 °C} Values calculated in accordance with standard EN14825:2022

① Values are guidelines only. Refer to the unit nameplate

② In dB re.f=10⁻¹² W, (A) weighting. Declared dual number noise emission value in accordance with ISO 4871 (with an associated uncertainty of +/-2dB(A)). Measured in accordance with ISO 9614-1

③ In dB ref 20 μPa, (A) weighting. Declared dual number noise emission value in accordance with ISO 4871 (with an associated uncertainty of +/-2dB(A)). For information, calculated from the sound power level Lw(A)

④ Min. water-side operating pressure with variable speed hydraulic module is 40 kPa

All specifications listed above are preliminary datas, and are subject to change. Please contact your sales representative to get latest data available.

Technical characteristics

30AWH 04R-16R		4R	6R	8R	10R	12R	14R	16R	12R (3ph)	14R (3ph)	16R (3ph)
Compressors	DC Twin-rotary	1	1	1	1	1	1	1	1	1	1
Refrigerant		R32									
Charge ^①	kg	1	1,1	1,6	1,8	2,2	2,6	2,6	2,2	2,6	2,6
Condenser											
Copper		Grooved copper tubes									
Fin type		Hydrophilic aluminum foil									

① Values are guidelines only. Refer to the unit nameplate

30AWH 04R-16R		4R	6R	8R	10R	12R	14R	16R
Air heat exchanger		Grooved copper tubes, aluminium fins						
Fan type		Axial type						
Fan quantity		1	1	1	1	2	2	2
Rated total air flow	m ³ /h	3200	3600	4200	4200	7300	7300	7300
Rated speed	rpm	630	730	860	860	860	860	860
Water heat exchanger		Brazen plate heat exchanger						
Water volume	L	0,62	0,62	1,08	1,08	1,45	1,45	1,45
Hydraulic module		Circulator, relief valve, paddle flow switch, expansion tank						
Circulator		Centrifugal pump (variable speed)						
Expansion tank volume	L	5	5	5	5	5	5	5
Max. water-side operating pressure with hydraulic module ^④	kPa	90	90	90	90	90	90	90
Water connections								
Inlet diameter (MPT GAS)	inch	1	1	1	1	1,25	1,25	1,25
Outlet diameter (MPT GAS)	inch	1	1	1	1	1,25	1,25	1,25

④ Cooling Eurovent condition

Electrical data

30AWH 04R-16R		4 (1Ph)	6 (1Ph)	8 (1Ph)	10 (1Ph)	12 (1Ph)	14 (1Ph)	16 (1Ph)	12 (3Ph)	14 (3Ph)	16 (3Ph)
Nominal power supply	V-ph-Hz	230-1N-50							400-3N-50		
Voltage range	V	220-240							380-415		
Maximum unit power input (Un) ^①	kW	3,3	3,52	4,4	4,84	5,5	6,6	6,6	5,94	7,26	7,26
Cos Phi unit at maximum power ^①		0,99	0,99	0,99	0,99	0,99	0,99	0,99	0,99	0,99	0,99
Maximum unit current drawn (Un-10%) ^②	A	15	16	20	22	25	30	30	9	11	11
Maximum unit current drawn (Un) ^③	A	15	16	20	22	25	30	30	9	11	11
Maximum Start-up current, standard unit ^④	A	Not Applicable (less than the operating current)									

Note: the current is not included the electric heater current, current of standard electric heater is 13.6A

① Power input, compressors and fans, at the unit operating limits and nominal voltage of 220V-1ph/400V-3ph (data given on the unit nameplate).

② Maximum unit operating current at maximum unit power input and at 200V-1ph/360V-3ph.

③ Maximum unit operating current at maximum unit power input and at 220V-1ph/400V-3ph (values given on the unit nameplate).

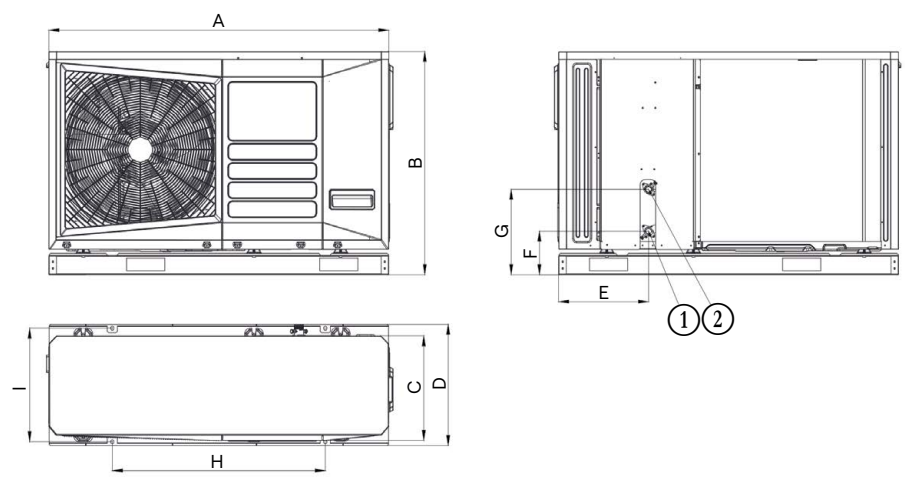
④ Maximum instantaneous start-up current at operating limits (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).

Electrical protection selection

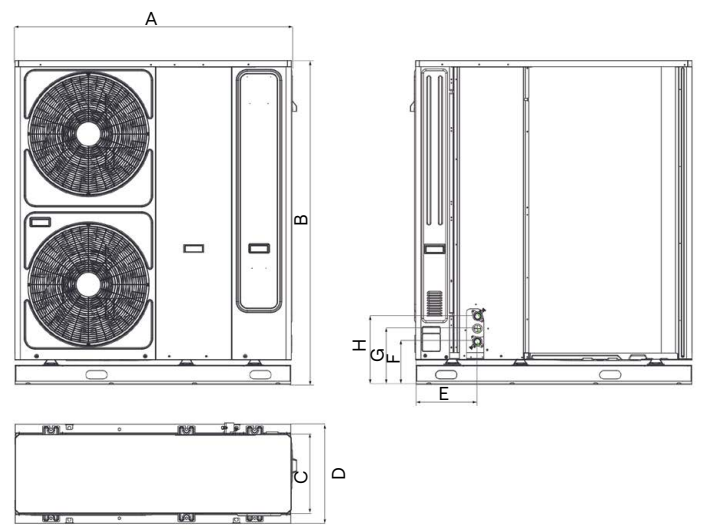
30AWH 04R-16R		4R	6-10R	12-16R(1Ph)	12-16R(3Ph)
Circuit breaker	Type	C	C	C	C
	Current A	32	40	50	40
Fuses	Type	gG	gG	gG	gG
	Current A	32	50	63	50

Dimensions (mm)

4-10R



12-16R



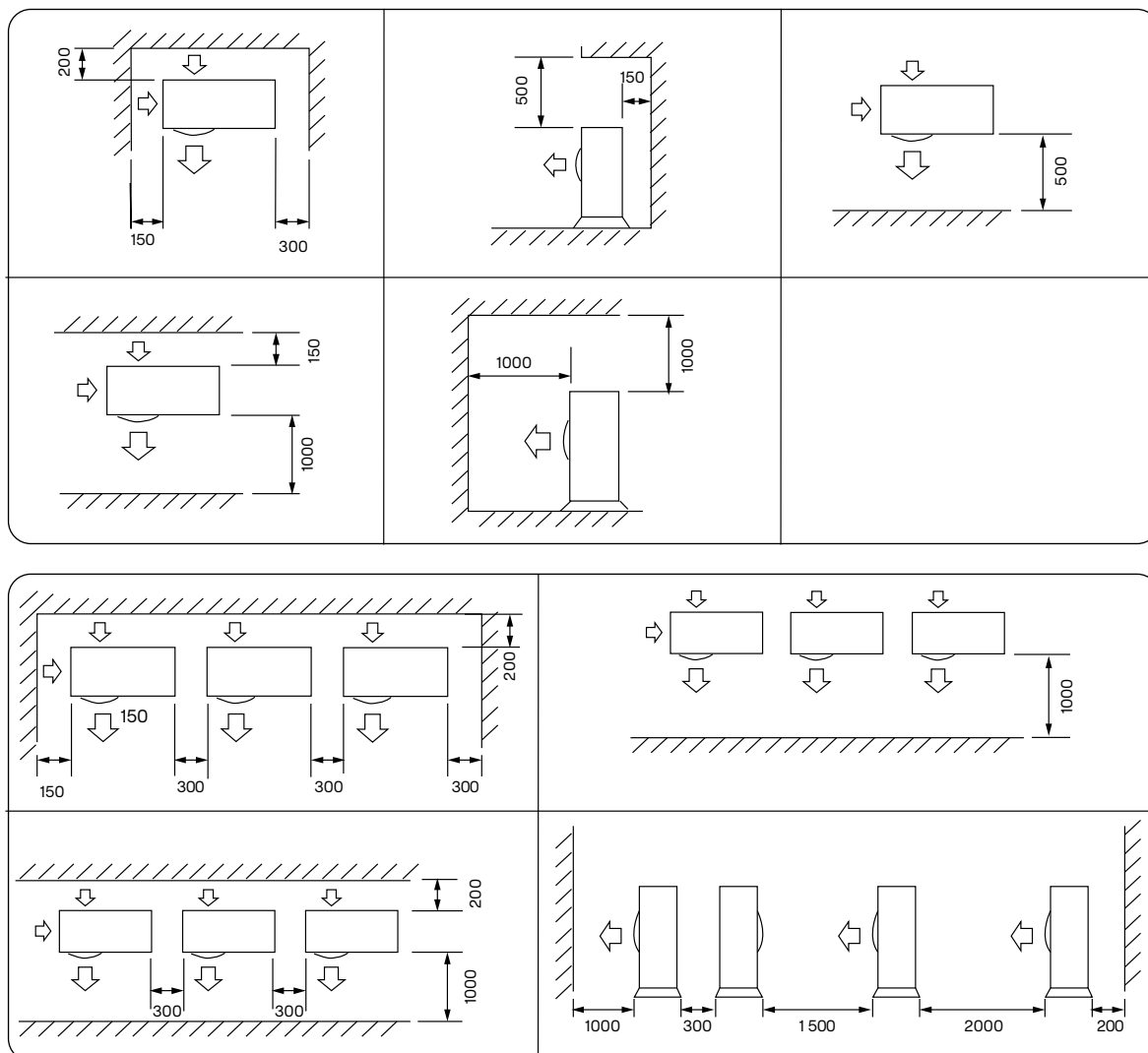
- ① Water inlet
- ② Water outlet

30AWH-R	A	B	C	D	E	F	G	H	I	Weight(kg)
4-6_1Ph	1335	875	410	475	353	170	334	836	445	109
8_1Ph	1335	875	410	475	353	170	334	836	445	120
10_1Ph	1335	875	410	475	353	170	334	836	445	126
12_1Ph	1302	1517	370	465	289	201	332	784	428	165,5
14-16_1Ph	1302	1517	370	465	289	201	332	784	428	167,7
12_3Ph	1302	1517	370	465	289	201	332	784	428	180,9
14-16_3Ph	1302	1517	370	465	289	201	332	784	428	182,9

NOTE : Dimensions are given in mm

Dimensions (mm)

The picture presents the minimal distances of the wall to ensure the correct air volume for air heat exchanger^①.



① Anticipate different maintenance actions before to place the unit (access of different parts / opening of panel/ part replacement...)