COOLING HEATING HOT WATER

AWR HT - AW HT

HFC R-407C

0122 - 0302
34 ÷ 118 kW

High temperature heat pump (reverse-cycle) with hot water production up to 65 °C for central heating and domestic hot water

PRELIMINARY

NEW!

((The photo of the unit is purely indicative and may vary depending on the model)

- High efficiency
- Adaptability
- Low noise
- Heat pump operation
- Domestic hot water production

TÜV SÜD ISO 14001 ISO 9001

A ENERGY CLASS

Detrazione fiscale del 55% D.M. 7 aprile 2008

prana

CLIMAVENETA

SUMMARY

Company quality system
certified to UNI EN ISO 9001
and environmental certification
UNI EN ISO 14001

1. GENERAL DESCRIPTION

The PRANA line units have been specially designed for use in heat pump systems requiring high temperature hot water production, up to 65°C, for both central heating and domestic use.
A special reverse-cycle version is also available, and consequently the new AWR HT can effectively be used for room air-conditioning in summer.
The products are fitted with two compressors that provide two capacity stages, so as to ensure hot water production for central heating and domestic use at maximum efficiency and without wasting energy.
All units feature two separate refrigerant circuits, so as to ensure maximum system reliability should one of the circuits be shut down for maintenance or when defrosting.

The following operating modes are available:
- chilled water production only (the unit operates as a chiller);
- hot water production only (the unit operates as a heat pump);
- combined production of chilled water for air-conditioning and domestic hot water
- combined production of hot water for central heating and domestic use

CHILLED WATER PRODUCTION ONLY
The unit operates as a simple chiller and transfers the excess heat from the inside environment (heat of condensation) to the air via a finned coil heat exchanger.
The system water is cooled in a freon-water plate heat exchanger (evaporator).

HOT WATER PRODUCTION ONLY
The unit works as a heat pump that, by exploiting the heat of the source air via the finned coil heat exchanger, heats the water delivered to the distribution system via a freon-water plate heat exchanger (condenser).

COMBINED PRODUCTION OF HOT AND CHILLED WATER
If the systems require simultaneous production of chilled water and hot water for domestic use, the unit manages the changeover in operating mode from chiller to heat pump and deviates the flow of water to the two separate systems via a three way valve, based on the priority assigned.
Changing the operating set point ensures the correct water production temperature for the different uses.
Suitable storage tanks can be used for both chilled and hot water to store the thermal energy produced for the systems, with consequent advantages in terms of running costs.

COMBINED PRODUCTION OF HOT WATER FOR HEATING AND DOMESTIC USE
If the systems require simultaneous production of hot water for heating and for domestic use, the unit deviates the flow of water to the two separate systems via a three way valve, based on the priority assigned, changing the set point to ensure production of hot water with different temperatures based on the type of use (heating or domestic).
In this case too, storage tanks can be used to store the thermal energy for the two systems, heating and domestic hot water, ensuring continuous operation by resolving the problem of simultaneous requests for hot water production.

2. MODELS AND VERSIONS

AWR HT/CA-E: high efficiency heat pump, reverse-cycle with cooling operation
AWR HT/LN-CA-E: low noise high efficiency heat pump, reverse-cycle with cooling operation

AWR HT/D/CA-E: high efficiency heat pump, reverse-cycle with cooling operation and partial heat recovery
AWR HT/D/LN-CA-E: low noise high efficiency heat pump, reverse-cycle with cooling operation and partial heat recovery

AW HT/CA-E: high efficiency heat pump
AW HT/LN-CA-E: low noise high efficiency heat pump

AW HT/D/CA-E: high efficiency heat pump with partial heat recovery
AW HT/D/LN-CA-E: low noise high efficiency heat pump with partial heat recovery

2.1. AW HT: heat pump

Heat pump designed for outdoor installation producing hot water for central heating and domestic use, with vapour-injection EVI hermetic scroll compressors operating on R407C, axial-flow fans, braze-welded plate heat exchanger and thermostatic expansion valve.
Peraluman external panelling and coated galvanised steel base. The range features two compressors operating in two separate refrigerant circuits.

MODELS
Basic model
Standard heat pump unit without heat recovery.

Model with partial heat recovery (D)
Heat pump unit complete with partial heat recovery.
In this configuration each refrigerant circuit, in addition to the basic configuration, has a refrigerant/water heat exchanger located on the gas discharge line.
This heat exchanger, placed in series downstream of the traditional condenser in the refrigerant circuit, is suitably sized to ensure heat recovery for hot water production at medium-high temperatures, for domestic or other use.
The heating capacity available is equal - as a rough approximation - to compressor power consumption.
Each heat exchanger is supplied as standard with frost protection heater.

VERSIONS AVAILABLE
CA-E - class A
High efficiency version that exceeds energy efficiency class A.

LN-CA-E - Low noise
High efficiency version, class A and low noise. This configuration features special soundproofing for the compressor compartments and a reduction in fan speed.
Rotation speed is however automatically increased in especially demanding environmental conditions.

2.2. AWR HT: reverse-cycle heat pump with cooling operation

Reverse-cycle heat pump designed for outdoor installation producing chilled/hot water for the cooling/heating system and hot water for domestic use, with vapour-injection EVI hermetic scroll compressors operating on R407C, axial-flow fans, braze-welded plate heat exchanger and thermostatic expansion valve.
Peraluman external panelling and coated galvanised steel base. The range features two compressors operating in two separate refrigerant circuits.

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Basic model
Standard reverse-cycle heat pump unit without heat recovery.

Model with partial heat recovery (D)
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The heating capacity available is equal - as a rough approximation - to compressor power consumption.
Each heat exchanger is supplied as standard with frost protection heater.
Heat of condensation is recovered both during operation in heating mode and operation in cooling mode.

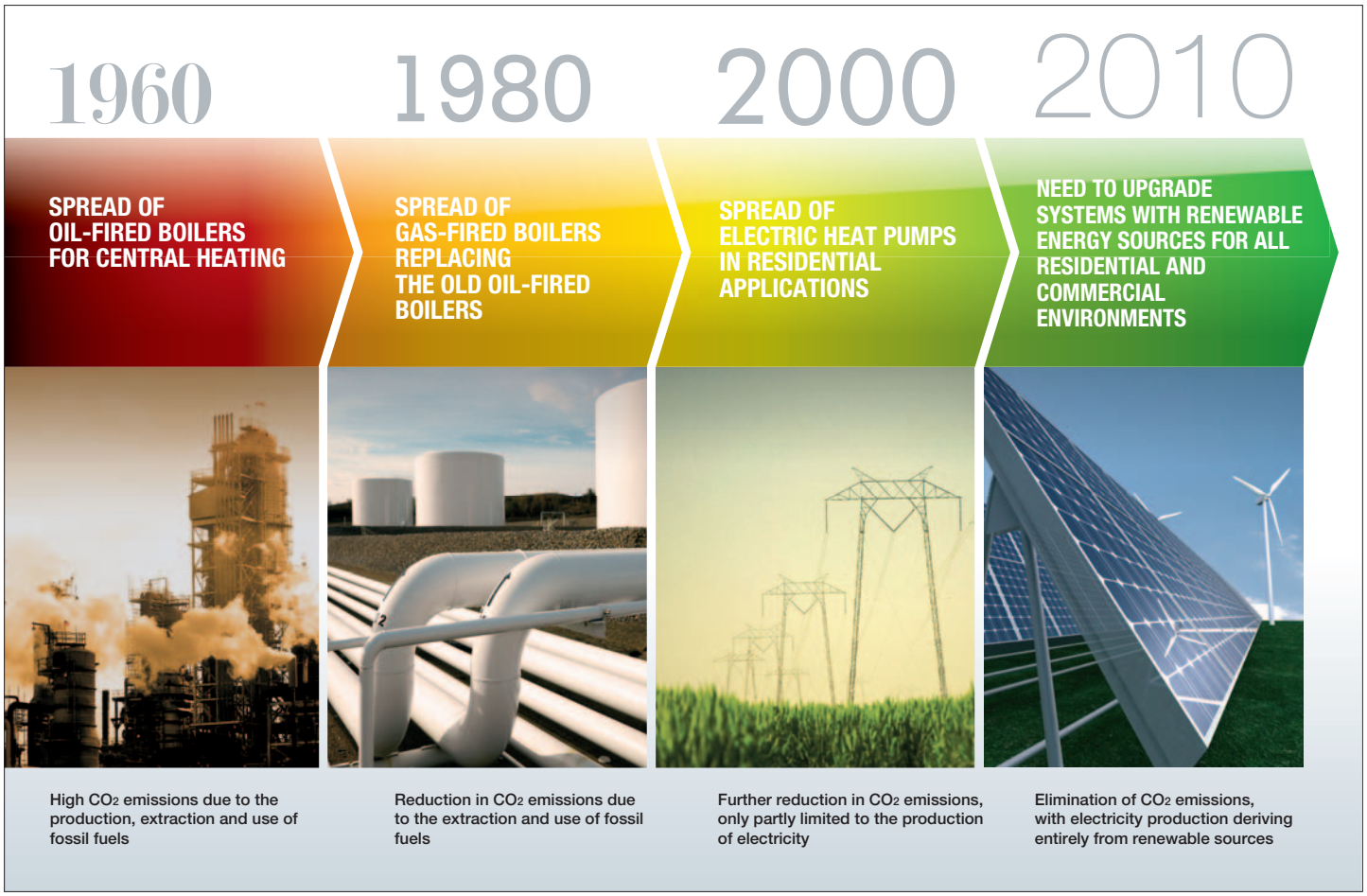
VERSIONS AVAILABLE
CA-E - Class A
High efficiency version that exceeds energy efficiency class A.

LN-CA-E - Low noise
High efficiency version in class A and low noise.
This configuration features special soundproofing for the compressor compartments and a reduction in fan speed.
Rotation speed is however automatically increased in especially demanding environmental conditions.

3. ADVANTAGES OF THE HEAT PUMP

THE EVOLUTION OF ENERGY RESOURCES

Until now, the energy used to heat rooms and domestic water in residential and service applications has accounted for a significant share of total energy consumption.
This energy is almost entirely produced using fossil fuels, meaning high levels of atmospheric pollution and with harmful effects on the environment.
Increasing environmental awareness, attention to the use of renewable sources and the drive to cut investments and operating costs, together with the need to comply with increasingly strict legislation, are factors that play an ever more important role in determining property values but also in the development possibilities available.
Heat pumps that exploit the heat of the earth or the air now represent the best solution for heating rooms and producing domestic hot water.



THE IMPORTANCE OF HEAT PUMPS

High temperature heat pumps are ideal for the renovation of buildings where gas- or oil-fired central heating boilers need to be replaced, however with the need to retain the existing hot water distribution system based on radiators and, at the same time, provide domestic hot water.
This situation is typical of contexts involving public buildings, such as schools and government offices, as well as in centralised residential systems such as apartment buildings, where the cost of renovation needs to be limited by keeping the same distribution system while at the same time offering a source of renewable energy, represented by the heat pump.
Renovating a building without involving the distribution system also solves the inconvenience relating to the building work that would otherwise be needed, meaning the building can still be used and consequently saving time and money.

One further advantage is represented by the possibility to use just one compact unit to manage the production of high temperature hot water for central heating and for domestic use, but also chilled water for air-conditioning in summer.
This function becomes essential in hotels where just one unit can satisfy the requirements of all the systems, ensuring the energy needs of the entire installation completely and efficiently.

For medium- and high-capacity installations, system capacity can be extended to 400 kW using a modular configuration. This type of installation allows differentiated management of domestic water production so as to optimise the use of energy resources without waste, likewise differentiating heating capacity from cooling capacity.

Its significant operating flexibility means high temperature heat pumps can be effectively used in the following applications:
- centralised systems for apartments
- public buildings
- schools
- hotels
- hospitals and clinics
- sports facilities and fitness centres

OPERATING RELIABILITY AND CONTINUITY

The new Climaveneta heat pumps offer maximum operating reliability, thanks to their two main features:
- two independent circuits for all sizes;
- system to prevent formation of ice on the coil, ensuring shorter and more efficient defrosts.

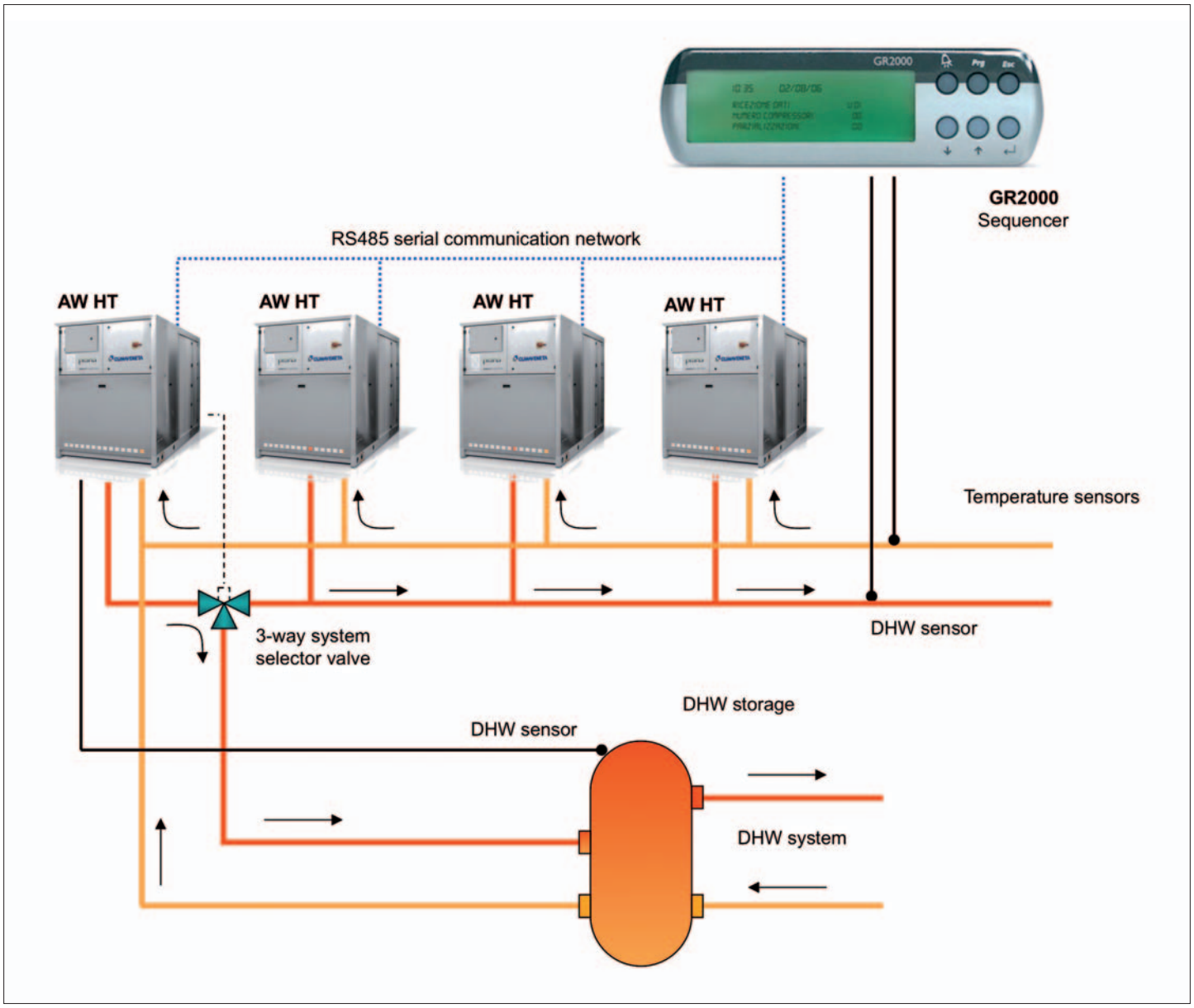
Indeed it should be remembered that a heat pump used to heat rooms has to operate at maximum capacity when the outside conditions are most adverse.

Typical night-time peaks in energy production must therefore always be ensured, regardless of the outside temperature and humidity conditions that may not allow a traditional heat pump to operate effectively.
For this reason, the Climaveneta AW(R) HT units are designed and tested to ensure continuous operation and guarantee maximum indoor comfort in all weather conditions.

EXTENSION TO SERVICE AND COMMERCIAL APPLICATIONS

For medium- and high-capacity installations, system capacity can be extended to 400 kW using a modular configuration to connect up to four AW(R) HT units.
In this type of installation, domestic hot water production can, if necessary, be managed by just one of the units, installing a three-way valve in the water circuit that deviates the flow of domestic hot water to a special storage tank.
This selector valve is managed directly by the AW(R) HT unit, which decides when to open or close it based on the temperature conditions measured directly in the systems (heating/cooling and DHW).
The system is completely managed by the Climaveneta GR2000 sequencer, which can be used to define dynamic standby conditions and priorities for unit activation.
An alarm signal is also available via a relay output.
The LCD user interface displays the main variables relating to the system and the units.
Control can be based on proportional or proportional and integral logic. The device is integrated perfectly into the unit, ensuring simultaneous activation of devices, optimising efficiency and start-up current, and managing the pumps on the unit.
An RS485 serial line is used for connection to the other system devices.

Below is an example of an installation with 4 AW HT units featuring domestic water production in combination with the Climaveneta GR2000 sequencer.



4. SPECIFICATIONS

STRUCTURE
Specific structure for outdoor installation, with hot galvanised steel sheet base painted with polyester powder coat, perimeter frame made from aluminium section bars.
Fan compartment separate from the compressor compartments.
Specific aluminium alloy panelling for outdoor installation, completely weatherproof, easily removable, designed to allow total access to internal components for inspection and maintenance (removal of front and side panels).
Ventilation of compressor compartments.

REFRIGERANT CIRCUIT
Main components of the refrigerant circuit:
- two circuits with compressors operating individually in each circuit
- R407C refrigerant
- mechanical thermostatic valves
- dewatering filter
- liquid flow indicator with moisture gauge
- high pressure safety valve
- low pressure safety valve
- high and low pressure transducers
- high pressure safety switches
- liquid receivers
- 4-way reversing valves
- plate heat exchanger on subcooling line
- solenoid on liquid subcooling line

COMPRESSOR
Hermetic rotary scroll compressor with vapour injection, complete with sump heater, electronic thermal protector with centralised manual reset, two-pole electric motor.

SYSTEM HEAT EXCHANGER
Braze welded AISI 316 steel plate heat exchanger.
The heat exchangers are lined on the outside with closed-cell neoprene lagging.
When the unit is not operating, these are protected against formation of ice on the inside by an electric heater with thermostat, while when the unit is operating protection is ensured by a differential pressure switch on the water side.
The unit can also operate with non-freezing mixes, down to heat exchanger outlet temperatures of -8°C.

SOURCE HEAT EXCHANGER
Finned coil heat exchanger made from copper tubes and suitably spaced aluminium fins to guarantee maximum heat exchange efficiency, including subcooling circuit located in the bottom section of the coil.

SOURCE FAN COMPARTMENT
450 mm axial-flow fans with IP 54 index of protection, external impeller, pressed metal blades, housed in aerodynamic tubes, complete with accident prevention grill.
Six-pole electric motor with integrated thermal protector.
Fan compartment divided into two zones to allow independent air flow for each circuit.
Differentiated ventilation control with fans on inactive circuit shut down.
Condenser managed by continuous control of fan rotation speed.

POWER AND CONTROL ELECTRICAL PANEL
Power and control electrical panel, built in compliance with EN 60204-1/IEC 204-1 standards, complete with:
- transformer for the control circuit,
- main door interlock disconnect switch,
- fuses and contactors for compressors and fans.
- cumulative alarm terminals (BCA),
- remote ON/OFF terminals,
- spring terminal blocks for control circuits,
- valve control terminals,
- electrical panel for outdoor installation, with two doors and seal gaskets,
- electronic controller.

Unit power supply voltage: 400V~ ±10% - 50 Hz - 3N.

CERTIFICATION
Unit compliant with the following directives and amendments:
- Machinery Directive 2006/42/EC.
- EMC 89/336/EEC + 2004/108/EC.
- Low Voltage Directive 2006/95/EC.
- Pressure Equipment Directive 97/23/EC. Model A1. TÜV Italy

TESTS
Checks performed throughout the entire manufacturing process according to the procedures specified by ISO 9001.
Performance or noise emission tests can be conducted by highly qualified technical personnel with the customer present.
Performance tests involve measuring:
- electrical data
- water flow-rates
- operating temperature
- power consumption
- capacity delivered
- pressure drop on the water-source heat exchanger at both full load (in rated conditions and at the most critical conditions for the condenser) and at part load.

During performance testing the main alarm conditions can also be simulated.
Noise emission tests verify the unit's sound power levels according to ISO 3744.

5. CONTROL ELECTRONICS

The W3000SE controller is the new device designed especially for heat pump applications with incorporated logic for high temperature hot water production.
The keypad features function controls and a complete LCD display for viewing data and activating the unit, via a multilevel menu, with settable display language.
The controller provides temperature control for the heating and cooling systems in the air-conditioned rooms, as well as for domestic hot water.
These different temperatures are managed automatically based on the different conditions in which the system operates, with the possibility to assign specific levels of priority to domestic hot water production, depending on the needs of the application.
Diagnostics include complete alarm management, with “black box” functions (via PC) and alarm log (display or PC) for best analysis of unit behaviour.
For systems made up of multiple units, differentiated device management means just a certain portion of the capacity installed can be dedicated to domestic water production, in this way ensuring more efficient energy distribution and, at the same time, guaranteeing simultaneous water delivery to the different distribution systems.
The built-in clock can be used to create an operating profile containing up to 4 typical days and 10 time bands, essential for efficient programming of energy production, and fundamental for managing the Legionella prevention cycles.
Defrosts use proprietary self-adaptive logic involving monitoring of multiple operating and climate parameters.
This reduces the number and duration of defrosts, consequently increasing overall energy efficiency.
Supervision is available with different options, using proprietary devices or by integration into third party systems using ModBus, BACnet, BACnet-over-IP and Echelon LonWorks protocols.
A dedicated wall-mounted keypad can be used for remote control of all the functions.

6. TECHNICAL DATA

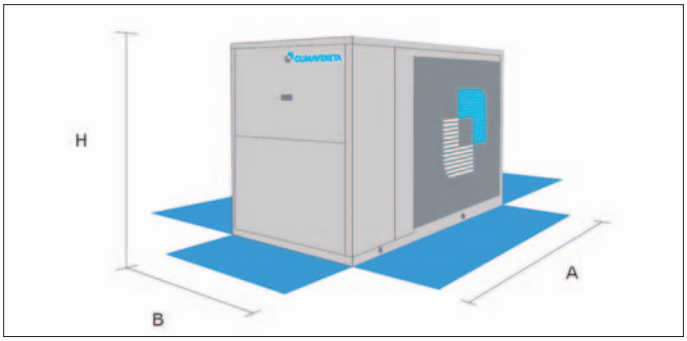
AWR HT/CA-E and AW HT/CA-E models

Sizes		0122	0152	0202	0262	0302
Cooling (1)	Pf [kW]	34,1	43,8	60,3	76,4	91,6
	Pa [kW]	11,5	14,7	20,4	25,9	31,3
	EER	2,97	2,98	2,96	2,95	2,93
Cooling (2)	Pf [kW]	43,7	56,2	77,1	98,0	118,4
	Pa [kW]	12,4	15,5	21,9	28,6	35,0
	EER	3,49	3,59	3,48	3,37	3,32
Heating (3)	Pc [kW]	38,0	51,3	68,8	84,9	102,0
	Pa [kW]	10,7	14,4	19,4	23,6	27,7
	COP	3,55	3,57	3,55	3,60	3,68
Heating (4)	Pc [kW]	37,6	50,6	67,9	83,7	100,7
	Pa [kW]	8,9	12,2	16,3	19,9	23,2
	COP	4,21	4,13	4,14	4,17	4,30
Compressors	Type	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL
	[no.]	2	2	2	2	2
Circuits	Refrigerant	R407C	R407C	R407C	R407C	R407C
	[no.]	2	2	2	2	2
Evaporator	Type	PLATE	PLATE	PLATE	PLATE	PLATE
	[no.]	1	1	1	1	1
Dimensions	A [mm]	1965	2195	2745	2745	2745
	B [mm]	1120	1120	1120	1120	1120
	H [mm]	1420	1420	1420	1420	1420
Sound power (5)	Lw [dB(A)]	84	86	87	87	87
Sound pressure (6)	Lp [dB(A)]	58	60	60	60	60

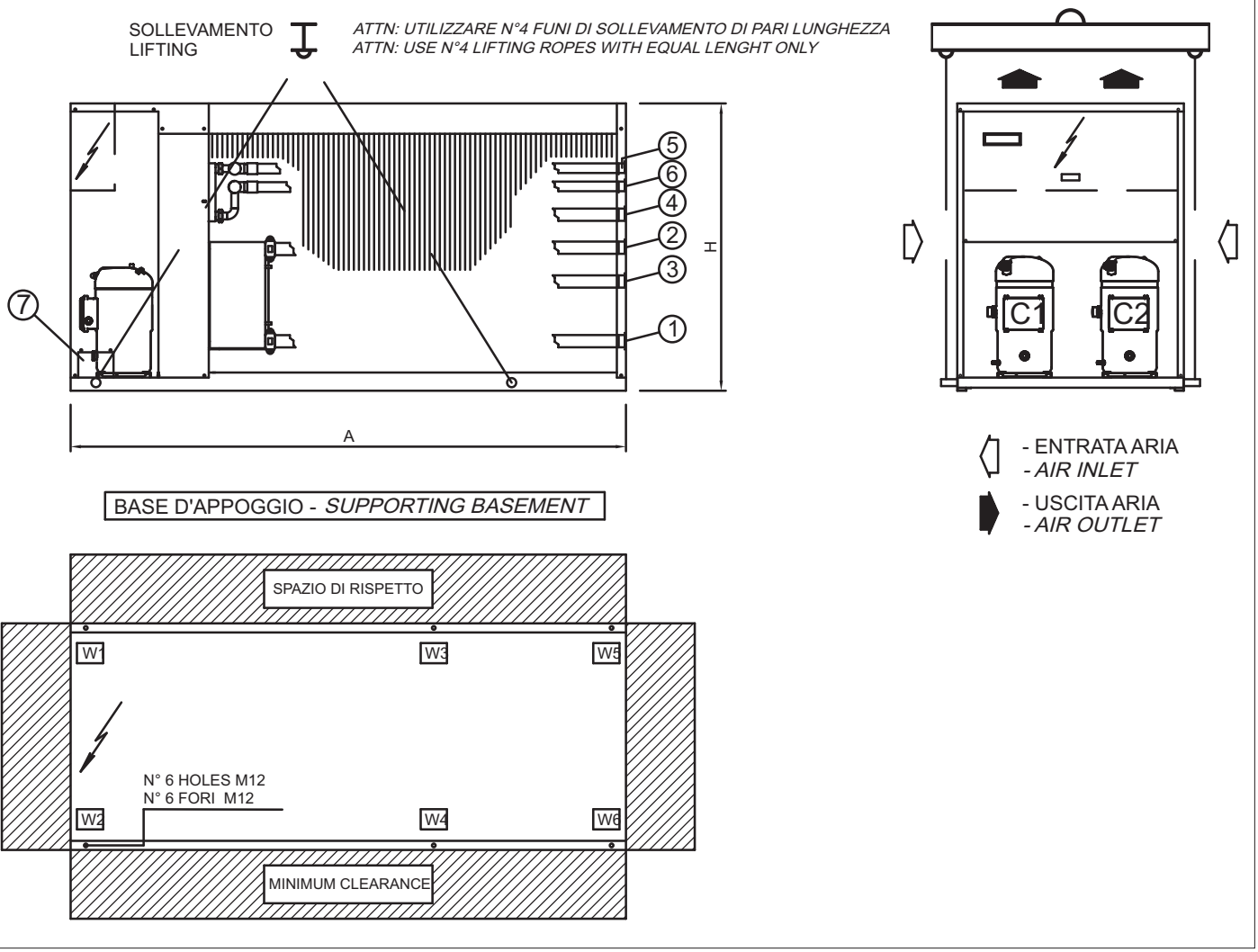
Modelli AWR HT/LN-CA-E e AW HT/LN-CA-E

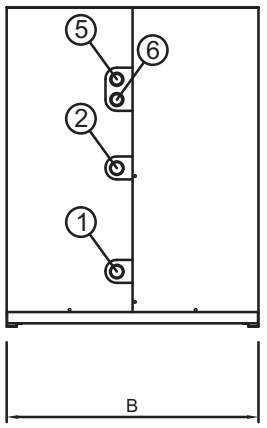
Sizes		0122	0152	0202	0262	0302
Cooling (1)	Pf [kW]	34,0	43,8	60,2	76,2	90,3
	Pa [kW]	11,6	15,0	20,5	26,1	32,9
	EER	2,93	2,93	2,94	2,92	2,74
Cooling (2)	Pf [kW]	43,6	56,2	77,0	97,6	116,3
	Pa [kW]	12,5	16,0	22,0	28,9	37,2
	EER	3,46	3,49	3,46	3,33	3,08
Heating (3)	Pc [kW]	38,4	51,0	69,4	85,8	100,3
	Pa [kW]	10,7	14,3	19,4	23,7	27,6
	COP	3,59	3,56	3,58	3,62	3,63
Heating (4)	Pc [kW]	38,0	50,2	68,5	84,7	99,0
	Pa [kW]	8,9	12,1	16,4	20,0	23,0
	COP	4,25	4,12	4,15	4,20	4,27
Compressors	Type	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL
	[no.]	2	2	2	2	2
Circuits	Refrigerant	R407C	R407C	R407C	R407C	R407C
	[no.]	2	2	2	2	2
Evaporator	Type	PLATE	PLATE	PLATE	PLATE	PLATE
	[no.]	1	1	1	1	1
Dimensions	A [mm]	1695	2195	2745	2745	2745
	B [mm]	1120	1120	1120	1120	1120
	H [mm]	1420	1420	1420	1420	1420
Sound power (5)	Lw [dB(A)]	80	82	83	83	84
Sound pressure (6)	Lp [dB(A)]	54	55	56	56	57

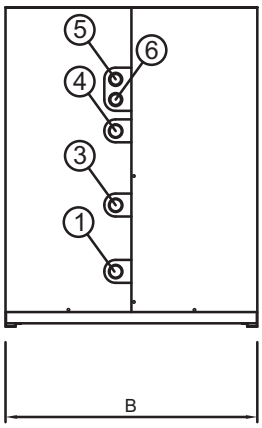
(1) Evaporator water (in/out) = 12/7°C; outside air = 35°C (only for reverse-cycle models with cooling operation)
(2) Evaporator water (in/out) = 23/18°C; outside air = 35°C, as per EN 14511 (only for reverse-cycle models with cooling operation)
(3) Condenser water (in/out) = 40/45°C; outside air = 7°C
(4) Condenser water (in/out) = 30/35°C; outside air = 7°C, as per EN 14511
(5) Sound power based on measurements performed in accordance with ISO 9614
(6) Average sound power on reflecting surface (Q=2) at a distance of 5 metres from the external surface.



DIMENSIONED DRAWINGS







STANDARD VERSION
WITH or WITHOUT HYDRONIC KIT

WITH or WITHOUT HYDRONIC KIT AND
3-WAY VALVE FOR DOMESTIC HOT WATER

① INGRESSO ACQUA
WATER INLET

② USCITA ACQUA IMPIANTO
PLANT WATER OUTLET

③ USCITA ACQUA IMPIANTO
PLANT WATER OUTLET

④ USCITA ACQUA SANITARIO
DOMESTIC HOT WATER OUTLET

⑤ INGRESSO ACQUA DESURRISCALDATORI (OPZIONALE)
DESUPERHEATERS WATER INLET (OPTIONAL)

⑥ USCITA ACQUA DESURRISCALDATORI (OPZIONALE)
DESUPERHEATERS WATER OUTLET (OPTIONAL)

⑦ INGRESSO LINEA ELETTRICA
POWER INLET

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