

Data Book

AW_HT_0404_0604_201305_EN



AW-HT 0404 - 0604

135-205 kW

High efficiency heat pump, air source for outdoor installation, high water temperature



R HFC R-407C

SCROLL

P PLATES

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

- ✓ PREMIUM 'CLASS A' EFFICIENCY
- ✓ WIDE OPERATING RANGE
- ✓ MAXIMUM RELIABILITY

- ✓ RENEWABLE ENERGY FOR COMMERCIAL INSTALLATIONS
- ✓ MODULAR CONFIGURATION

CERTIFICATIONS

Product certifications



Certificate Number MCS HP0005
Heat Pumps

System certifications



Climaveneta S.p.A.:

Quality System complying with the requirements of UNI EN ISO9001:2008 regulation

Environmental Management System complying with the requirements of UNI EN ISO14001:2004 regulation



Certificate Number MCS HP0005
Heat Pumps

SUMMARY

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The units highlighted in this publication contain HFC R407C [GWP₁₀₀ 1774] fluorinated greenhouse gases.

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All work must be performed, components selected and materials used professionally and in complete accordance with the legislation in force in material in the country concerned, and considering the operating conditions and intended uses of the system, by qualified personnel.

The data contained in this publication may be changed without prior notice.

1. GENERAL DESCRIPTION

AW-HT represent the best solution for systems in which there is the need to combine both high temperature water for space heating and sanitary purposes, as well as air conditioning. With this solution the space heating can be easily provided by using radiators, so without any major changes on the already existing distribution system available on site. The EVI technology compressor with additional steam injection in the compressing cycle assures a water temperature of 65°C and operating limits as low as -20°C. Neither probes nor connections pipes to wells are needed; the installation is simple, this is a suitable solution for all applications.

PREMIUM 'CLASS A' EFFICIENCY

The full range is available with a premium efficiency rating, over the Class A. AW-HT/CA-E and AW-HT/LN-CA-E guaranty premium levels of efficiency and quietness, making this range the best solution for both residential and light commercial markets.

MAXIMUM RELIABILITY

AW-HT 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 defrost cycles

The unique feature of this unit consists in the low noise operation in winter conditions, making this heat pump the most suitable and flexible solution for the commercial environment as well as for the most demanding residential contexts.

EXTENSIVE RANGE OF OPERATION

Production of high temperature hot water up to 65°C for space heating and sanitary purposes. The unit can operate as standard down to -20°C outdoor temperature.

The unique feature of this unit consists in the low noise operation in winter conditions, making this heat pump the most suitable and flexible solution for the commercial environment as well as for the most demanding residential contexts.

RENEWABLE ENERGY FOR COMMERCIAL INSTALLATIONS

Best solution in centralised residential systems such as apartment buildings, where the cost of renovation needs to be limited by keeping the same distribution system with radiators, while offering a source of renewable energy.

MODULAR CONFIGURATION

Modular configuration with capacity extension up to about 1.000kw for medium- and high-capacity installations. Ability of managing different thermal loads according to the requirements of both heating and the domestic hot water systems

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 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

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

AW-HT: heat pump with heating operation

Heat pump designed for outdoor installation producing hot water for the 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.

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 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.

The unique feature of this version consists in the low noise operation in winter conditions.

3. ADVANTAGES OF THE HEAT PUMP

THE EVOLUTION OF ENERGY RESOURCES

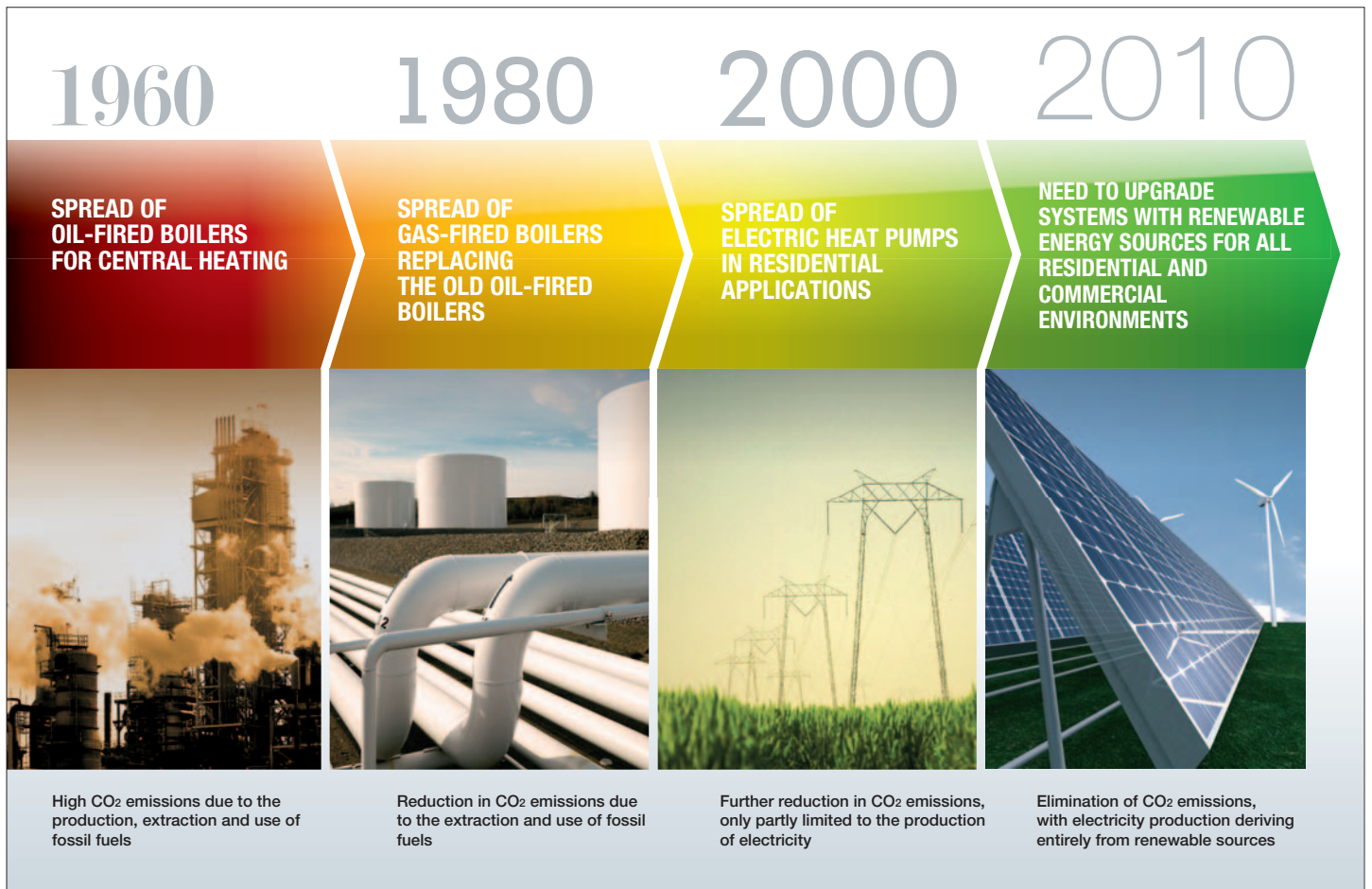
Until now, the energy used to heat rooms and domestic water in residential and service applications has accounted for a significant share of total energy consumption.

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.

For medium- and high-capacity installations, system capacity can be extended to about 1.000kW 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.

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-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 about 1.000kW using a modular configuration to connect up to four AW-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-HT unit, which decides when to open or close it based on the temperature conditions measured directly in the systems (heating 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.

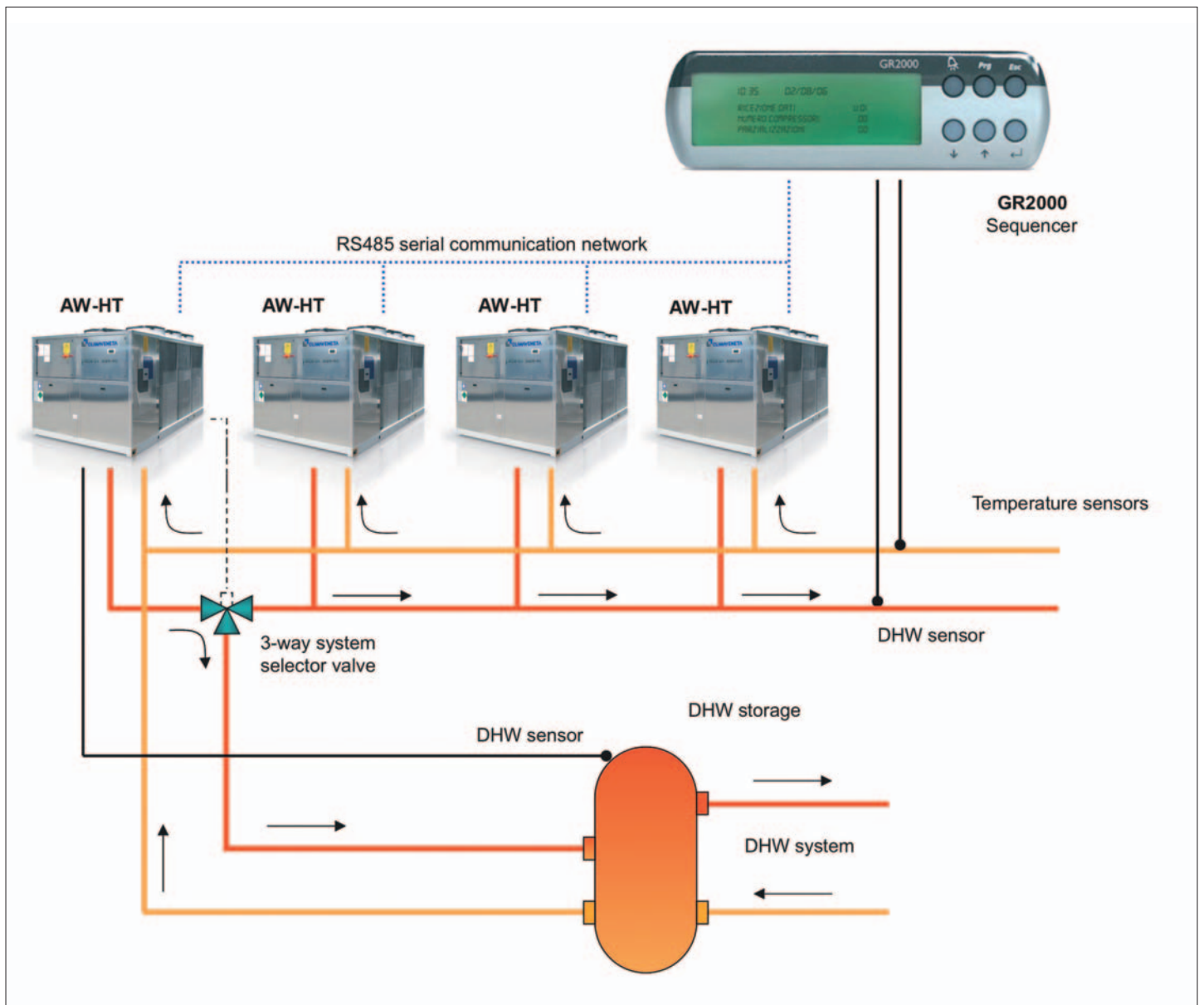
An alarm signal is also available via a relay output.

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

DESCRIPTION

Reversible heat pump designed for outdoor installation producing hot high-temperature water up to 65°C 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. Per-aluman external paneling and coated galvanized steel base. Operating limit in summer mode: +40°C outdoor temperature
Operating limit in winter mode: -20°C outdoor temperature

STRUCTURE

Specific structure for outdoor installation, with hot galvanized steel sheet base painted with polyester powder coat, perimeter frame made from aluminum section bars. Fan compartment separate from the compressor compartments. Specific aluminum alloy paneling 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). Condensate collection and disposal system composed by double pan, insulated with closed-cell neoprene lagging and heated by dedicated electrical heaters. Double nozzle for water expelling with a 1 1/4" diameter. Ventilation of compressor compartments.

REFRIGERANT CIRCUIT

Main components of the refrigerant circuit:

- two separated and independent circuits with two compressors in tandem configuration on each circuit,
- R407C refrigerant,
- mechanical thermostatic valves,
- filter dryer,
- 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 aluminum fins to guarantee maximum heat exchange efficiency, including subcooling circuit located in the bottom section of the coil.

POWER AND CONTROL ELECTRICAL PANEL

Power and control electrical panel, built in compliance with EN60204-1/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,
 - 3 way 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.

SOURCE FAN COMPARTMENT

Axial-flow fans with IP54 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.

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
- Eurovent certification according to the program LCP/A/P/R

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 test 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. W3000 CONTROL ELECTRONICS

The W3000 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 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. ACCESSORIES

CODE	ACCESSORIES	DESCRIPTION	BENEFIT
881	Cu/Cu condensing coils	Air-refrigerant heat exchanger with copper fins and tubes.	Recommended for applications in corrosive atmospheres
894	Condensing coils with epoxy-coated fins	Painted air-refrigerant heat exchanger.	Recommended for applications in medium level pollution atmospheres.
895	Condensing coils with Fin Guard Silver treatment	Air-refrigerant heat exchanger with epoxidic treatment on coils and fins.	Recommended for marine exposure conditions, with a high level of pollution or other aggressive atmospheres.
1511	Soft start	Electronic device adopted to manage the inrush current.	Break down of the inrush current as soon as the electrical motor is switch on, lower motor's mechanical wear, favourable sizing for the electrical system.
2411	Remote phase-sequence control	Relay for controlling the phase-sequence of mains.	Protects loads against faults due to incorrect connection of the electric line.
3601	Compressors' on/off signal	Auxiliary contacts providing a voltage-free signal	Allows remote signalling of compressor's activation or remote control of any auxiliary loads.
4181	ModBUS connectivity	Interface module for ModBUS protocols	Allows integration with BMS operating with ModBUS protocol
4184	BACnet connectivity	Interface module for BACnet protocols	Allows integration with BMS operating with BACnet protocol
4182	Echelon connectivity	Interface module for Echelon systems	Allows integration with BMS operating with Lon-Works protocols
1401	HP and LP gauges	High and low pressure gauges.	Allows immediate reading of the pressure values on both low and high pressure circuits.
1901	Compressor suction valve	Shut-off solenoid valve on compressor's suction circuit.	Simplifies maintenance activities
1911	Compr. discharge line valve	Shut-off solenoid valve on compressor discharge circuit	Simplifies maintenance activities.
2032	Cond. coil protection net	Coil protecting net	Protects against the intrusion of solid bodies with medium/large dimensions.
2621	Extra insulation for the compressors section	Acoustic enclosure on both compressor and pump sections (when applicable)	Noise emission reduction
4185	BACnet OVER-IP connectivity	Interface module for BACnet OVER-IP protocols (LN standard version)	Allows to interconnect BACnet devices over Internet Protocol within wide-area networks
1961	Pressure relief valves	Dual relief valve with manual diverting switch	Allows to unselect a relief valve in order to service the unit avoiding medium or long inoperative periods
1252	Arrangement for 3 way on field	Arrangement for a 3 way valve for remote installation for the production of domestic hot water	Allows to divert the water flow through the space heating system and the domestic hot water circuit according to the assigned priority level. The control of the flow is based on the water temperature detected by a dedicated sensor placed on the DHW boiler. The unit comes standard without the built in valve. The valve must be installed externally and can be placed close to the DHW boiler, thus simplifying the water circuit.
1253	With 3 way valve on board	3 way valve built-in installed for the production of domestic hot water	Allows to divert the water flow through the space heating system and the domestic hot water circuit according to the assigned priority level. The control of flow is based on the water temperature detected by a dedicated sensor placed on the DHW boiler. The unit comes with the valve factory built in. The actuator is installed into a dedicated board with an electrical heater, protected against low ambient temperature. The built in valve allows to simplify the on-site installation operations.

7. GENERAL TECHNICAL DATA

AW-HT / CA-E

APPLICATION HYDRONIC TERMINAL

AW-HT / CA-E			0404	0524	0604
Power supply		V/ph/Hz	400/3/50	400/3/50	400/3/50
PERFORMANCE					
HEATING ONLY (GROSS VALUE)					
Total heating capacity	(1)	kW	135	171	205
Total power input	(1)	kW	39,6	48,1	58,9
COP	(1)		3,41	3,56	3,48
EXCHANGERS					
HEAT EXCHANGER USER SIDE IN HEATING					
Water flow	(1)	m ³ /h	23,4	29,7	35,6
Pressure drop	(1)	kPa	25,4	28,6	31,3
COMPRESSORS					
Compressors nr.		N°	4	4	4
Number of capacity		N°	4	4	4
No. Circuits		N°	2	2	2
Regulation			STEPS	STEPS	STEPS
Min. capacity step		%	25	25	25
Refrigerant			R407C	R407C	R407C
Refrigerant charge		kg	66,0	108	108
Oil charge		kg	16,0	16,4	16,4
FANS					
Quantity		N°	4	4	6
Air flow		m ³ /s	15,8	18,0	23,7
Fans power		kW	1,2	1,2	1,2
NOISE LEVEL					
Noise Pressure	(2)	dB(A)	73	73	74
Noise Power	(3)	dB(A)	92	93	94
SIZE AND WEIGHT					
A	(4)	mm	3110	4110	4110
B	(4)	mm	2220	2220	2220
H	(4)	mm	2150	2150	2150
Operating weight	(4)	kg	1950	2400	2530

Notes:

- Plant (side) heat exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger air (in) 7°C - 87% R.H.
 - Average sound pressure level, at 1m distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.
 - Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units.
 - Unit in standard configuration/execution, without optional accessories.
- Unavailable

7. GENERAL TECHNICAL DATA

AW-HT / LN-CA-E

APPLICATION HYDRONIC TERMINAL

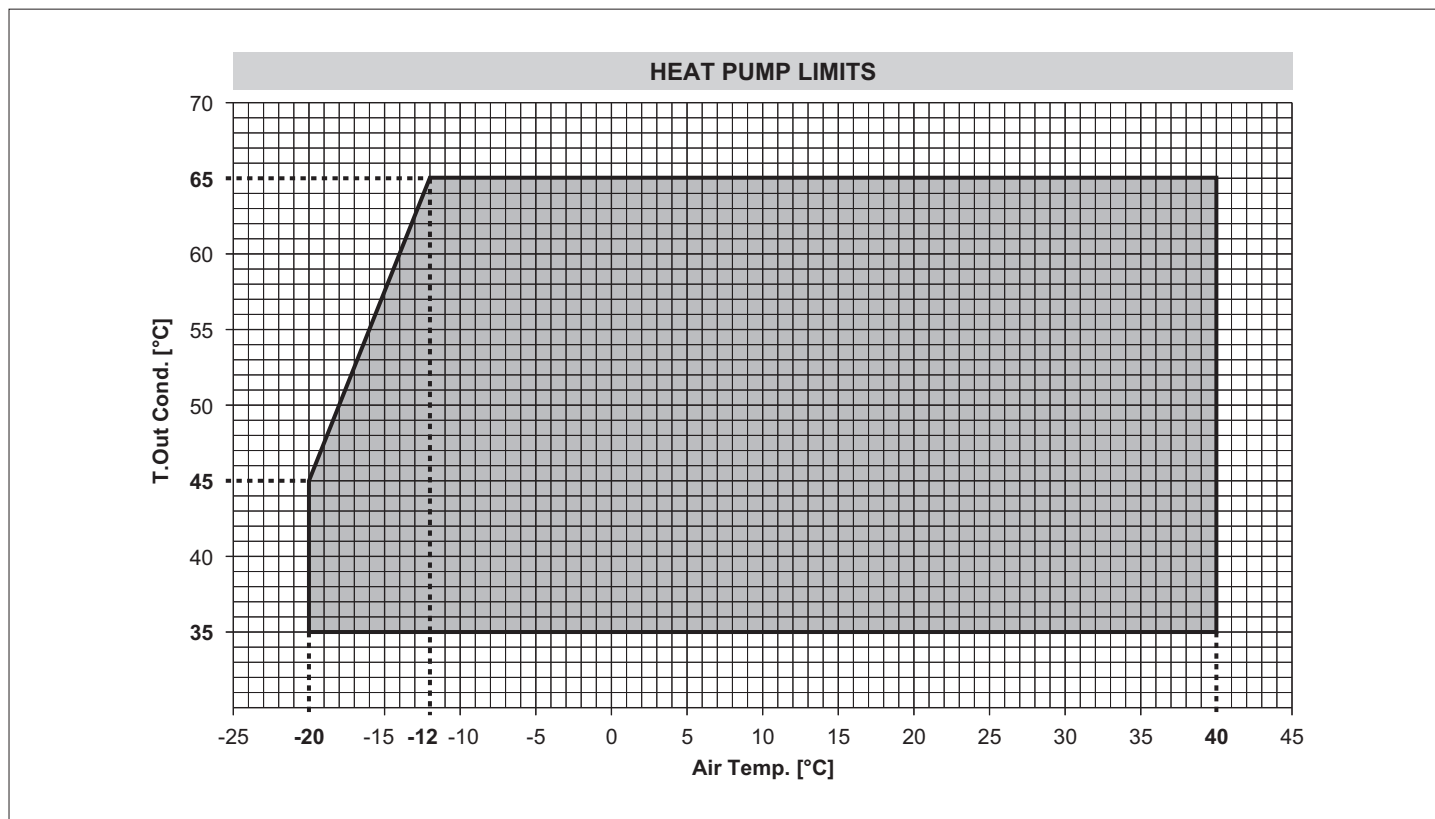
AW-HT / LN-CA-E		0404	0524	0604	
Power supply		V/ph/Hz	400/3/50	400/3/50	400/3/50
PERFORMANCE					
HEATING ONLY (GROSS VALUE)					
Total heating capacity	(1)	kW	135	171	205
Total power input	(1)	kW	39,6	48,1	58,9
COP	(1)		3,41	3,56	3,48
EXCHANGERS					
HEAT EXCHANGER USER SIDE IN HEATING					
Water flow	(1)	m ³ /h	23,4	29,7	35,6
Pressure drop	(1)	kPa	25,4	28,6	31,3
COMPRESSORS					
Compressors nr.		N°	4	4	4
Number of capacity		N°	4	4	4
No. Circuits		N°	2	2	2
Regulation			STEPS	STEPS	STEPS
Min. capacity step		%	25	25	25
Refrigerant			R407C	R407C	R407C
Refrigerant charge		kg	66,0	108	108
Oil charge		kg	16,0	16,4	16,4
FANS					
Quantity		N°	4	4	6
Air flow		m ³ /s	15,8	18,0	23,7
Fans power		kW	1,2	1,2	1,2
NOISE LEVEL					
Noise Pressure	(2)	dB(A)	67	66	67
Noise Power	(3)	dB(A)	86	86	87
SIZE AND WEIGHT					
A	(4)	mm	3110	4110	4110
B	(4)	mm	2220	2220	2220
H	(4)	mm	2150	2150	2150
Operating weight	(4)	kg	1960	2410	2540

Notes:

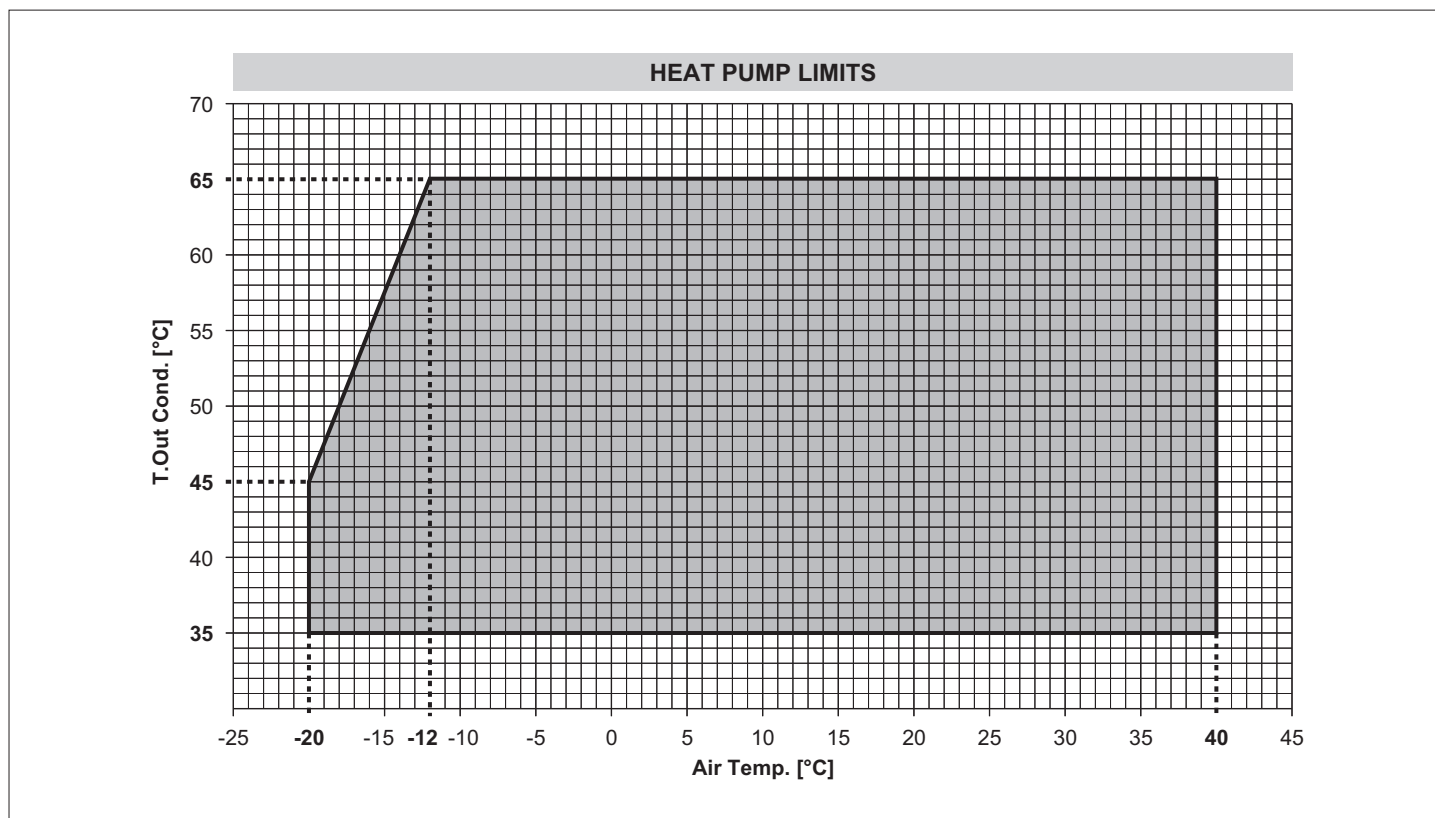
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 - Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units.
 - Unit in standard configuration/execution, without optional accessories.
- Unavailable

8. OPERATING LIMITS

AW-HT / CA-E 0404 ÷ 0604



AW-HT / LN-CA-E 0404 ÷ 0604



9. ETHYLENE GLYCOL MIXTURE

Ethylene glycol and water mixture, used as a heat-conveying fluid, cause a variation in unit performance. For correct data, use the factors indicated in the following table.

	Freezing point (°C)							
	0	-5	-10	-15	-20	-25	-30	-35
	Ethylene glycol percentage by weight							
	0	12%	20%	30%	35%	40%	45%	50%
cQ	1	1,02	1,04	1,075	1,11	1,14	1,17	1,2
cdp	1	1,07	1,11	1,18	1,22	1,24	1,27	1,3

cQ: flow correction factor
cdp: pressure drop correction factor

For data concerning other kind of anti-freeze solutions (e.g. propylene glycol) please contact our Sale Department.

10. FOULING FACTORS

Performances are based on clean condition of tubes (fouling factor = 1). For different fouling values, performance should be adjusted using the correction factors shown in the following table.

FOULING FACTORS ff (m ² °CW)	EVAPORATOR			CONDENSER/RECOVERY			DESUPERHEATER
	F1	FK1	KE [°C]	F2	FK2	KC [°C]	R3
0	1,000	1,000	0,0	1,000	1,000	0,0	1,000
1,80 x 10 ⁻⁵	1,000	1,000	0,0	1,000	1,000	0,0	1,000
4,40 x 10 ⁻⁵	1,000	1,000	0,0	0,990	1,030	1,0	0,990
8,80 x 10 ⁻⁵	0,960	0,990	0,7	0,980	1,040	1,5	0,980
13,20 x 10 ⁻⁵	0,944	0,985	1,0	0,964	1,050	2,3	0,964
17,20 x 10 ⁻⁵	0,930	0,980	1,5	0,950	1,060	3,0	0,950

ff: fouling factors
f1 - f2: potential correction factors
fk1 - fk2: compressor power input correction factors
r3: capacity correction factors

KE: minimum condenser outlet temperature increase
KC: maximum condenser outlet temperature decrease

11. HYDRAULIC DATA

Water flow and pressure drop

Water flow in the heat exchangers is given by: $Q = P \times 0,86 / Dt$

Q: water flow (m³/h)

Dt: difference between inlet and outlet water temp. (°C)

P: heat exchanger capacity (kW)

Pressure drop is given by: $Dp = K \times Q^2 / 1000$

Q: water flow (m³/h)

Dp: pressure drop (kPa)

K: unit size ratio

SIZE	HEAT EXCHANGER USER SIDE					HEAT RECOVERY EX. USER SIDE			
	K	Q min	Q max	C.A.S.	C.a.	K	Q min	C.A.S.	Q max
		m ³ /h	m ³ /h	dm ³	min m ³		m ³ /h	dm ³	m ³ /h
AW-HT /CA-E /0404	46,2	10,0	50,0	29	1,03	-	-	-	-
AW-HT /CA-E /0524	32,4	10,0	55,0	40	1,28	-	-	-	-
AW-HT /CA-E /0604	24,7	10,0	60,0	53	1,55	-	-	-	-
AW-HT /D /CA-E /0404	46,2	10,0	50,0	29	1,03	376	-	7	7,00
AW-HT /D /CA-E /0524	32,4	10,0	55,0	40	1,28	401	-	10	8,90
AW-HT /D /CA-E /0604	24,7	10,0	60,0	53	1,55	398	-	10	10,5
AW-HT /LN-CA-E /0404	46,2	10,0	50,0	29	1,03	-	-	-	-
AW-HT /LN-CA-E /0524	32,4	10,0	55,0	40	1,28	-	-	-	-
AW-HT /LN-CA-E /0604	24,7	10,0	60,0	53	1,55	-	-	-	-
AW-HT /D /LN-CA-E /0404	46,2	10,0	50,0	29	1,03	376	-	7	1,00
AW-HT /D /LN-CA-E /0524	32,4	10,0	55,0	40	1,28	401	-	10	8,90
AW-HT /D /LN-CA-E /0604	24,7	10,0	60,0	53	1,55	398	-	10	10,5

Q min: minimum water flow admitted to the heat exchanger

Q max: maximum water flow admitted to the heat exchanger

C.a. min: minimum water content admitted in the plant, using traditional control logic

C.A.S.: Heat exchanger water content

12. HYDRONIC GROUP (Optional)

The units can be supplied with a hydronic group. This houses all the main hydraulic components, thereby optimising hydraulic and electric installation space, time and cost.

Available pump configurations:

- Hydronic kit with one IN-LINE 2-pole low-head pump
- Hydronic kit with one IN-LINE 2-pole high-head pump
- Hydronic kit with IN-LINE 2-pole low-head twin pumps
- Hydronic kit with IN-LINE 2-pole high-head twin pumps

2-pole low head pump

Centrifugal pumps with in-line suction and delivery flanges, in single and twin versions. Pump body in cast iron and impeller in AISI 316L stainless steel or cast-iron, entirely laser technology welded. Mechanical seal with components in ceramics, carbon and EPDM elastomers. Three-phase electric motor protected to IP55, insulation class F, suitable for continuous service.

2-pole high-head pump

All versions of the hydronic unit can be supplied with a high head pump. In these cases, the pump features a two-pole motor even in the silent-running versions.

Twin pump

A second stand-by pump for high or low pressures is available on request. The pumps are automatically exchanged on the basis of a rotation programme and the stand-by pump cuts in automatically if the primary pump fails.

GENERAL CHARACTERISTICS

Water connections

In the units without pumps, standard version, the connections for the water inlet and outlet both in the evaporator and in the desuperheater are inside the unit. As an accessory one can request these connections flush with the unit.

For units with pumps, the connections are always flush with the unit.

3 way valve kit

Three way valve for the production of domestic hot water (DHW) including water temperature sensor, voltage-free contact for activating an integrating external heating source (gas boiler or electrical heater). The kit comes with or without the 3 way valve factory built-in.

Water-side mechanical filter (optional)

Y-filter designed and built to capture the impurities in the hydraulic circuit. It is fitted with a 0.9 mm stainless steel mesh cartridge which can be replaced without removing the valve body from the piping.

Unit electrical panel

The unit electrical panel is fitted with fuses and a circuit breaker contactor.

Special pumps

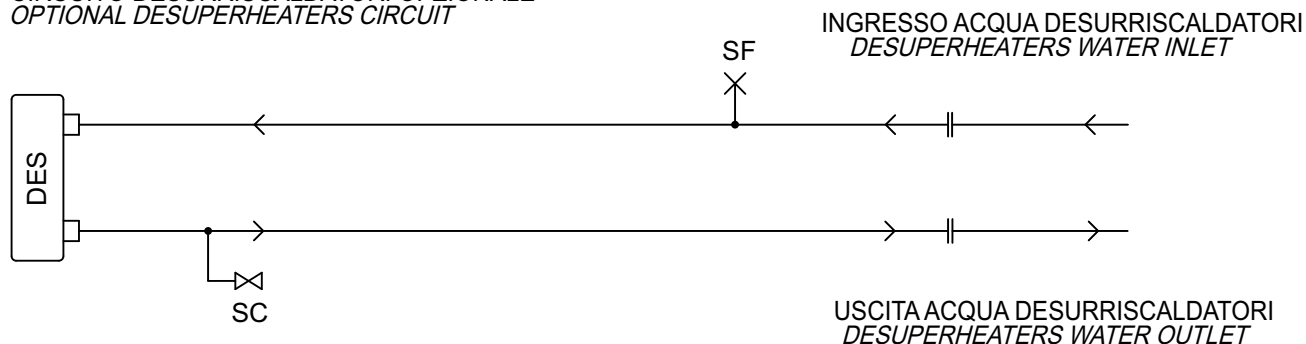
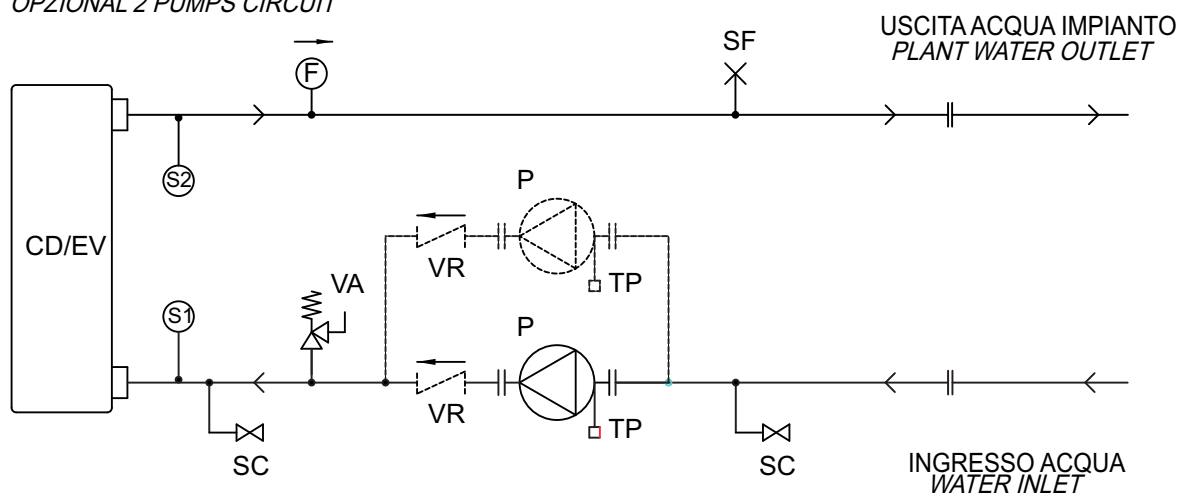
For pumps with different configurations, please contact our sales department.

Additional components

The supply does not include the following accessories though these are recommended to ensure correct system operation:

- MA Pressure gauges upline and downline from the unit
- GF Flexible joints on piping
- RI On-off valves
- T Outlet control thermometer

Hydraulic diagram

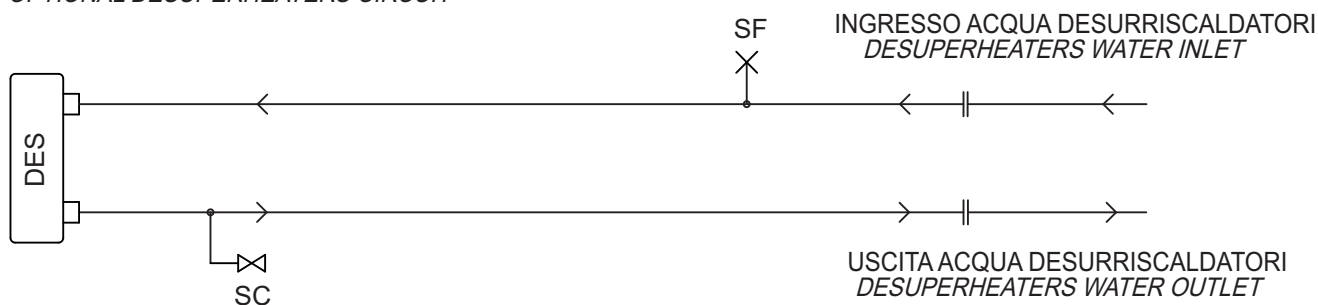
CIRCUITO DESURRISCALDATORI OPZIONALE
OPTIONAL DESUPERHEATERS CIRCUITCIRCUITO A 2 POMPE OPZIONALE
OPTIONAL 2 PUMPS CIRCUIT

LEGENDA - LEGEND

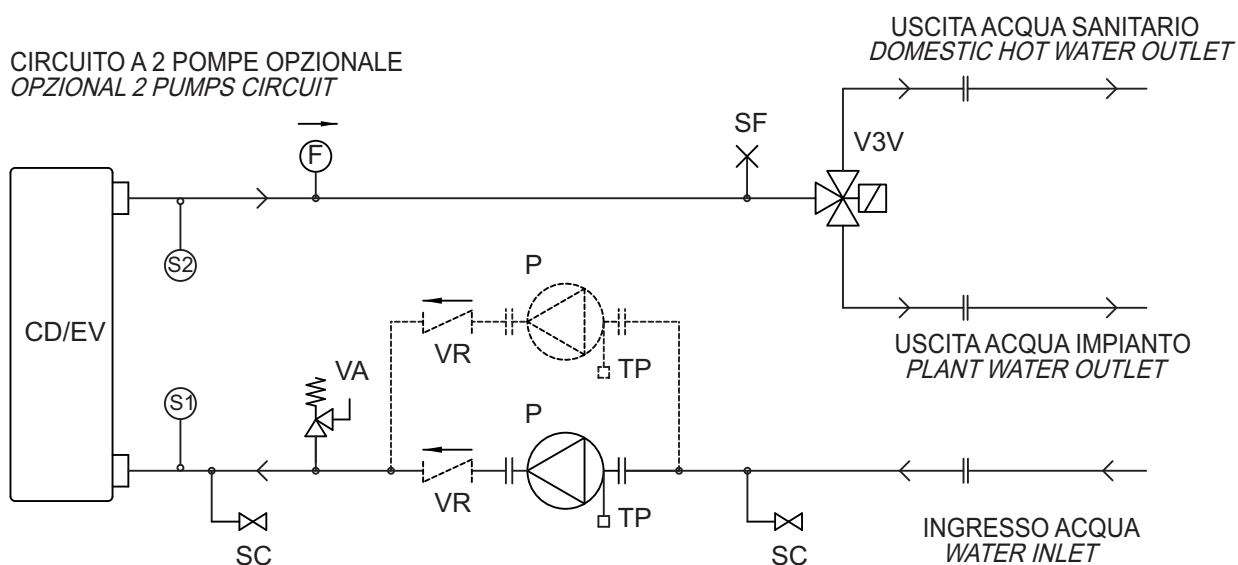
CD/EV	Evaporatore/Condensatore (scambiatore a piastre) Evaporator/Condenser (plate exchanger)
DES	Desurriscaldatori opzionali (scambiatore a piastre) Desuperheaters optional (plate exchanger)
F	Flussostato Flow switch
P	Pompa di circolazione Available pressure pump
SC	Valvola di scarico Drain valve
SF	Valvola di sfianto Purge valve
S1	Sonda ingresso acqua scambiatore Exchanger water inlet probe
S2	Sonda uscita acqua scambiatore Exchanger water outlet probe
TP	Tappo di drenaggio Drain plug
VA	Valvola di sicurezza Safety valve
VR	Valvola di ritegno (solo con 2 pompe) Check valve (only with 2 pumps)

Hydraulic diagram with 3 way valve

CIRCUITO DESURRISCALDATORI OPZIONALE
 OPTIONAL DESUPERHEATERS CIRCUIT



CIRCUITO A 2 POMPE OPZIONALE
 OPZIONAL 2 PUMPS CIRCUIT



LEGENDA - LEGEND

CD/EV	Evaporatore/Condensatore (scambiatore a piastre) Evaporator/Condenser (plate exchanger)
DES	Desurriscaldatori opzionali (scambiatore a piastre) Desuperheaters optional (plate exchanger)
F	Flussostato Flow switch
P	Pompa di circolazione Available pressure pump
SC	Valvola di scarico Drain valve
SF	Valvola di sfiato Purge valve
S1	Sonda ingresso acqua scambiatore Exchanger water inlet probe
S2	Sonda uscita acqua scambiatore Exchanger water outlet probe
TP	Tappo di drenaggio Drain plug
VA	Valvola di sicurezza Safety valve
VR	Valvola di ritegno (solo con 2 pompe) Check valve (only with 2 pumps)
V3V	Valvole 3 vie 3 way valve

HEATING - 1 PUMP - 2 Pole - HIGH HEAD PUMP

SIZE	PT (1)	Q (1)	Rif. Pump	Pump type	N. Pole	F.L.I.	F.L.A.	Ks	Dps	Hu	Kv3v	Kfi
	[kW]	[m³/h]				[kW]	[A]		-	kPa		
0404 /CA-E	119,7	20,6	A1	TP 65-260/2	2	4	7,9	61	26	220	16,4	47,9
0404 /LN-CA-E	116,3	20							24	222		
0524 /CA-E	146,5	25,2	B1	TP 65-260/2	2	4	7,9	48	30	211	16,4	47,9
0524 /LN-CA-E	144,7	24,9							30	211		
0604 /CA-E	181,2	31,2	C1	TP 65-340/2	2	5,5	11	33	32	285	16,4	23,7
0604 /LN-CA-E	175,8	30,2							30	289		

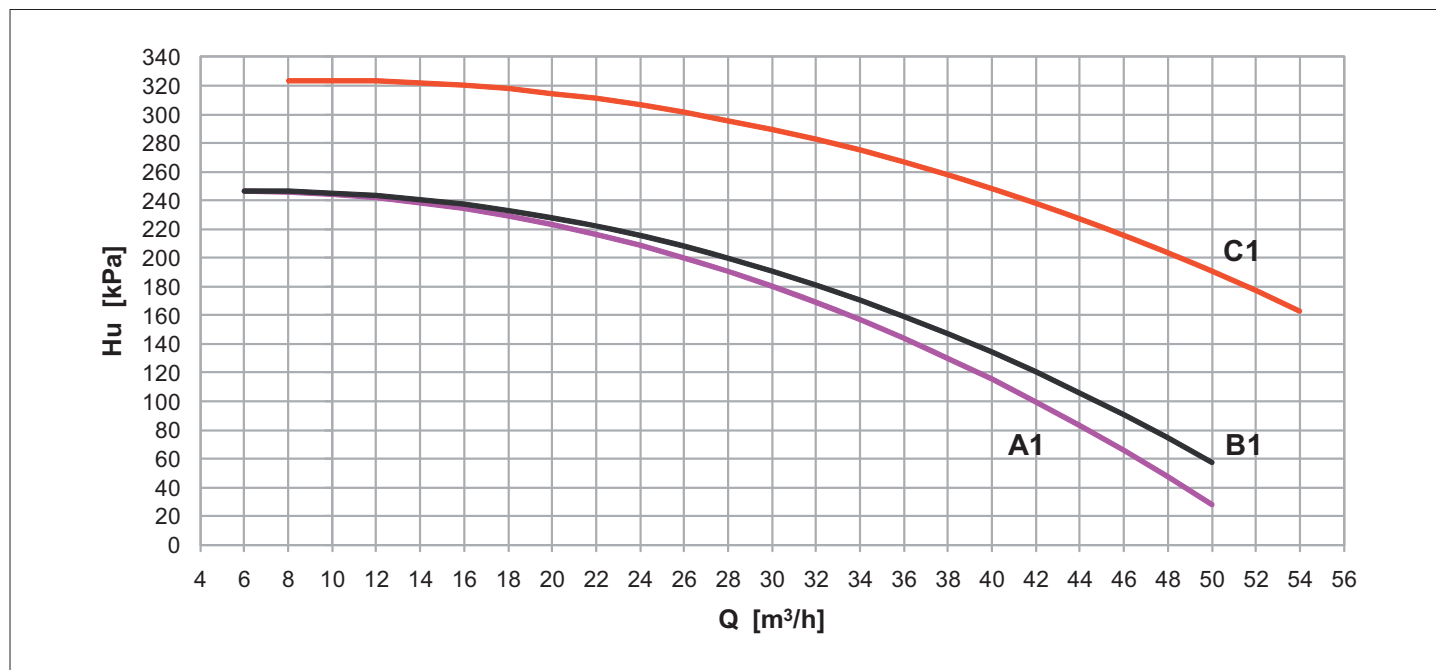
(1) Values refer to rated operating conditions

- Pt Heating capacity of unit
- Q Flow of water to evaporator
- F.L.I. Power absorbed by pump
- F.L.A. Current absorbed by pump

- Ks Coefficients for calculating pressure drops Unit with hydronic unit without network filter and 3 way valve
- Kv3v Coefficients 3 way valve for calculating pressure drops
- Kfi Coefficients filter for calculating pressure drops
- Dps Total pressure drop of hydronic group
- Hu Residual head

WORKING HEAD CURVES

Unit with hydronic unit without network filter and 3 way valve
(water)



HEATING - 2 PUMPS - 2 Pole - HIGH HEAD PUMP

SIZE	Pt (1)	Q (1)	Rif. Pump	Pump type	N. Pole	F.L.I.	F.L.A.	Ks	Dps	Hu	Kv3v	Kfi
	[kW]	[m³/h]				[kW]	[A]		-	kPa		
0404 /CA-E	119,7	20,6	A2	TPD 65-260/2	2	4	7,9	61	26	218	16,4	47,9
0404 /LN-CA-E	116,3	20							24	220		
0524 /CA-E	146,5	25,2	B2	TPD 65-260/2	2	4	7,9	48	30	206	16,4	47,9
0524 /LN-CA-E	144,7	24,9							30	208		
0604 /CA-E	181,2	31,2	C2	TPD 65-340/2	2	5,5	11	33	32	278	16,4	23,7
0604 /LN-CA-E	175,8	30,2							30	283		

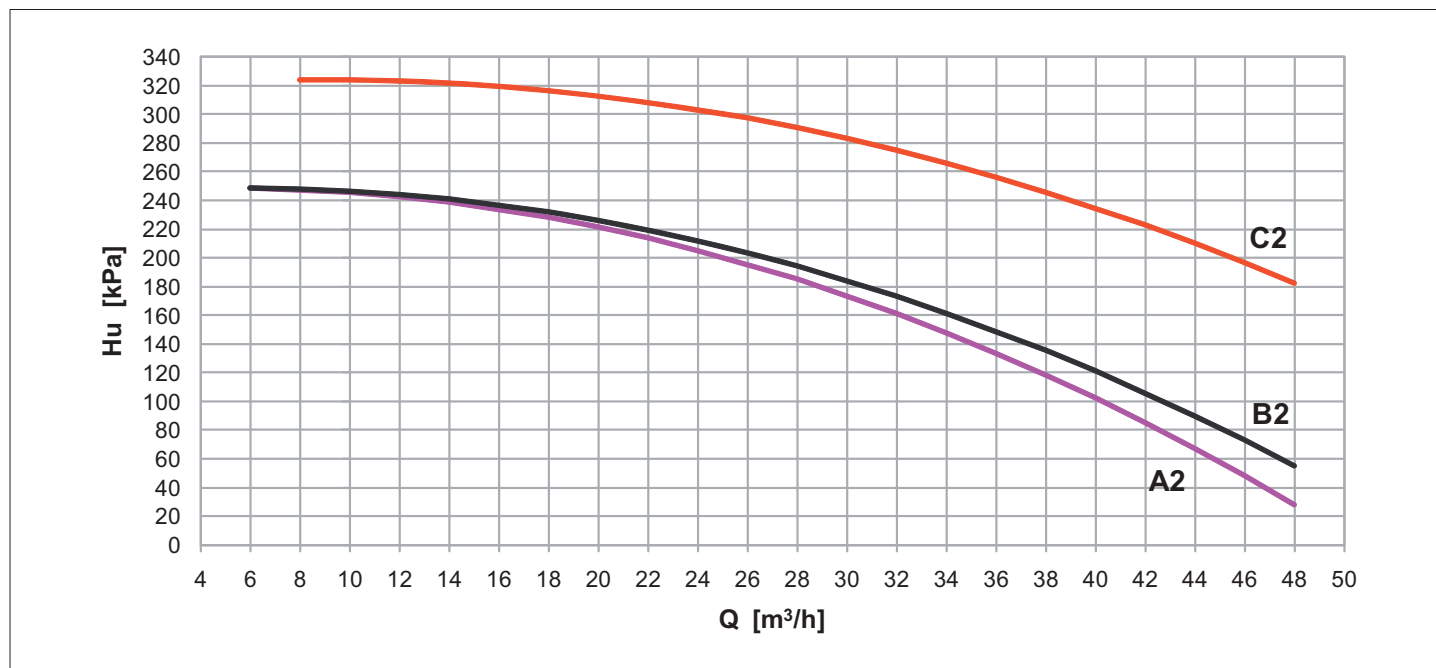
(1) Values refer to rated operating conditions

- Pt Heating capacity of unit
- Q Flow of water to evaporator
- F.L.I. Power absorbed by pump
- F.L.A. Current absorbed by pump

- Ks Coefficients for calculating pressure drops Unit with hydronic unit without network filter and 3 way valve
- Kv3v Coefficients 3 way valve for calculating pressure drops
- Kfi Coefficients filter for calculating pressure drops
- Dps Total pressure drop of hydronic group
- Hu Residual head

WORKING HEAD CURVES

Unit with hydronic unit without network filter and 3 way valve
(water)



HEATING - 1 PUMP - 2 Pole - LOW HEAD PUMP

TAGLIA	Pt (1)	Q (1)	Rif. Pump	Pump type	N. Pole	F.L.I.	F.L.A.	Ks	Dps	Hu	Kv3v	Kfi
	[kW]	[m³/h]				[kW]	[A]		-	kPa		
0404 /CA-E	119,7	20,6	A3	TP 65-190/2	2	2,2	4,5	61	26	145	16,4	47,9
0404 /LN-CA-E	116,3	20							24	146		
0524 /CA-E	146,5	25,2	B3	TP 65-230/2	2	3	6,3	48	30	172	16,4	47,9
0524 /LN-CA-E	144,7	24,9							30	172		
0604 /CA-E	181,2	31,2	C3	TP 65-230/2	2	3	6,3	33	32	160	16,4	23,7
0604 /LN-CA-E	175,8	30,2							30	164		

(1) Values refer to rated operating conditions

Pt Heating capacity of unit

Q Flow of water to evaporator

F.L.I. Power absorbed by pump

F.L.A. Current absorbed by pump

Ks Coefficients for calculating pressure drops

Unit with hydronic unit without network filter and 3 way valve

Kv3v Coefficients 3 way valve for calculating pressure drops

Kfi Coefficients filter for calculating pressure drops

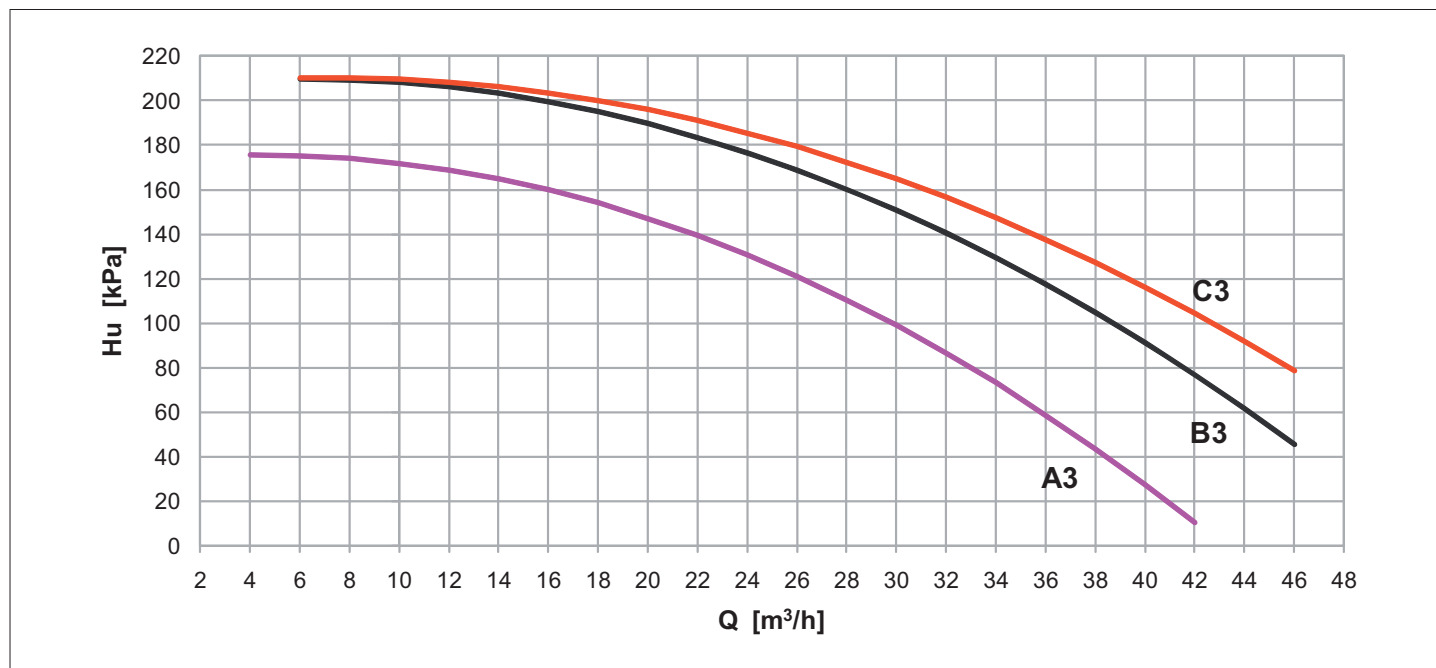
Dps Total pressure drop of hydronic group

Hu Residual head

WORKING HEAD CURVES

Unit with hydronic unit without network filter and 3 way valve

(water)



HEATING - 2 PUMPS - 2 Pole - LOW HEAD PUMP

TAGLIA	Pt (1)	Q (1)	Rif. Pump	Pump type	N. Pole	F.L.I.	F.L.A.	Ks	Dps	Hu	Kv3v	Kfi
	[kW]	[m³/h]				[kW]	[A]			[kPa]		
0404 /CA-E	119,7	20,6	A4	TPD 65-190/2	2	2,2	4,5	61	26	140	16,4	47,9
0404 /LN-CA-E	116,3	20								142		
0524 /CA-E	146,5	25,2	B4	TPD 65-230/2	2	3	6,3	48	30	163	16,4	47,9
0524 /LN-CA-E	144,7	24,9							30	164		
0604 /CA-E	181,2	31,2	C4	TPD 65-230/2	2	3	6,3	33	32	147	16,4	23,7
0604 /LN-CA-E	175,8	30,2							30	151		

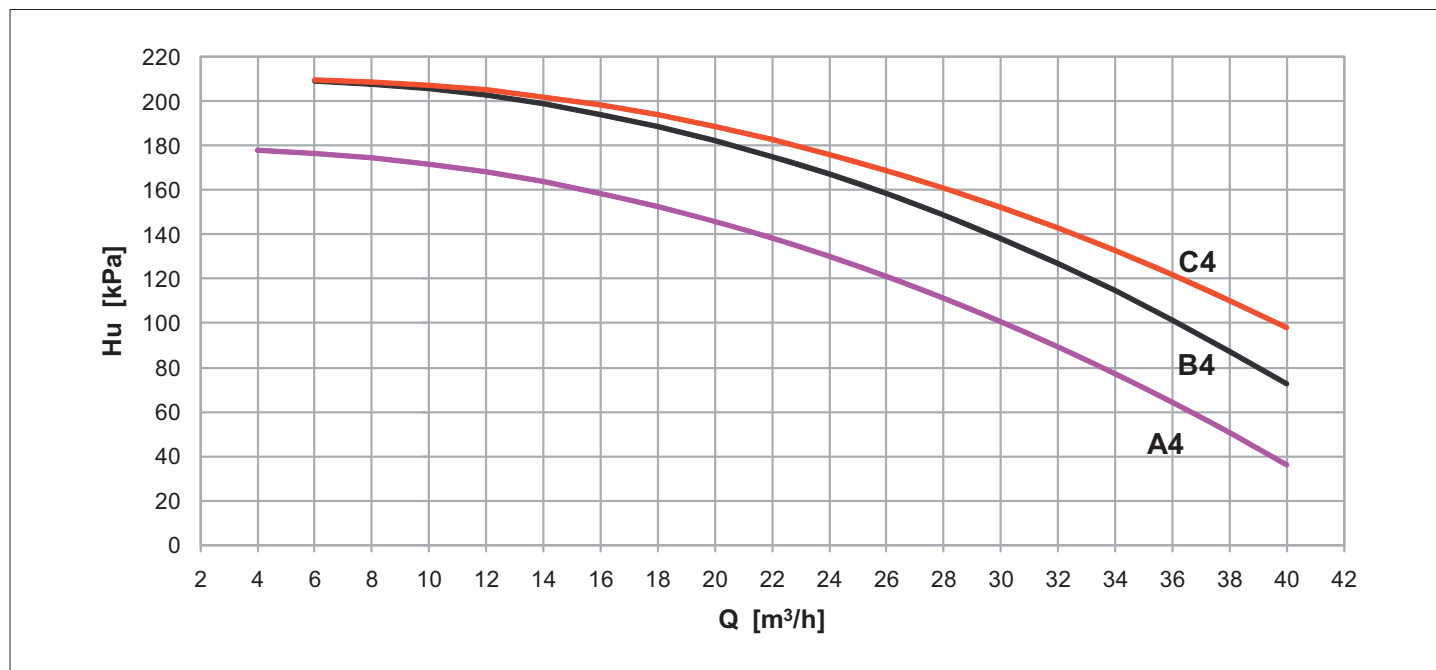
(1) Values refer to rated operating conditions

- Pt Heating capacity of unit
- Q Flow of water to evaporator
- F.L.I. Power absorbed by pump
- F.L.A. Current absorbed by pump

- Ks Coefficients for calculating pressure drops Unit with hydronic unit without network filter and 3 way valve
- Kv3v Coefficients 3 way valve for calculating pressure drops
- Kfi Coefficients filter for calculating pressure drops
- Dps Total pressure drop of hydronic group
- Hu Residual head

WORKING HEAD CURVES

Unit with hydronic unit without network filter and 3 way valve
(water)



13. ELECTRICAL DATA

AW-HT / CA-E

SIZE	Power supply V/ph/Hz	Maximum values								
		n	Compressor			Fans (1)		Total (1)(2)		
			F.L.I. [kW]	F.L.A. [A]	L.R.A. [A]	F.L.I. [kW]	F.L.A. [A]	F.L.I. [kW]	F.L.A. [A]	S.A. [A]
0404	400/3/50	4	4 X 14.2	4 X 23.3	4 X 127	2,00	4,10	65,0	110	213
0524	400/3/50	4	4 X 18	4 X 28.5	4 X 167	2,00	4,10	80,0	130	269
0604	400/3/50	4	4 X 21.7	4 X 34.7	4 X 198	2,00	4,10	99,0	163	327

AW-HT / LN-CA-E

SIZE	Power supply V/ph/Hz	Maximum values								
		n	Compressor			Fans (1)		Total (1)(2)		
			F.L.I. [kW]	F.L.A. [A]	L.R.A. [A]	F.L.I. [kW]	F.L.A. [A]	F.L.I. [kW]	F.L.A. [A]	S.A. [A]
0404	400/3/50	4	4 X 14.2	4 X 23.3	4 X 127	2,00	4,10	65,0	110	213
0524	400/3/50	4	4 X 18	4 X 28.5	4 X 167	2,00	4,10	80,0	130	269
0604	400/3/50	4	4 X 21.7	4 X 34.7	4 X 198	2,00	4,10	99,0	163	327

F.L.I. Full load power

F.L.A. Full load current

L.R.A. Locked rotor amperes for single compressor

S.A. Inrush current

(1) Values calculated referring to the version with the maximum number of fans working at the max absorbed current

(1)(2) Safety values to be considered when cabling the unit for power supply and line-protections

Voltage tolerance: 10%

Maximum voltage unbalance: 3%

Give the typical operating conditions of units designed for outdoor installation, which can be associated (according to reference document IEC 60721) to the following classes:
- climatic conditions class 4K4H: air temperature range from -20 up to 55°C (*), relative humidity range from 4 up to 100%, with possible precipitations, at air pressure from 70 and 106 kPa and a maximum solar radiation of 1120 W/m2

- special climatic conditions negligible

- biological conditions class 4B1 and 4C2: locations in a generic urban area

- mechanically active substances class 4S2: locations in areas with sand or dust representative of urban areas

- mechanical conditions class 4M1: locations protected from significant vibrations or shocks

The required protection level for safe operation, according to reference document IEC 60529, is IP43XW (protection against access, to the most critical unit's parts, of external devices with diameter larger than 1 mm and rain).

The unit can be considered IP44XW protected, i.e. protected against access of external devices (with diameter larger than 1 mm) and water in general.

(*) for the unit's operating limits, see "selection limits" section

14. FULL LOAD SOUND LEVEL

AW-HT / CA-E

SOUND POWER									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound power level dB								
0404	95	94	91	89	88	83	77	72	92
0524	96	95	92	90	89	84	78	73	93
0604	97	96	93	91	90	85	79	74	94

AW-HT / LN-CA-E

SOUND POWER									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound power level dB								
0404	88	87	86	84	81	76	69	63	86
0524	88	87	86	84	81	76	69	63	86
0604	89	88	87	85	82	77	70	64	87

Working conditions

Plant (side) heat exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger air (in) 7°C - 87% R.H.

Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units.

Such certification refers specifically to the sound Power Level in dB(A). This is therefore the only acoustic data to be considered as binding.

AW-HT / CA-E

SOUND PRESSURE LEVEL									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound pressure level dB								
0404	76	75	72	70	69	64	58	53	73
0524	76	75	72	70	69	64	58	53	73
0604	77	76	73	71	70	65	59	54	74

AW-HT / LN-CA-E

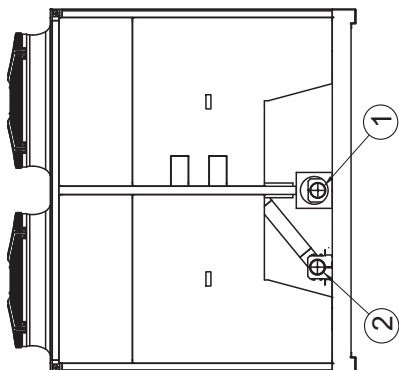
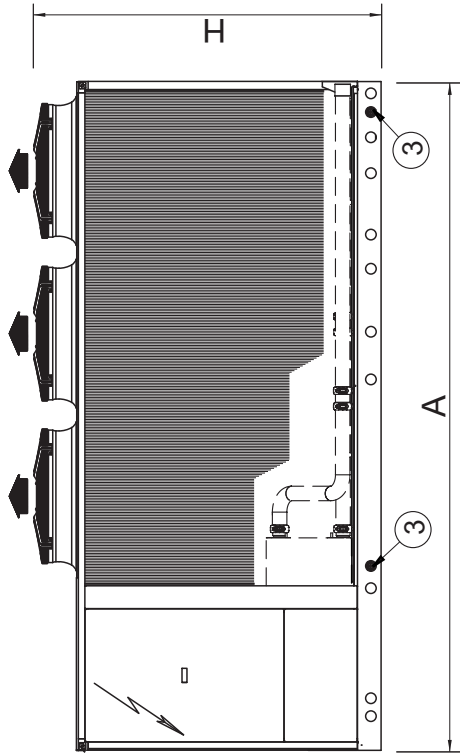
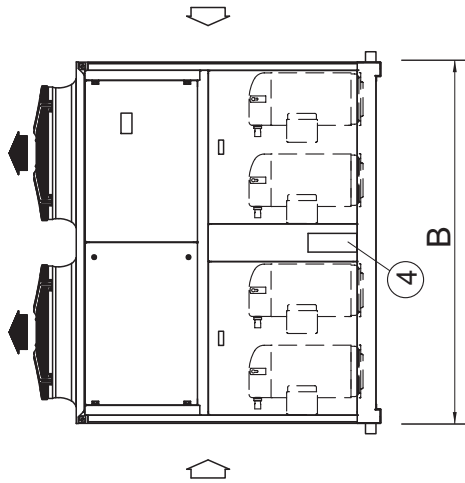
SOUND PRESSURE LEVEL									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound pressure level dB								
0404	69	68	67	65	62	57	50	44	67
0524	68	67	66	64	61	56	49	43	66
0604	69	68	67	65	62	57	50	44	67

Working conditions

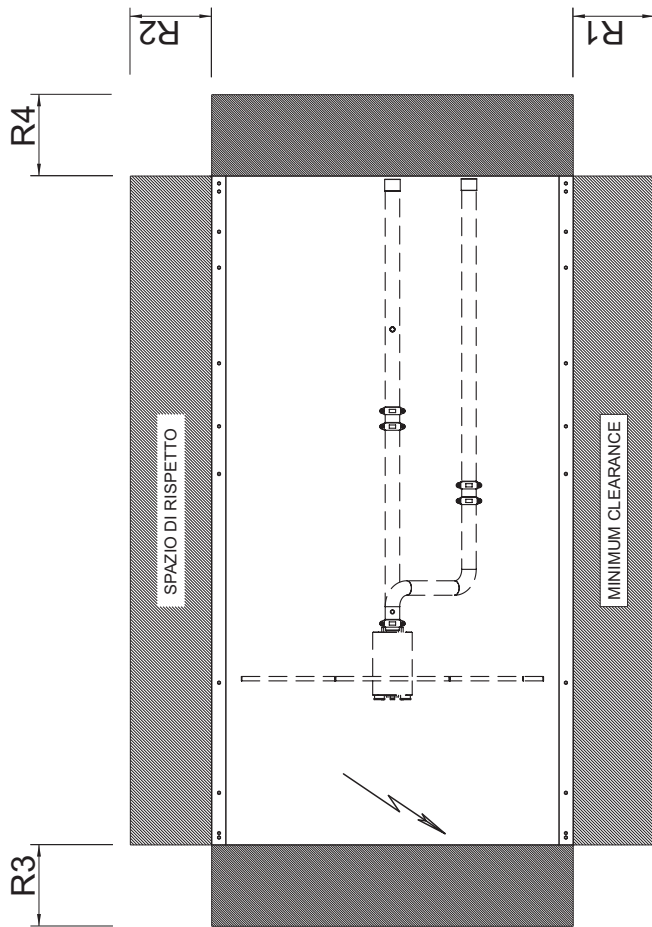
Plant (side) heat exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger air (in) 7°C - 87% R.H.

Average sound pressure level, at 1m distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

15. DIMENSIONAL DRAWINGS



- ① ENTRATA ACQUA EVAPORATORE
EVAPORATOR WATER INLET
- ② USCITA ACQUA EVAPORATORE
EVAPORATOR WATER OUTLET
- ③ SCARICO ACQUA CONDENSA
DRAIN WATER OUTLET
- ④ INGRESSO LINEA ELETTRICA
POWER INLET



AW-HT

SIZE	DIMENSIONS AND WEIGHTS				CLEARANCE				HEAT EXCHANGER USER SIDE		HEAT RECOVERY EX. USER SIDE	
	A	B	H	WEIGHT	R1	R2	R3	R4	IN/OUT		IN/OUT	
	[mm]	[mm]	[mm]	[kg]	[mm]	[mm]	[mm]	[mm]	TYPE	Ø	TYPE	Ø
AW-HT /CA-E /0404	3110	2220	2150	1950	2000	2000	1100	2000	GAS	2 1/2"	-	-
AW-HT /CA-E /0524	4110	2220	2150	2400	2000	2000	1100	2000	GAS	2 1/2"	-	-
AW-HT /CA-E /0604	4110	2220	2150	2530	2000	2000	1100	2000	GAS	3"	-	-
AW-HT /D /CA-E /0404	3110	2220	2150	2010	2000	2000	1100	2000	GAS	2 1/2"	GAS	1 1/2"
AW-HT /D /CA-E /0524	4110	2220	2150	2470	2000	2000	1100	2000	GAS	2 1/2"	GAS	1 1/2"
AW-HT /D /CA-E /0604	4110	2220	2150	2600	2000	2000	1100	2000	GAS	3"	GAS	1 1/2"
AW-HT /LN-CA-E /0404	3110	2220	2150	1960	2000	2000	1100	2000	GAS	2 1/2"	-	-
AW-HT /LN-CA-E /0524	4110	2220	2150	2410	2000	2000	1100	2000	GAS	2 1/2"	-	-
AW-HT /LN-CA-E /0604	4110	2220	2150	2540	2000	2000	1100	2000	GAS	3"	-	-
AW-HT /D /LN-CA-E /0404	3110	2220	2150	2020	2000	2000	1100	2000	GAS	2 1/2"	GAS	1 1/2"
AW-HT /D /LN-CA-E /0524	4110	2220	2150	2480	2000	2000	1100	2000	GAS	2 1/2"	GAS	1 1/2"
AW-HT /D /LN-CA-E /0604	4110	2220	2150	2610	2000	2000	1100	2000	GAS	3"	GAS	1 1/2"

LEGEND OF PIPE CONNECTIONS

UNI ISO 228/1

Pipe threads where pressure-tight joints are not made on the threads - Designation, dimensions and tolerances

Used terminology:

G: Pipe threads where pressure-tight joints are not made on the threads

A: Close tolerance class for external pipe threads where pressure-tight joints are not made on the threads

B: Wider tolerance class for external pipe threads where pressure-tight joints are not made on the threads

Internal threads: G letter followed by thread mark (only tolerance class)

External threads: G letter followed by thread mark and by A letter for A class external threads or by B letter for B class external threads.

UNI ISO 7/1

Pipe threads where pressure-tight joints are made on the threads - Designation, dimensions and tolerances

Used terminology:

Rp: Internal cylindrical threads where pressure-tight joints are made on the threads

Rc: Internal conical threads where pressure-tight joints are made on the threads

R: External conical threads where pressure-tight joints are made on the threads

Internal cylindrical threads: R letter followed by p letter

Internal conical threads: R letter followed by c letter

External conical threads: R letter

Designation	Description
UNI ISO 7/1 - Rp 1 1/2	Internal cylindrical threads where pressure-tight joints are made on the threads, defined by standard UNI ISO 7/1 Conventional ø 1 1/2"
UNI ISO 7/1 - Rp 2 1/2	Internal cylindrical threads where pressure-tight joints are made on the threads, defined by standard UNI ISO 7/1 Conventional ø 2 1/2"
UNI ISO 7/1 - Rp 3	Internal cylindrical threads where pressure-tight joints are made on the threads, defined by standard UNI ISO 7/1 Conventional ø 3"
UNI ISO 7/1 - R 3	External conical threads where pressure-tight joints are made on the threads, defined by standard UNI ISO 7/1 Conventional ø 3"
UNI ISO 228/1 - G 4 B	Internal cylindrical threads where pressure-tight joints are not made on the threads, defined by standard UNI ISO 228/1 Tolerance class B for external thread Conventional ø 4"
DN 80 PN 16	Flange Nominal Diameter: 80 mm Nominal Pressure: 16 bar

Notes:

Conventional diameter value [in inches] identifies short thread designation, based upon the relative standard.

All relative values are defined by standards.

As example, here below some values:

	UNI ISO 7/1	UNI ISO 228/1
Conventional ø	1"	1"
Pitch	2.309 mm	2.309 mm
External ø	33.249 mm	33.249 mm
Core ø	30.291 mm	30.291 mm
Thread height	1.479 mm	1.479 mm



for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.



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