

Air/Water heat pumps with axial fans

Technical bulletin

Models

HWA1-A/H 02109-04345



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1. UNIT DESCRIPTION AND TECHNICAL CHARACTERISTICS

The air / water heat pumps have been designed for commercial and industrial applications, they are very compact but in any case equipped with large surface air side exchangers; therefore they ensure high efficiency, with COP among the highest in their category. The use of high efficiency and particularly robust scroll compressors, together with the patented oil recovery and distribution system used on tandem circuits, guarantee high reliability and constant performance.

All units are also equipped with low and high pressure transducers, NTC probes on the suction side of the compressors and a microprocessor control with integrated driver for the management of an electronic expansion valve capable of further improving the performance of the units even in the non-standard applications.

1.1 UNIT STRUCTURE

All the unit of series have a structure suitable for outdoor installation, consisting of hot-galvanized steel sheet painted with polyester powders RAL 7035/RAL 3020 (only a few details) to ensure the best resistance to atmospheric agents. All screws and inserts are in galvanized steel.

1.2 COMPRESSORS

The compressors are scroll type, specifically designed for operation with R410A, mounted on rubber antivibration dampers. The always present crankcase heater is activated when the compressor is off and is disabled when it starts again. We therefore invite you to power the unit electrically and put it on stand-by at least 12 hours before it starts operating. The cooling capacity control is carried out through partialisation steps equal in number to the number of compressors installed in the unit. The inspection of the compressors is easily accessible; only in the SSL version this occurs through the front panel of the compressor box.

1.3 AIR SIDE HEAT EXCHANGER

The air side heat exchangers have a finned pack, made with copper pipes and aluminum fins with a corrugated surface and adequately spaced to ensure maximum heat exchange performance.

1.4 USER SIDE HEAT EXCHANGER

The user side heat exchanger is of the brazed plate type and is made of AISI 304 stainless steel for the monocircuit units and AISI 316 for the bicircuit units, insulated in the factory using closed cell material, and can be equipped with antifreeze electric heater (optional accessory KA). A differential pressure switch, installed on the water side, ensures the presence of water flow avoiding the formation of ice inside.

1.5 FANS

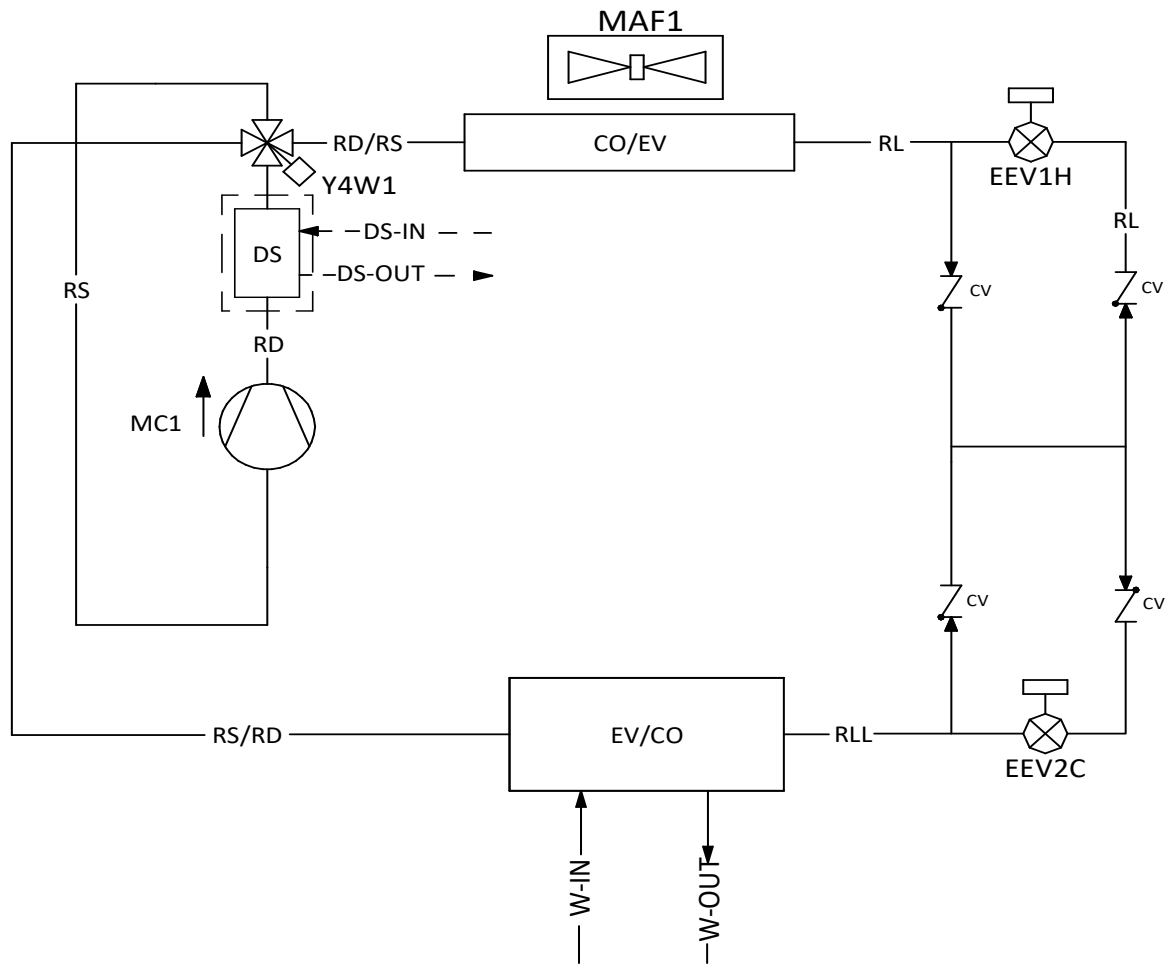
The fans are axial with wing profile blades. They are statically and dynamically balanced and supplied complete with protection grille and double flared profile air inlet and outlet, specially shaped to increase efficiency and reduce noise. The motor has an IP54 protection degree according to CEI EN 60529.

The regulation takes place through voltage regulators, directly controlled by the control on the machine; it is particularly suitable when operation with outside air temperatures below -10°C is required and is supplied on request on all models. EC fans are provided as an accessory which allow to further extend the operating range.

1.6 REFRIGERANT CIRCUIT

The refrigerant circuit is made using components from leading international companies and according to UNI EN 13134 concerning braze welding processes. The refrigerant gas is R410A. The refrigeration circuit includes in its basic version: electronic expansion valve, inspection valves for maintenance and control, safety device compliant with current legislation (high and low pressure switch), safety valve for the refrigerant, pressure transducers to measure accurately evaporation and condensation pressures, high capacity interchangeable cartridge filter drier to avoid obstructions of the rolling valve and eliminate any humidity present in the circuit, liquid sight glass to control the refrigerant charge, solenoid valve and shut-off valves. In the heat pump versions there are also the 4-way reverse cycle valve, liquid separator, liquid receiver and the probe for measuring the outside air temperature.

The conceptual scheme of the heat pump is shown below.



| LEGEND | | | |
|--------|--|--------|-----------------------------------|
| MC1 | Compressor | W-IN | User side water inlet |
| CO/EV | Condenser in chiller operation | W-OUT | User side water outlet |
| EV/CO | Evaporator in chiller operation | RD | Delivery line |
| MAF1 | Axial fan | RL | Liquid line |
| Y4W1 | Reverse cycle 4 way valve | RLL | Laminated liquid line |
| EEV2C | Electronic expansion valve for chiller operation | RS | Suction line |
| EEV1H | Electronic expansion valve for heat pump operation | RS/RD | Chiller functioning suction line |
| CV | Non return valve | RD/RS | Chiller functioning delivery line |
| DS | Desuperheater | DS-IN | Inlet water desuperheater |
| — | Optional | DS-OUT | Outlet water desuperheater |

1.7 ELECTRICAL PANEL

The electrical panel is completely built and wired in accordance with EN 60204 and includes a power section and a control section. To access the electrical panel, the disconnecter must be set to OFF (presence of a door lock system) and open the front panel after unscrewing the fixing screws. The degree of protection of the electrical panel is IP54. The electrical panel is equipped with a terminal block with clean contacts for remote ON-OFF.

1.8 CONTROL SYSTEM

All units are equipped with a control unit equipped with a microprocessor with superheating control logic managed on the basis of the signals sent by the pressure transducers and by the temperature probes. The CPU also controls the following functions: water temperature adjustment, antifreeze protection, compressor timing and start, fan and circulation pump management (if present), alarm reset, alarm signaling and operation LED. Upon request, the microprocessor can be connected to remote BMS control systems.

1.9 CONTROL AND PROTECTION DEVICES

All units are equipped with the following control and protection devices: phase monitor complete with minimum and maximum voltage relays, which stops the unit if the phase sequence is incorrect or the voltage of at least one phase differs by more than 15% from the others, delivery water temperature probe (with antifreeze function), return water temperature probe (both installed inside the exchanger), low pressure transducer, high pressure translator, delivery temperature on the compressors, safety valve on the low and high pressure side, temperature probe on

the compressor delivery, external air temperature probe, fan thermal protection, thermal protection on each compressor, water side differential pressure switch to protect the evaporator, manual reset high pressure switch installed on the compressor delivery pipe.

1.10 HYDRAULIC CIRCUIT

The heat pumps of the series can be supplied with a built-in hydronic unit, which includes, in addition to the differential pressure switches, a single or double pump (one in reserve to the other) with AC motor, suitable for the use of chilled water and directly managed by the machine control.

It is also possible to install an internal inertial storage tank externally insulated with closed cell expanded material having adequate capacity to avoid excessive start and stop of the compressor.

2. VERSION DESCRIPTION AND ACCESSORIES

| SERIE | Size | Version with desuperheater / low water temperature | Acoustic configuration | Hydronic kit |
|----------|-------|--|------------------------|--------------|
| HWA1-A/H | xxxxx | - | - | - |
| | | DS | SL | PS |
| | | BT | SSL | PSAP |
| | | | C | PD |
| | | | | PDAP |
| | | | | PS/SI |
| | | | | PSAP/SI |
| | | | | PD/SI |
| | | | | PDAP/SI |

2.1 VERSIONS

The versions available for reverse cycle heat pumps are:

HWA1-A/H - Reverse cycle heat pump standard version /DS - Reverse cycle heat pump with desuperheater

The unit with the desuperheater provides for the addition of a brazed plate heat exchanger made of AISI 316 stainless steel, insulated in the factory using closed cell material. This version allows to recover about 20% of the otherwise dispersed condensation heat and to use it to power the post-heating water coils of an AHU or for a flywheel of domestic hot water or for any other process uses.

In this version, no circulator is supplied, on the water side and no probe for recovery management. It remains the responsibility of the system designer to provide for their presence and correct connection.

/BT— Reverse cycle heat pump BT version (for low water temperatures)

The BT version allows you to extend the operating range of the unit by cooling the water directly to the user down to -8°C . In this case, the use of a mixture of water and glycol is envisaged.

The BT version includes the EC fan and condensation control down to -20°C (CC).

2.2 ACOUSTIC CONFIGURATION

You can choose an acoustic configuration among the following:

/SL – Silenced version

The silenced unit (equipped with SL accessory) provides an innovative thermo-acoustic cover on the compressors. This insulation allows up to 10% noise reduction at certain compressor rotation frequencies. The particular multilayer structure allows thermal insulation which at very low temperatures reduces losses by up to 2% compared to standard insulation.

The SL version includes condensation control down to -10°C (CT).

/SSL – Super silenced version

The super silenced unit (equipped with SSL accessory) provides, in addition to the thermo-acoustic hood on the compressors, also a special diffuser mounted on the fan. This diffuser increases the efficiency of the fan allowing it to reduce its speed, lowering the sound pressure and energy consumption. In this way it is possible to save substantial amounts of electricity for each fan.

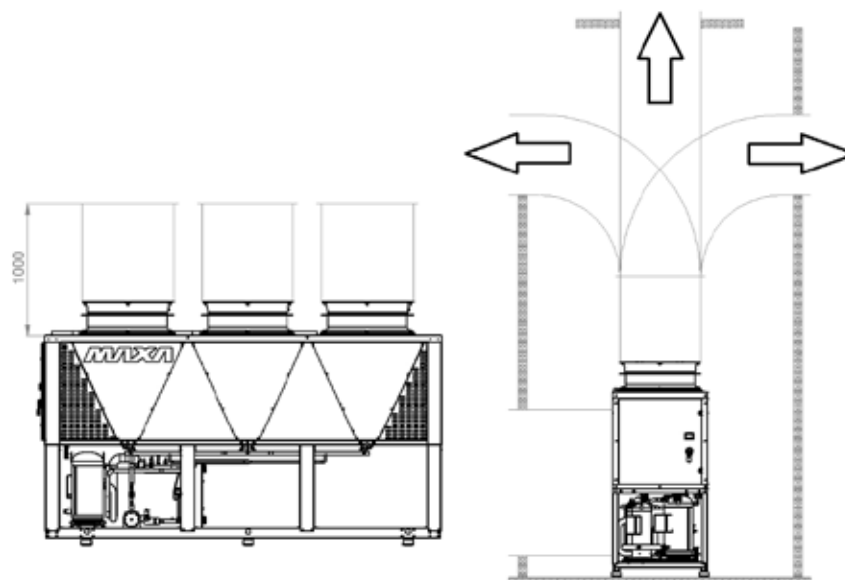
The SSL version includes the EC fan and condensation control down to -20°C (CC)

/C – Ducted version

With the ductable version, the diffuser is used to take advantage of the greater prevalence of the fan and possibly channel the expulsion of air.

In the C version includes the EC fan and the condensation control down to -20°C (CC)

A possible ducted installation is shown in the figure. Before any change in the direction of the duct, the minimum length to be observed is indicated.



A quantitative indication of the additional static head obtainable with the ductable version compared to the standard version is given, with the same flow rate and absorbed power.

Higher pressure drops on the duct do not ensure the declared performance.

In the ductable version, the declared acoustic data lose meaning and are no longer reliable.

| Model HWA1-A/H | Additional static head ductable version compared to standard version | |
|----------------|--|-------|
| | Pa | mmH2O |
| 02109 | 40,46 | 4,13 |
| 02121 | 41,96 | 4,28 |
| 02142 | 39,77 | 4,06 |
| 02148 | 39,95 | 4,07 |
| 02160 | 41,34 | 4,22 |
| 04176 | 38,47 | 3,92 |
| 04199 | 38,84 | 3,96 |
| 04215 | 39,25 | 4,00 |
| 04237 | 40,68 | 4,15 |
| 04273 | 38,7 | 3,95 |
| 04304 | 39,1 | 3,99 |
| 04345 | 40,69 | 4,15 |

/C(S) – Ducted version with compressor acoustic insulation

In addition to the ductable version, thermo-acoustic insulation are installed on the compressors.

NOTE: The acoustic data indicated in chapter “7. SOUND EMISSIONS” ARE NOT valid for ducted configurations.

2.3 HYDRONIC KIT

A hydronic kit can be combined with the heat pump from the following:

- /PS – Reverse cycle heat pump standard only head pump version.
- /PSAP – Reverse cycle heat pump only high head pump version.
- /PD – Reverse cycle heat pump double head pump standard version.
- /PDAP – Reverse cycle heat pump double high head pump version.
- /PS/SI – Reverse cycle heat pump standard head pump + tank version.
- /PSAP/SI – Reverse cycle heat pump high head pump + tank version.
- /PD/SI – Reverse cycle heat pump double head standard pump + tank version.
- /PDAP/SI – Reverse cycle heat pump high head double pump + tank version

The unit code is composed of:

- nr. 5 fixed digits, different depending on the number of fans present and the type of unit:

2 fans – digit 02221

3 fans – digit 02321

4 fans – digit 02421

6 fans – digit 02521

- The # symbol as a separator
- nr. 18 variable digits (fields) that identify sizes, versions and accessories factory fitted.
- nr. 2 digits identifying any customisations

XXXXX#(RV)(PCF)(TA)(C1)(TE)(KS)(KA)(EL)(EL2)(VF)(FAN)(SIL)(TR)(AC1)(AC2)(MC)

| Order code | RV | | PCF | TA | C1 | TE |
|------------|---------------|-------------------------|--|----------|------------------------|------------------|
| | Configuration | | | | | |
| | 09 | /H Reversible heat pump | | | | |
| | 55 | BT version | | | | |
| 02221# | | | 109 02109 | Recovery | Hydronic configuration | Specific sealing |
| | | | 121 02121 | | | |
| | | | 142 02142 | | | |
| 02321# | | | 148 02148 | | | |
| | | | 160 02160 | | | |
| | | | 176 04176 | | | |
| 02421# | | | 199 04199 | | | |
| | | | 215 04215 | | | |
| | | | 237 04237 | | | |
| | | | 273 04273 | | | |
| 02521# | | | 304 04304 | | | |
| | | | 345 04345 | | | |
| | | | 0 - | | | |
| | | | 3 Desuperheater (DS) | | | |
| | | | 0 - | | | |
| | | | 1 Standard-head pump version (PS) | | | |
| | | | 2 Standard-head double pump version (PD) | | | |
| | | | 3 High-head pump version (PSAP) | | | |
| | | | 4 High-head double pump version (PDAP) | | | |
| | | | 0 - | | | |
| | | | 1 Special seal for Gly>40% (TE1) * | | | |

| XXXXX#(RV)(PCF)(TA)(C1)(TE) | | KA | EL | EL2 | VF |
|-----------------------------|--------------------------------------|----------------|---|------------------------|--|
| KS | | | | | |
| Tank | | Antifreeze kit | Electrical accessories | Electrical accessories | Refrigerator accessories |
| 0 | - | | | | |
| 2 | Integrated technical storage (SI) ** | | | | |
| | | 0 | - | | |
| | | 5 | Heat exchanger and pump resistance (if present) (KA1) | | |
| | | 6 | Heat exchanger, pump and tank (KA2) **** | | |
| | | | 0 | - | |
| | | | 1 | Soft starter (SS) | |
| | | | | 0 | - |
| | | | | 1 | Shuko plug (SH) |
| | | | | 2 | Internal lights for EP (LQ) |
| | | | | 3 | Shuko plug (SH) e Internal lights for EP (LQ) |
| | | | | 0 | - |
| | | | | 1 | Compressors supply/suction ball valve (RFM) |
| | | | | 2 | Double relief valve (2SFV) |
| | | | | 3 | Compressors supply/suction ball valve (RFM) e Double relief valve (2SFV) |

| XXXXX#(RV)(PCF)(TA)(C1)(TE)(KS)(KA)(EL)(EL2)(VF) | | SIL | TR | AC1 | AC2 | MC |
|--|--|----------|---|---------------------------------|------------------------|----|
| FAN | | | | | | |
| Fan | | Muffling | Heat exchanger treatment | - | Electrical accessories | - |
| 0 | Standard (EC) | | | | | |
| 3 | Phase cut AC ** | | | | | |
| 6 | Phase cut AC with condensation control (CT) ** | | | | | |
| 7 | Standard EC with condensation control (CC) | | | | | |
| | | | | | | |
| | | 1 | Silenced (SL) | | | |
| | | 2 | Super-silenced (SSL) **** | | | |
| | | 4 | Ductable (C) *** | | | |
| | | 5 | Ductable with compressor acoustic insulation (C(S)) *** | | | |
| | | | 0 | - | | |
| | | | 8 | With Silverline treatment (TR2) | | |
| | | | | 0 | - | |
| | | | | 2 | Circuit breakers (IM) | |
| | | | | 0 | - | |
| | | | | 2 | Circuit breakers (IM) | |
| | | | | | 01 | - |

- * Not possible if C1=0
- ** Not possible if RV=55
- *** Not possible if FAN=3 or FAN=6
- **** Not possible if KS=0

2.4 ACCESSORIES LIST

The available accessories are listed below:

| Description | Accessory | Standard | Factory fitted | Supplied separately / Available after delivery |
|---|-----------|----------|----------------|--|
| SS Soft starter | X | | X | |
| SAS Remote probe | X | | | X |
| Three-phase relay for monitoring of maximum and minimum voltage/sequence/lack | | X | X | |
| ACK6 Summer / Winter signalling | X | | X | |

| Description | Accessory | Standard | Factory fitted | Supplied separately / Activable after delivery |
|---|-----------|----------|----------------|--|
| Compressor on/off signalling | | x | x | |
| Machine lockout signal | | x | x | |
| Defrosting signal | | x | x | |
| Digital input for double set-point | | x | x | |
| CM Modbus enabling | x | | x | |
| ISK Serial converter USB/RS485 | x | | | x |
| KA1 Plate heat exchanger antifreeze resistance and pump (if present) | x | | x | |
| KA2 Heat exchanger antifreeze heater, pump and tank (if present) - KA1 included | x | | x | |
| IM Magnethermic switch for compressors and fans | x | | x | |
| Hi-TV415 Touchscreen remote control | x | | | x |
| i-CR Wall mounted remote control | x | | | x |
| Dry contact on/off remote | | x | x | |
| Dry contact for summer/winter selection | | x | x | |
| Modification of the dynamic set-point – climatic curve (via external air probe present in the unit) | | x | x | |
| LQ Electrical board lighting | x | | x | |
| SH schuko plug (with magnetothermal switch) | x | | x | |
| CT Condensation control up to –10°C | x | | x | |
| CC Condensation control up to –20°C (Only with EC fans) | x | | x | |
| Cu/Al Battery | | x | x | |
| TR2 Battery Cu/Al with Silver Line anti-corrosion treatment | x | | x | |
| Liquid line solenoid valve | | x | x | |
| Liquid / humidity indicator | | x | x | |
| Differential pressure switch (flow presence signal) | | x | x | |
| RFM Compressor delivery and suction tap | x | | x | |
| AG Rubber antivibration dampers | x | | | x |
| AM Spring antivibration dampers | x | | | x |
| GR1 Anti-intrusion kit for refrigeration circuit compartment | x | | x | |
| GR2 Condenser anti-intrusion grid | x | | x | |
| 2SFV Changeover tap with double safety valve | x | | x | |
| EEV - Electronic valve | | x | x | |
| FY Y filter | x | | | x |
| TE1 Special mechanical seal for glycol concentration over 40% | x | | x | |
| RV Grooved connection joint | x | | | x |
| KS Hoist ring kit | x | | x | |
| EC Fan (it includes CC control) | x | | x | |

2.5 DESCRIPTION OF ACCESSORIES

2.5.1 Factory fitted accessories

Three-phase relay for monitoring of maximum and minimum voltage / sequence / absence – indicates the presence of all three phases in the correct sequence and if all three phase-phase voltages are within the set limits. The maximum and minimum voltage thresholds can be set separately.

Compressor on/off signalling – auxiliary contactors that provide a clean contact, allowing remote signaling of compressor activation.

Machine lockout signal - auxiliary contactors that provide a clean contact, allowing you to remotely report the machine lockout.

Defrost signal - auxiliary contactors that provide a clean contact, allowing remote signaling of the defrost in progress.

Digital input for double set-point - input that allows you to change the set point.

Dry contact on/off remote - contact in the terminal block which allows the unit to be switched on and off.

Dry contact for summer/winter selection - possibility to manage remotely the heating or cooling operating mode of the heat pump.

Modification of the dynamic set-point – climatic curve (via external air probe present in the unit) - the regulator allows to modify the set-point by adding a value according to the temperature of the external air probe.

Liquid line solenoid valve – inlet valve to the refrigerant circuit, used for the pump down, to prevent the presence of liquid at the compressor inlet.

Liquid/humidity indicator - it allows a quick and safe assessment of the conditions of the refrigerant fluid on the liquid line as regards flow and humidity regularity.

Differential pressure switch (flow presence signalling) – by monitoring the pressure difference, it ensures that there is sufficient flow for correct machine operation.

EEV – electronic valve – expansion valve, designed for continuous control and regulation of the quantity of refrigerant entering the evaporator. The changes in thermal load can be followed quickly, so as to optimize consumption.

2.5.2 Optional accessories factory fitted

Soft starter (SS) – electronic static starter for starting management, installed inside the electrical panel, allows the reduction of the starting current and the mechanical wear of the motor windings.

The expected values of the maximum current at starting with SS accessory are shown below. The values are indicative and consider a tolerance of 10% based on the actual starting operating condition.

| | | 02109 | 02121 | 02142 | 02148 | 02160 | 04176 | 04199 | 04215 | 04237 | 04273 | 04304 | 04345 |
|------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Maximum inrush current at SS | A | 196,3 | 224,3 | 238,0 | 241,1 | 251,5 | 226,6 | 270,9 | 279,3 | 317,7 | 337,8 | 365,0 | 441,2 |



Summer / winter signaling (ACK6) - auxiliary contactors that provide a clean contact, allowing to remotely signal the operating mode (summer / winter).

Modbus enabling (CM) – accessory that allows the unit to be connected to external controllers via serial cable with RS-485 electrical standard and ModBus RTU protocol.

KA1 Heat exchanger antifreeze resistance and pump (if present) - electrical resistance on the front face of the plate heat exchanger, which is activated when the temperature of the water inside the heat exchanger falls below +4°C, and electrical resistance that protects the pump against ice formation.

KA2 Heat exchanger antifreeze resistance, pump and tank (if present) - includes KA1 - A resistance immersed in the tank is added to the KA1 accessory. The kit consists of:

- An armoured AISI 321 electric resistance
- A digital temperature regulator with parameters
- A contactor

The purpose of the tank resistance is to prevent the temperature of the water inside the tank from dropping too low. The device is activated by digital thermostat when the temperature of the water in the tank falls below a set value and remains active until a second temperature, higher than the first and also fixed. Depending on the version of the unit and the vector fluid, the temperature values for switching the resistance on and off are different, as shown in the table.

| Unit version | Vector fluid | Water temperature resistance switch on [°C] | Water temperature resistance switch off [°C] |
|--------------|-----------------------------|---|--|
| Standard | water | +4 | +8 |
| BT | water + 10% ethylene glycol | +1 | +5 |
| BT | water + 20% ethylene glycol | -4 | 0 |
| BT | water + 35% ethylene glycol | -8 | -4 |

Magnetothermic switch for compressors and fans (IM) – Overcurrent breakers applied to compressors and fans protect the components from failures caused by possible current peaks.



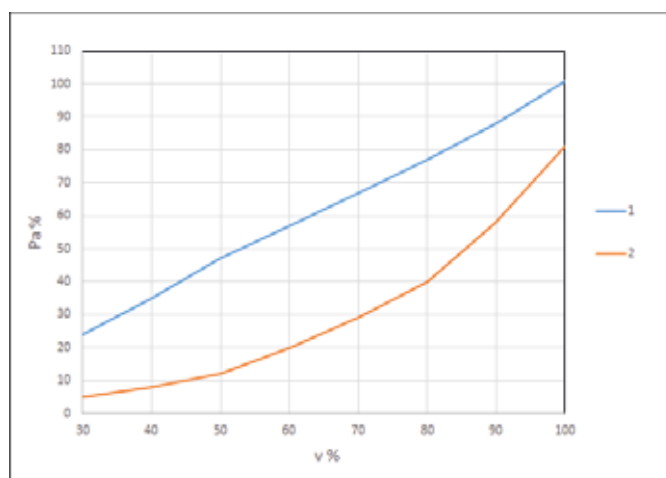
Electrical board lighting (LQ) - light to illuminate the interior of the electrical panel facilitating maintenance for the operator.

Schuko plug (with thermomagnetic) (SH) - courtesy socket on the electrical panel (maximum 16 A) protected against overcurrents and short circuits by a thermal magnetic circuit breaker.

Condensation control down to -10°C (CT) (for standard AC fan) - The use of the electronic controller allows effective control of the pressure / temperature on the chiller. The regulator reduces the rotation speed of the fans up to 1/5 of the nominal allowing to keep the system condensing temperature within the limits prescribed by the compressor manufacturer even with very low external temperatures (up to -10 °C of external air) without having to resort to continuous on-offs that involve swinging, reduced efficiency and risk of possible blockages due to low pressure alarms.

Condensation control down to -20°C (CC) (for EC fan) - The electric motor used is piloted in modulation with brushless EC motor, directly coupled, and equipped with integrated thermal protection. With this type of fans, regulation takes place by modulating the brushless motor directly controlled by the 0-10V signal of the controller. This adjustment is particularly suitable for heat pump units or when operation as a chiller is required with outdoor air temperatures below -10 °C and down to -20 °C.

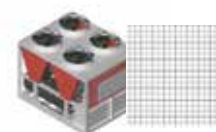
In the image you can see the % savings in terms of electrical power consumption using the EC fan accessory, as the speed of the fan varies
 P_a = power absorption
 v = fan speed
 1 = standard fan
 2 = EC fan (accessory)



Cu/Al Battery with Silver Line anti-corrosion treatment (TR2) – finned pack heat exchanger with copper pipes and aluminum fins, subjected to treatment with a special polyurethane-based paint for corrosion protection. The protection gives the battery flexibility to resist contractions and thermal expansions, resistance to UV rays and makes it repellent to dirt. The treatment guarantees battery protection in practically all environmental conditions: from marine to rural environments, from industrial to urban areas. For specific instructions for cleaning the coils treated in this way, please refer to chapter 10.1.1 of the user-installer manual “Cleaning the finned coils treated with the anti-corrosion method”.

Suction and discharge valve for compressors (RFM) – shut-off valve placed on the suction and delivery of compressors, allows simplification of maintenance by avoiding draining the refrigerant in the entire unit.

Cooling circuit anti-intrusion grid (GR1) – in order to prevent the intrusion of foreign bodies into the structure, it is placed on the refrigerator circuit compartment.



Battery compartment anti-intrusion kit (GR2) – wire mesh that prevents the intrusion of foreign bodies inside the battery and to protect the battery from accidental contact are things or people.

Changeover valve with double safety valve (2SFV) – the exchange tap allows the alternative use of 2 safety valves facilitating periodic verification or replacement ensuring the operation of the system and the maintenance of the safety system.

Special pump gasket seal for glycol concentration over 40% (TE1) - for mixtures of water and glycol higher than a weight percentage of 40% and up to 50%, a different mechanical seal is used to ensure correct operation of the electric pump.

Lifting bracket kit (KS) – facilitate the lifting and positioning of the unit.

2.5.3 Optional accessories supplied separately/activable after delivery

Remote probe (SAS) – probe co-molded with IP 67 thermoplastic rubber strip, 4 m long, operating in the temperature range -50 ° C + 120 ° C.

Enabling remote probe – In some system solutions it may be necessary to enable a system temperature probe so that the board controller can process the management correctly. The remote system probe controls the heat pump only during the compressor start up phase, the shut down is managed by the probe present on the unit return.

Touch screen remote control USB RS485 (ISK) - device interface capable of reading and writing the registers of the control via the RS485 standard and converting it into a USB port that can be connected to any supervision system.



Touchscreen remote control (Hi-TV415) - allow to visualize the remote unit status; to be mounted in the most convenient place for the user;

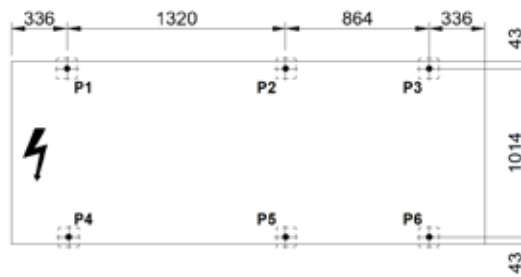


Wall-mounted remote control (i-CR) – Modbus remote control with negative LCD and capacitive keys. The device is to be used as a remote machine keyboard with local temperature detection, it replicates the functionality of the on-board control.

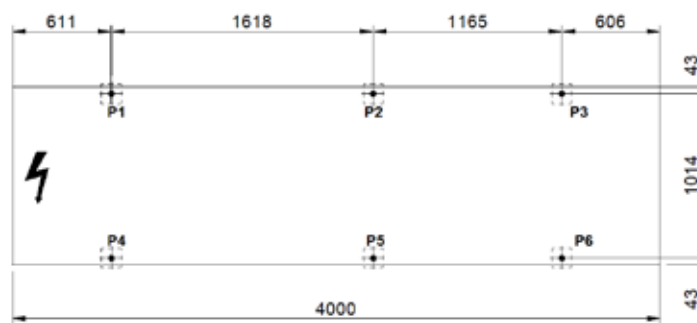


Rubber (AG) and spring vibration dampers (AM) — they have the purpose of not transmitting vibrations to the structure; they are to be mounted under the unit, in special holes. The ideal installation positions of the vibration dampers for each type of machine are shown below.

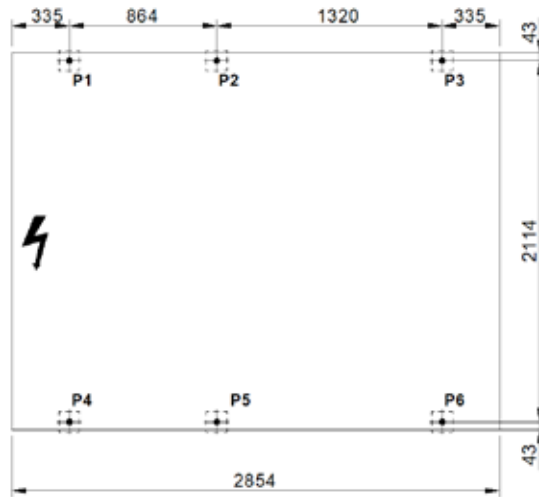
HWA1-A/H 2 fans: 02109, 02121



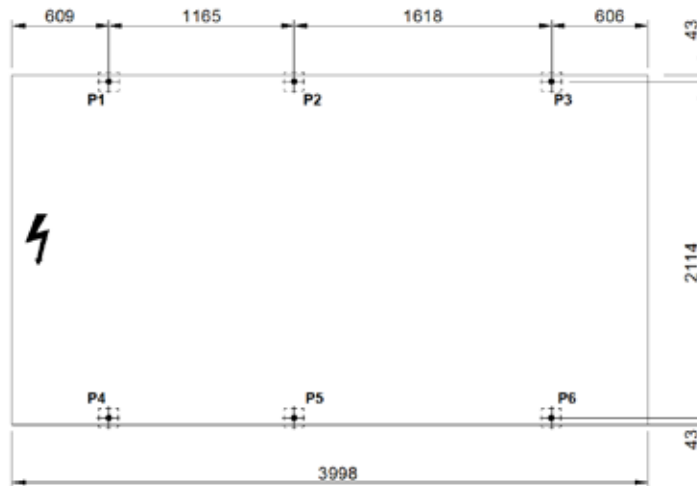
HWA1-A/H 3 fans: 02142, 02148, 02160



HWA1-A/H 4 fans: 04176, 04199, 04215, 04237



HWA1-A/H 6 fans: 04273, 04304, 04345



There are two types of antivibrations available: in rubber and spring.
The recommended optimal flow rates are given for each of them, based on the size of the machine.

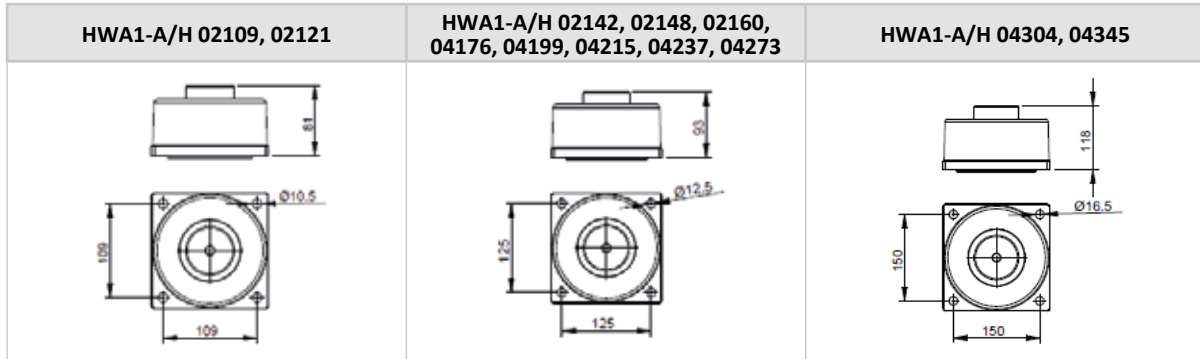
| Model HWA1-A/H | Antivibration rubber mounts carrying capacity P1÷P6 [daN] |
|--|---|
| 02109, 02121 | 300-400 |
| 02142, 02148, 02160, 04176, 04199, 04215, 04237, 04273 | 400-600 |
| 04304, 04345 | 600-800 |



| Model HWA1-A/H | Spring antivibration mounts carrying capacity P1÷P6 [daN] | | | | | |
|----------------|---|-----|-----|-----|-----|-----|
| | P1: | P2: | P3: | P4: | P5: | P6: |
| 02109 | 330 | 330 | 290 | 330 | 330 | 290 |
| 02121 | 330 | 330 | 290 | 330 | 330 | 290 |
| 02142 | 600 | 460 | 330 | 600 | 460 | 330 |
| 02148 | 600 | 460 | 330 | 600 | 460 | 330 |
| 02160 | 600 | 460 | 330 | 600 | 460 | 330 |
| 04176 | 560 | 510 | 460 | 560 | 510 | 460 |
| 04199 | 560 | 510 | 460 | 560 | 510 | 460 |
| 04215 | 600 | 540 | 460 | 600 | 540 | 460 |
| 04237 | 600 | 540 | 460 | 600 | 540 | 460 |
| 04273 | 600 | 540 | 460 | 600 | 540 | 460 |

| Model HWA1-A/H | Spring antivibration mounts carrying capacity P1÷P6 [daN] | | | | | |
|-------------------|---|-----|-----|-----|-----|-----|
| | P1: | P2: | P3: | P4: | P5: | P6: |
| 04304 | 860 | 750 | 560 | 860 | 750 | 560 |
| 04345 | 860 | 750 | 560 | 860 | 750 | 560 |

Below are details of the rubber vibration dampers for each size



and the spring dampers, which are dimensionally identical for all sizes.

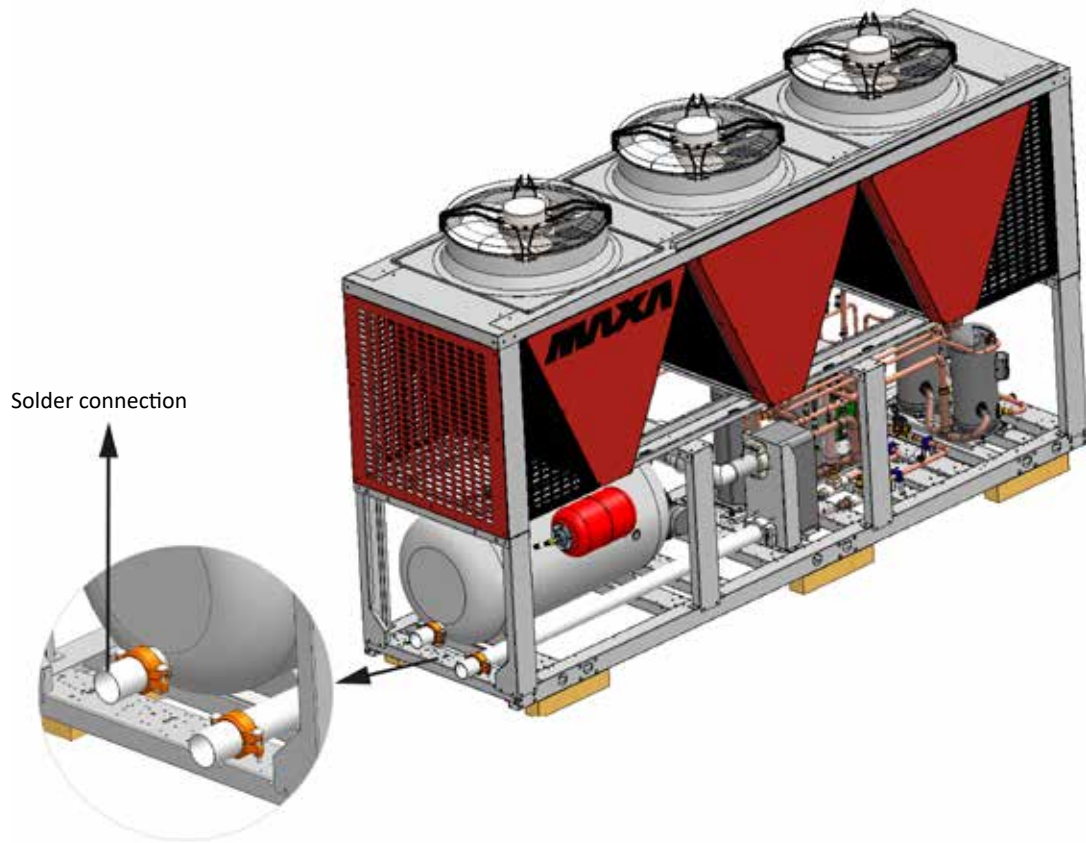


Y filter (FY) – it contains a stainless steel mesh sieve that collects the solid materials present in the water. Filtration allows to avoid the obstruction and / or damage of the devices installed downstream of the filter.

Grooved connection joint (RV) – it joins pipes or grooved fittings, ensuring perfect seal between the two components. The starter kit consists of 2 jaws and 2 smooth sockets, 120 mm long, grooved on one side and seal and soldered on the other. The recommended tightening torques for each mold should be in the range 120-150 Nm.



ATTENTION: Check, at start-up, the absence of leakage at the pipe junction points, possible caused by seal failure / misalignment / non tightening.



3. INSTALLATION

All handling, installation and maintenance operations must be carried out only by QUALIFIED PERSONNEL. Before any operation on the unit, make sure that the power supply is disconnected.

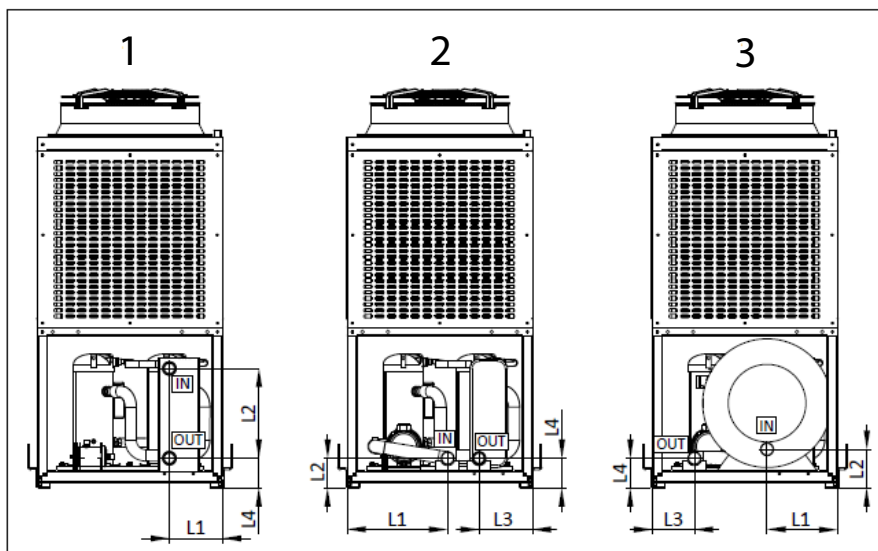
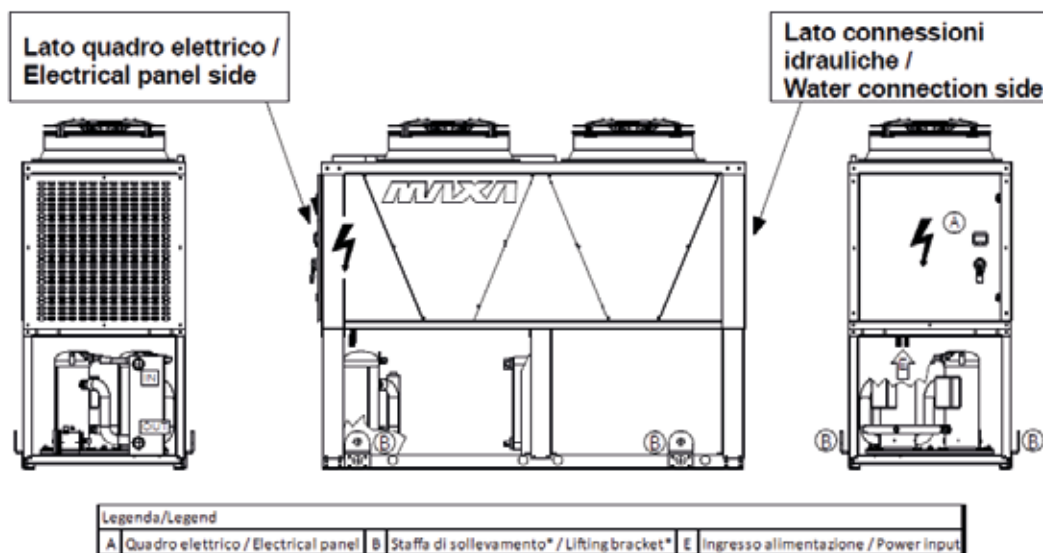
3.1 UNIT DIMENSIONS, WATER CONNECTIONS, WEIGHTS AND CENTRE OF GRAVITY POSITION

3.1.1 Net dimensions and packaging

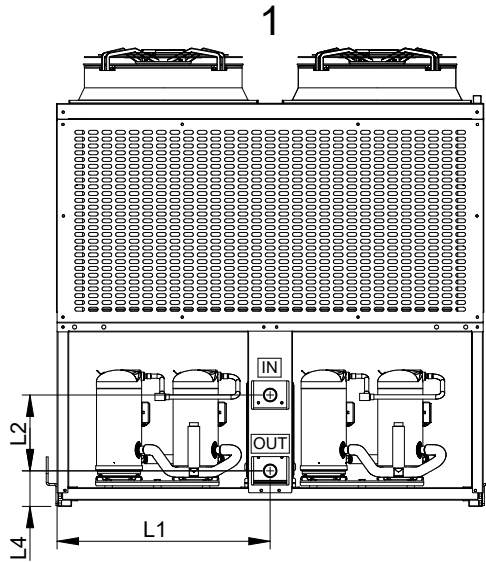
| Model HWA1-A/H | Length [mm] | Width [mm] | Height [mm] | Height SSL and C versions [mm] | Height max with packaging [mm] | Height max with packaging SSL or C versions [mm] |
|----------------------------|-------------|------------|-------------|--------------------------------|--------------------------------|--|
| 02109, 02121 | 2860 | 1100 | 2361 | 2418 | 2450 | 2500 |
| 02142, 02148, 02160 | 4060 | 1100 | 2361 | 2418 | 2450 | 2500 |
| 04176, 04199, 04215, 04237 | 2860 | 2200 | 2361 | 2418 | 2450 | 2500 |
| 04273, 04304, 04345 | 4060 | 2200 | 2361 | 2418 | 2450 | 2500 |

3.1.2 Position and connections details

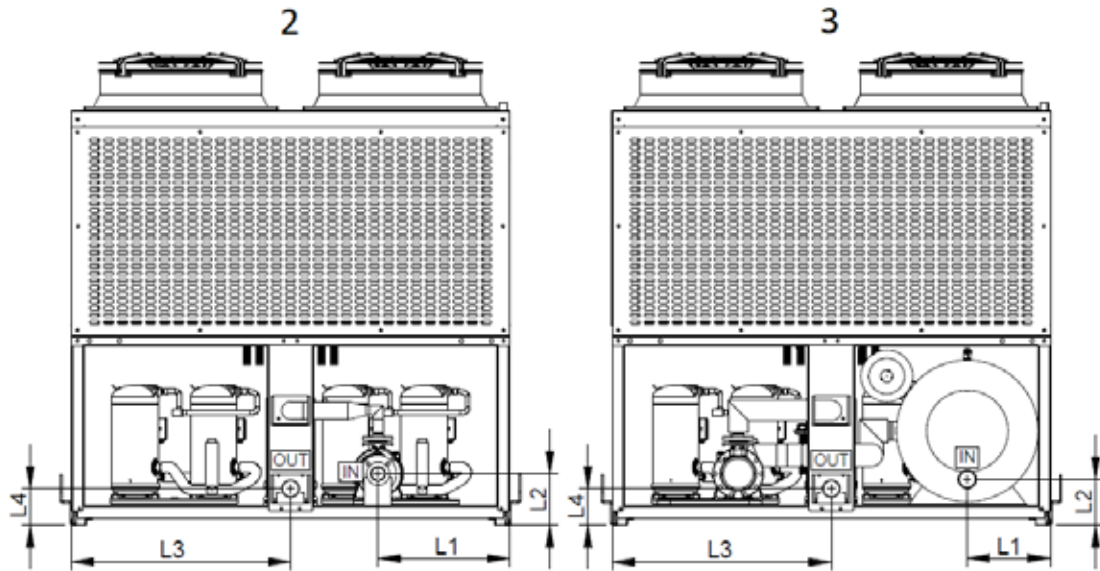
The table shows the connection diameters and the positions of the hydraulic connections (in/out) according to the size and configuration of the unit. All connections shown are grooved — “Victaulic” type. The location of the hydraulic connections is highlighted in the image below.



| | Model | Version | Ref. Image | L1 [mm] | L2 [mm] | L3 [mm] | L4 [mm] | ØIN | ØOUT |
|--------|-------------------------|---------------------------|------------|---------|---------|---------|---------|-------|-------|
| 2 fans | HWA1-A/H | | | | | | | | |
| | 02109 02121 | Standard | 1 | 314 | 530 | - | 176 | 2"1/2 | 2"1/2 |
| | | Single/double pump | 2 | 573 | 176 | 314 | | | |
| | | Single/double pump + tank | 3 | 416 | 229 | 248 | | | |
| 3 fans | HWA1-A/H | | | | | | | | |
| | 02142 02148 02160 | Standard | 1 | 314 | 530 | - | 176 | 2"1/2 | 2"1/2 |
| | | Single/double pump | 2 | 605 | 176 | 314 | | | |
| | | Single/double pump + tank | 3 | 416 | 231 | 228 | 3" | | |

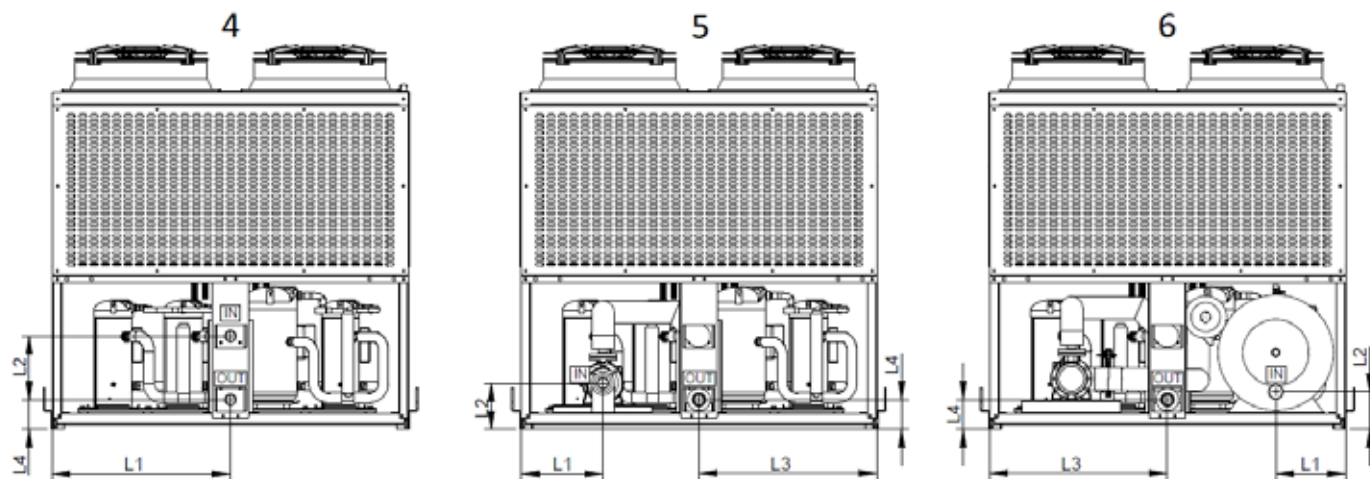


Standard



Single/double pump

Single/double pump + tank

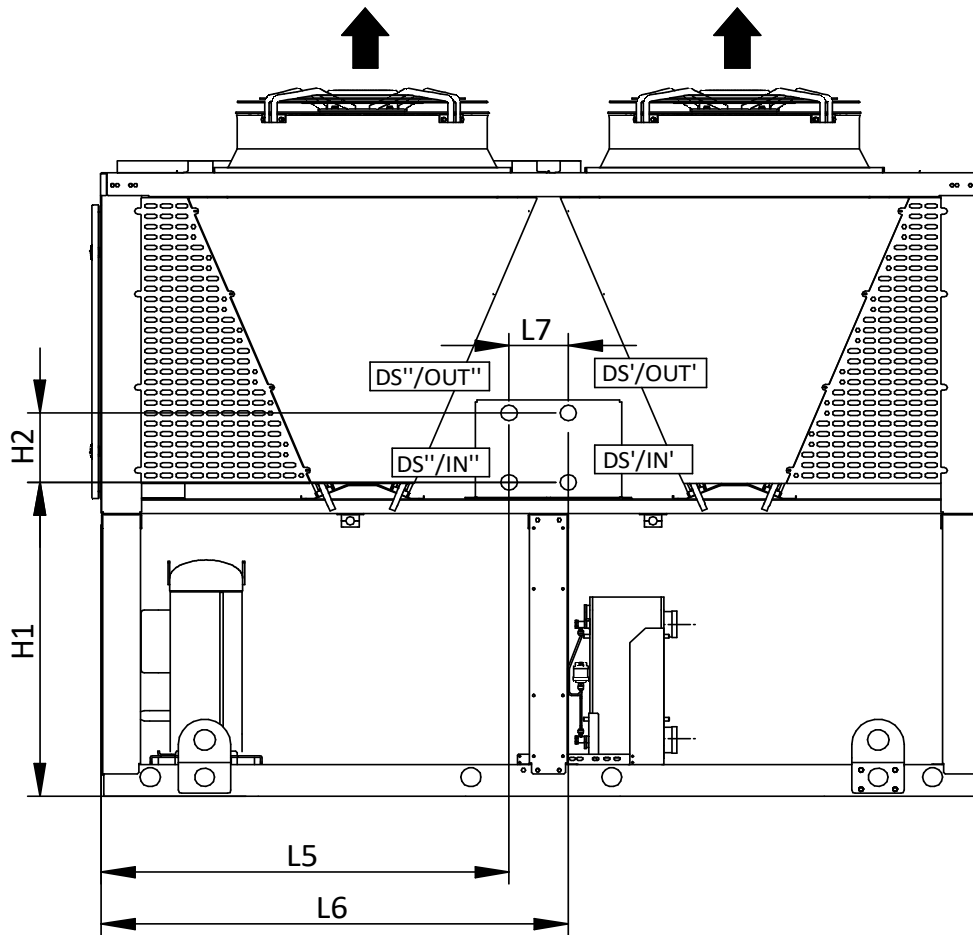


Standard

Single/double pump

Single/double pump + tank

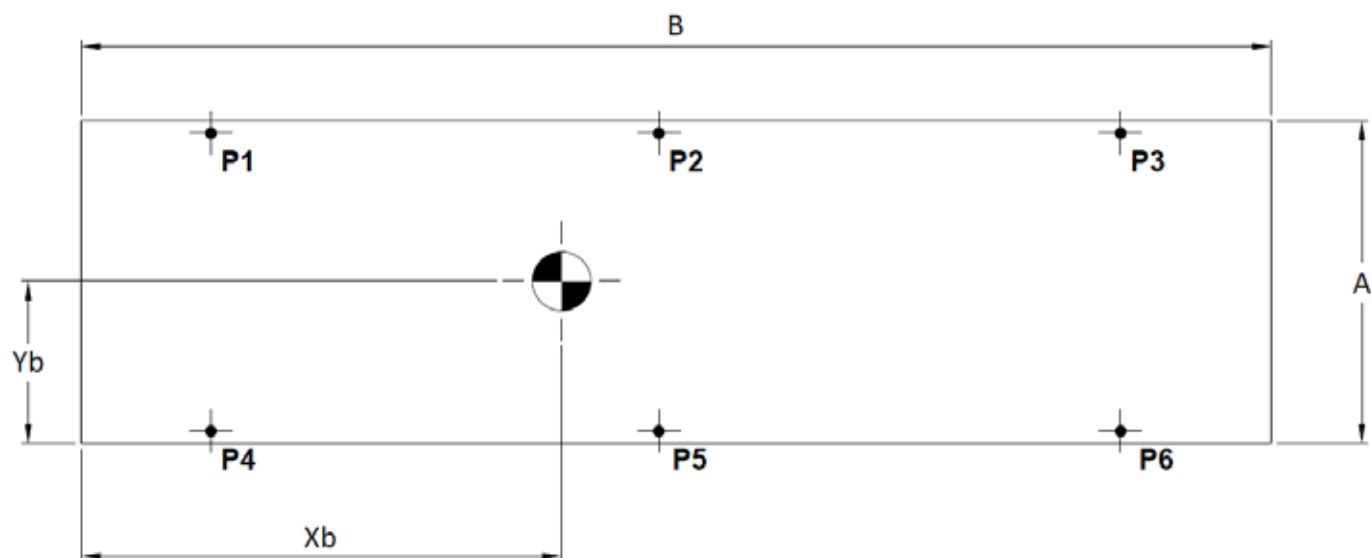
| | Model | Version | Ref. Image | L1 [mm] | L2 [mm] | L3 [mm] | L4 [mm] | ØIN | ØOUT | |
|--------|----------------|----------------------------------|------------|---------|---------|---------|---------|-----|------|----|
| 4 fans | HWA1-A/H | | | | | | | | | |
| | 04176 04199 | Standard | 1 | 1100 | 390 | - | 1100 | 183 | 3" | 3" |
| | | Standard head single pump | 2 | 693 | 246 | | | | | |
| | | High head single pump | 2 | 658 | 258 | | | | | |
| | | Standard head double pump | 2 | 547 | 246 | | | | | |
| | | High head double pump | 2 | 516 | 258 | | | | | |
| | 04215 04237 | Standard | 1 | 1100 | 390 | - | 1100 | 183 | 3" | 3" |
| | | Single pump | 2 | 658 | 258 | | | | | |
| | | Double pump | 2 | 516 | 258 | | | | | |
| | | Single/double pump + tank | 3 | 415 | 231 | | | | | |
| 6 fans | HWA1-A/H | | | | | | | | | |
| | 04273 | Standard | 4 | 1100 | 390 | - | 1100 | 183 | 3" | 3" |
| | | Single/double pump | 5 | 506 | 283 | | | | 4" | 4" |
| | | Single/double pump + tank | 6 | 429 | 231 | | | | 3" | 4" |
| | 04304 | Standard | 4 | 1100 | 390 | - | 1100 | 183 | 3" | 3" |
| | | Standard head single/double pump | 5 | 506 | 283 | | | | 4" | 4" |
| | | High head single double pump | 5 | 506 | 311 | | | | 4" | 4" |
| | | Single/double pump + tank | 6 | 429 | 231 | | | | 3" | 4" |
| | 04345 | Standard | 4 | 1100 | 390 | - | 1100 | 183 | 3" | 3" |
| | | Single/double pump | 5 | 506 | 311 | | | | 4" | 4" |
| | | Single/double pump + tank | 6 | 429 | 231 | | | | 3" | 4" |



| | Model | Version | L5 [mm] | L6 [mm] | L7 [mm] | H1 [mm] | H2 [mm] | Ø DS' IN | Ø DS' OUT | Ø DS'' IN | Ø DS'' OUT |
|----------|---------------------|--------------------|---------|---------|---------|---------|---------|----------------------|----------------------|----------------------|----------------------|
| 2/3 fans | HWA1-A/H -DS | | | | | | | | | | |
| | 02109 | with desuperheater | - | 1517 | - | 1060 | 234 | 1"1/2 G ISO 228-1 | 1"1/2 G ISO 228-1 | - | - |
| | 02121 | | | | | | | | | | |
| | 02142 | | | | | | | | | | |
| | 02148 | | | | | | | | | | |
| 02160 | | | | | | | | | | | |
| 4/6 fans | HWA1-A/H -DS | | | | | | | | | | |
| | 04176 | with desuperheater | 1324 | 1516 | 192 | 1060 | 234 | 1"1/2 G ISO 228-1 | 1"1/2 G ISO 228-1 | 1"1/2 G ISO 228-1 | 1"1/2 G ISO 228-1 |
| | 04199 | | | | | | | | | | |
| | 04215 | | | | | | | | | | |
| | 04237 | | | | | | | | | | |
| | 04273 | | | | | | | | | | |
| | 04304 | | | | | | | | | | |
| 04345 | | | | | | | | | | | |

3.1.3 Weights and position of the centre of gravity

The position of the centre of gravity of each machine is indicated in the table, with reference to the dimensions shown in the image. A distinction is made between the standard version machine and the complete hydraulic circuit with double pump and tank.



| Model HWA1-A/H | Version | Net shipping weight [kg] | Operating weight [kg] | A [mm] | B [mm] | Xb [mm] | Yb [mm] |
|-------------------|----------|-----------------------------|--------------------------|--------|--------|---------|---------|
| 02109 | Standard | 1180 | 1190 | 1100 | 2860 | 968 | 571 |
| | /PDAP/SI | 1410 | 1810 | | | 1386 | 584 |
| 02121 | Standard | 1210 | 1220 | 1100 | 2860 | 1090 | 529 |
| | /PDAP/SI | 1440 | 1840 | | | 1378 | 538 |
| 02142 | Standard | 1470 | 1480 | 1100 | 4060 | 1621 | 544 |
| | /PDAP/SI | 1770 | 2480 | | | 2101 | 582 |
| 02148 | Standard | 1530 | 1540 | 1100 | 4060 | 1641 | 544 |
| | /PDAP/SI | 1880 | 2600 | | | 2068 | 573 |
| 02160 | Standard | 1530 | 1540 | 1100 | 4060 | 1639 | 553 |
| | /PDAP/SI | 1890 | 2600 | | | 1701 | 566 |
| 04176 | Standard | 2030 | 2040 | 2200 | 2860 | 1203 | 1121 |
| | /PDAP/SI | 2380 | 2910 | | | 1324 | 1136 |
| 04199 | Standard | 2060 | 2070 | 2200 | 2860 | 1200 | 1046 |
| | /PDAP/SI | 2370 | 2900 | | | 1451 | 1171 |
| 04215 | Standard | 2100 | 2110 | 2200 | 2860 | 1185 | 1095 |
| | /PDAP/SI | 2440 | 2970 | | | 1426 | 1201 |




| Model HWA1-A/H | Version | Net shipping weight [kg] | Operating weight [kg] | A [mm] | B [mm] | Xb [mm] | Yb [mm] |
|-------------------|----------|-----------------------------|--------------------------|--------|--------|---------|---------|
| 04237 | Standard | 2130 | 2140 | 2200 | 2860 | 1180 | 1105 |
| | /PDAP/SI | 2460 | 3000 | | | 1293 | 1120 |
| 04273 | Standard | 2680 | 2700 | 2200 | 4060 | 1694 | 1096 |
| | /PDAP/SI | 3190 | 3910 | | | 1812 | 1115 |
| 04304 | Standard | 2880 | 2900 | 2200 | 4060 | 1559 | 1138 |
| | /PDAP/SI | 3360 | 4090 | | | 1974 | 1233 |
| 04345 | Standard | 2900 | 2930 | 2200 | 4060 | 1605 | 1069 |
| | /PDAP/SI | 3450 | 4180 | | | 1776 | 1105 |

3.2 SERVICE AND TECHNICAL SPACE

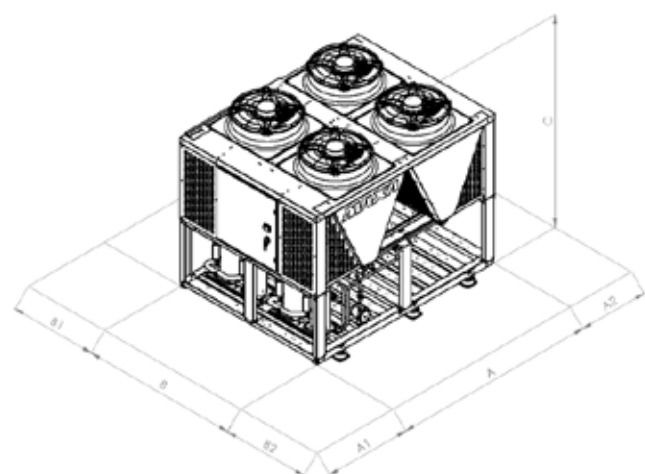
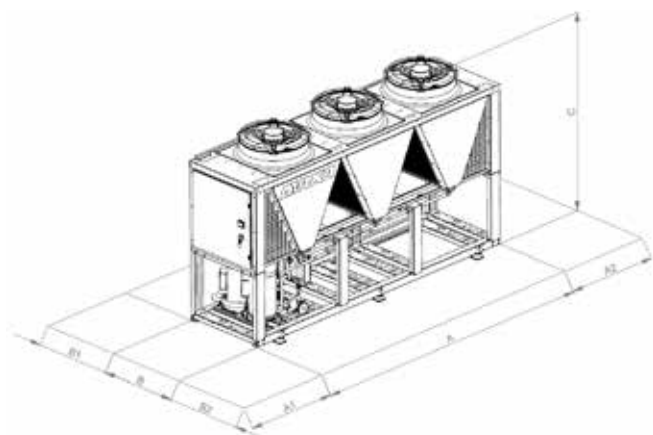
The whole series is designed and built for outdoor installations.

It is good practice to create a support slab of a size adequate to that of the unit.

The units transmit a low level of vibrations to the ground: it is however advisable to place anti-vibration supports between the base frame and the support surface.

| | |
|---|--|
|  | <p>The support surface must have a sufficient capacity to support the weight of the unit, which can be seen both on the technical label affixed to the machine and in this manual in the dedicated chapter.</p> <p>The support surface must not be inclined to ensure the correct operation of the unit and to prevent it from tipping over.</p> <p>The installation surface of the unit must not be smooth, in order to avoid the deposit of water/ice, a potential source of danger.</p> |
|  | <p>The installation site of the unit must be free of foliage, dust, etc. which could clog or cover the heat exchangers coils.</p> <p>Installation in areas subject to stagnation or falling water, e.g. from gutters, should be avoided.</p> <p>Also, avoid locations subject to snow accumulation (such as corners of buildings with sloping roofs). When installing in areas subject to snowfall, mount the unit on a base 20-30 cm above the ground to prevent snow accumulation around the unit.</p> |
|  | <p>Installation of the unit under covers of any kind, such as roofs, canopies should be avoided.</p> |

It is very important to avoid recirculation between suction and delivery, otherwise the performance of the unit will deteriorate or even interruption of normal operation. In this regard, it is necessary to guarantee the minimum service spaces sotto riportati.

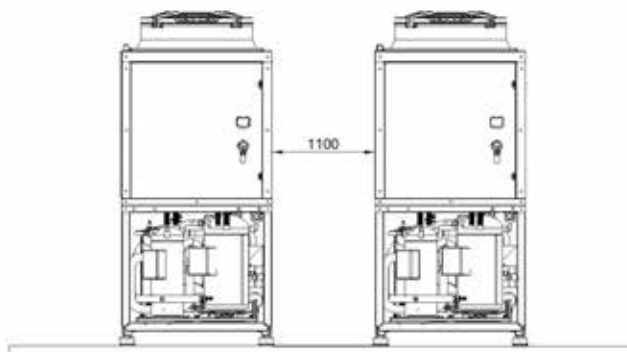


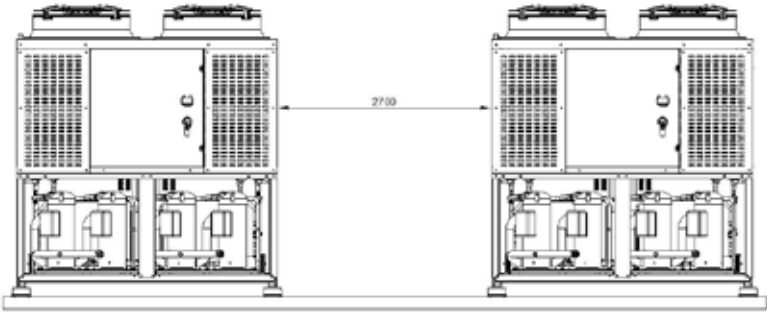
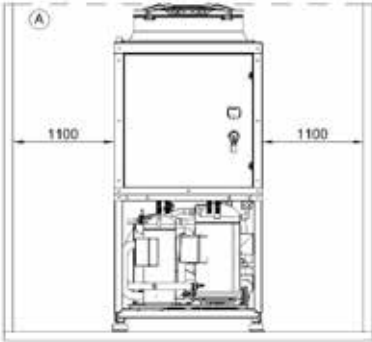
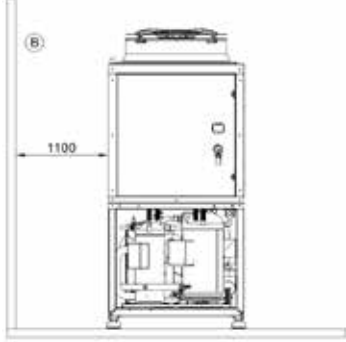
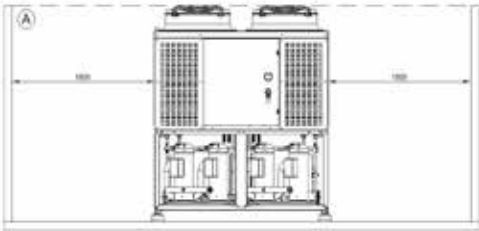
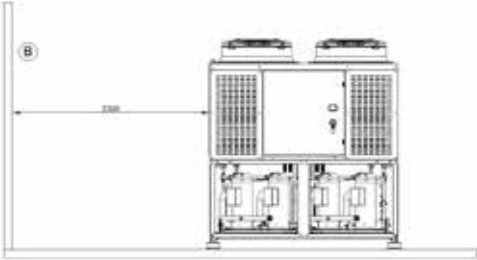
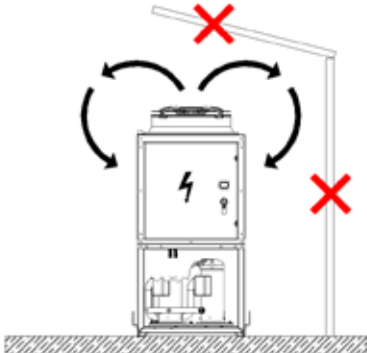
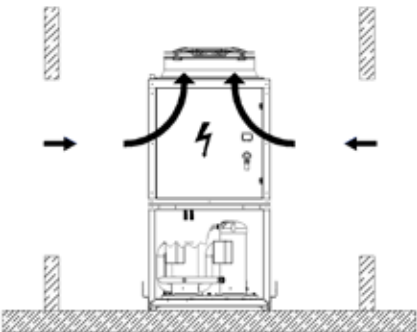
| Model | | A1 | A2 | B1 | B2 |
|----------|----|------|-----|------|------|
| HWA1-A/H | mm | 1000 | 800 | 1000 | 1000 |



For installations in locations with strong winds refer to the area classification according to the Beaufort scale. If the value is ≥ 7 (strong wind, average wind speed = 13,9-17,1 m/s) it is strictly necessary to maintain the fan powered at all times, in order to prevent its unintentional rotation.

In case of units placed side by side, the minimum distance L_{min} to be observed between them is 1100 mm for units with a width of 1100 mm:
HWA1-A/H 02109, 02121, 02142, 02148, 02160












| | | |
|---|--|--|
| <p>2700 mm for unit with width 2200 mm: HWA1-A/H 04176, 04199, 04215, 04237, 04273, 04304, 04345</p> |  | |
| <p>Unit with width 1100 mm: HWA1-A/H 02109, 02121, 02142, 02148, 02160</p> <p>In case of units surrounded by walls or obstacles of equal height (CASE A), the installation should be at a distance of no less 1100 mm on either side. If the height of the wall or single obstacle is greater than the unit height (CASE B) use a minimum distance of 1100 mm or contact MAXA technical sales support.</p> |  |  |
| <p>Units with width 2200 mm: HWA1-A/H 04176, 04199, 04215, 04237, 04273, 04304, 04345</p> <p>In case of units surrounded by walls or obstacles of equal height (CASE A), the installation should be at a distance of no less 1800 mm on either side. If the height of the wall or single obstacle is greater than the unit height (CASE B) use a minimum distance of 2300 mm or contact MAXA technical sales support.</p> |  |  |
| <p>Covering with canopies or positioning near plants or walls should be avoided in order to prevent air circulation.</p> |  | |
| <p>In case of winds with speeds in excess to 13,9-17,1 m/s (strong winds according to the Beaufort scale) the use of windbreaks is recommended.</p> |  | |

Always make an environmental impact evaluation based on the power and sound pressure data given in the technical data chapter and the sound emission limits based on the installation area of the unit, with reference to the DPCM of 14/11/1997. An evaluation must also be made if the unit is installed in the vicinity of workers, according to D. LGS. 81/2008 Art. 189 and following.

3.3 HYDRAULIC CIRCUIT

The hydraulic connections must be made in compliance with national or local regulations; the pipes can be made of steel. The pipes must be carefully sized according to the unit's nominal water flow rate and pressure drops in the hydraulic circuit. All hydraulic connections must be isolated using closed cell material of adequate thickness. The unit must be connected to the pipes using grooved joints. It is recommended to install the following components in the hydraulic circuit:

- Well thermometers for detecting the temperature in the circuit.
- Manual gate valves to isolate the chiller from the hydraulic circuit.
- Metal Y filter or a defangator (installed on the return pipe from the system) with a metal mesh of no more than 1mm.
- Expansion vessel of adequate capacity for the total water content of the system.
- Anti vibration joints of adequate diameter to the pipes to prevent the transfer of vibrations of the system.
- Pressure gauge for the measuring the outlet water pressure and the approximate determination of the water flow.
- Loading group and discharge valve where necessary.

| | |
|---|---|
|  | ATTENTION: Make sure, when sizing the pipes, not to exceed the maximum loss on the system side shown in the technical-data table (see useful head). |
|  | ATTENTION: Check, at start-up, that there are no leaks at the junction points between the pipes, possibly caused by seal failure/ misalignment / non-tightening. The technical bulletin contains the recommended tightening torques for each size. |
|  | ATTENTION: Create a suitable outlet for the safety valve. |
|  | ATTENTION: An automatic air vent valve must be installed at the highest point of system. |
|  | ATTENTION: In the series models with configuration in which the tank is not present, the expansion tank integrated on the system side is not present. The installer is responsible for checking the actual capacity of the system and providing an expansion tank of adequate volume. |
|  | ATTENTION: The return pipe from the system must be in correspondence with the "WATER INLET" label otherwise the evaporator could freeze. |
|  | ATTENTION: It is mandatory to install a metal filter (with mesh no greater than 1 mm) on the return pipe from the system labelled "WATER INLET". Alternatively, it is possible to install a defangator that guarantees a filtration degree of no more than 1 mm; in this case, it is no longer necessary to install the Y-filter. If the metal filter or the defangator are not present on the system, the warranty expires immediately. The filter (or the defangator) must be kept clean, therefore it must be ensured that after the installation of the unit it is still clean and checked periodically. |
|  | All units leave the factory with a differential pressure switch (factory installed). If the differential pressure switch is tampered with or removed, the warranty will be void. Refer to the wiring diagram enclosed with the unit for the connection of the differential pressure switch. Never jumper the differential pressure switch connections in the terminal block. |
|  | The heating system and safety valves must comply with the requirements EN 12828. |

3.3.1 System water characteristics

To ensure the correct operation of the unit, the water must be adequately filtered (see what is reported at the beginning of this paragraph) and that the quantities of dissolved substances must be minimal. Below are the maximum allowed values.

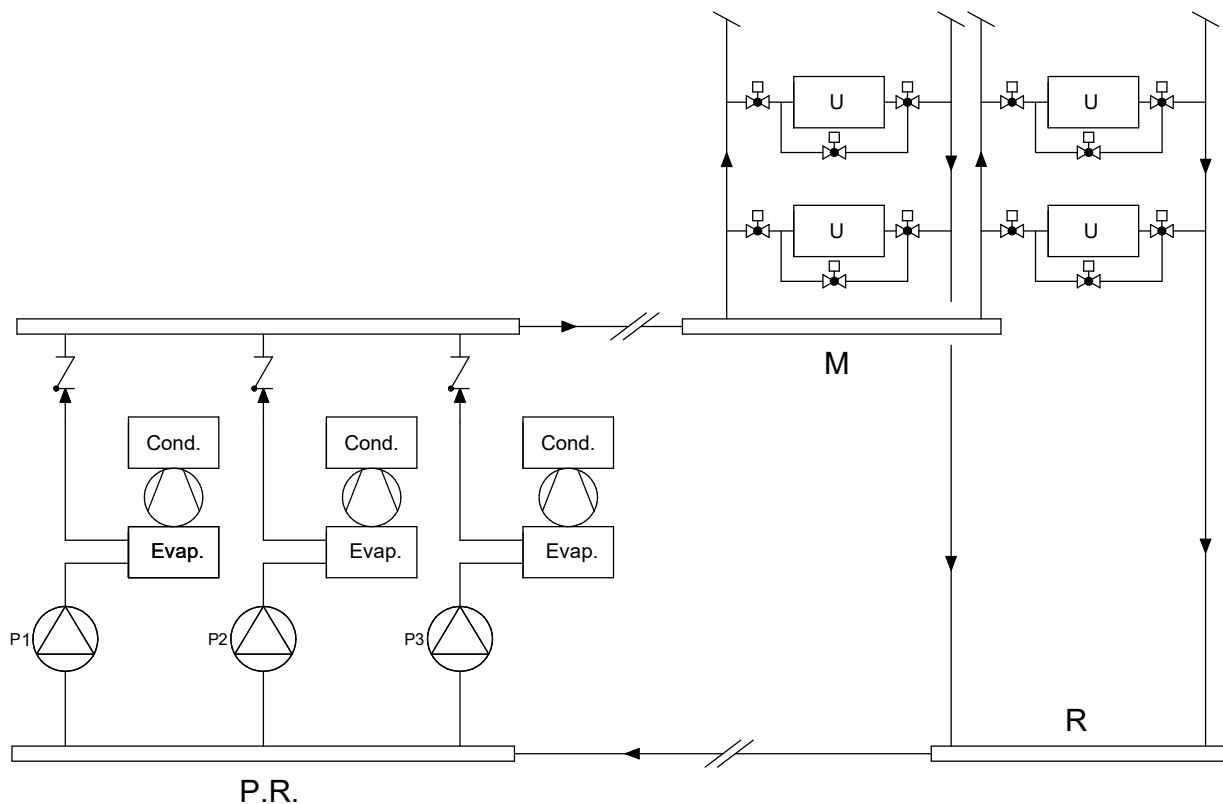
| MAXIMUM CHEMICAL-PHYSICAL CHARACTERISTICS ALLOWED FOR THE SYSTEM WATER | |
|--|-----------------|
| PH | 7,5 - 9 |
| Electrical conductivity | 100 - 500 µS/cm |
| Total hardness | 4,5 – 8,5 dH |
| Temperature | < 65°C |
| Oxygen content | < 0,1 ppm |
| Glycol Max quantity | 50 %* |

| MAXIMUM CHEMICAL-PHYSICAL CHARACTERISTICS ALLOWED FOR THE SYSTEM WATER | |
|--|--------------|
| Phosphates (PO4) | < 2ppm |
| Manganese (Mn) | < 0,05 ppm |
| Iron (Fe) | < 0,3 ppm |
| Alkalinity (HCO3) | 70 – 300 ppm |
| Chlorine ions (Cl-) | < 50 ppm |
| Sulphate ions (SO4) | < 50 ppm |
| Sulfide ions (S) | None |
| Ammonium ion (NH4) | None |
| Silica (SiO2) | < 30 ppm |

* In case of units with hydronic kit, pay attention to the maximum quantity of glycol present in the system: if more than 40% use accessory TE1 (Special mechanical seal for glycol above 40%).

3.3.2 Hydraulic scheme type

Possible hydraulic schemes are shown when the associated hydronic kit is present. Remember that the input filter is MANDATORY, on request it is supplied as an accessory. The following diagrams are conceptual and purely indicative; they cannot be used as an executive document for the realisation of a project. Please contact a specialised thermo-technical engineer in order to obtain a suitable hydraulic diagram for your specific requirements.



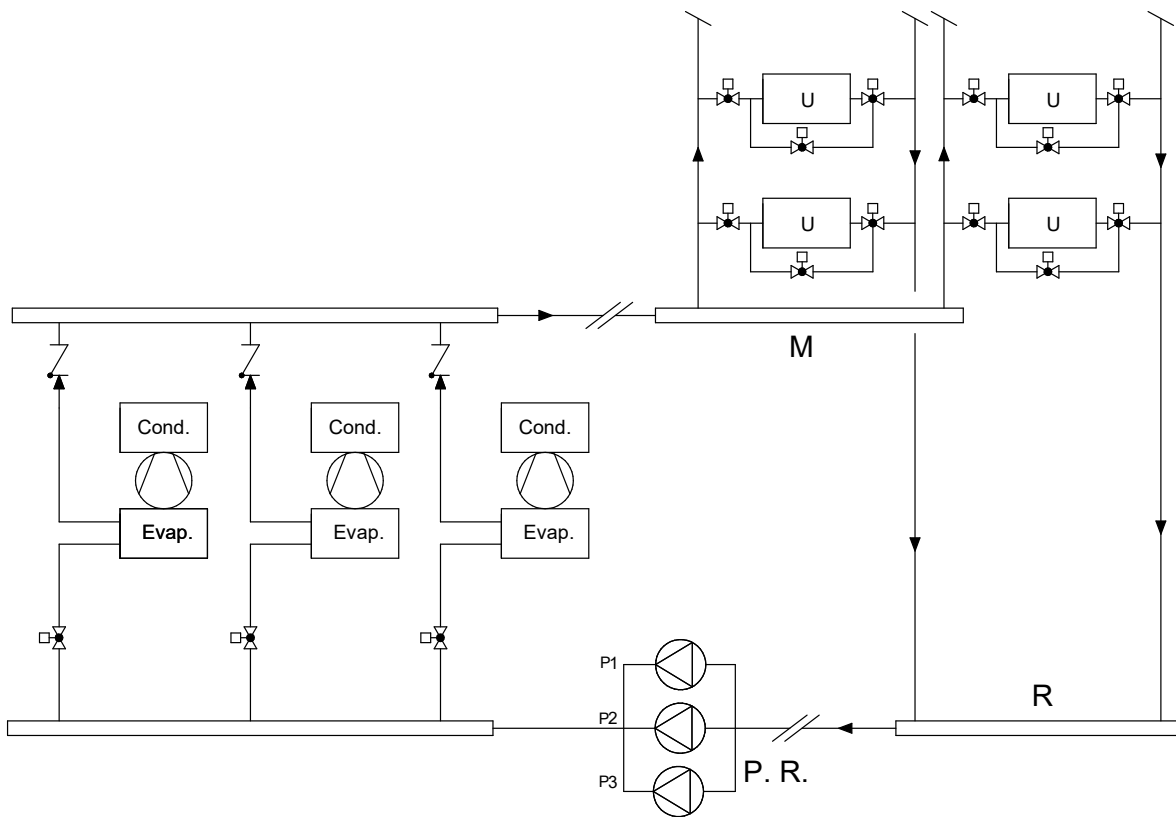
P. R. = chiller flow (constant flow)

U = user side

M = supply

R = return

- Since there is no division between the primary and secondary circuit, the flow rate of the pumps must be sized on the sum of the design flow rates of all the terminals, without considering contemporaneity.
- The flow rate circulating in the system is constant in any operating condition.
- The units must always be all functional; stopping one of them would lose control of the water delivery temperature.



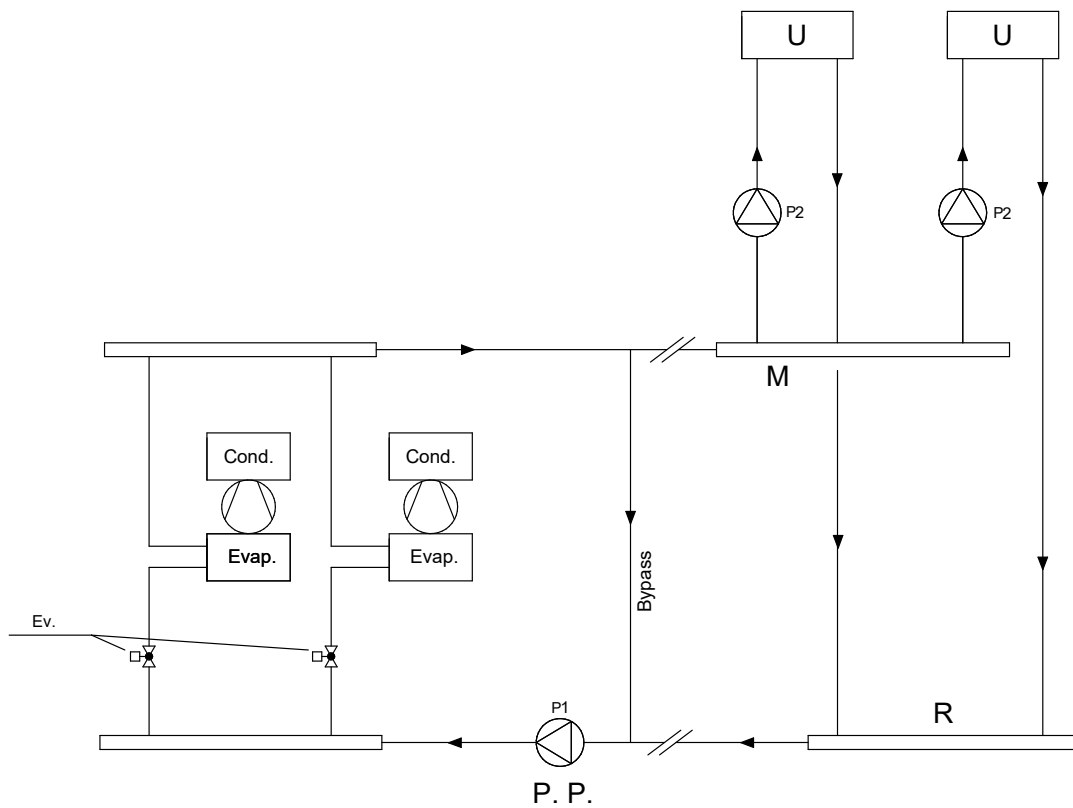
P. R. = chillers pumps (constant flow)

U = user side

M = supply

R = return

- Since there is no division between the primary and secondary circuit, the flow rate of the pumps must be sized on the sum of the design flow rates of all the terminals, without considering contemporaneity.
- The flow rate circulating through each chiller is constant in any load condition.
- The flow rate circulating in the system is constant in any operating condition.
- Thanks to the use of common pumps, it is necessary to insert only one chiller reserve pump. The shut-off valves only start operating in an emergency, to exclude a single unit.
- The units must always be all functional; stopping one of them would lose control of the water delivery temperature.



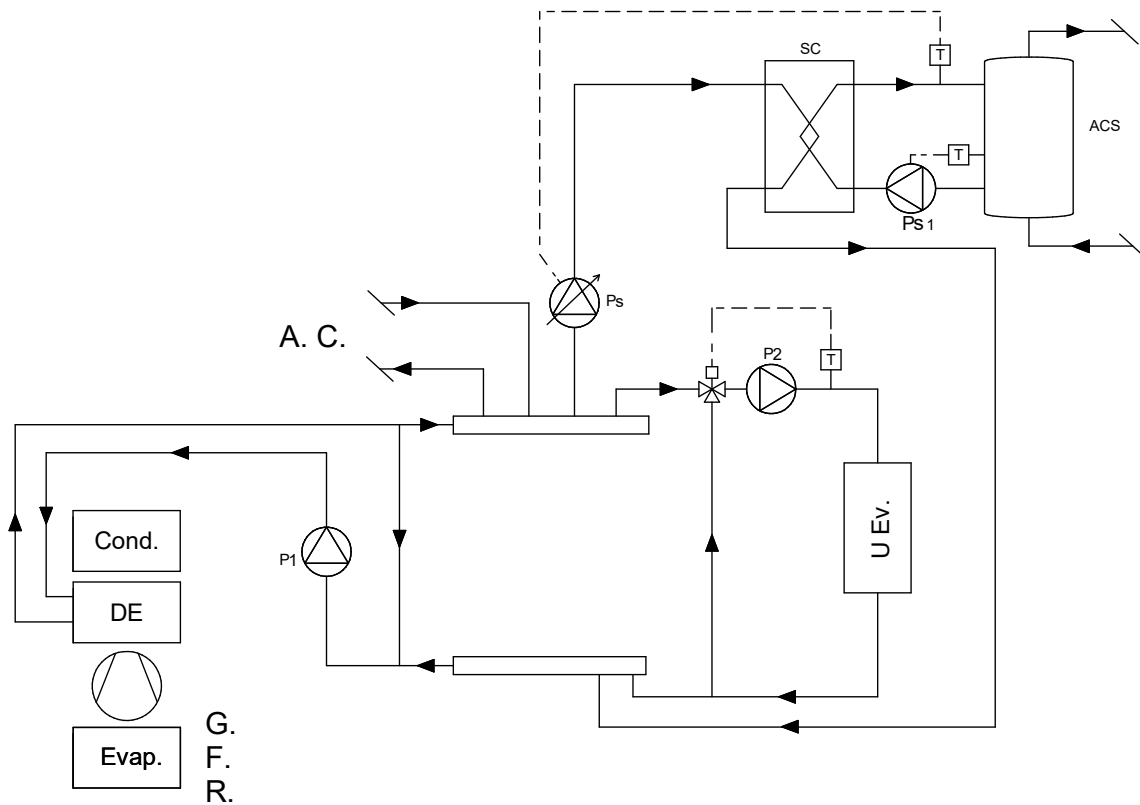
P. P. = primary pump (constant flow)

Ev. = potential

M = supply

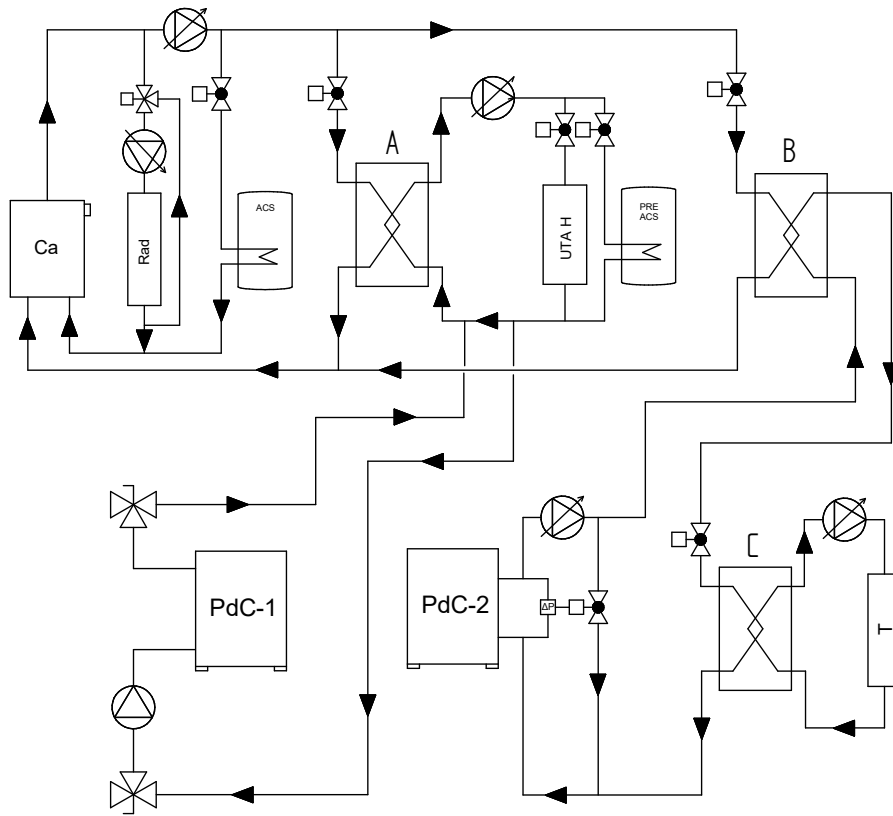
R = return

- The scheme is suitable for equal refrigeration units and for both constant and variable flow users.
- The flow rate of the primary pump P1 must be greater than the sum of the flow rates of the pumps P2 in any condition: in the by-pass section the flow rate must flow from the delivery to the return.
- The flow rate circulating through each chiller is constant in any load condition.
- The units must always be all functional; stopping one of them would lose control of the water delivery temperature.



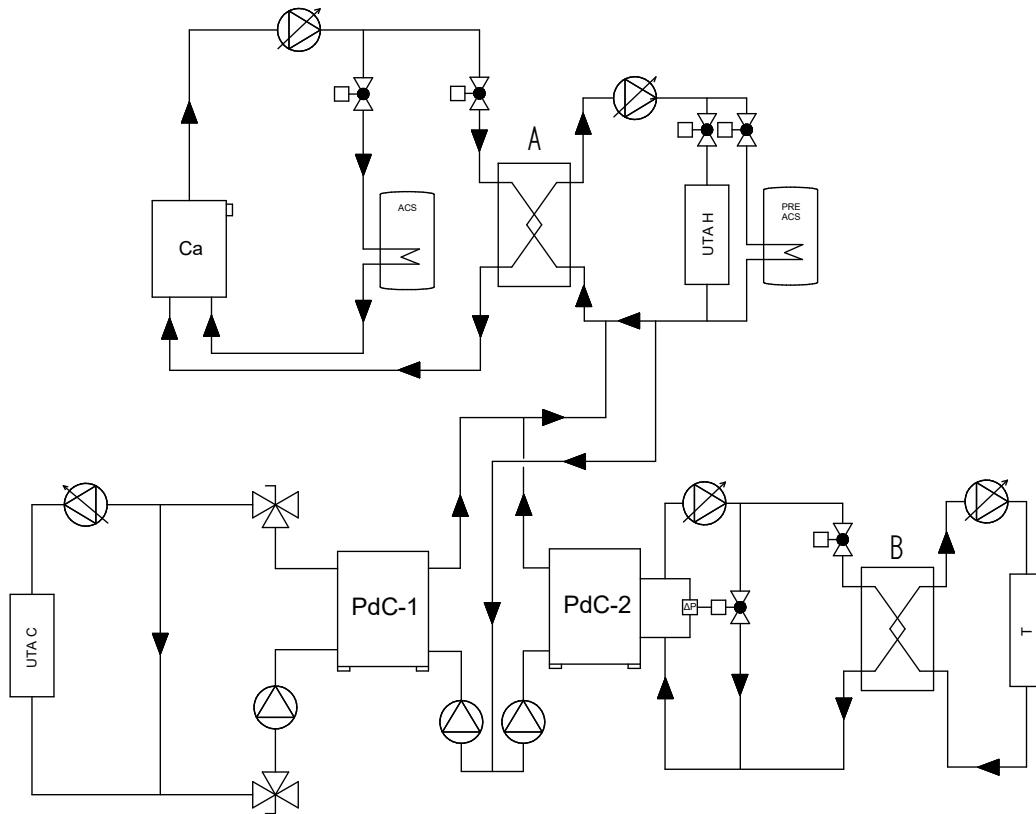
DE = desuperheater
 G. F. R. = Recovery chiller
 A. C. = to the boiler
 U Ev. = other hypothetical user sides

- With the use of the desuperheaters, it is possible to raise the temperature of the domestic hot water.
- The SC exchanger is used to avoid scale deposits caused by limescale which is deposited on the recovery exchanger of the refrigeration unit and must always be provided.
- Pump P1 activates and switches off based on the temperature of the sanitary water in the storage tank, while Ps pump is controlled to maintain the desired set-point value at the outlet of the SC exchanger.



Ca = boiler
 Rad = radiators
 UTA H = heating AHU
 T = terminals

- The heat generators feed the high temperature circuits consisting of the heating systems and those for the production of domestic hot water.
- The PdC-1 group produces hot water which is introduced into the low temperature network that supplies the hot batteries of the air treatment units (AHU) and the preheating of the domestic hot water. If the efficiency of the heat pump is too low, then the system is not sufficiently efficient, or in the event of a fault, the hot water is produced entirely via exchanger A powered by the boilers.
- The PdC-2 group also produces hot water at low temperature, which passes through the exchanger B and feeds the C. Also in this case, in the absence of convenience or due to faults, hot water is produced by the exchanger B powered by the boilers.

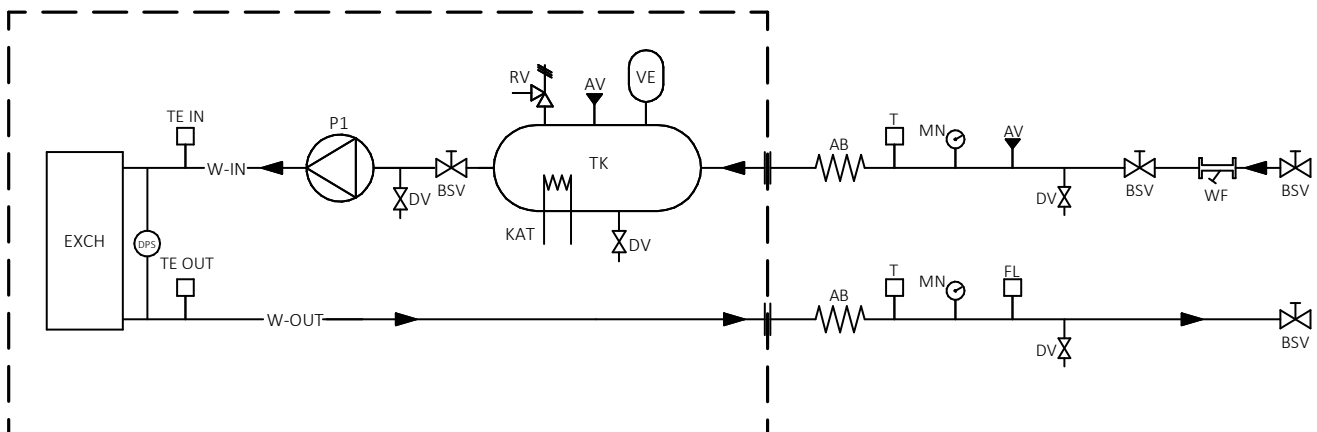


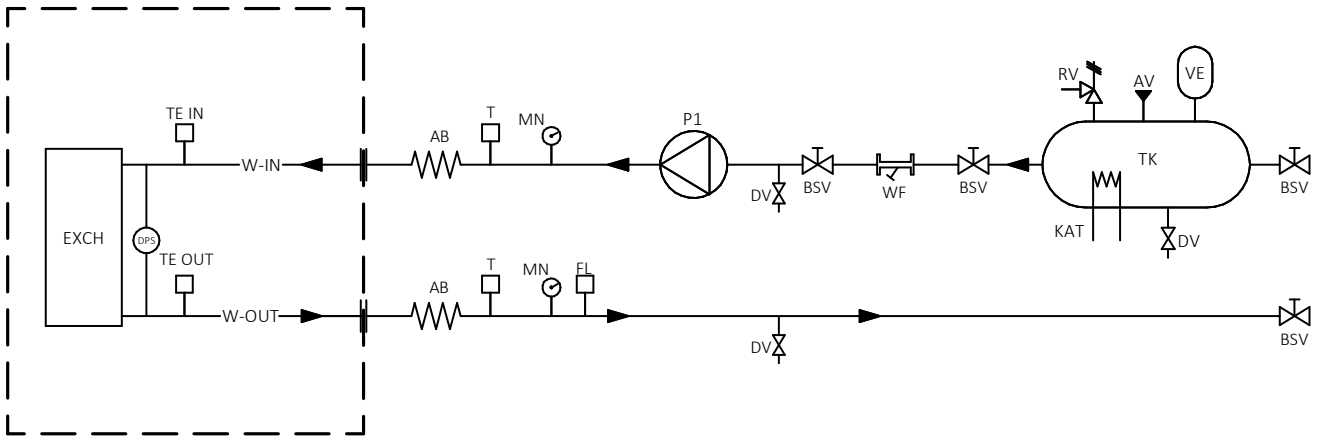
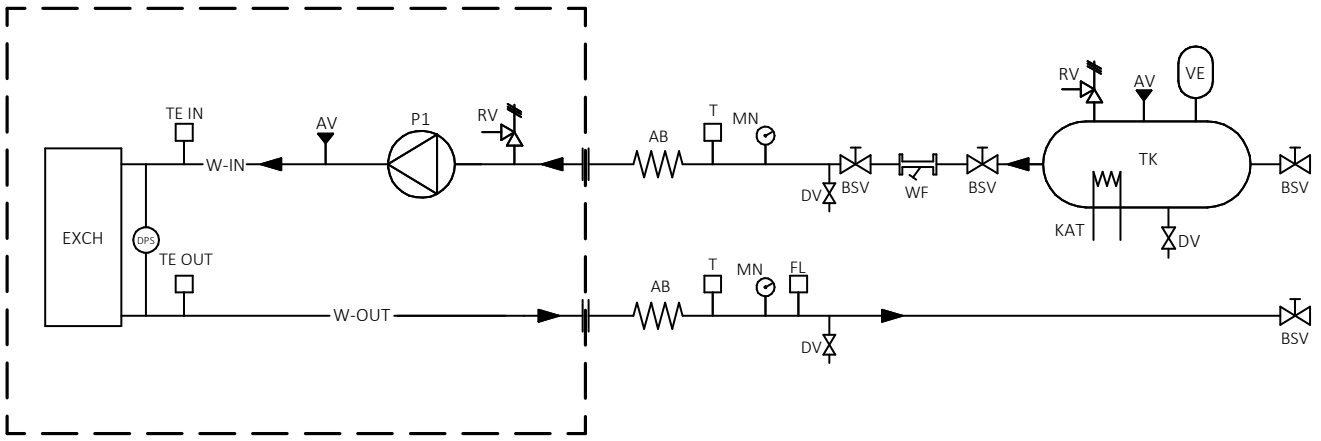
Ca = boiler
 UTA H = heating AHU
 UTA C = cooling AHU
 T = terminals

- The heat generators work to integrate, if necessary, renewable sources present and any post-heaters.
- The PdC-1 group works as a water chiller producing water for the cold batteries of the AHU.
- It is good to equip the two heat pump refrigeration units with desuperheaters to power the reheating batteries (if present) and to preheat the DHW.
- The PdC-2 group produces chilled water at a temperature higher than that produced by group 1; the water feeds the exchanger B. It is not possible to make a direct coupling between group 2 and the terminals, as these have lower summer temperature difference values than the minimum 4°C accepted by the chillers.

3.3.3 Hydraulic diagram inside the unit

Below are the hydraulic connection diagrams for the unit, respectively for units with PS/SI hydronic kit (pump and tank), units with PS kit (single pump) and units without hydronic kit. The dotted area delimits the machine in the various configurations, what is outside is to be considered as recommended and is not supplied.





| Legend | | | |
|--------|-------------------------------|--------|--------------------------------|
| EXCH | Plate heat exchanger | TK | Inertial tank |
| DPS | Differential pressure switch | AV | Air vent valve |
| T | Temperature sensor | VE | Expansion vessel |
| P1 | Pump | MN | Manometer |
| DV | Discharge tap | FL | Flow switch |
| BSV | Interception valve | WF | Water filter |
| RV | Safety valve | W-IN | User water inlet |
| KAT | Tank electric element | W-OUT | User water outlet |
| TE IN | Plant inlet temperature probe | TE OUT | Plant outlet temperature probe |
| AB | Antivibration dampers | | |

Each unit equipped with a hydronic kit with tank (PS/SI, PSAP/SI, PD/SI, PDAP/SI configurations) includes an expansion tank and a safety valve. The expansion tank is single or double based on the size of the unit. Here are the main features:

- membrane resistant to peaks of 130°C;
- pre-charge pressure 2,5 bar;
- glycol percentage up to 100%;
- maximum pressure 10 bar.

| HWA1-A/H | 02109 | 02121 | 02142 | 02148 | 02160 | 04176 | 04199 | 04215 | 04237 | 04273 | 04304 | 04345 |
|------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Number of expansions vessels | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| Expansion vessels volume [l] | 25 | | | | | | | | | | | |

Each unit equipped with a hydronic kit without tank (PS, PSAP, PD, PDAP configurations) a safety valve with an opening pressure of 6 bar is included.

3.3.4 Minimum water content and hydraulic circuit volumes


The table shows the minimum recommended water content of the system for unit and the volume of the storage tank (if present). The volume of the hydraulic circuit is also indicated in the case of units with the pump + tank (PS/SI, PSAP/SI, PD/SI, PDAP/SI configurations). If this volume is lower than the minimum recommended water content, it is necessary to make sure that the pipes connecting to the unit have sufficient capacity to compensate this difference. The necessary supplementary volume is shown in the table.

| HWA1-A/H | 02109 | 02121 | 02142 | 02148 | 02160 | 04176 | 04199 | 04215 | 04237 | 04273 | 04304 | 04345 |
|------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Plant minimum content of water [l] | 501 | 633 | 633 | 831 | 831 | 494 | 626 | 626 | 791 | 1039 | 1039 | 1316 |
| Tank volume [l] | 390 | 390 | 705 | 705 | 705 | 520 | 520 | 520 | 520 | 705 | 705 | 705 |
| Hydraulic circuit volume [l] | 414 | 414 | 730 | 733 | 743 | 550 | 550 | 553 | 557 | 752 | 786 | 787 |
| Necessary external volume [l] | 87 | 219 | - | 98 | 88 | - | 76 | 73 | 234 | 287 | 253 | 529 |

3.3.5 Condensate drain system


Any condensation that may percolate from the pipes of the hydraulic system and gas circuit, and in the heat pump versions for draining the condensation that forms during defrosting cycle, is free to fall on the unit's support surface, as there is no containment base, but the water drains directly onto the ground.

FOR HEAT PUMP UNITS, IN A PARTICULARLY RIGID CLIMATE, INSTALLATION ON ELEVATION SUPPORTS IS RECOMMENDED TO ALLOW THE FORMATION OF ICE UNDER THE UNIT WITHOUT THE DAMAGE TO IT BEING DAMAGED.



ATTENTION: water (possible ice in the winter period) may be deposited on the base of the supporting structure and around the unit which could result in a slipping/falling hazard.

3.3.6 Plant load / unload



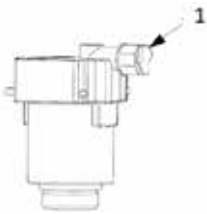
ATTENTION: supervise all loading / reintegration operations.

ATTENTION: before loading /reintegration the system, disconnect the power supply to the units.

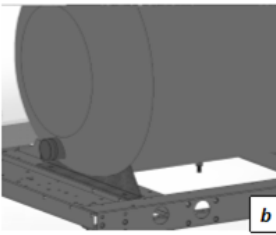
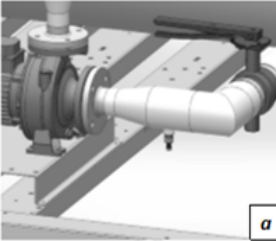
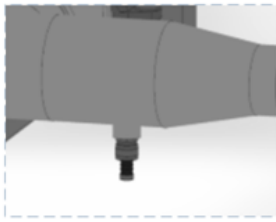
ATTENTION: the loading / reintegration of the system must always take place under controlled pressure conditions (1÷3 bar). Ensure that a pressure reducer and safety valve is installed on the filling/reintegration line.

ATTENTION: the water on the loading / reintegration line must be properly pre-filtered from any impurities and suspended particles. Make sure that a removable cartridge filter has been installed and a defangator.

ATTENTION: periodically check and vent the air that accumulates in the system.



During loading / reintegration operations, the vent valve cap must be partially unscrewed to allow air to flow freely outside the valve.
(1) vent valve tap



It is recommended to use an external tap to fill the system, which must be prepared by the installer.

Only if the unit is equipped with a hydronic kit is there a tap to be used if it is necessary to top up/download the amount of water in the system or adjust the percentage of glycol, it is possible to use the service tap.

This tap has a different location depending on the hydronic kit present:

- Absence of hydronic kit — tap not present;
- Hydronic kit with single /double pump — tap along the suction section of the Pump (imm. a);
- Hydronic kit with single / double pump + tank — tap under the tank (imm. b).

To perform one of the above operations it is necessary to unscrew the cap of the service tap and connect a 14 mm pipe (internal diameter) to the hose connector connected to the water mains, then fill the system by unscrewing the ring nut. After this operation, tighten the ring nut and screw the cap back on.

If it is necessary to top up the system or adjust the glycol content, the service tap can be used. Unscrew the cap of the service tap (A) and connect a 14 or 12 mm pipe (internal diameter measurements – check the tap model installed on your unit) to the hose connector connected to the water mains, then fill the system by unscrewing the ring nut (B). After this operation, tighten the ring nut (B) again and screw the cap (A) back on. In any case, it is advisable to use an external tap to fill the system which is the responsibility of the installer.



If the unit must be completely drained, first close the manual inlet and outlet gates (not supplied) and then disconnect the pipes externally on the water inlet and outlet in order to drain the liquid contained in the unit (to make this operation easier, it is advisable to install two external drain cocks on the water inlet and outlet between the unit and the manual gates).

3.3.7 Air vent valve

The unit is equipped with an air vent valve that automatically eliminates the air accumulated inside the circuit, avoiding: undesirable effects such as premature corrosion and wear, lower efficiency and reduced exchange yield.

The device also has a safety function in that, in the event of a break in the exchanger, it allows the refrigerant gas to escape into the outside air, preventing it from being transported to the internal terminals.

It is possible to leave the valve in the closed position by closing the cap on the outlet; by loosening the cap the valve remains in the open position and the air is discharged automatically.



In case of water leakage you must replace the component, by unscrewing it with a spanner, as shown in the picture below.



4. TECHNICAL DATA

4.1 HEAT PUMP DATA SHEET

Performance referred to the following conditions, according to standard 14511:2018:

- (1) Cooling: external air temperature 35°C; inlet/outlet water temperature 12/7°C.
- (2) Cooling: external air temperature 35°C; inlet/outlet water temperature 23/18°C.
- (3) Heating: Outdoor air temperature 7°C b.s. 6°C b.u.; inlet/outlet water temperature 30/35°C.
- (4) Heating: Outdoor air temperature 7°C b.s. 6°C b.u.; inlet/outlet water temperature 40/45°C.
- (5) Cooling: inlet/outlet water temperature 7/12°C.
- (6) Cooling: Average climatic conditions; $T_{biv} = -7^{\circ}\text{C}$; inlet/outlet water temperature 30/35°C.
- (7) Indicative data and subject to variation. For the correct data, always refer to the technical label on the unit.
- (8) The volume indicated refers to the total required, the designer must satisfy this by considering the quantity already present inside the unit depending on the hydronic kit chosen. (control this value in the technical sheet).
- (9) Condition (1); this value is determined on the basis of measurements taken in accordance with the UNI EN ISO 9614-1
- (10) Value calculated from the sound power level using ISO 3744: 2010, referred to 10 m distance from the unit.
- (11) BT version cooling: external air temperature 35 ° C, internal exchanger water temperature = -3 / -8 ° C. Fluid treated with ethylene glycol 30%

N.B. The performance data shown are indicative and may be subject to change. The yields declared in points (1), (2), (3) and (4) are to be understood referring to the instantaneous power according to UNI EN 14511. The data declared in points (5) and (6) are determined according to UNI EN 14825.

| Technical specifications | | Unit | HWA1-A/H model | | | | | |
|--------------------------|--|--------|-----------------------------|-----------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| | | | 02109 | 02121 | 02142 | 02148 | 02160 | 04176 |
| Cooling | Cooling capacity (1) | kW | 103 | 113 | 132 | 138 | 148 | 165 |
| | Total power input (1) | kW | 33,8 | 38,9 | 41,3 | 44,4 | 49,8 | 52,6 |
| | EER (1) | W/W | 3,05 | 2,90 | 3,19 | 3,11 | 2,97 | 3,14 |
| | Cooling capacity (2) | kW | 139 | 151 | 177 | 188 | 202 | 224 |
| | Total power input (2) | kW | 36,5 | 42,7 | 44,1 | 47,7 | 53,0 | 55,7 |
| | EER (2) | W/W | 3,81 | 3,53 | 4,01 | 3,94 | 3,82 | 4,01 |
| | SEER (5) | W/W | 4,35 | 4,36 | 4,38 | 4,73 | 4,50 | 4,61 |
| | Cooling capacity (11) | kW | 63,0 | 68,4 | 78,9 | 82,4 | 90,6 | 97,4 |
| | Total power input (11) | kW | 30,2 | 34,8 | 37,6 | 40,1 | 44,8 | 48,7 |
| | EER (11) | W/W | 2,09 | 1,97 | 2,10 | 2,05 | 2,02 | 2,00 |
| | Water flow (1) | l/s | 4,9 | 5,4 | 6,3 | 6,6 | 7,1 | 7,9 |
| | Press. drop on use-side heat exch. (1) | kPa | 30,5 | 36,3 | 37,8 | 41,0 | 38,0 | 36,0 |
| Heating | Heating capacity (3) | kW | 113 | 125 | 148 | 154 | 166 | 188 |
| | Total power input (3) | kW | 27,6 | 30,9 | 36,6 | 37,7 | 41,4 | 46,0 |
| | COP (3) | W/W | 4,09 | 4,05 | 4,04 | 4,08 | 4,01 | 4,08 |
| | Heating capacity (4) | kW | 108 | 120 | 142 | 148 | 160 | 179 |
| | Total power input (4) | kW | 32,9 | 37,5 | 43,9 | 45,3 | 49,4 | 55,9 |
| | COP (4) | W/W | 3,30 | 3,20 | 3,22 | 3,26 | 3,23 | 3,21 |
| | SCOP (6) | W/W | 3,72 | 3,77 | 3,62 | 3,69 | 3,68 | 3,90 |
| | Water flow (4) | l/s | 5,2 | 5,7 | 6,8 | 7,1 | 7,6 | 8,6 |
| | Press. drop on use-side heat exch. (4) | kPa | 33,5 | 40,5 | 43,0 | 46,6 | 43,6 | 41,8 |
| | Water heating energy eff. 35°C/55°C | classe | A+/A+ | A+/A+ | A+/A+ | A+/A+ | A+/A+ | A++/A+ |
| Compressor | Type | | SCROLL | | | | | |
| | Refrigerant oil (type) | | Emkarate RL 32 3MAF | | | | | |
| | Number | Nr | 2 | 2 | 2 | 2 | 2 | 2 |
| | Capacity steps Std | Nr | 2 | 3 | 2 | 3 | 3 | 4 |
| | Oil charge (Circuit 1) | l | 4,44 + 4,44 | 4,44 + 4,44 | 4,44 + 4,44 | 6,3 + 4,44 | 6,3 + 4,44 | 3,25 + 3,25 |
| | Oil charge (Circuit 2) | l | - | - | - | - | - | 3,25 + 3,25 |
| | Refrigerant circuits | Nr | 1 | 1 | 1 | 1 | 1 | 2 |
| Refrigerant | Type | | R410A | | | | | |
| | Refrigerant charge (Circuit 1) (7) | kg | 26,5 | 27,0 | 34,5 | 42,0 | 40,0 | 22,0 |
| | Refrigerant charge (Circuit 2) (7) | kg | - | - | - | - | - | 22,0 |
| | Quantity of CO2 equivalent (7) | ton | 55,3 | 56,4 | 72,0 | 87,7 | 83,5 | 91,9 |
| | Design pressure (high/low) | bar | 40,5/2,5 | 40,5/2,5 | 40,5/2,5 | 40,5/2,5 | 40,5/2,5 | 40,5/2,5 |
| External zone fan motors | Type | | ASSIALE | | | | | |
| | Number of fans | Nr | 2 | 2 | 3 | 3 | 3 | 4 |
| | Rated power (1) | kW | 1,4 | 1,4 | 1,4 | 1,4 | 1,4 | 1,4 |
| | Max power input | kW | 3,80 | 3,80 | 5,70 | 5,70 | 5,70 | 7,60 |
| | Max input current | A | 3,9 | 3,9 | 3,9 | 3,9 | 3,9 | 3,9 |
| | Standard air flow | l/s | 10021 | 9984 | 15109 | 15088 | 15045 | 20954 |
| Internal heat exchanger | Internal heat exchanger type | | PHE - A PIASTRE | | | | | |
| | Number of internal heat exchanger | Nr | 1 | 1 | 1 | 1 | 1 | 1 |
| | Water content | l | 6,87 | 6,87 | 7,88 | 7,88 | 8,89 | 11,40 |
| Hydraulic circuit | Max pressure on water side | bar | 12 | 12 | 12 | 12 | 12 | 12 |
| | Max press. on hydronic kit side (relief valve calibration) | bar | 6 | 6 | 6 | 6 | 6 | 6 |
| | Water connections | | 2" 1/2 | 2" 1/2 | 2" 1/2 | 2" 1/2 | 2" 1/2 | 3" |
| | Min content of water plant (8) | l | 490 | 630 | 630 | 820 | 820 | 480 |
| Sound levels | Sound power (9) | dB (A) | 88 std/ 87 SL/ 84 SSL | 88 std/ 87 SL/ 84 SSL | 88 std/ 87 SL/ 84 SSL | 88 std/ 87 SL/ 84 SSL | 88 std/ 87 SL/ 84 SSL | 89 std/ 88 SL/ 85 SSL |
| | Sound pressure (10) | dB (A) | 56 std/ 55 SL/ 52 SSL | 56 std/ 55 SL/ 52 SSL | 55,9 std/ 54,9 SL/ 51,9 SSL | 55,9 std/ 54,9 SL/ 51,9 SSL | 55,9 std/ 54,9 SL/ 51,9 SSL | 56,9 std/ 55,9 SL/ 52,9 SSL |
| Electrical data | Power supply | | 400V/3P/50Hz | | | | | |
| | Max power input (no access. version) | kW | 48,9 | 55,0 | 63,1 | 66,9 | 73,0 | 87,9 |
| | Max curr. input (no access. version) | A | 83,0 | 93,4 | 107,1 | 113,5 | 123,9 | 149,2 |
| | Max start-up curr. (no access. version) | A | 285,6 | 332,3 | 346,0 | 358,1 | 368,5 | 289,2 |
| Dimensions and weights | A - Length | mm | 2860 | 2860 | 4060 | 4060 | 4060 | 2860 |
| | B - Width | mm | 1100 | 1100 | 1100 | 1100 | 1100 | 2200 |
| | C - Height | mm | 2350 | 2350 | 2350 | 2350 | 2350 | 2350 |
| | Shipping net weight | kg | 1180 | 1210 | 1470 | 1530 | 1530 | 2030 |
| | Weight in operation | kg | 1190 | 1220 | 1480 | 1540 | 1540 | 2040 |

| Technical specifications | | Unit | HWA1-A/H model | | | | | |
|--|--|--------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| | | | 04199 | 04215 | 04237 | 04273 | 04304 | 04345 |
| Cooling | Cooling capacity (1) | kW | 187 | 208 | 225 | 260 | 289 | 325 |
| | Total power input (1) | kW | 59,4 | 67,2 | 77,5 | 80,6 | 92,9 | 112 |
| | EER (1) | W/W | 3,15 | 3,10 | 2,90 | 3,22 | 3,10 | 2,90 |
| | Cooling capacity (2) | kW | 252 | 282 | 301 | 351 | 388 | 434 |
| | Total power input (2) | kW | 63,8 | 71,6 | 83,2 | 87,0 | 101 | 122 |
| | EER (2) | W/W | 3,95 | 3,94 | 3,62 | 4,04 | 3,86 | 3,56 |
| | SEER (5) | W/W | 4,64 | 4,71 | 4,53 | 4,65 | 4,73 | 4,42 |
| | Cooling capacity (11) | kW | 111 | 129 | 140 | 155 | 177 | 203 |
| | Total power input (11) | kW | 54,3 | 60,0 | 69,4 | 72,3 | 84,2 | 99,9 |
| | EER (11) | W/W | 2,04 | 2,15 | 2,02 | 2,14 | 2,10 | 2,03 |
| | Water flow (1) | l/s | 8,9 | 10,0 | 10,7 | 12,4 | 13,8 | 15,5 |
| Press. drop on use-side heat exch. (1) | kPa | 45,4 | 55,7 | 38,5 | 50,7 | 36,8 | 46,0 | |
| Heating | Heating capacity (3) | kW | 207 | 223 | 246 | 286 | 316 | 356 |
| | Total power input (3) | kW | 50,7 | 54,8 | 61,1 | 69,2 | 78,3 | 88,5 |
| | COP (3) | W/W | 4,09 | 4,07 | 4,02 | 4,13 | 4,04 | 4,02 |
| | Heating capacity (4) | kW | 198 | 214 | 237 | 273 | 303 | 344 |
| | Total power input (4) | kW | 61,5 | 66,0 | 74,0 | 83,8 | 94,7 | 108 |
| | COP (4) | W/W | 3,22 | 3,24 | 3,20 | 3,26 | 3,20 | 3,20 |
| | SCOP (6) | W/W | 3,84 | 3,96 | 4,00 | 3,92 | 3,95 | 4,01 |
| | Water flow (4) | l/s | 9,5 | 10,2 | 11,3 | 13,0 | 14,5 | 16,5 |
| | Press. drop on use-side heat exch. (4) | kPa | 50,6 | 58,6 | 42,5 | 55,8 | 40,4 | 51,6 |
| Water heating energy eff. 35°C/55°C | classe | A++/A+ | A++/A+ | A++/A+ | A++/A+ | A++/A+ | A++/A+ | |
| Compressor | Type | | SCROLL | | | | | |
| | Refrigerant oil (type) | | Emkarate RL 32 3MAF | | | | | |
| | Number | Nr | 4 | 4 | 4 | 4 | 4 | 4 |
| | Capacity steps Std | Nr | 6 | 4 | 6 | 5 | 5 | 5 |
| | Oil charge (Circuit 1) | l | 4,44 + 3,25 | 4,44 + 4,44 | 4,44 + 4,44 | 6,3 + 4,44 | 6,3 + 6,3 | 6,3 + 6,3 |
| | Oil charge (Circuit 2) | l | 4,44 + 3,25 | 4,44 + 4,44 | 4,44 + 4,44 | 4,44 + 4,44 | 4,44 + 4,44 | 4,44 + 4,44 |
| | Refrigerant circuits | Nr | 2 | 2 | 2 | 2 | 2 | 2 |
| Refrigerant | Type | | R410A | | | | | |
| | Refrigerant charge (Circuit 1) (7) | kg | 18,0 | 25,5 | 28,5 | 43,0 | 47,0 | 50,0 |
| | Refrigerant charge (Circuit 2) (7) | kg | 18,0 | 24,0 | 28,5 | 36,0 | 34,0 | 30,0 |
| | Quantity of CO2 equivalent (7) | ton | 75,2 | 103,4 | 119,0 | 165,0 | 169,1 | 167,0 |
| | Design pressure (high/low) | bar | 40,5/2,5 | 40,5/2,5 | 40,5/2,5 | 40,5/2,5 | 40,5/2,5 | 40,5/2,5 |
| External zone fan motors | Type | | ASSIALE | | | | | |
| | Number of fans | Nr | 4 | 4 | 4 | 6 | 6 | 6 |
| | Rated power (1) | kW | 1,4 | 1,4 | 1,4 | 1,4 | 1,4 | 1,4 |
| | Max power input | kW | 7,60 | 7,60 | 7,60 | 11,40 | 11,40 | 11,40 |
| | Max input current | A | 3,9 | 3,9 | 3,9 | 3,9 | 3,9 | 3,9 |
| | Standard air flow | l/s | 20888 | 20815 | 20738 | 31370 | 31264 | 31109 |
| Internal heat exchanger | Internal heat exchanger type | | PHE - A PIASTRE | | | | | |
| | Number of internal heat exchanger | Nr | 1 | 1 | 1 | 1 | 1 | 1 |
| | Water content | l | 11,40 | 11,40 | 15,50 | 15,50 | 22,10 | 22,10 |
| Hydraulic circuit | Max pressure on water side | bar | 12 | 12 | 12 | 12 | 12 | 12 |
| | Max press. on hydronic kit side (relief valve calibration) | bar | 6 | 6 | 6 | 6 | 6 | 6 |
| | Water connections | | 3" | 3" | 3" | 3" | 3" | 3" |
| | Min content of water plant (8) | l | 610 | 610 | 780 | 1020 | 1020 | 1290 |
| Sound levels | Sound power (9) | dB (A) | 89 std/ 88 SL/ 85 SSL | 89 std/ 88 SL/ 85 SSL | 90 std/ 89 SL/ 86 SSL | 90 std/ 89 SL/ 86 SSL | 91 std/ 90 SL/ 87 SSL | 92 std/ 91 SL/ 88 SSL |
| | Sound pressure (10) | dB (A) | 56,9 std/ 55,9 SL/ 52,9 SSL | 56,9 std/ 55,9 SL/ 52,9 SSL | 57,9 std/ 56,9 SL/ 53,9 SSL | 57,8 std/ 56,9 SL/ 53,9 SSL | 58,8 std/ 57,8 SL/ 54,8 SSL | 59,8 std/ 58,8 SL/ 55,8 SSL |
| Electrical data | Power supply | | 400V/3P/50Hz | | | | | |
| | Max power input (no access. version) | kW | 92,8 | 97,8 | 110,0 | 123,8 | 139,8 | 160,1 |
| | Max curr. input (no access. version) | A | 157,6 | 166,0 | 186,8 | 210,2 | 237,4 | 271,8 |
| | Max start-up curr. (no access. version) | A | 360,2 | 368,6 | 425,7 | 454,8 | 482,0 | 597,2 |
| Dimensions and weights | A - Length | mm | 2860 | 2860 | 2860 | 4060 | 4060 | 4060 |
| | B - Width | mm | 2200 | 2200 | 2200 | 2200 | 2200 | 2200 |
| | C - Height | mm | 2350 | 2350 | 2350 | 2350 | 2350 | 2350 |
| | Shipping net weight | kg | 2060 | 2100 | 2130 | 2680 | 2880 | 2900 |
| | Weight in operation | kg | 2070 | 2110 | 2140 | 2700 | 2900 | 2930 |

4.2 DATA SHEET FOR UNIT WITH DESUPERHEATER

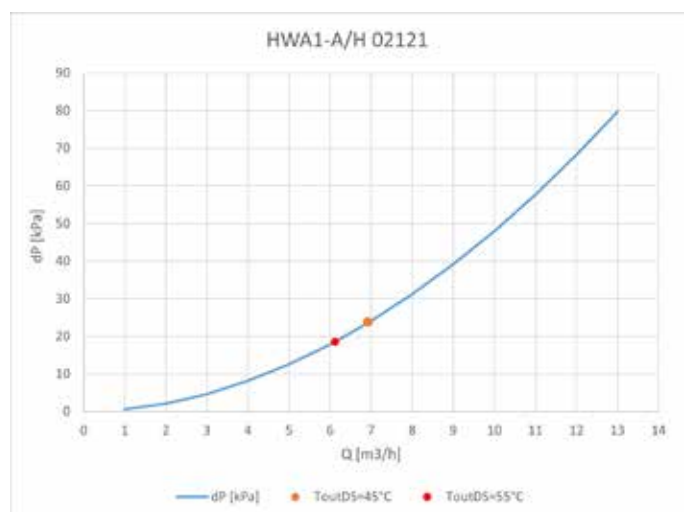
The performances are reported below under the conditions (1) of the previous technical data sheets, in the case of units equipped with a desuperheater, for water temperatures leaving the desuperheater of 45°C and 55°C, with input-output temperature difference of 5°C. The unit with this version has no hydraulic circuit and no control, therefore it is the responsibility of the designer to verify that partial recovery is effective in any operating condition.

| Model HWA1-A/H | T _{out} DS=45°C | | | | | | T _{out} DS=55°C | | | | | |
|-------------------|--------------------------|------------------|-----------|--------------------------|---------------------------|-------------------------|--------------------------|------------------|-----------|--------------------------|---------------------------|-------------------------|
| | Cooling capacity [kW] | Power input [kW] | EER [W/W] | Heating capacity DS [kW] | Water flow rate DS [m³/h] | Pressure drops DS [kPa] | Cooling capacity [kW] | Power input [kW] | EER [W/W] | Heating capacity DS [kW] | Water flow rate DS [m³/h] | Pressure drops DS [kPa] |
| 02109 | 113,2 | 29,9 | 3,79 | 34,4 | 5,92 | 20,8 | 111,4 | 30,7 | 3,63 | 24,9 | 4,28 | 11,3 |
| 02121 | 123,2 | 35,2 | 3,50 | 40,2 | 6,92 | 31,0 | 118,9 | 36,8 | 3,23 | 35,5 | 6,11 | 20,1 |
| 02142 | 142,4 | 36,7 | 3,88 | 41,2 | 7,08 | 16,3 | 136,4 | 39,7 | 3,44 | 35,0 | 6,03 | 11,1 |
| 02148 | 148,6 | 40,4 | 3,68 | 51,2 | 8,81 | 21,2 | 146,9 | 41,2 | 3,57 | 36,9 | 6,35 | 11,1 |
| 02160 | 163,4 | 43,9 | 3,72 | 70,0 | 12,03 | 18,6 | 161,6 | 44,9 | 3,60 | 39,3 | 6,77 | 9,3 |
| 04176 | 169,7 | 49,6 | 3,42 | 62,4 | 10,73 | 16,5 | 166,8 | 50,7 | 3,29 | 45,8 | 7,88 | 9,3 |
| 04199 | 201,6 | 53,1 | 3,80 | 57,3 | 9,86 | 15,3 | 193,6 | 56,9 | 3,40 | 49,2 | 8,46 | 10,3 |
| 04215 | 224,5 | 61,6 | 3,65 | 79,3 | 13,65 | 23,5 | 219,2 | 63,4 | 3,46 | 58,2 | 10,01 | 13,7 |
| 04237 | 244,0 | 70,8 | 3,45 | 92,3 | 15,88 | 31,7 | 243,2 | 71,0 | 3,43 | 59,7 | 10,27 | 16,1 |
| 04273 | 278,7 | 72,4 | 3,85 | 89,7 | 15,43 | 14,9 | 272,9 | 75,6 | 3,61 | 67,9 | 11,67 | 8,0 |
| 04304 | 314,7 | 82,5 | 3,81 | 104,5 | 17,97 | 19,0 | 302,7 | 88,4 | 3,43 | 85,6 | 14,73 | 12,3 |
| 04345 | 362,5 | 97,0 | 3,74 | 123,8 | 21,29 | 23,7 | 344,6 | 104,9 | 3,29 | 108,4 | 18,65 | 16,6 |

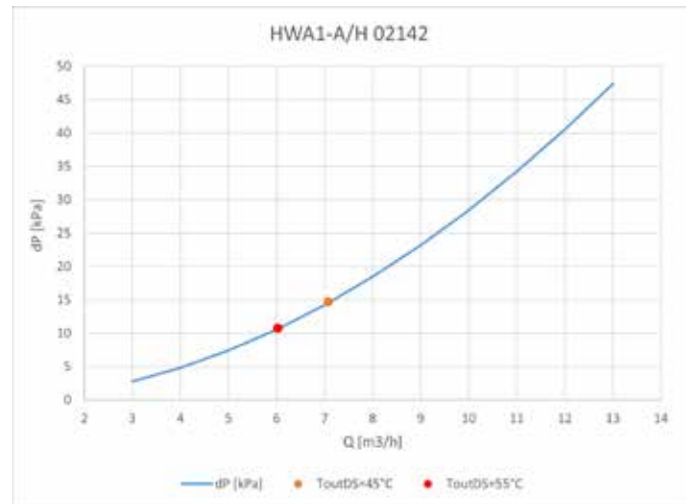
| Water flow rate DS [m³/h] | Pressure drops DS [kPa] |
|---------------------------|-------------------------|
| 1,0 | 0,62 |
| 2,0 | 2,14 |
| 3,0 | 4,68 |
| 4,0 | 8,16 |
| 5,0 | 12,57 |
| 6,0 | 17,88 |
| 7,0 | 24,09 |
| 8,0 | 31,18 |
| 9,0 | 39,16 |
| 10,0 | 48,01 |
| 11,0 | 57,72 |
| 12,0 | 68,30 |
| 13,0 | 79,73 |



| Water flow DS [m³/h] | Pressure drops DS [kPa] |
|----------------------|-------------------------|
| 1,0 | 0,62 |
| 2,0 | 2,14 |
| 3,0 | 4,68 |
| 4,0 | 8,16 |
| 5,0 | 12,57 |
| 6,0 | 17,88 |
| 7,0 | 24,09 |
| 8,0 | 31,18 |
| 9,0 | 39,16 |
| 10,0 | 48,01 |
| 11,0 | 57,72 |
| 12,0 | 68,30 |
| 13,0 | 79,73 |



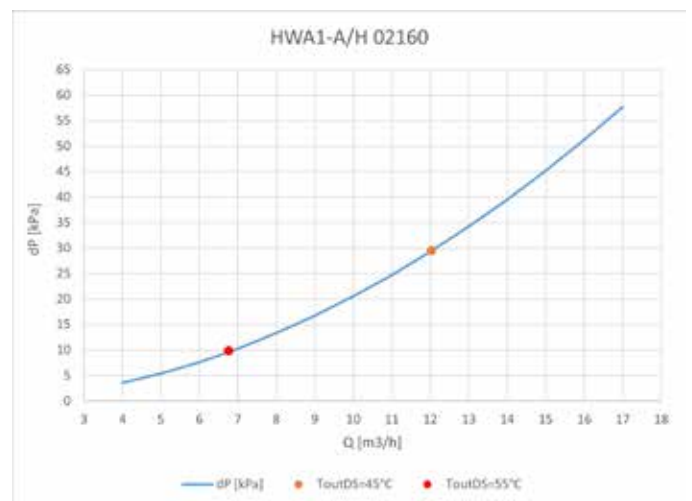
| HWA1-A/H 02142 | |
|-----------------------------------|-------------------------|
| Water flow DS [m ³ /h] | Pressure drops DS [kPa] |
| 3,0 | 2,76 |
| 4,0 | 4,82 |
| 5,0 | 7,42 |
| 6,0 | 10,57 |
| 7,0 | 14,25 |
| 8,0 | 18,46 |
| 9,0 | 23,20 |
| 10,0 | 28,46 |
| 11,0 | 34,24 |
| 12,0 | 40,53 |
| 13,0 | 47,34 |



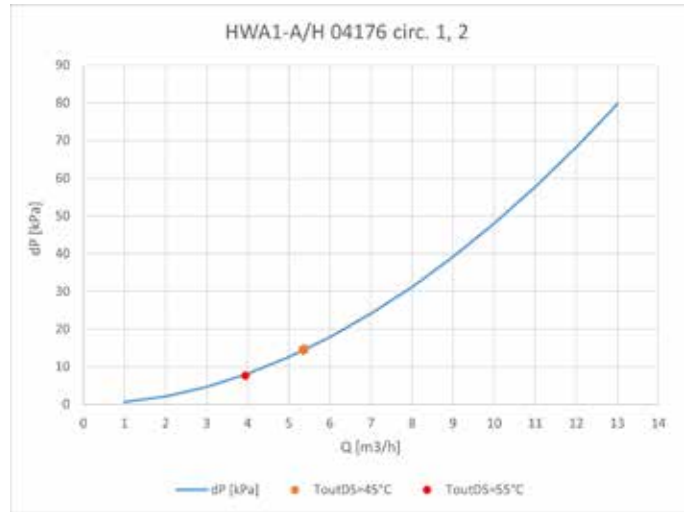
| HWA1-A/H 02148 | |
|-----------------------------------|-------------------------|
| Water flow DS [m ³ /h] | Pressure drops DS [kPa] |
| 3,0 | 2,76 |
| 4,0 | 4,82 |
| 5,0 | 7,42 |
| 6,0 | 10,57 |
| 7,0 | 14,25 |
| 8,0 | 18,46 |
| 9,0 | 23,20 |
| 10,0 | 28,46 |
| 11,0 | 34,24 |
| 12,0 | 40,53 |
| 13,0 | 47,34 |
| 14,0 | 54,65 |



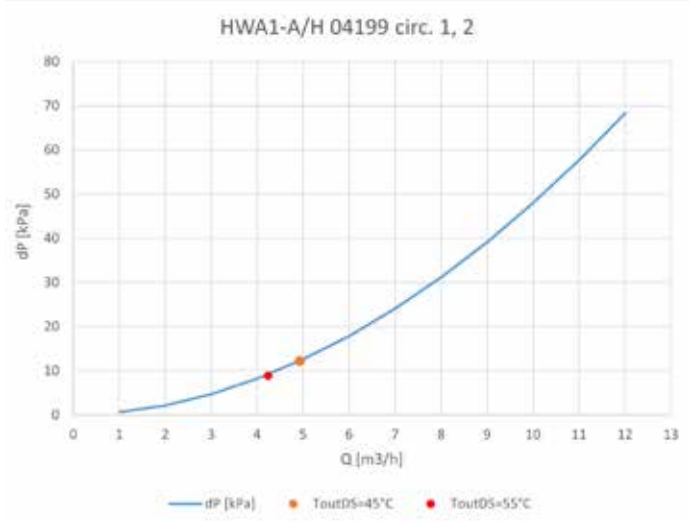
| HWA1-A/H 02160 | |
|--|-------------------------|
| Water flow rate DS [m ³ /h] | Pressure drops DS [kPa] |
| 4,0 | 3,57 |
| 5,0 | 5,34 |
| 6,0 | 7,61 |
| 7,0 | 10,27 |
| 8,0 | 13,31 |
| 9,0 | 16,74 |
| 10,0 | 20,55 |
| 11,0 | 24,73 |
| 12,0 | 29,29 |
| 13,0 | 34,22 |
| 14,0 | 39,53 |
| 15,0 | 45,21 |
| 16,0 | 51,25 |
| 17,0 | 57,67 |



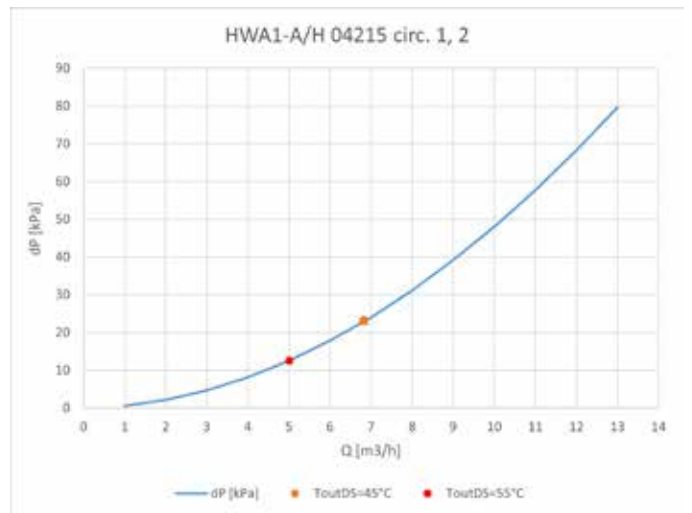
| HWA1-A/H 04176 circuit 1 and 2 | |
|--|-------------------------|
| Water flow rate DS [m ³ /h] | Pressure drops DS [kPa] |
| 1,0 | 0,62 |
| 2,0 | 2,14 |
| 3,0 | 4,68 |
| 4,0 | 8,16 |
| 5,0 | 12,57 |
| 6,0 | 17,88 |
| 7,0 | 24,09 |
| 8,0 | 31,18 |
| 9,0 | 39,16 |
| 10,0 | 48,01 |
| 11,0 | 57,72 |
| 12,0 | 68,30 |
| 13,0 | 79,73 |



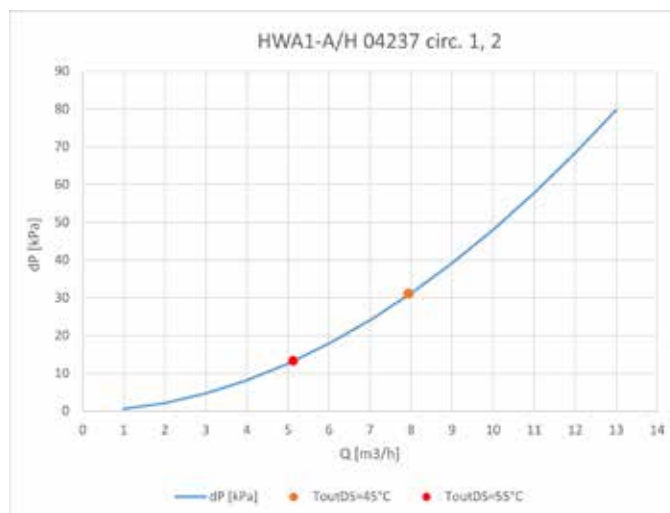
| HWA1-A/H 04199 circuit 1 and 2 | |
|--|-------------------------|
| Water flow rate DS [m ³ /h] | Pressure drops DS [kPa] |
| 1,0 | 0,62 |
| 2,0 | 2,14 |
| 3,0 | 4,68 |
| 4,0 | 8,16 |
| 5,0 | 12,57 |
| 6,0 | 17,88 |
| 7,0 | 24,09 |
| 8,0 | 31,18 |
| 9,0 | 39,16 |
| 10,0 | 48,01 |
| 11,0 | 57,72 |
| 12,0 | 68,30 |



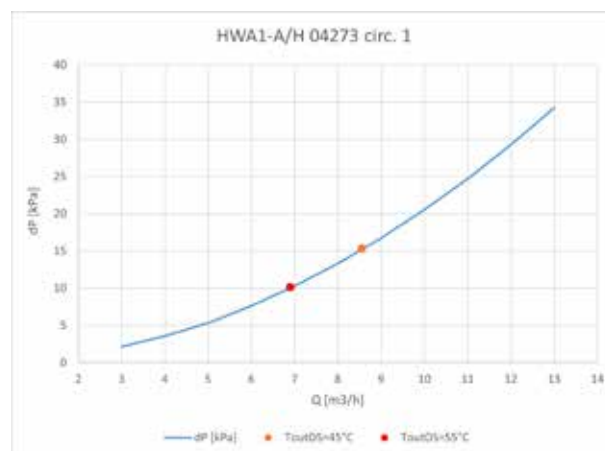
| HWA1-A/H 04215 circuit 1 and 2 | |
|--|-------------------------|
| Water flow rate DS [m ³ /h] | Pressure drops DS [kPa] |
| 1,0 | 0,62 |
| 2,0 | 2,14 |
| 3,0 | 4,68 |
| 4,0 | 8,16 |
| 5,0 | 12,57 |
| 6,0 | 17,88 |
| 7,0 | 24,09 |
| 8,0 | 31,18 |
| 9,0 | 39,16 |
| 10,0 | 48,01 |
| 11,0 | 57,72 |
| 12,0 | 68,30 |
| 13,0 | 79,73 |



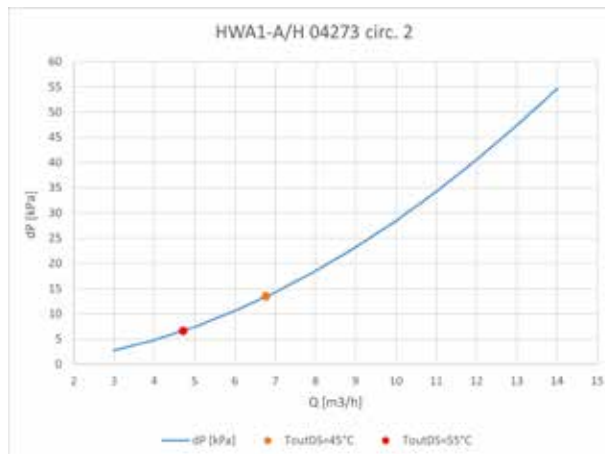
| HWA1-A/H 04237 circuit 1 and 2 | |
|--|-------------------------|
| Water flow rate DS [m ³ /h] | Pressure drops DS [kPa] |
| 1,0 | 0,62 |
| 2,0 | 2,14 |
| 3,0 | 4,68 |
| 4,0 | 8,16 |
| 5,0 | 12,57 |
| 6,0 | 17,88 |
| 7,0 | 24,09 |
| 8,0 | 31,18 |
| 9,0 | 39,16 |
| 10,0 | 48,01 |
| 11,0 | 57,72 |
| 12,0 | 68,30 |
| 13,0 | 79,73 |



| HWA1-A/H 04273 circuit 1 | |
|--|-------------------------|
| Water flow rate DS [m ³ /h] | Pressure drops DS [kPa] |
| 3,0 | 2,12 |
| 4,0 | 3,57 |
| 5,0 | 5,34 |
| 6,0 | 7,61 |
| 7,0 | 10,27 |
| 8,0 | 13,31 |
| 9,0 | 16,74 |
| 10,0 | 20,55 |
| 11,0 | 24,73 |
| 12,0 | 29,29 |
| 13,0 | 34,22 |



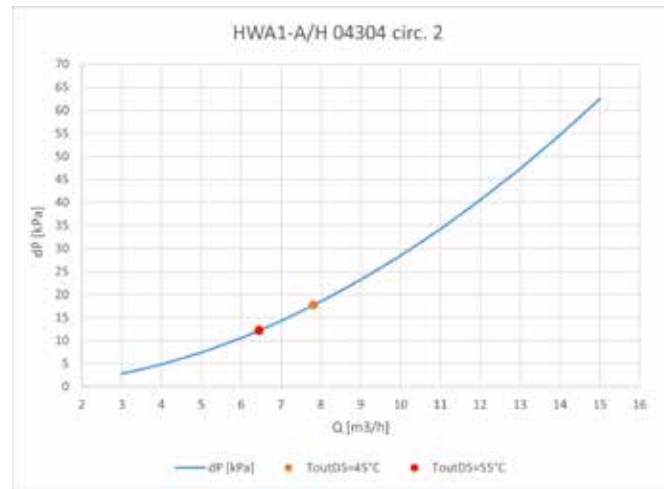
| HWA1-A/H 04273 circuit 2 | |
|--|-------------------------|
| Water flow rate DS [m ³ /h] | Pressure drops DS [kPa] |
| 3,0 | 2,76 |
| 4,0 | 4,82 |
| 5,0 | 7,42 |
| 6,0 | 10,57 |
| 7,0 | 14,25 |
| 8,0 | 18,46 |
| 9,0 | 23,20 |
| 10,0 | 28,46 |
| 11,0 | 34,24 |
| 12,0 | 40,53 |
| 13,0 | 47,34 |



| HWA1-A/H 04304 circuit 1 | |
|---------------------------|-------------------------|
| Water flow rate DS [m³/h] | Pressure drops DS [kPa] |
| 3,0 | 2,12 |
| 4,0 | 3,57 |
| 5,0 | 5,34 |
| 6,0 | 7,61 |
| 7,0 | 10,27 |
| 8,0 | 13,31 |
| 9,0 | 16,74 |
| 10,0 | 20,55 |
| 11,0 | 24,73 |
| 12,0 | 29,29 |
| 13,0 | 34,22 |
| 14,0 | 39,53 |



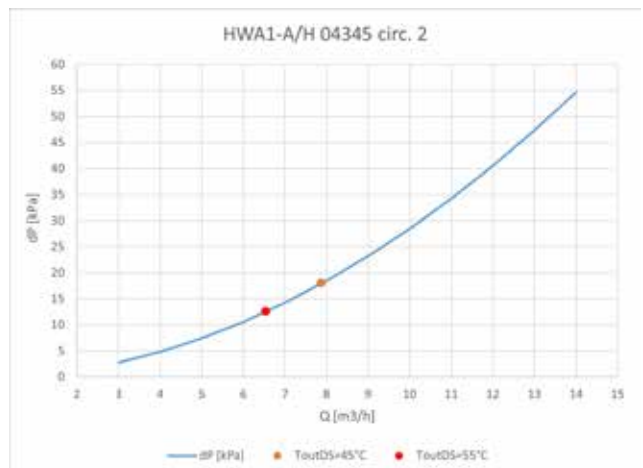
| HWA1-A/H 04304 circuit 2 | |
|---------------------------|-------------------------|
| Water flow rate DS [m³/h] | Pressure drops DS [kPa] |
| 3,0 | 2,76 |
| 4,0 | 4,82 |
| 5,0 | 7,42 |
| 6,0 | 10,57 |
| 7,0 | 14,25 |
| 8,0 | 18,46 |
| 9,0 | 23,20 |
| 10,0 | 28,46 |
| 11,0 | 34,24 |
| 12,0 | 40,53 |
| 13,0 | 47,34 |
| 14,0 | 54,65 |



| HWA1-A/H 04345 circuit 1 | |
|---------------------------|-------------------------|
| Water flow rate DS [m³/h] | Pressure drops DS [kPa] |
| 6,0 | 6,27 |
| 7,0 | 8,46 |
| 8,0 | 10,97 |
| 9,0 | 13,80 |
| 10,0 | 16,95 |
| 11,0 | 20,41 |
| 12,0 | 24,18 |
| 13,0 | 28,27 |
| 14,0 | 32,66 |
| 15,0 | 37,36 |
| 16,0 | 42,37 |



| HWA1-A/H 04345 circuit 2 | |
|---------------------------|-------------------------|
| Water flow rate DS [m³/h] | Pressure drops DS [kPa] |
| 3,0 | 2,76 |
| 4,0 | 4,82 |
| 5,0 | 7,42 |
| 6,0 | 10,57 |
| 7,0 | 14,25 |
| 8,0 | 18,46 |
| 9,0 | 23,20 |
| 10,0 | 28,46 |
| 11,0 | 34,24 |
| 12,0 | 40,53 |
| 13,0 | 47,34 |



4.3 ELECTRICAL AND AUSILIARY DATA

| | | |
|--------------------------|--------|---------------|
| Unit power supply | V/~/Hz | 400/3PH+PE/50 |
| On board control circuit | V/~/Hz | 12/1/50 |
| On board control circuit | V/~/Hz | 12/1/50 |
| Fans power supply | V/~/Hz | 400/3PH+PE/50 |

NOTE: Electrical data are subject to change by update. It is therefore always necessary to refer to the technical features label applied on the side panel of the unit.

| Dimensions | Unit | HWA1-A/H model | | | | | |
|---|------|----------------|-------|-------|-------|-------|-------|
| | | 02109 | 02121 | 02142 | 02148 | 02160 | 04176 |
| F.L.A. Input current input at the maximum allowable conditions | | | | | | | |
| F.L.A. Compressor 1 | A | 38,2 | 48,6 | 48,6 | 65,4 | 65,4 | 34,0 |
| F.L.A. Compressor 2 | A | 38,2 | 38,2 | 48,6 | 38,2 | 48,6 | 34,0 |
| F.L.A. Compressor 3 | A | - | - | - | - | - | 34,0 |
| F.L.A. Compressor 4 | A | - | - | - | - | - | 34,0 |
| F.L.A. Fan motors | A | 6,6 | 6,6 | 9,9 | 9,9 | 9,9 | 13,2 |
| L.R.A. Startup current (locked rotor) | | | | | | | |
| L.R.A. Compressor 1 | A | 240,8 | 287,5 | 287,5 | 310,0 | 310,0 | 174,0 |
| L.R.A. Compressor 2 | A | 240,8 | 240,8 | 287,5 | 240,8 | 287,5 | 174,0 |
| L.R.A. Compressor 3 | A | - | - | - | - | - | 174,0 |
| L.R.A. Compressor 4 | A | - | - | - | - | - | 174,0 |
| Whole unit | | | | | | | |
| Max power input | kW | 48,9 | 55,0 | 63,1 | 66,9 | 73,0 | 87,9 |
| Max current input | A | 83,0 | 93,4 | 107,1 | 113,5 | 123,9 | 149,2 |
| L.R.A. | A | 285,6 | 332,3 | 346,0 | 358,1 | 368,5 | 289,2 |
| F.L.A. | A | 83,0 | 93,4 | 107,1 | 113,5 | 123,9 | 149,2 |
| F.L.I. | kW | 41,7 | 44,7 | 47,3 | 50,7 | 56,9 | 60,6 |

| Dimensions | Unit | HWA1-A/H model | | | | | |
|---|------|----------------|-------|-------|-------|-------|-------|
| | | 04199 | 04215 | 04237 | 04273 | 04304 | 04345 |
| F.L.A. Input current input at the maximum allowable conditions | | | | | | | |
| F.L.A. Compressor 1 | A | 38,2 | 38,2 | 48,6 | 65,4 | 65,4 | 82,6 |
| F.L.A. Compressor 2 | A | 34,0 | 38,2 | 38,2 | 48,6 | 65,4 | 82,6 |
| F.L.A. Compressor 3 | A | 38,2 | 38,2 | 38,2 | 38,2 | 38,2 | 38,2 |
| F.L.A. Compressor 4 | A | 34,0 | 38,2 | 48,6 | 38,2 | 48,6 | 48,6 |
| F.L.A. Fan motors | A | 13,2 | 13,2 | 13,2 | 19,8 | 19,8 | 19,8 |
| L.R.A. Startup current (locked rotor) | | | | | | | |
| L.R.A. Compressor 1 | A | 240,8 | 240,8 | 287,5 | 310,0 | 310,0 | 408,0 |
| L.R.A. Compressor 2 | A | 174,0 | 240,8 | 240,8 | 287,5 | 310,0 | 408,0 |
| L.R.A. Compressor 3 | A | 240,8 | 240,8 | 240,8 | 240,8 | 240,8 | 240,8 |
| L.R.A. Compressor 4 | A | 174,0 | 240,8 | 287,5 | 240,8 | 287,5 | 287,5 |
| Whole unit | | | | | | | |
| Max power input | kW | 92,8 | 97,8 | 110 | 124 | 140 | 160 |
| Max current input | A | 157,6 | 166,0 | 186,8 | 210,2 | 237,4 | 271,8 |
| L.R.A. | A | 360,2 | 368,6 | 425,7 | 454,8 | 482,0 | 597,2 |
| F.L.A. | A | 157,6 | 166,0 | 186,8 | 210,2 | 237,4 | 271,8 |
| F.L.I. | kW | 68,2 | 76,8 | 89,1 | 92,6 | 107 | 130 |

5. CORRECTIVE FACTORS

5.1 CORRECTIVE FACTORS FOR THE USE OF A MIXTURE OF GLYCOL WATER

The correction factors of the water flow and pressure drops must be applied to the values obtained without the use of glycol. The water flow rate correction factor is calculated so as to maintain the same temperature difference that would be obtained without the use of glycol. The pressure drops correction factor is applied to the correct water flow rate value of the water flow rate connection factor.

| Percentage of glycol | Freezing point [°C] | Yeld correction factor | Correction factor of power input | Fattore di correzione della portata d'acqua | Fattore di correzione delle perdite di carico |
|----------------------|---------------------|------------------------|----------------------------------|---|---|
| 10% | -3,2 | 0,985 | 1 | 1,02 | 1,08 |
| 20% | -7,8 | 0,98 | 0,99 | 1,05 | 1,12 |

| Percentage of glycol | Freezing point [°C] | Yeld correction factor | Correction factor of power input | Fattore di correzione della portata d'acqua | Fattore di correzione delle perdite di carico |
|----------------------|---------------------|------------------------|----------------------------------|---|---|
| 30% | -14,1 | 0,97 | 0,98 | 1,10 | 1,22 |
| 40% | -22,3 | 0,965 | 0,97 | 1,14 | 1,25 |
| 50% | -33,8 | 0,955 | 0,965 | 1,2 | 1,33 |

5.2 SCALE CORRECTION FACTORS

We report the correction factors due to the soiling of the internal gas / water exchanger.

| $m^2 \text{ } ^\circ\text{C}/\text{kW}$ | Correction factor of power output | Correction factor of the power input |
|---|-----------------------------------|--------------------------------------|
| $0,44 \times 10^{-1}$ | 1,00 | 1,00 |
| $0,88 \times 10^{-1}$ | 0,99 | 1,00 |
| $1,76 \times 10^{-1}$ | 0,98 | 1,00 |

5.3 CALIBRATIONS AND CONTROLS PROTECTIONS

| Description | Value |
|---|----------------------|
| High pressure safety valve | 45 bar |
| High pressure switch | 41,5 bar |
| High pressure alarm | 40,5 bar (± 1) |
| Low pressure alarm | 2,5 bar |
| Low pressure safety valve | 29,5 bar |
| Maximum number of restarts after low pressure alarm | 3 |
| Antifreeze protection kit (except BT version) | 3°C |
| Hydronic circuit safety valve (present with hydronic kit) | 6 bar |
| Maximum water circuit pressure without hydronic kit | 25 bar |

5.4 CORRECTION FACTORS ACCORDING TO ALTITUDE

The correction factors of the performance according to the altitude are calculated for cooling under conditions (1) and for heating under conditions (3) of the previous technical data tables and are provided for altitudes of 500, 1000, 1500 and 2000 m.

| Altitude [m] | 500 | 1000 | 1500 | 2000 |
|---|--------|--------|--------|--------|
| Thermal yield corrective factor | 0,9964 | 0,9941 | 0,9888 | 0,9869 |
| Correction factor for power absorbed in heating | 0,9931 | 0,9841 | 0,9853 | 0,9755 |
| Corrective factor for cooling | 0,9888 | 0,9762 | 0,9618 | 0,9466 |
| Correction factor for power input in cooling | 1,0106 | 1,0235 | 1,0386 | 1,0560 |

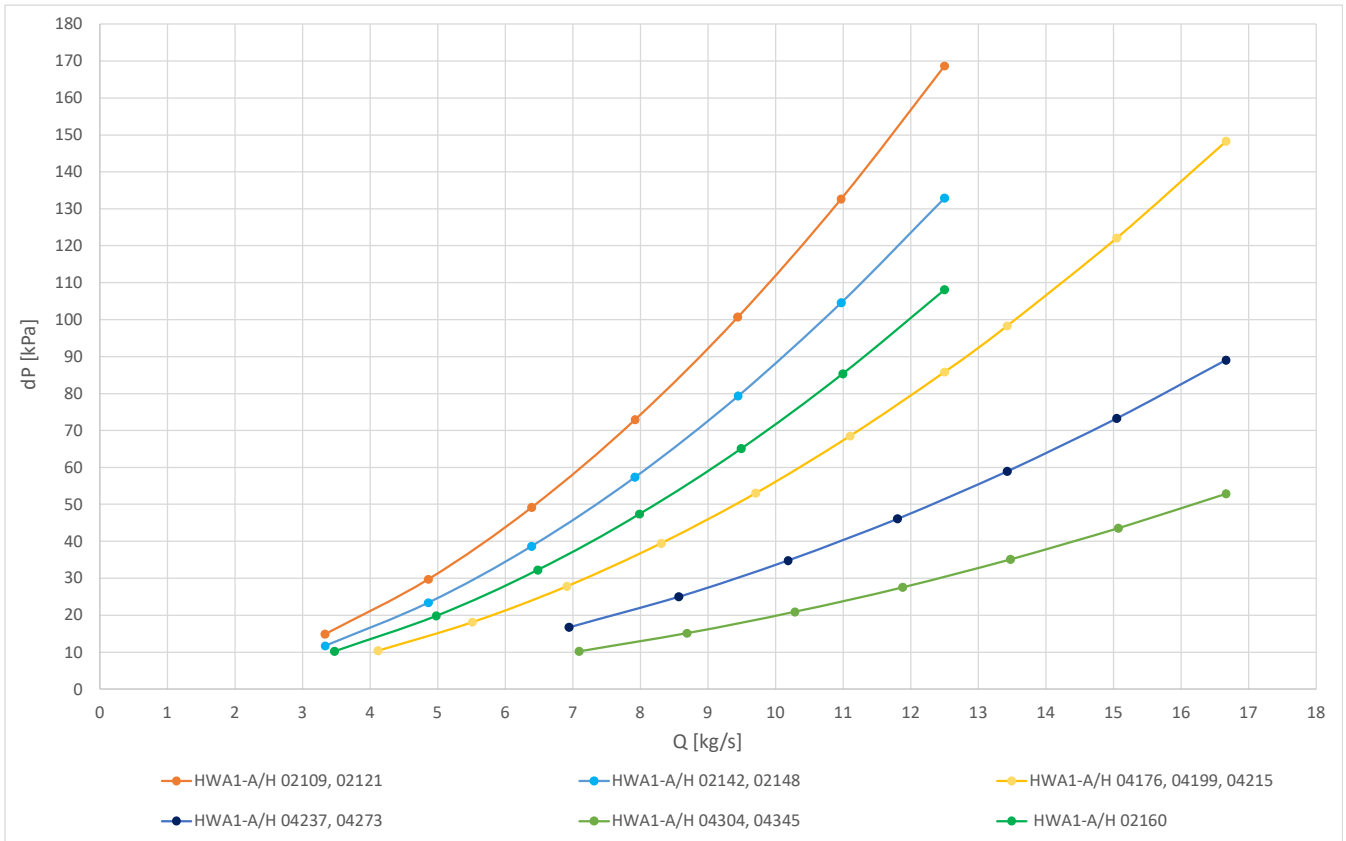
6. HYDRONIC GROUP DATA

6.1 PRESSURE DROPS

The pressure drops of the heat exchangers on the user side according to the flow rate are shown, both for water and 35% ethylene glycol. Note: Flow rates are expressed in kg/s in order to correctly compare the two fluids, which have different densities.

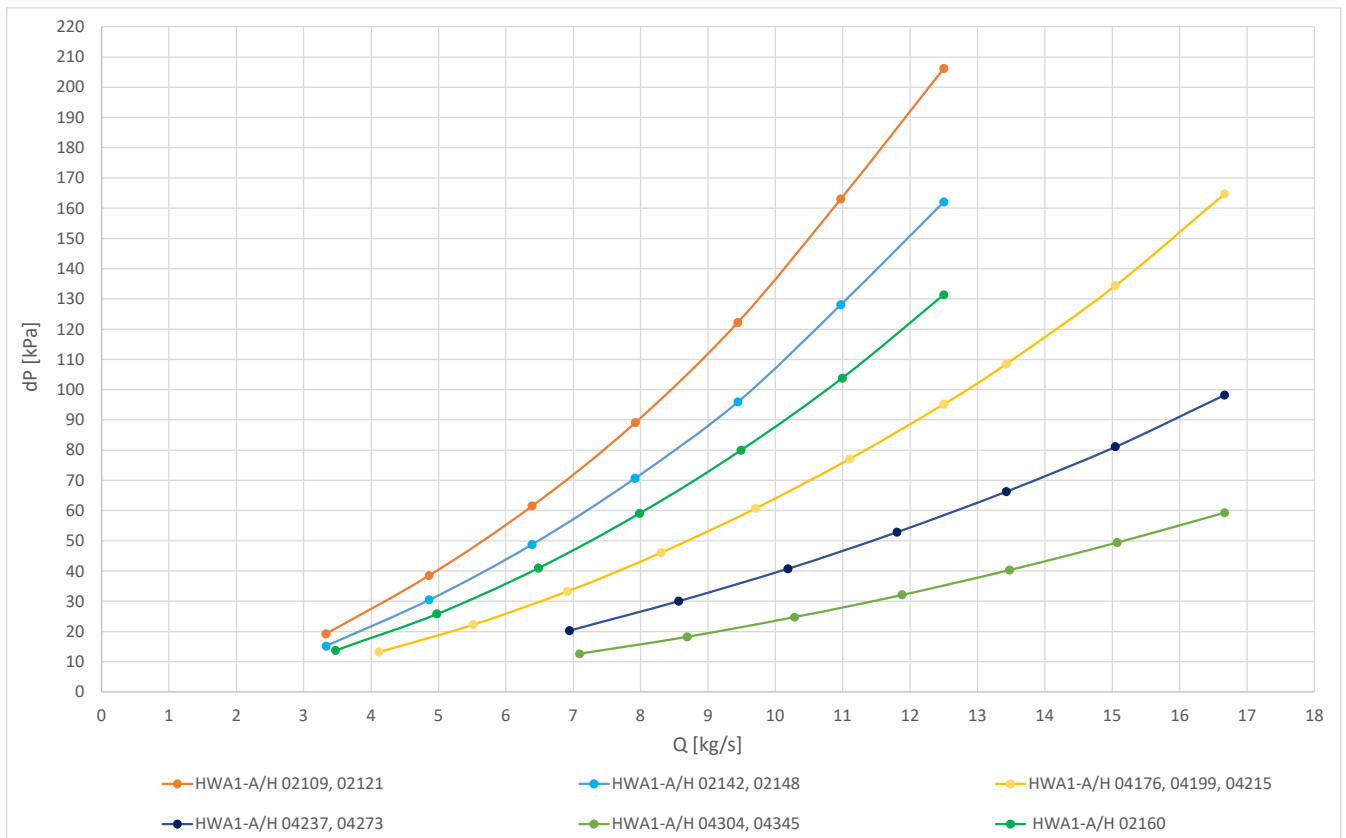
| | Flow [kg/s] | Water pressure drops [kPa] | Water + 35% ethylene glycol pressure drops [kPa] |
|------------------------------|-------------|----------------------------|--|
| HWA1-A/H 02109, 02121 | 3,3 | 14,8 | 19,2 |
| | 4,9 | 29,7 | 38,5 |
| | 6,4 | 49,2 | 61,5 |
| | 7,9 | 72,9 | 89,1 |
| | 9,4 | 100,7 | 122,2 |
| | 11,0 | 132,7 | 163,1 |
| | 12,5 | 168,7 | 206,2 |
| HWA1-A/H 02142, 02148 | 3,3 | 11,7 | 15,2 |
| | 4,9 | 23,4 | 30,5 |
| | 6,4 | 38,7 | 48,8 |
| | 7,9 | 57,4 | 70,7 |
| | 9,4 | 79,4 | 96,0 |
| | 11,0 | 104,6 | 128,1 |
| | 12,5 | 132,9 | 162,0 |
| HWA1-A/H 02160 | 3,5 | 10,2 | 13,8 |
| | 5,0 | 19,8 | 25,8 |
| | 6,5 | 32,3 | 41,0 |
| | 8,0 | 47,4 | 59,1 |
| | 9,5 | 65,1 | 80,0 |
| | 11,0 | 85,4 | 103,8 |
| | 12,5 | 108,1 | 131,4 |
| HWA1-A/H 04176, 04199, 04215 | 4,1 | 10,4 | 13,3 |
| | 5,5 | 18,1 | 22,3 |
| | 6,9 | 27,8 | 33,2 |
| | 8,3 | 39,5 | 46,1 |
| | 9,7 | 53,1 | 60,7 |
| | 11,1 | 68,5 | 77,1 |
| | 12,5 | 85,8 | 95,2 |
| | 13,4 | 98,3 | 108,5 |
| | 15,0 | 122,1 | 134,4 |
| | 16,7 | 148,3 | 164,8 |
| HWA1-A/H 04237, 04273 | 6,9 | 16,8 | 20,3 |
| | 8,6 | 25,0 | 30,1 |
| | 10,2 | 34,8 | 40,8 |
| | 11,8 | 46,1 | 52,8 |
| | 13,4 | 58,9 | 66,3 |
| | 15,0 | 73,3 | 81,1 |
| | 16,7 | 89,1 | 98,2 |
| HWA1-A/H 04304, 04345 | 7,1 | 10,2 | 12,7 |
| | 8,7 | 15,1 | 18,3 |
| | 10,3 | 20,9 | 24,8 |
| | 11,9 | 27,6 | 32,1 |
| | 13,5 | 35,1 | 40,4 |
| | 15,1 | 43,6 | 49,4 |
| | 16,7 | 52,8 | 59,3 |

Carrier fluid = water



dP = pressure drop on user side of the plate heat exchanger
 Q = water flow rate

Carrier fluid = water + 35% ethylene glycol

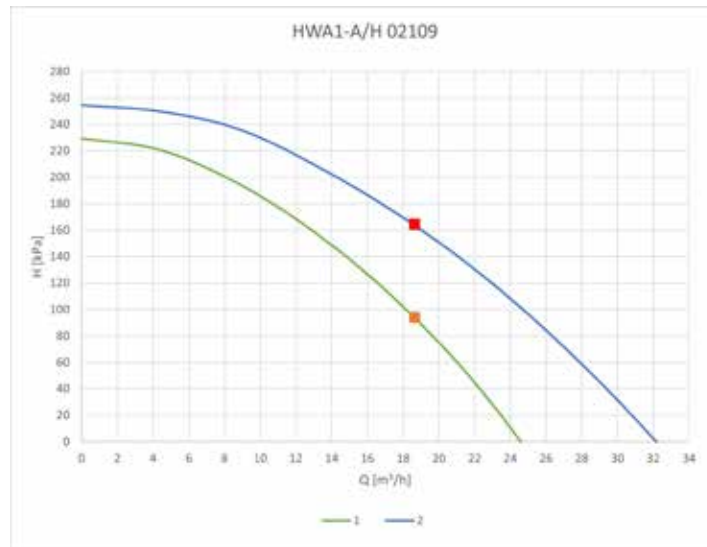


dP = pressure drop on user side of the plate heat exchanger
 Q = water + 35% ethylene glycol flow rate

6.2 USEFUL HEAD FOR WATER AS CARRIER FLUID

the head-flow characteristic curves net of the pressure drops of the hydronic kit with the pump at maximum speed are shown below. Curve number 1 is referred to the standard pump; curve number 2 is referred to the high pressure pump. On each curve, the optimal operating point is shown under the conditions (4) of the technical data. The system MUST be designed so as to guarantee the nominal flow rate relative to the work points shown below. Data are referred to water as carrier fluid.

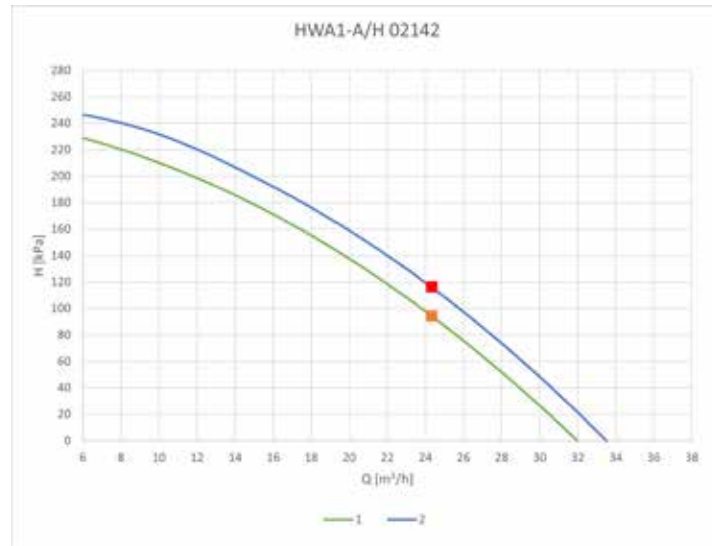
| HWA1-A/H 02109 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 0,0 | 229,5 | 0,0 | 254,7 |
| 4,4 | 220,5 | 4,4 | 249,8 |
| 8,9 | 194,4 | 8,9 | 236,0 |
| 13,3 | 155,6 | 13,3 | 207,3 |
| 17,8 | 105,0 | 17,8 | 171,5 |



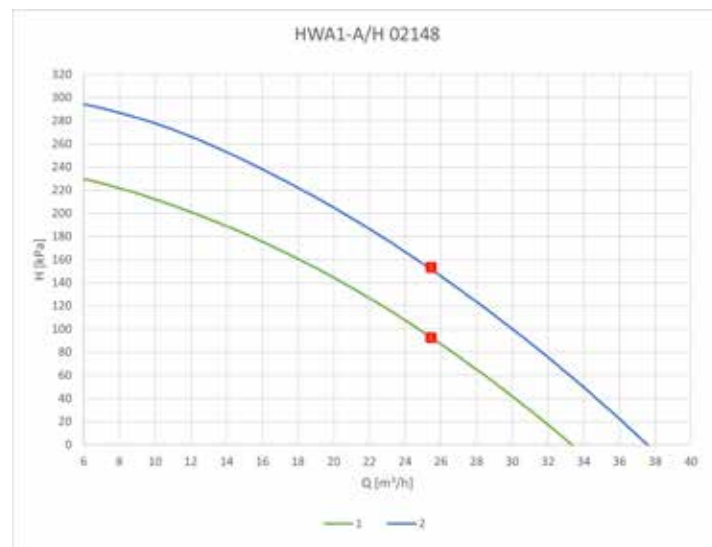
| HWA1-A/H 02121 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 0,0 | 178,1 | 0,0 | 254,7 |
| 4,4 | 172,0 | 4,4 | 249,8 |
| 8,9 | 156,3 | 8,9 | 236,0 |
| 13,3 | 128,7 | 13,3 | 207,3 |
| 17,8 | 93,3 | 17,8 | 171,5 |
| 22,2 | 49,9 | 22,2 | 128,1 |



| HWA1-A/H 02142 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 0,0 | 241,0 | 0,0 | 254,7 |
| 5,0 | 232,5 | 5,0 | 249,0 |
| 10,0 | 210,2 | 10,0 | 231,7 |
| 15,0 | 178,7 | 15,0 | 199,4 |
| 20,0 | 137,7 | 20,0 | 158,9 |
| 25,0 | 87,0 | 25,0 | 108,7 |
| 30,0 | 26,7 | 30,0 | 48,3 |



| HWA1-A/H 02148 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 0,0 | 241,0 | 0,0 | 304,0 |
| 5,6 | 231,2 | 5,6 | 295,6 |
| 11,1 | 206,0 | 11,1 | 271,5 |
| 16,7 | 170,6 | 16,7 | 232,8 |
| 22,2 | 124,6 | 22,2 | 184,3 |
| 27,8 | 67,4 | 27,8 | 125,9 |
| 33,3 | 0,1 | 33,3 | 58,4 |



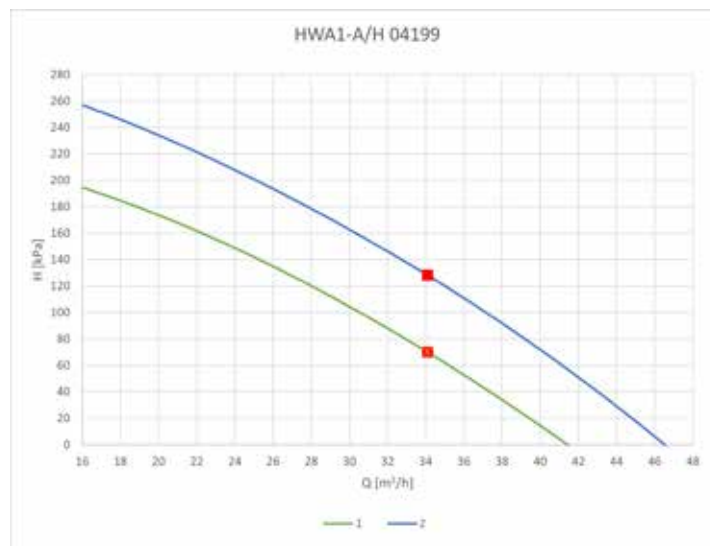
| HWA1-A/H 02160 | | | |
|-------------------------------|-------------------|-------------------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m ³ /h] | Useful head [kPa] | Flow rate [m ³ /h] | Useful head [kPa] |
| 0,0 | 241,0 | 0,0 | 304,0 |
| 5,0 | 234,1 | 5,0 | 298,5 |
| 10,0 | 216,5 | 10,0 | 282,7 |
| 15,0 | 192,6 | 15,0 | 255,7 |
| 20,0 | 162,0 | 20,0 | 222,5 |
| 25,0 | 124,5 | 25,0 | 183,3 |
| 30,0 | 80,1 | 30,0 | 138,5 |
| 35,0 | 29,4 | 35,0 | 87,7 |



| HWA1-A/H 04176 | | | |
|-------------------------------|-------------------|-------------------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m ³ /h] | Useful head [kPa] | Flow rate [m ³ /h] | Useful head [kPa] |
| 15,0 | 200,7 | 15,0 | 262,6 |
| 18,9 | 180,6 | 18,9 | 240,9 |
| 22,8 | 156,7 | 22,8 | 216,2 |
| 26,7 | 130,0 | 26,7 | 188,6 |
| 30,6 | 99,9 | 30,6 | 158,2 |
| 34,4 | 66,9 | 34,4 | 125,1 |
| 38,3 | 30,7 | 38,3 | 88,6 |



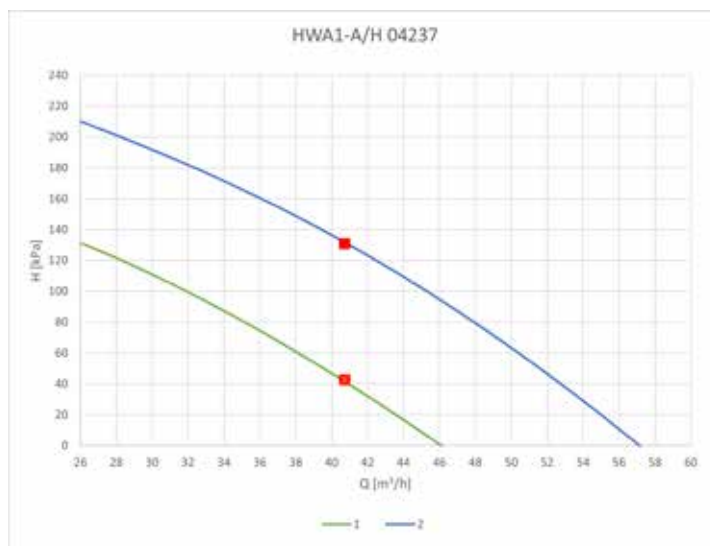
| HWA1-A/H 04199 | | | |
|-------------------------------|-------------------|-------------------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m ³ /h] | Useful head [kPa] | Flow rate [m ³ /h] | Useful head [kPa] |
| 15,0 | 199,5 | 15,0 | 262,6 |
| 18,9 | 179,9 | 18,9 | 240,9 |
| 22,8 | 156,7 | 22,8 | 216,2 |
| 26,7 | 130,0 | 26,7 | 188,6 |
| 30,6 | 99,9 | 30,6 | 158,2 |
| 34,4 | 66,9 | 34,4 | 125,1 |
| 38,3 | 30,7 | 38,3 | 88,6 |



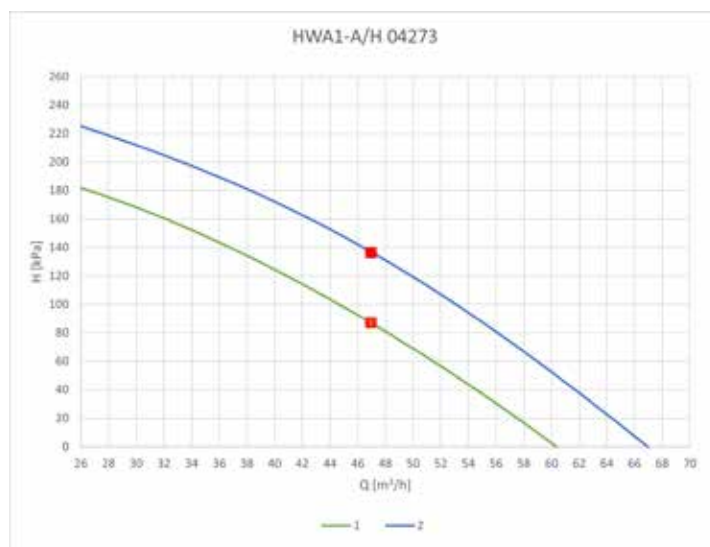
| HWA1-A/H 04215 | | | |
|-------------------------------|-------------------|-------------------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m ³ /h] | Useful head [kPa] | Flow rate [m ³ /h] | Useful head [kPa] |
| 25,0 | 124,5 | 25,0 | 203,4 |
| 28,9 | 102,1 | 28,9 | 182,3 |
| 32,8 | 76,0 | 32,8 | 159,2 |
| 36,7 | 46,7 | 36,7 | 133,4 |
| 40,6 | 14,5 | 40,6 | 104,8 |



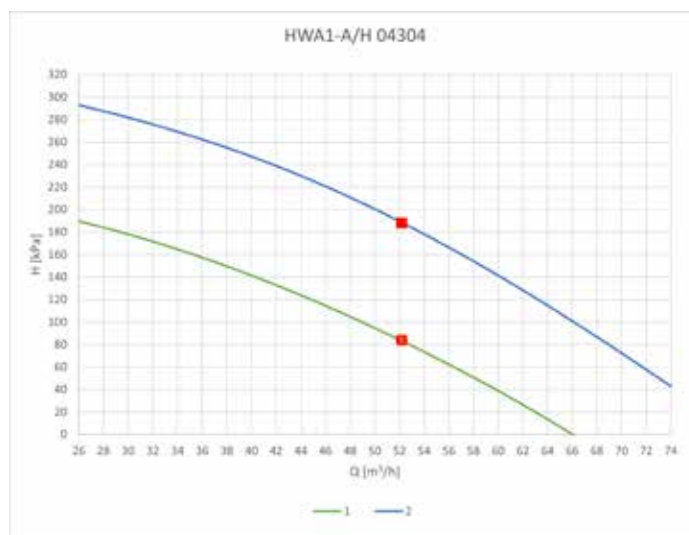
| HWA1-A/H 04237 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 15,0 | 164,5 | 15,0 | 256,2 |
| 21,1 | 150,7 | 21,1 | 231,0 |
| 27,2 | 125,4 | 27,2 | 204,8 |
| 33,3 | 91,4 | 33,3 | 175,1 |
| 39,4 | 50,7 | 39,4 | 140,1 |
| 45,6 | 4,3 | 45,6 | 98,2 |



| HWA1-A/H 04273 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 25,0 | 185,0 | 25,0 | 228,6 |
| 30,0 | 168,2 | 30,0 | 212,0 |
| 35,0 | 147,9 | 35,0 | 193,5 |
| 40,0 | 124,4 | 40,0 | 172,3 |
| 45,0 | 98,1 | 45,0 | 147,6 |
| 50,0 | 69,0 | 50,0 | 119,4 |
| 55,0 | 37,2 | 55,0 | 87,6 |
| 60,0 | 2,6 | 60,0 | 52,6 |



| HWA1-A/H 04304 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 20,0 | 202,3 | 20,0 | 307,3 |
| 26,1 | 189,2 | 26,1 | 292,5 |
| 32,2 | 170,8 | 32,2 | 275,0 |
| 38,3 | 148,2 | 38,3 | 253,7 |
| 44,4 | 121,8 | 44,4 | 227,9 |
| 50,6 | 91,8 | 50,6 | 197,4 |
| 56,7 | 58,5 | 56,7 | 162,3 |
| 62,8 | 21,5 | 62,8 | 123,0 |



| HWA1-A/H 04345 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 40,0 | 152,8 | 40,0 | 250,5 |
| 45,0 | 135,3 | 45,0 | 232,8 |
| 50,0 | 115,8 | 50,0 | 214,0 |
| 55,0 | 94,4 | 55,0 | 193,8 |
| 60,0 | 71,5 | 60,0 | 172,3 |
| 65,0 | 47,0 | 65,0 | 149,3 |
| 70,0 | 21,1 | 70,0 | 124,7 |
| 75,0 | -6,3 | 75,0 | 98,6 |



6.3 USEFUL HEAD FOR WATER + 35% ETHYLENE GLYCOL AS CARRIER FLUID


The following are the characteristic curves of the power H - rate Q net of load losses of the hydronic kit with pump at maximum speed. Curve 1 refers to standard pressure pump, curve 2 to high pressure pump.

On each curve is highlighted the minimum possible working point with BT configuration (Tout=-8°C). The nominal data at -8°C are given in the following table:

| Technical characteristics | Unit of measurement | Model HWA1-A -BT | | | | | | | | | | | |
|---------------------------|---------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 02109 | 02121 | 02142 | 02148 | 02160 | 04176 | 04199 | 04215 | 04237 | 04273 | 04304 | 04345 |
| Cooling capacity | kW | 63,0 | 68,4 | 78,9 | 82,4 | 90,6 | 97,4 | 111 | 129 | 140 | 155 | 177 | 203 |
| Water flow rate | l/s | 3,5 | 3,8 | 4,3 | 4,5 | 5,0 | 5,4 | 6,1 | 7,1 | 7,7 | 8,5 | 9,7 | 11,2 |
| Pump head P* (8) | kPa | 156 | 118 | 169 | 162 | 166 | 172 | 155 | 112 | 116 | 158 | 155 | 143 |
| Pump head P*AP (8) | kPa | 205 | 197 | 190 | 225 | 228 | 233 | 215 | 190 | 194 | 202 | 260 | 240 |

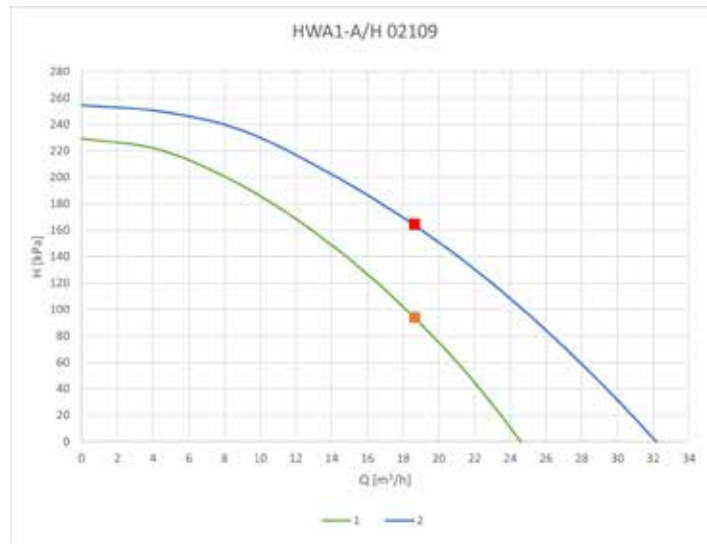
(8) BT version cooling: external air temperature 35°C, internal exchanger water temperature = -3/-8°C. Fluid treated with glycol 35% ethylene glycol.

Refer to these curves also in case of standard units working with glycol (maximum percentage 35%) in Tout higher than 4°C.



ATTENTION: In this case it is necessary to carefully evaluate the volumetric flow rate of the working point and verify the resulting pressure. In most cases only the high pressure pump (hydronic kit /PSAP, /PDAD, /PSAP/SI, /PDAP/SI) satisfy the needs.

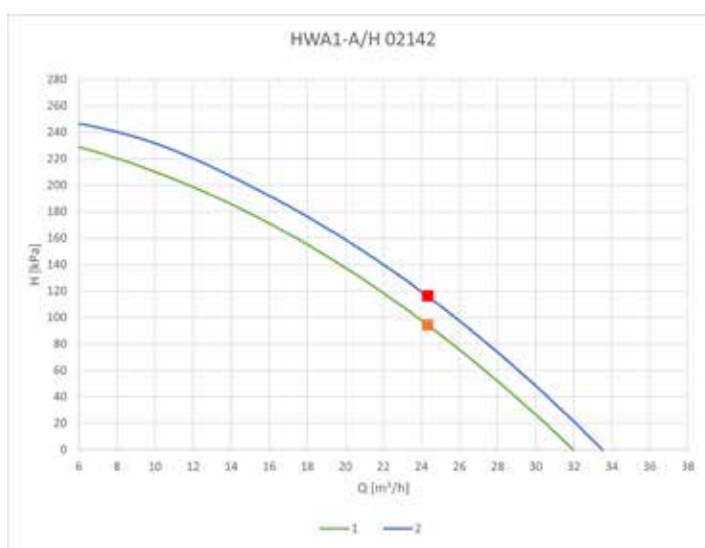
| HWA1-A/H 02109 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 0,0 | 229,5 | 0,0 | 254,7 |
| 4,4 | 218,8 | 4,4 | 248,1 |
| 8,9 | 190,0 | 8,9 | 231,7 |
| 13,3 | 147,3 | 13,3 | 198,9 |
| 17,8 | 91,7 | 17,8 | 158,2 |
| 22,2 | 22,3 | 22,2 | 109,2 |



| HWA1-A/H 02121 | | | |
|-------------------------------|-------------------|-------------------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m ³ /h] | Useful head [kPa] | Flow rate [m ³ /h] | Useful head [kPa] |
| 0,0 | 178,1 | 0,0 | 254,7 |
| 4,4 | 170,3 | 4,4 | 248,1 |
| 8,9 | 151,2 | 8,9 | 229,5 |
| 13,3 | 121,2 | 13,3 | 199,7 |
| 17,8 | 80,9 | 17,8 | 159,4 |
| 22,2 | 31,6 | 22,2 | 110,1 |



| HWA1-A/H 02142 | | | |
|-------------------------------|-------------------|-------------------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m ³ /h] | Useful head [kPa] | Flow rate [m ³ /h] | Useful head [kPa] |
| 0,0 | 241,0 | 0,0 | 254,7 |
| 5,0 | 231,8 | 5,0 | 248,3 |
| 10,0 | 208,1 | 10,0 | 229,6 |
| 15,0 | 174,9 | 15,0 | 195,6 |
| 20,0 | 131,2 | 20,0 | 152,4 |
| 25,0 | 77,1 | 25,0 | 98,8 |
| 30,0 | 12,8 | 30,0 | 34,5 |



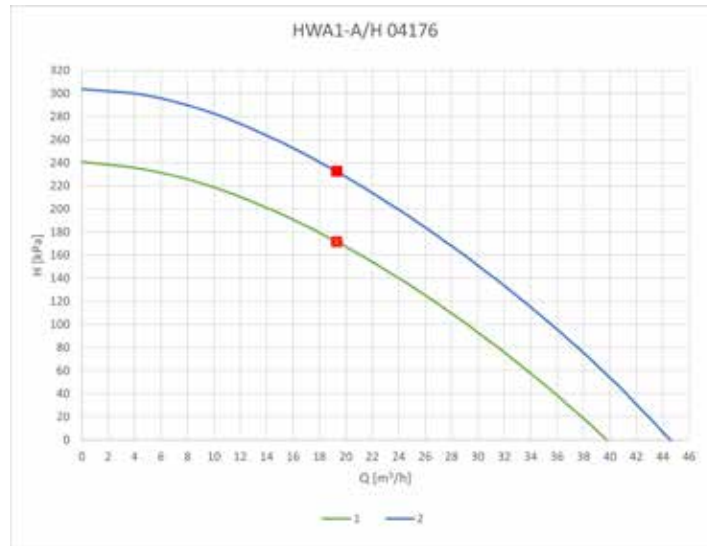
| HWA1-A/H 02148 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 0,0 | 241,0 | 0,0 | 304,0 |
| 5,6 | 229,3 | 5,6 | 293,7 |
| 11,1 | 200,9 | 11,1 | 266,4 |
| 16,7 | 160,7 | 16,7 | 222,9 |
| 22,2 | 108,9 | 22,2 | 168,6 |
| 27,8 | 45,0 | 27,8 | 103,4 |



| HWA1-A/H 02160 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 0,0 | 241,0 | 0,0 | 304,0 |
| 5,0 | 232,5 | 5,0 | 297,0 |
| 10,0 | 213,0 | 10,0 | 279,2 |
| 15,0 | 185,9 | 15,0 | 249,0 |
| 20,0 | 151,4 | 20,0 | 211,9 |
| 25,0 | 109,5 | 25,0 | 168,3 |
| 30,0 | 60,1 | 30,0 | 118,4 |
| 35,0 | 3,9 | 35,0 | 62,1 |



| HWA1-A/H 04176 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 0,0 | 241,0 | 0,0 | 304,0 |
| 5,0 | 233,8 | 5,0 | 298,3 |
| 10,0 | 218,7 | 10,0 | 282,6 |
| 15,0 | 196,1 | 15,0 | 258,3 |
| 20,0 | 167,2 | 20,0 | 227,7 |
| 25,0 | 132,8 | 25,0 | 191,8 |
| 30,0 | 93,1 | 30,0 | 151,1 |
| 35,0 | 48,1 | 35,0 | 105,4 |



| HWA1-A/H 04199 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 0,0 | 241,0 | 0,0 | 304,0 |
| 5,0 | 233,8 | 5,0 | 298,3 |
| 10,0 | 218,7 | 10,0 | 282,6 |
| 15,0 | 196,1 | 15,0 | 258,3 |
| 20,0 | 167,2 | 20,0 | 227,7 |
| 25,0 | 132,8 | 25,0 | 191,8 |
| 30,0 | 93,1 | 30,0 | 151,1 |
| 35,0 | 48,1 | 35,0 | 105,4 |



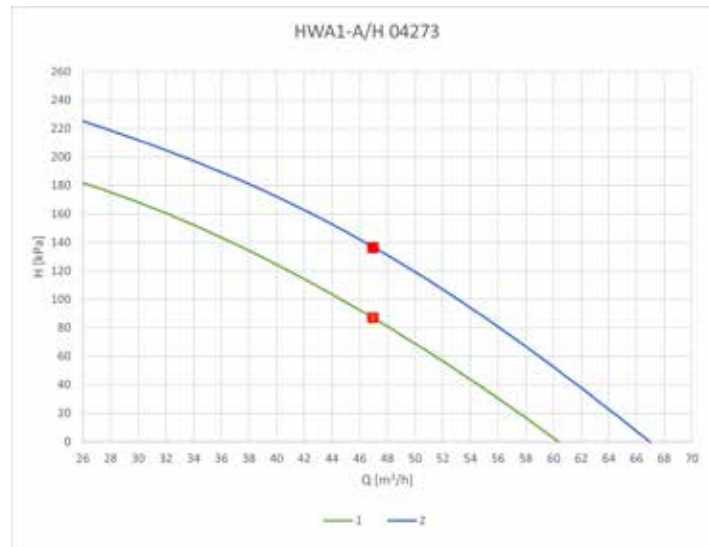
| HWA1-A/H 04215 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 0,0 | 191,2 | 0,0 | 259,9 |
| 5,6 | 188,2 | 5,6 | 254,8 |
| 11,1 | 177,2 | 11,1 | 244,8 |
| 16,7 | 157,9 | 16,7 | 228,6 |
| 22,2 | 131,5 | 22,2 | 206,4 |
| 27,8 | 98,0 | 27,8 | 177,6 |
| 33,3 | 58,1 | 33,3 | 142,5 |
| 38,9 | 11,8 | 38,9 | 100,5 |



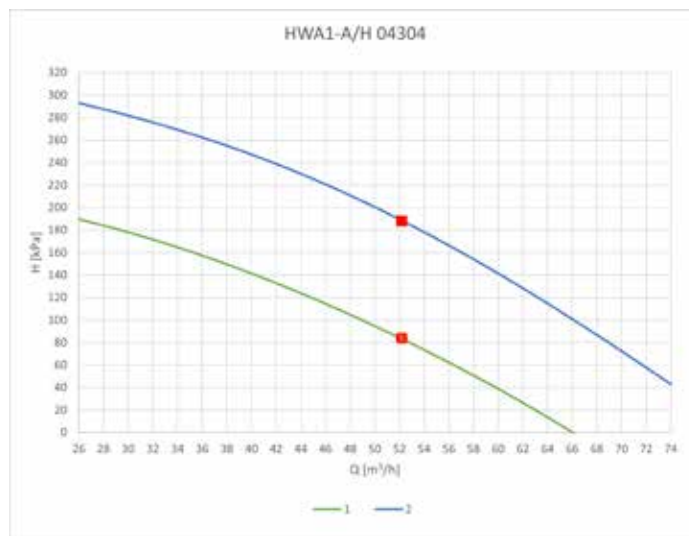
| HWA1-A/H 04237 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 0,0 | 191,2 | 0,0 | 259,9 |
| 5,6 | 189,2 | 5,6 | 255,8 |
| 11,1 | 180,7 | 11,1 | 248,3 |
| 16,7 | 165,0 | 16,7 | 235,6 |
| 22,2 | 143,1 | 22,2 | 218,0 |
| 27,8 | 115,1 | 27,8 | 194,8 |
| 33,3 | 81,7 | 33,3 | 166,1 |
| 38,9 | 42,7 | 38,9 | 131,4 |



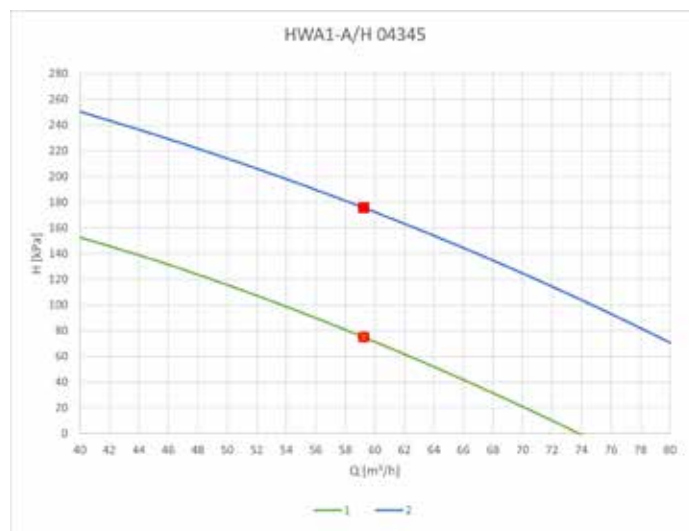
| HWA1-A/H 04273 | | | |
|-------------------------------|-------------------|-------------------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m ³ /h] | Useful head [kPa] | Flow rate [m ³ /h] | Useful head [kPa] |
| 10,0 | 213,4 | 10,0 | 252,5 |
| 14,4 | 206,5 | 14,4 | 246,2 |
| 18,9 | 196,9 | 18,9 | 237,6 |
| 23,3 | 184,7 | 23,3 | 226,6 |
| 27,8 | 169,5 | 27,8 | 212,8 |
| 32,2 | 151,6 | 32,2 | 196,6 |
| 36,7 | 130,7 | 36,7 | 177,3 |
| 41,1 | 107,2 | 41,1 | 155,4 |
| 45,6 | 81,0 | 45,6 | 130,6 |
| 50,0 | 52,7 | 50,0 | 103,3 |



| HWA1-A/H 04304 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 10,0 | 208,5 | 10,0 | 318,4 |
| 15,6 | 206,1 | 15,6 | 311,7 |
| 21,1 | 197,3 | 21,1 | 301,4 |
| 26,7 | 183,3 | 26,7 | 287,6 |
| 32,2 | 165,1 | 32,2 | 270,2 |
| 37,8 | 143,0 | 37,8 | 249,1 |
| 43,3 | 117,9 | 43,3 | 224,3 |
| 48,9 | 89,6 | 48,9 | 195,7 |
| 54,4 | 58,6 | 54,4 | 163,6 |
| 60,0 | 24,4 | 60,0 | 127,8 |



| HWA1-A/H 04345 | | | |
|------------------------|-------------------|--------------------|-------------------|
| Standard pressure pump | | High pressure pump | |
| Flow rate [m³/h] | Useful head [kPa] | Flow rate [m³/h] | Useful head [kPa] |
| 20,0 | 196,5 | 20,0 | 292,2 |
| 24,4 | 188,7 | 24,4 | 283,9 |
| 28,9 | 178,5 | 28,9 | 273,7 |
| 33,3 | 166,3 | 33,3 | 261,8 |
| 37,8 | 152,1 | 37,8 | 248,2 |
| 42,2 | 136,2 | 42,2 | 233,2 |
| 46,7 | 118,6 | 46,7 | 216,5 |
| 51,1 | 99,6 | 51,1 | 198,6 |
| 55,6 | 79,0 | 55,6 | 179,0 |
| 60,0 | 57,2 | 60,0 | 158,3 |



6.4 PUMP ABSORPTION

The pumps nominal absorptions are shown below.

| HWA1-A/H | | 02109 | 02121 | 02142 | 02148 | 02160 | 04176 | 04199 | 04215 | 04237 | 04273 | 04304 | 04345 |
|------------------------|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Standard pressure pump | kW | 1,72 | 1,72 | 2,55 | 2,55 | 2,55 | 2,55 | 2,55 | 2,55 | 2,55 | 3,44 | 3,44 | 4,56 |
| | A | 3,8 | 3,8 | 3,8 | 4,7 | 3,8 | 4,7 | 4,7 | 4,7 | 4,7 | 6,4 | 6,4 | 8,7 |
| High pressure pump | kW | 3,44 | 3,44 | 3,44 | 3,44 | 3,44 | 3,44 | 3,44 | 4,52 | 4,52 | 4,52 | 6,09 | 8,26 |
| | A | 6,4 | 6,4 | 6,4 | 6,4 | 6,4 | 6,4 | 6,4 | 8,7 | 8,7 | 8,7 | 10,6 | 13,6 |

7. NOISE EMISSIONS

The sound levels refer to units with full load and under normal test conditions in heating mode, according to the provisions of EU Regulation 813/2013 (temperature b.s. (b.u.) outdoor air = 7°C (6°C), inlet water temperature - output = 30-35°C). The tolerance on the value of the total sound power level is 3 dB(A). The value is determined in accordance with EN 12102-1:2017, used in conjunction with UNI EN ISO 9614-2 which describe the test methods with the Intensimetric method.

The sound pressure values are calculated from the sound power level using ISO 3744:2010, considering the units operating in the open field, both for standard machines and for SL and SSL accessories installed.

7.1 POWER AND SOUND PRESSURES STANDARD VERSION

| Model HWA1-A/H | Sound power level per octave band [dB(A)] | | | | | | | Sound power level Lw(A) [dB(A)] | Sound pressure level at 1m [dB(A)] | Sound pressure level at 10m [dB(A)] |
|-------------------|---|--------|--------|---------|---------|---------|---------|---------------------------------|------------------------------------|-------------------------------------|
| | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz | | | |
| 02109 | 55,9 | 74,9 | 79,4 | 80,8 | 84,8 | 78,2 | 67,5 | 88,0 | 69,6 | 56,0 |
| 02121 | 55,8 | 76,2 | 79,3 | 80,8 | 84,7 | 78,1 | 67,7 | 88,0 | 69,6 | 56,0 |
| 02142 | 57,1 | 77,7 | 79,7 | 81,1 | 84,3 | 77,8 | 68,2 | 88,0 | 69,0 | 55,9 |
| 02148 | 56,4 | 75,8 | 81,0 | 82,8 | 83,3 | 77,7 | 68,3 | 88,0 | 69,0 | 55,9 |
| 02160 | 56,3 | 76,6 | 80,9 | 82,7 | 83,2 | 77,6 | 68,4 | 88,0 | 69,0 | 55,9 |
| 04176 | 58,2 | 77,0 | 81,8 | 82,5 | 84,9 | 79,1 | 69,9 | 89,0 | 69,9 | 56,9 |
| 04199 | 58,1 | 76,9 | 81,6 | 82,6 | 84,9 | 79,1 | 70,1 | 89,0 | 69,9 | 56,9 |
| 04215 | 57,2 | 76,4 | 80,8 | 82,0 | 85,8 | 79,4 | 69,0 | 89,0 | 69,9 | 56,9 |
| 04237 | 57,8 | 78,5 | 81,6 | 82,9 | 86,7 | 80,2 | 70,0 | 90,0 | 70,9 | 57,9 |
| 04273 | 58,7 | 78,7 | 82,8 | 84,2 | 85,8 | 79,9 | 70,3 | 90,0 | 70,3 | 57,8 |
| 04304 | 59,0 | 79,4 | 84,1 | 85,7 | 86,2 | 80,6 | 71,3 | 91,0 | 71,3 | 58,8 |
| 04345 | 58,3 | 78,9 | 83,1 | 88,1 | 87,3 | 81,3 | 71,0 | 92,0 | 72,3 | 59,8 |

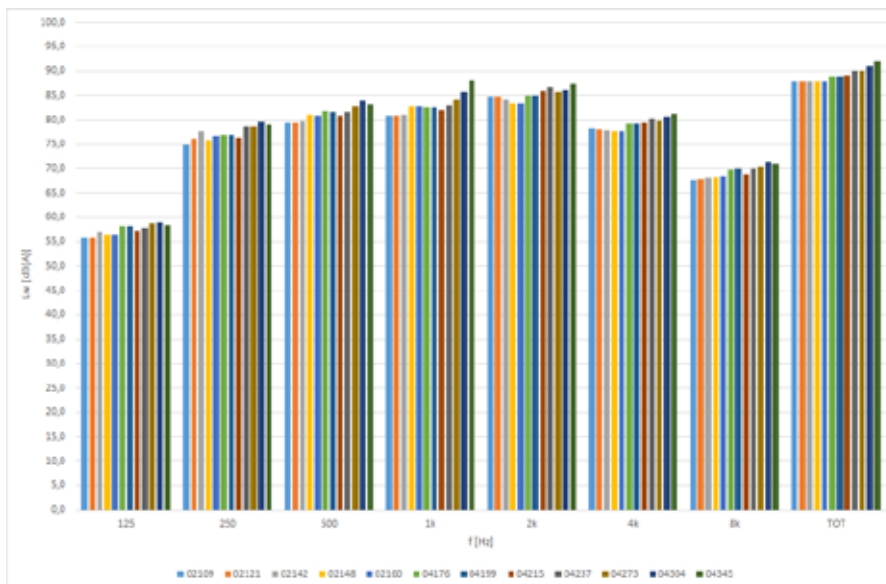
7.2 POWER AND SOUND PRESSURES SILENCED VERSION SL

| Model HWA1-A/H | Sound power level per octave band [dB(A)] | | | | | | | Sound power level Lw(A) [dB(A)] | Sound pressure level at 1m [dB(A)] | Sound pressure level at 10m [dB(A)] |
|-------------------|---|--------|--------|---------|---------|---------|---------|---------------------------------|------------------------------------|-------------------------------------|
| | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz | | | |
| 02109 | 55,8 | 74,5 | 78,6 | 80,0 | 83,5 | 77,3 | 66,5 | 87,0 | 68,6 | 55,0 |
| 02121 | 55,8 | 75,8 | 78,4 | 79,9 | 83,4 | 77,2 | 66,8 | 87,0 | 68,6 | 55,0 |
| 02142 | 57,0 | 77,3 | 78,8 | 80,2 | 82,9 | 76,9 | 67,2 | 87,0 | 68,0 | 54,9 |
| 02148 | 56,3 | 75,4 | 80,1 | 81,8 | 81,9 | 76,7 | 67,3 | 87,0 | 68,0 | 54,9 |
| 02160 | 56,2 | 76,2 | 80,0 | 81,8 | 81,8 | 76,7 | 67,4 | 87,0 | 68,0 | 54,9 |
| 04176 | 58,2 | 76,6 | 80,9 | 81,6 | 83,5 | 78,2 | 68,9 | 88,0 | 68,9 | 55,9 |
| 04199 | 58,1 | 76,5 | 80,7 | 81,7 | 83,6 | 78,2 | 69,1 | 88,0 | 68,9 | 55,9 |
| 04215 | 57,2 | 76,0 | 79,9 | 81,1 | 84,5 | 78,5 | 68,0 | 88,0 | 68,9 | 55,9 |
| 04237 | 57,8 | 78,1 | 80,7 | 82,0 | 85,4 | 79,3 | 69,0 | 89,0 | 69,9 | 56,9 |
| 04273 | 58,6 | 78,2 | 81,9 | 83,3 | 84,4 | 78,9 | 69,3 | 89,0 | 69,3 | 56,8 |
| 04304 | 58,9 | 79,0 | 83,2 | 84,8 | 84,7 | 79,7 | 70,3 | 90,0 | 70,3 | 57,8 |
| 04345 | 58,2 | 78,5 | 82,1 | 87,2 | 85,9 | 80,4 | 70,0 | 91,0 | 71,3 | 58,8 |

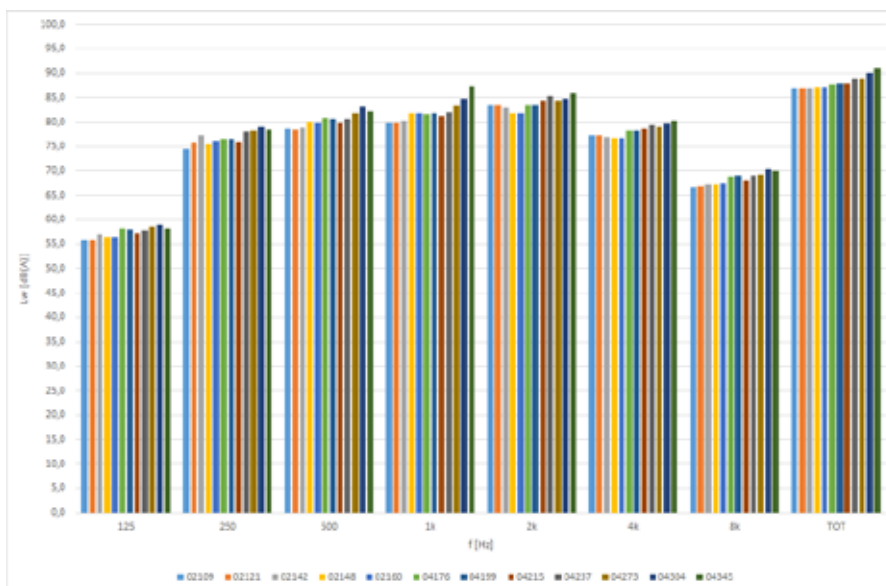
7.3 POWER AND SOUND PRESSURES SILENCED VERSION SSL

| Model HWA1-A/H | Sound power level per octave band [dB(A)] | | | | | | | Sound power level Lw(A) [dB(A)] | Sound pressure level at 1m [dB(A)] | Sound pressure level at 10m [dB(A)] |
|-------------------|---|--------|--------|---------|---------|---------|---------|---------------------------------|------------------------------------|-------------------------------------|
| | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz | | | |
| 02109 | 56,3 | 73,1 | 76,3 | 76,2 | 80,1 | 74,3 | 63,4 | 84,0 | 65,6 | 52,0 |
| 02121 | 56,2 | 74,4 | 76,1 | 76,2 | 80,0 | 74,1 | 63,6 | 84,0 | 65,6 | 52,0 |
| 02142 | 57,4 | 76,0 | 76,4 | 76,2 | 79,5 | 73,7 | 63,8 | 84,0 | 65,0 | 51,9 |
| 02148 | 56,6 | 73,9 | 77,8 | 78,3 | 78,3 | 73,5 | 64,0 | 84,0 | 65,0 | 51,9 |
| 02160 | 56,5 | 74,7 | 77,6 | 78,2 | 78,2 | 73,4 | 64,2 | 84,0 | 65,0 | 51,9 |
| 04176 | 58,6 | 75,2 | 78,6 | 77,6 | 80,1 | 75,0 | 65,7 | 85,0 | 65,9 | 52,9 |
| 04199 | 58,5 | 75,2 | 78,4 | 77,8 | 80,1 | 75,1 | 65,9 | 85,0 | 65,9 | 52,9 |
| 04215 | 57,6 | 74,6 | 77,6 | 77,4 | 81,1 | 75,5 | 64,9 | 85,0 | 65,9 | 52,9 |
| 04237 | 58,2 | 76,8 | 78,3 | 78,2 | 81,9 | 76,2 | 65,8 | 86,0 | 66,9 | 53,9 |
| 04273 | 58,9 | 76,8 | 79,5 | 79,6 | 80,9 | 75,7 | 66,1 | 86,0 | 66,3 | 53,8 |
| 04304 | 59,2 | 77,5 | 80,8 | 81,2 | 81,2 | 76,4 | 67,1 | 87,0 | 67,3 | 54,8 |
| 04345 | 58,4 | 77,0 | 79,8 | 84,0 | 82,4 | 77,2 | 66,9 | 88,0 | 68,3 | 55,8 |

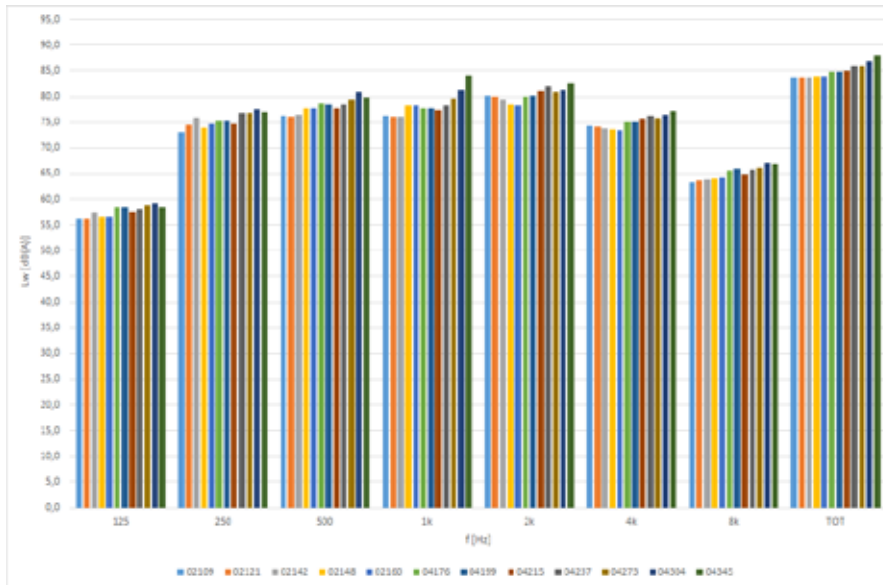
HWA1-A/H Standard version



HWA1-A/H Silenced version



HWA1-A/H super silenced version



8. OPERATING LIMITS

8.1 EVAPORATOR WATER FLOW

The nominal water flow rate refers to a temperature difference between the evaporator inlet and outlet of 5°C. The maximum admissible flow is the one with a temperature difference of 3°C while the minimum is the one with a temperature difference of 8°C at nominal conditions as stated in the data sheet.

For greater precision, we enclose below the tables with the minimum flow rates to be ensured for the plate heat exchanger to ensure correct operation in function of the model (note: the safety device is used to avoid failure of the antifreeze probe due to lack of flow, but does not guarantee the minimum water flow required for the correct functioning of the unit).

| HWA1-A/H model | 02109 | 02121 | 02142 | 02148 | 02160 | 04176 | 04199 | 04215 | 04237 | 04273 | 04304 | 04345 |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Minimum water flow to be assured in chiller mode (condition (1) technical sheet) [l/s] | 3,1 | 3,4 | 3,9 | 4,1 | 4,4 | 4,9 | 5,6 | 6,2 | 6,7 | 7,8 | 8,6 | 9,7 |
| Maximum water flow to be assured in chiller mode (condition (1) technical sheet) [l/s] | 8,2 | 9,0 | 10,5 | 11,0 | 11,8 | 13,2 | 14,9 | 16,6 | 17,9 | 20,7 | 23,0 | 25,8 |
| Minimum safety device water flow rate* [l/s] | 1,72 | 1,72 | 1,96 | 1,96 | 2,20 | 2,62 | 2,62 | 2,62 | 3,44 | 3,44 | 4,55 | 4,55 |
| Maximum safety device water flow rate* [l/s] | 1,85 | 1,85 | 2,11 | 2,11 | 2,36 | 2,81 | 2,81 | 2,81 | 3,69 | 3,69 | 4,89 | 4,89 |

* When the flow rate falls below the indicated limit (safety device intervention flow rate – decreasing flow) the safety device signals an alarm, which can only be reset when the safety device intervention flow rate - increasing flow- is reached.

As a first approximation, for units equipped with an on-board pump, and in the absence of other detection systems, the correct flow rate to guarantee the best performance of the unit can be verified, in correspondence with the maximum speeds of the pump, by checking with the pressure gauges the difference in pressure between the return and delivery of the water on the hydraulic connections installed outside the unit and making sure that this value is equal to or less than the useful head indicated on the curves shown in the technical bulletin for the respective models and if necessary modifying the settings regarding the circulator which can be viewed in the MCO manual.

8.2 CHILLED WATER PRODUCTION (SUMMER OPERATION)

The minimum temperature allowed at the evaporator outlet is +4°C: for lower temperatures there is the BT version - low temperature, which guarantees operation for external temperatures down to -8°C. In the case of lower water temperatures, contact our technical office for the feasibility study and evaluation of the changes to be made according to the requests. The maximum temperature that can be kept steady at the outlet of the evaporator is 18 °C.

8.3 HOT WATER PRODUCTION (WINTER OPERATION)

Once the system has reached steady state, the water inlet temperature must not fall below 25°C: lower values, not due to transient or normal phases, can cause system anomalies with the possibility of breakages del compressor. The maximum temperature of the leaving water must not exceed 58°C. At this temperature, the electrical absorption and the COP performance are optimized if the external temperature is above 5°C, even if the unit is still able to work up to the limit of -10°C.

For temperatures higher than those indicated, especially if in conjunction with reduced water flow rates, there may be anomalies in the regular operation of the unit, or in the most critical cases, safety devices could intervene.

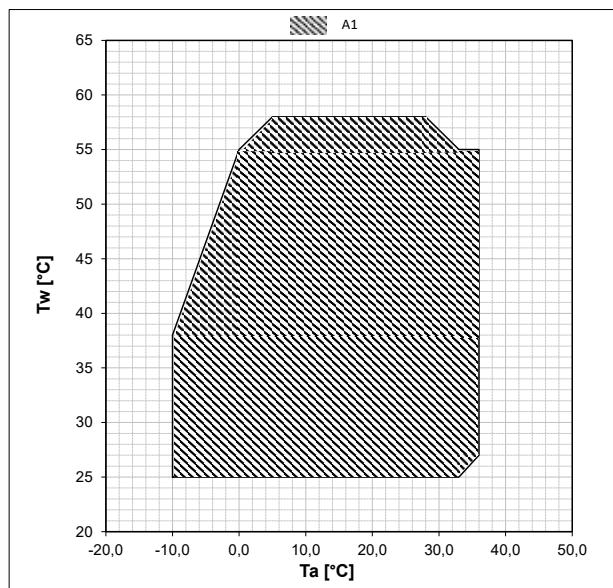
8.4 AMBIENT AIR TEMPERATURE AND SUMMARY TABLE

The units are designed and built to operate in summer mode, with connection control. In heat pump operation, the permitted temperature range of the outside air varies from -10°C to +36°C depending on the temperature of the leaving water, as shown in table and in the following graphs.

| Water chiller mode | | |
|---|---|---------------|
| Ambient temperature standard version | Minimum -10°C (-20°C with CC accessory) | Maximum 46°C |
| Standard version outlet water temperature | Minimum 4°C | Maximum 18°C |
| Ambient temperature BT version | Minimum -20°C | Maximum +46°C |
| Outlet water temperature BT version | Minimum -8°C | Maximum +18°C |
| Heat pump mode | | |
| Ambient temperature | Minimum -10°C | Maximum 36°C |
| Outlet water temperature | Minimum 25°C | Maximum 58°C |

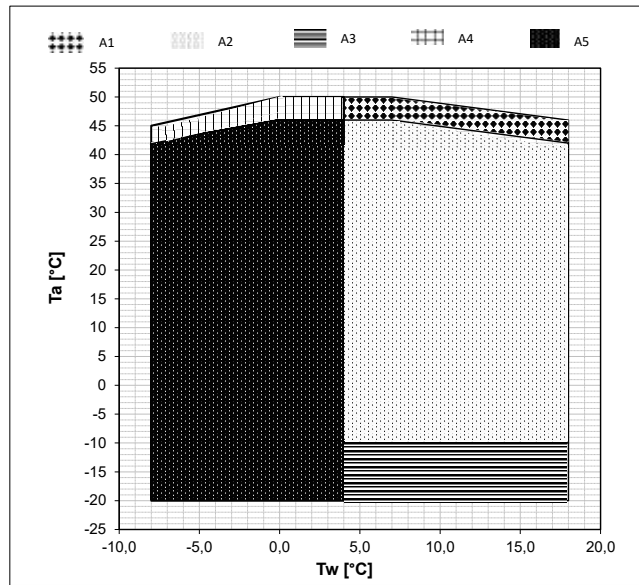
Below are graphed operating limits.

HEAT PUMP MODE



A1 = HWA1-A/H heating

CHILLER MODE



- A1 = HWA1-A/H cooling partial load
- A2 = HWA1-A/H cooling full load
- A3 = HWA1-A/H cooling with CC condensation control up to -20°C
- A4 = HWA1-A/H BT partial load
- A5 = HWA1-A/H BT

9. PERFORMANCE TABLE

The tables show the heating capacity, absorbed power and efficiency for various outdoor air temperature conditions. The data are calculated according to EN 14511:2018. They are indicative and may be subject to change.

9.1 HEATING

| Model HWA1-A/H | | HEATING | | | | | | | | | | | | | | | | | | | | |
|--------------------------|---------------------|-----------------------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|------|------|
| | | T air outdoor [°C] | Tout [°C] | | | | | | | | | | | | | | | | | | | |
| | | | 25 | | | 30 | | | 35 | | | 40 | | | 45 | | | 50 | | | 55 | |
| Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | | |
| 02109 | -10 | 68,9 | 21,3 | 3,23 | 68,1 | 23,5 | 2,89 | 67,3 | 25,7 | 2,62 | - | - | - | - | - | - | - | - | - | - | - | |
| | -7 | 73,2 | 21,5 | 3,40 | 72,4 | 23,6 | 3,07 | 71,5 | 25,7 | 2,79 | 70,6 | 28,3 | 2,50 | - | - | - | - | - | - | - | - | |
| | -2 | 81,4 | 21,4 | 3,81 | 80,4 | 23,3 | 3,45 | 79,1 | 25,6 | 3,09 | 77,9 | 28,1 | 2,77 | 76,7 | 31,0 | 2,48 | 75,4 | 33,9 | 2,22 | - | - | - |
| | 2 | 99,3 | 22,1 | 4,49 | 101 | 24,7 | 4,08 | 98,8 | 27,1 | 3,64 | 97,6 | 29,7 | 3,29 | 95,8 | 32,8 | 2,92 | 94,0 | 36,1 | 2,60 | 92,2 | 39,7 | 2,32 |
| | 7 | 117 | 22,8 | 5,13 | 115 | 24,9 | 4,61 | 113 | 27,6 | 4,09 | 111 | 30,3 | 3,65 | 108 | 32,9 | 3,30 | 106 | 36,3 | 2,92 | 104 | 40,1 | 2,58 |
| | 12 | 134 | 23,2 | 5,77 | 132 | 25,4 | 5,18 | 129 | 27,8 | 4,64 | 126 | 30,2 | 4,17 | 123 | 33,2 | 3,70 | 120 | 36,6 | 3,27 | 117 | 40,5 | 2,88 |
| | 15 | 137 | 23,2 | 5,92 | 135 | 25,3 | 5,33 | 132 | 27,7 | 4,77 | 130 | 30,1 | 4,31 | 127 | 33,2 | 3,81 | 123 | 36,6 | 3,35 | 119 | 40,2 | 2,97 |
| | 20 | 144 | 23,4 | 6,16 | 142 | 25,5 | 5,57 | 139 | 27,9 | 4,98 | 136 | 30,3 | 4,47 | 133 | 33,1 | 4,00 | 129 | 36,2 | 3,57 | 126 | 39,6 | 3,18 |
| | 25 | 158 | 22,9 | 6,90 | 155 | 24,8 | 6,22 | 151 | 26,8 | 5,64 | 147 | 29,4 | 5,01 | 143 | 32,5 | 4,40 | 139 | 35,5 | 3,91 | 135 | 39,2 | 3,44 |
| | 30 | 168 | 22,2 | 7,57 | 165 | 24,5 | 6,75 | 161 | 26,7 | 6,03 | 157 | 29,3 | 5,36 | 153 | 32,1 | 4,75 | 148 | 35,2 | 4,21 | 143 | 38,9 | 3,68 |
| 35 | 177 | 21,9 | 8,08 | 173 | 24,2 | 7,14 | 172 | 26,5 | 6,46 | 167 | 28,9 | 5,79 | 162 | 31,7 | 5,12 | 156 | 35,0 | 4,46 | 151 | 38,6 | 3,91 | |
| 02121 | -10 | 77,8 | 24,5 | 3,17 | 77,0 | 26,9 | 2,87 | 76,2 | 29,4 | 2,59 | - | - | - | - | - | - | - | - | - | - | - | |
| | -7 | 82,1 | 24,4 | 3,37 | 81,2 | 26,8 | 3,03 | 80,3 | 29,4 | 2,73 | 79,5 | 32,4 | 2,46 | - | - | - | - | - | - | - | - | |
| | -2 | 91,4 | 24,3 | 3,76 | 90,0 | 26,9 | 3,34 | 88,6 | 29,4 | 3,02 | 87,4 | 32,2 | 2,71 | 86,1 | 35,7 | 2,41 | 85,2 | 39,4 | 2,16 | - | - | - |
| | 2 | 103 | 24,8 | 4,15 | 103 | 27,4 | 3,76 | 104 | 30,5 | 3,41 | 106 | 33,7 | 3,14 | 106 | 37,3 | 2,85 | 105 | 41,2 | 2,55 | 104 | 45,5 | 2,28 |
| | 7 | 129 | 26,1 | 4,95 | 127 | 28,6 | 4,46 | 125 | 30,9 | 4,05 | 123 | 33,9 | 3,61 | 120 | 37,5 | 3,20 | 118 | 41,8 | 2,82 | 116 | 45,7 | 2,53 |
| | 12 | 148 | 26,2 | 5,63 | 145 | 28,9 | 5,01 | 142 | 31,4 | 4,54 | 139 | 34,8 | 4,01 | 137 | 37,6 | 3,64 | 133 | 41,6 | 3,20 | 130 | 45,8 | 2,83 |
| | 15 | 151 | 26,3 | 5,75 | 149 | 28,8 | 5,17 | 146 | 31,3 | 4,67 | 143 | 34,4 | 4,15 | 140 | 37,8 | 3,70 | 137 | 41,4 | 3,31 | 133 | 45,6 | 2,92 |
| | 20 | 159 | 26,4 | 6,01 | 156 | 28,8 | 5,40 | 153 | 31,6 | 4,83 | 150 | 34,3 | 4,37 | 147 | 37,7 | 3,89 | 143 | 41,7 | 3,43 | 140 | 45,4 | 3,07 |
| | 25 | 173 | 26,8 | 6,45 | 170 | 28,4 | 5,99 | 167 | 31,1 | 5,36 | 163 | 34,0 | 4,78 | 159 | 36,7 | 4,34 | 155 | 40,6 | 3,81 | 150 | 44,7 | 3,36 |
| | 30 | 183 | 27,2 | 6,73 | 181 | 28,7 | 6,30 | 179 | 30,2 | 5,91 | 174 | 33,5 | 5,18 | 169 | 36,6 | 4,63 | 165 | 40,1 | 4,10 | 160 | 44,2 | 3,61 |
| 35 | 191 | 26,9 | 7,09 | 189 | 29,0 | 6,52 | 188 | 31,1 | 6,02 | 184 | 33,3 | 5,54 | 179 | 36,5 | 4,92 | 174 | 39,9 | 4,36 | 168 | 44,3 | 3,80 | |
| 02142 | -10 | 90,4 | 28,8 | 3,14 | 89,5 | 31,3 | 2,86 | 88,3 | 34,3 | 2,58 | - | - | - | - | - | - | - | - | - | - | - | |
| | -7 | 96,4 | 28,6 | 3,37 | 95,1 | 31,2 | 3,05 | 93,6 | 34,5 | 2,71 | 92,4 | 37,4 | 2,47 | - | - | - | - | - | - | - | - | |
| | -2 | 107 | 28,7 | 3,72 | 105 | 31,1 | 3,39 | 103 | 34,3 | 3,01 | 102 | 37,2 | 2,73 | 99,7 | 41,2 | 2,42 | 98,4 | 45,0 | 2,19 | - | - | - |
| | 2 | 134 | 30,3 | 4,44 | 132 | 33,1 | 4,00 | 130 | 36,3 | 3,58 | 128 | 39,4 | 3,24 | 125 | 43,2 | 2,90 | 123 | 47,9 | 2,56 | 121 | 52,3 | 2,31 |
| | 7 | 153 | 30,7 | 4,99 | 151 | 33,6 | 4,49 | 148 | 36,6 | 4,04 | 145 | 39,7 | 3,64 | 142 | 43,9 | 3,22 | 138 | 48,1 | 2,87 | 135 | 52,5 | 2,57 |
| | 12 | 175 | 31,0 | 5,63 | 172 | 33,6 | 5,11 | 168 | 37,1 | 4,53 | 164 | 40,1 | 4,10 | 161 | 43,5 | 3,70 | 157 | 47,7 | 3,29 | 152 | 52,3 | 2,90 |
| | 15 | 179 | 31,1 | 5,77 | 176 | 33,8 | 5,21 | 173 | 36,8 | 4,70 | 169 | 40,2 | 4,19 | 164 | 43,5 | 3,78 | 160 | 47,5 | 3,37 | 156 | 51,9 | 3,00 |
| | 20 | 187 | 30,7 | 6,10 | 184 | 33,3 | 5,54 | 181 | 36,0 | 5,01 | 177 | 39,2 | 4,51 | 173 | 42,6 | 4,05 | 169 | 46,4 | 3,63 | 164 | 50,9 | 3,23 |
| | 25 | 203 | 30,1 | 6,72 | 199 | 32,3 | 6,18 | 195 | 35,2 | 5,53 | 190 | 38,5 | 4,94 | 185 | 41,8 | 4,43 | 180 | 45,6 | 3,95 | 175 | 50,1 | 3,50 |
| | 30 | 215 | 30,0 | 7,18 | 212 | 32,3 | 6,55 | 208 | 34,6 | 6,01 | 203 | 37,4 | 5,43 | 197 | 41,4 | 4,76 | 192 | 45,1 | 4,25 | 186 | 49,5 | 3,74 |
| 35 | 228 | 29,4 | 7,75 | 223 | 32,2 | 6,93 | 218 | 35,0 | 6,24 | 214 | 37,8 | 5,65 | 208 | 41,2 | 5,04 | 202 | 45,1 | 4,48 | 196 | 49,2 | 3,98 | |
| 02148 | -10 | 93,9 | 29,7 | 3,16 | 92,9 | 32,4 | 2,87 | 91,8 | 35,8 | 2,57 | - | - | - | - | - | - | - | - | - | - | - | |
| | -7 | 100 | 29,7 | 3,37 | 98,8 | 32,3 | 3,06 | 97,6 | 35,6 | 2,74 | 96,3 | 39,2 | 2,46 | - | - | - | - | - | - | - | - | |
| | -2 | 111 | 29,6 | 3,75 | 110 | 32,1 | 3,41 | 108 | 35,7 | 3,02 | 106 | 38,9 | 2,72 | 104 | 42,9 | 2,43 | 103 | 47,5 | 2,16 | - | - | - |
| | 2 | 140 | 31,1 | 4,50 | 138 | 34,0 | 4,05 | 136 | 37,7 | 3,60 | 133 | 41,2 | 3,23 | 131 | 45,1 | 2,89 | 128 | 50,1 | 2,56 | 126 | 55,7 | 2,26 |
| | 7 | 160 | 31,7 | 5,06 | 157 | 34,5 | 4,55 | 154 | 37,7 | 4,08 | 151 | 41,9 | 3,60 | 148 | 45,3 | 3,26 | 145 | 50,3 | 2,87 | 141 | 55,6 | 2,54 |
| | 12 | 185 | 32,4 | 5,70 | 180 | 35,5 | 5,07 | 176 | 38,6 | 4,56 | 172 | 41,9 | 4,10 | 168 | 45,7 | 3,68 | 164 | 50,3 | 3,25 | 159 | 55,8 | 2,84 |
| | 15 | 189 | 32,6 | 5,80 | 185 | 35,3 | 5,26 | 181 | 38,5 | 4,71 | 177 | 41,9 | 4,22 | 172 | 45,8 | 3,76 | 167 | 50,8 | 3,29 | 163 | 55,3 | 2,95 |
| | 20 | 199 | 32,6 | 6,10 | 194 | 35,2 | 5,52 | 191 | 37,7 | 5,05 | 185 | 41,4 | 4,48 | 181 | 45,1 | 4,01 | 176 | 49,4 | 3,57 | 172 | 54,3 | 3,16 |
| | 25 | 216 | 32,3 | 6,67 | 212 | 34,1 | 6,23 | 206 | 37,3 | 5,52 | 201 | 40,6 | 4,94 | 195 | 44,3 | 4,41 | 189 | 48,6 | 3,90 | 184 | 53,5 | 3,43 |
| | 30 | 231 | 32,2 | 7,16 | 225 | 34,6 | 6,51 | 220 | 37,1 | 5,94 | 214 | 40,4 | 5,31 | 208 | 44,0 | 4,74 | 202 | 48,2 | 4,19 | 195 | 53,1 | 3,67 |
| 35 | 248 | 31,1 | 7,97 | 241 | 33,5 | 7,18 | 234 | 37,0 | 6,32 | 227 | 40,4 | 5,61 | 221 | 43,5 | 5,07 | 213 | 48,1 | 4,43 | 206 | 52,8 | 3,89 | |

| Model HWA1-A/H | | HEATING | | | | | | | | | | | | | | | | | | | | |
|--------------------------|---------------------|-----------------------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|------|------|
| | | T air outdoor [°C] | Tout [°C] | | | | | | | | | | | | | | | | | | | |
| | | | 25 | | | 30 | | | 35 | | | 40 | | | 45 | | | 50 | | | 55 | |
| Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | | |
| 02160 | -10 | 102 | 32,3 | 3,17 | 101 | 35,5 | 2,85 | 100 | 39,1 | 2,56 | - | - | - | - | - | - | - | - | - | - | - | |
| | -7 | 109 | 32,3 | 3,37 | 108 | 35,7 | 3,01 | 106 | 38,9 | 2,73 | 105 | 42,9 | 2,45 | - | - | - | - | - | - | - | - | |
| | -2 | 121 | 32,1 | 3,76 | 119 | 35,5 | 3,35 | 117 | 39,0 | 3,01 | 115 | 42,6 | 2,71 | 113 | 47,6 | 2,39 | 112 | 52,1 | 2,14 | - | - | - |
| | 2 | 150 | 34,1 | 4,40 | 149 | 37,5 | 3,97 | 146 | 40,8 | 3,57 | 144 | 44,6 | 3,23 | 141 | 49,6 | 2,85 | 139 | 54,5 | 2,55 | 137 | 60,6 | 2,25 |
| | 7 | 173 | 34,4 | 5,01 | 169 | 37,7 | 4,49 | 166 | 41,4 | 4,01 | 163 | 45,6 | 3,57 | 160 | 49,4 | 3,23 | 156 | 55,0 | 2,84 | 153 | 60,8 | 2,51 |
| | 12 | 198 | 35,1 | 5,63 | 194 | 38,3 | 5,07 | 189 | 42,0 | 4,51 | 185 | 46,2 | 4,01 | 181 | 50,6 | 3,57 | 176 | 54,8 | 3,22 | 172 | 60,5 | 2,85 |
| | 15 | 203 | 35,3 | 5,74 | 199 | 38,4 | 5,18 | 195 | 41,3 | 4,73 | 191 | 45,6 | 4,18 | 186 | 50,2 | 3,70 | 180 | 55,4 | 3,26 | 176 | 60,5 | 2,91 |
| | 20 | 213 | 35,2 | 6,05 | 209 | 38,3 | 5,47 | 204 | 42,0 | 4,85 | 200 | 45,1 | 4,44 | 195 | 49,7 | 3,91 | 190 | 54,2 | 3,50 | 185 | 59,5 | 3,11 |
| | 25 | 231 | 35,3 | 6,55 | 227 | 37,6 | 6,04 | 221 | 41,0 | 5,39 | 216 | 44,8 | 4,82 | 210 | 48,8 | 4,30 | 204 | 53,5 | 3,81 | 198 | 58,5 | 3,39 |
| | 30 | 246 | 35,6 | 6,90 | 242 | 37,8 | 6,39 | 237 | 40,0 | 5,93 | 230 | 44,3 | 5,18 | 225 | 47,7 | 4,70 | 216 | 53,2 | 4,07 | 210 | 58,0 | 3,63 |
| 35 | 263 | 35,6 | 7,38 | 257 | 37,8 | 6,80 | 251 | 40,6 | 6,18 | 245 | 43,5 | 5,63 | 237 | 47,6 | 4,98 | 229 | 52,8 | 4,35 | 222 | 57,7 | 3,85 | |
| 04176 | -10 | 115 | 36,3 | 3,18 | 114 | 39,7 | 2,87 | 112 | 43,6 | 2,57 | - | - | - | - | - | - | - | - | - | - | - | |
| | -7 | 121 | 35,9 | 3,39 | 120 | 39,4 | 3,04 | 118 | 43,9 | 2,69 | 117 | 47,9 | 2,43 | - | - | - | - | - | - | - | - | |
| | -2 | 135 | 35,7 | 3,77 | 132 | 39,2 | 3,38 | 130 | 43,0 | 3,03 | 129 | 47,2 | 2,73 | 126 | 52,5 | 2,40 | 124 | 58,1 | 2,14 | - | - | - |
| | 2 | 147 | 35,6 | 4,12 | 148 | 38,7 | 3,81 | 149 | 43,4 | 3,44 | 152 | 48,7 | 3,11 | 154 | 55,2 | 2,78 | 153 | 60,9 | 2,51 | 151 | 67,6 | 2,23 |
| | 7 | 190 | 37,8 | 5,02 | 186 | 41,4 | 4,50 | 188 | 46,0 | 4,08 | 179 | 50,1 | 3,57 | 179 | 55,9 | 3,21 | 172 | 61,1 | 2,81 | 168 | 67,5 | 2,49 |
| | 12 | 216 | 38,1 | 5,68 | 212 | 41,2 | 5,16 | 207 | 45,7 | 4,54 | 203 | 50,1 | 4,05 | 198 | 55,2 | 3,59 | 194 | 60,7 | 3,19 | 189 | 67,1 | 2,81 |
| | 15 | 232 | 38,2 | 6,07 | 226 | 42,0 | 5,38 | 220 | 46,1 | 4,78 | 215 | 50,2 | 4,28 | 208 | 55,7 | 3,74 | 203 | 61,2 | 3,31 | 197 | 67,5 | 2,91 |
| | 20 | 243 | 37,6 | 6,47 | 238 | 41,0 | 5,80 | 233 | 44,3 | 5,25 | 226 | 49,4 | 4,58 | 220 | 54,1 | 4,07 | 215 | 59,4 | 3,61 | 209 | 65,6 | 3,18 |
| | 25 | 262 | 37,1 | 7,07 | 258 | 39,5 | 6,53 | 250 | 43,6 | 5,74 | 244 | 47,7 | 5,11 | 236 | 52,6 | 4,50 | 229 | 58,7 | 3,89 | 222 | 64,5 | 3,44 |
| | 30 | 278 | 37,2 | 7,49 | 273 | 39,9 | 6,84 | 267 | 42,6 | 6,27 | 259 | 47,2 | 5,49 | 251 | 51,9 | 4,85 | 243 | 57,5 | 4,22 | 235 | 63,8 | 3,68 |
| 35 | 290 | 38,4 | 7,56 | 285 | 41,1 | 6,94 | 280 | 43,6 | 6,43 | 276 | 46,1 | 5,98 | 265 | 51,8 | 5,12 | 257 | 57,1 | 4,50 | 248 | 63,3 | 3,92 | |
| 04199 | -10 | 127 | 39,9 | 3,17 | 125 | 43,9 | 2,84 | 124 | 48,3 | 2,56 | - | - | - | - | - | - | - | - | - | - | - | |
| | -7 | 135 | 39,9 | 3,38 | 133 | 43,8 | 3,04 | 131 | 48,2 | 2,73 | 130 | 53,0 | 2,44 | - | - | - | - | - | - | - | - | |
| | -2 | 150 | 39,5 | 3,81 | 148 | 43,3 | 3,41 | 145 | 47,7 | 3,04 | 143 | 52,4 | 2,72 | 140 | 58,0 | 2,42 | 138 | 64,1 | 2,15 | - | - | - |
| | 2 | 188 | 41,8 | 4,50 | 185 | 46,0 | 4,03 | 182 | 50,3 | 3,61 | 179 | 55,6 | 3,21 | 175 | 61,0 | 2,87 | 172 | 67,6 | 2,55 | 169 | 74,7 | 2,27 |
| | 7 | 215 | 42,0 | 5,12 | 211 | 46,3 | 4,57 | 207 | 50,7 | 4,09 | 203 | 55,8 | 3,63 | 198 | 61,5 | 3,22 | 194 | 67,4 | 2,88 | 190 | 74,9 | 2,54 |
| | 12 | 247 | 42,7 | 5,77 | 242 | 46,7 | 5,18 | 237 | 50,9 | 4,66 | 231 | 55,8 | 4,14 | 226 | 61,4 | 3,68 | 219 | 68,2 | 3,21 | 213 | 75,6 | 2,82 |
| | 15 | 254 | 42,8 | 5,93 | 249 | 46,9 | 5,30 | 243 | 51,4 | 4,73 | 237 | 56,3 | 4,21 | 232 | 61,5 | 3,77 | 226 | 67,8 | 3,33 | 220 | 74,6 | 2,94 |
| | 20 | 267 | 43,0 | 6,21 | 262 | 46,6 | 5,63 | 256 | 50,9 | 5,03 | 250 | 55,8 | 4,47 | 244 | 60,6 | 4,02 | 237 | 67,1 | 3,54 | 232 | 73,2 | 3,17 |
| | 25 | 289 | 42,4 | 6,82 | 284 | 45,4 | 6,26 | 278 | 49,4 | 5,62 | 271 | 53,6 | 5,05 | 263 | 59,4 | 4,43 | 255 | 65,3 | 3,91 | 248 | 72,0 | 3,44 |
| | 30 | 308 | 42,2 | 7,31 | 302 | 45,6 | 6,63 | 296 | 49,0 | 6,04 | 289 | 53,0 | 5,45 | 279 | 59,0 | 4,73 | 271 | 64,6 | 4,20 | 263 | 71,3 | 3,68 |
| 35 | 326 | 42,5 | 7,67 | 319 | 45,9 | 6,95 | 312 | 49,6 | 6,29 | 305 | 53,2 | 5,73 | 296 | 58,8 | 5,03 | 287 | 64,4 | 4,45 | 277 | 71,0 | 3,91 | |
| 04215 | -10 | 137 | 42,9 | 3,19 | 135 | 46,8 | 2,89 | 134 | 51,7 | 2,59 | - | - | - | - | - | - | - | - | - | - | - | |
| | -7 | 145 | 42,8 | 3,39 | 144 | 46,7 | 3,07 | 142 | 51,3 | 2,76 | 140 | 56,3 | 2,48 | - | - | - | - | - | - | - | - | |
| | -2 | 162 | 42,5 | 3,80 | 160 | 46,5 | 3,43 | 157 | 51,4 | 3,06 | 154 | 56,1 | 2,75 | 152 | 61,6 | 2,47 | 150 | 68,3 | 2,19 | - | - | - |
| | 2 | 192 | 44,1 | 4,36 | 195 | 48,7 | 4,00 | 194 | 53,5 | 3,62 | 193 | 59,3 | 3,25 | 189 | 65,1 | 2,90 | 186 | 71,9 | 2,58 | 183 | 79,1 | 2,31 |
| | 7 | 230 | 45,4 | 5,08 | 227 | 49,7 | 4,57 | 223 | 54,8 | 4,07 | 219 | 59,7 | 3,66 | 214 | 66,0 | 3,24 | 210 | 71,5 | 2,93 | 205 | 79,8 | 2,56 |
| | 12 | 265 | 46,2 | 5,73 | 260 | 50,5 | 5,15 | 255 | 55,0 | 4,63 | 249 | 60,5 | 4,12 | 243 | 66,1 | 3,68 | 237 | 72,8 | 3,26 | 231 | 79,8 | 2,89 |
| | 15 | 272 | 46,1 | 5,89 | 267 | 50,3 | 5,30 | 262 | 54,5 | 4,80 | 256 | 60,3 | 4,24 | 249 | 66,2 | 3,77 | 244 | 72,2 | 3,37 | 237 | 80,0 | 2,96 |
| | 20 | 286 | 46,5 | 6,16 | 281 | 50,6 | 5,55 | 276 | 55,3 | 4,98 | 270 | 60,4 | 4,47 | 263 | 66,0 | 3,98 | 256 | 72,3 | 3,55 | 250 | 79,2 | 3,15 |
| | 25 | 313 | 45,8 | 6,83 | 307 | 49,1 | 6,26 | 300 | 54,0 | 5,55 | 293 | 58,6 | 5,00 | 285 | 64,2 | 4,44 | 276 | 71,2 | 3,87 | 267 | 78,3 | 3,42 |
| | 30 | 334 | 45,3 | 7,39 | 328 | 49,0 | 6,68 | 321 | 52,8 | 6,08 | 312 | 58,5 | 5,33 | 303 | 64,0 | 4,74 | 294 | 70,3 | 4,18 | 284 | 77,6 | 3,66 |
| 35 | 358 | 44,7 | 8,00 | 349 | 48,5 | 7,19 | 340 | 53,2 | 6,39 | 331 | 57,8 | 5,72 | 321 | 63,8 | 5,02 | 311 | 69,9 | 4,45 | 301 | 76,9 | 3,91 | |

| Model HWA1-A/H | | HEATING | | | | | | | | | | | | | | | | | | | | |
|--------------------------|---------------------|-----------------------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|------|------|
| | | T air outdoor [°C] | Tout [°C] | | | | | | | | | | | | | | | | | | | |
| | | | 25 | | | 30 | | | 35 | | | 40 | | | 45 | | | 50 | | | 55 | |
| Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | Heating capacity [kW] | Power input [kW] | COP [W/W] | | |
| 04237 | -10 | 155 | 48,1 | 3,21 | 153 | 52,8 | 2,90 | 151 | 58,2 | 2,60 | - | - | - | - | - | - | - | - | - | - | - | |
| | -7 | 163 | 47,8 | 3,40 | 161 | 52,6 | 3,05 | 159 | 58,0 | 2,74 | 157 | 63,6 | 2,47 | - | - | - | - | - | - | - | - | |
| | -2 | 180 | 47,8 | 3,77 | 178 | 52,7 | 3,37 | 176 | 58,0 | 3,03 | 173 | 63,6 | 2,72 | 171 | 69,6 | 2,45 | 168 | 77,2 | 2,18 | - | - | - |
| | 2 | 196 | 47,7 | 4,10 | 195 | 52,8 | 3,70 | 194 | 57,3 | 3,39 | 198 | 64,5 | 3,06 | 201 | 71,7 | 2,80 | 204 | 80,2 | 2,54 | 203 | 89,3 | 2,28 |
| | 7 | 254 | 51,0 | 4,99 | 250 | 56,3 | 4,44 | 246 | 61,1 | 4,02 | 241 | 67,2 | 3,59 | 237 | 74,0 | 3,20 | 232 | 81,3 | 2,86 | 228 | 89,8 | 2,53 |
| | 12 | 291 | 51,6 | 5,63 | 285 | 56,9 | 5,02 | 281 | 62,2 | 4,51 | 274 | 67,8 | 4,05 | 268 | 74,9 | 3,58 | 261 | 82,4 | 3,17 | 256 | 89,8 | 2,85 |
| | 15 | 298 | 51,5 | 5,79 | 293 | 56,1 | 5,22 | 288 | 61,4 | 4,68 | 282 | 67,3 | 4,19 | 275 | 74,4 | 3,70 | 268 | 82,0 | 3,27 | 262 | 90,2 | 2,90 |
| | 20 | 313 | 52,1 | 6,01 | 308 | 56,9 | 5,41 | 302 | 62,3 | 4,85 | 296 | 68,0 | 4,35 | 290 | 74,6 | 3,88 | 283 | 82,3 | 3,44 | 275 | 90,5 | 3,04 |
| | 25 | 343 | 52,0 | 6,60 | 337 | 56,5 | 5,97 | 330 | 61,6 | 5,36 | 322 | 67,2 | 4,80 | 314 | 73,0 | 4,31 | 306 | 80,0 | 3,82 | 296 | 88,6 | 3,34 |
| | 30 | 376 | 50,5 | 7,45 | 364 | 55,6 | 6,55 | 352 | 60,7 | 5,80 | 343 | 66,4 | 5,17 | 334 | 72,8 | 4,59 | 325 | 79,6 | 4,08 | 315 | 87,5 | 3,60 |
| 35 | 392 | 50,1 | 7,82 | 383 | 55,2 | 6,94 | 374 | 60,3 | 6,20 | 365 | 65,5 | 5,58 | 355 | 71,8 | 4,95 | 344 | 78,8 | 4,36 | 332 | 87,4 | 3,80 | |
| 04273 | -10 | 174 | 54,7 | 3,18 | 172 | 60,1 | 2,86 | 170 | 66,0 | 2,58 | - | - | - | - | - | - | - | - | - | - | - | |
| | -7 | 185 | 54,6 | 3,39 | 183 | 59,9 | 3,05 | 180 | 65,7 | 2,74 | 178 | 72,4 | 2,46 | - | - | - | - | - | - | - | - | |
| | -2 | 206 | 54,4 | 3,78 | 203 | 59,3 | 3,42 | 199 | 65,5 | 3,04 | 196 | 71,7 | 2,73 | 192 | 79,2 | 2,43 | 189 | 87,3 | 2,17 | - | - | - |
| | 2 | 259 | 57,4 | 4,51 | 255 | 62,8 | 4,05 | 251 | 69,1 | 3,63 | 246 | 75,6 | 3,26 | 241 | 83,5 | 2,89 | 236 | 91,7 | 2,58 | 232 | 101 | 2,29 |
| | 7 | 296 | 58,3 | 5,08 | 291 | 63,5 | 4,59 | 286 | 69,2 | 4,13 | 280 | 75,8 | 3,69 | 273 | 83,8 | 3,26 | 267 | 91,6 | 2,91 | 260 | 102 | 2,55 |
| | 12 | 341 | 58,9 | 5,79 | 334 | 64,2 | 5,20 | 326 | 70,1 | 4,66 | 318 | 76,9 | 4,14 | 310 | 84,1 | 3,69 | 302 | 92,9 | 3,25 | 293 | 102 | 2,88 |
| | 15 | 349 | 59,1 | 5,89 | 341 | 64,1 | 5,32 | 335 | 69,1 | 4,84 | 326 | 75,9 | 4,29 | 317 | 83,2 | 3,81 | 308 | 91,1 | 3,38 | 298 | 100 | 2,98 |
| | 20 | 367 | 58,1 | 6,32 | 360 | 63,2 | 5,69 | 352 | 68,5 | 5,14 | 344 | 74,9 | 4,59 | 335 | 82,0 | 4,08 | 326 | 89,1 | 3,67 | 317 | 98,2 | 3,23 |
| | 25 | 399 | 57,3 | 6,96 | 391 | 61,5 | 6,36 | 381 | 67,2 | 5,67 | 371 | 73,0 | 5,08 | 360 | 80,2 | 4,49 | 349 | 88,1 | 3,96 | 339 | 96,6 | 3,51 |
| | 30 | 428 | 55,7 | 7,68 | 417 | 61,2 | 6,81 | 406 | 66,7 | 6,09 | 396 | 72,1 | 5,49 | 383 | 79,0 | 4,85 | 371 | 87,0 | 4,26 | 358 | 95,7 | 3,74 |
| 35 | 458 | 55,1 | 8,32 | 445 | 60,6 | 7,35 | 432 | 66,2 | 6,53 | 419 | 71,8 | 5,84 | 406 | 79,1 | 5,13 | 392 | 86,9 | 4,51 | 379 | 95,3 | 3,97 | |
| 04304 | -10 | 195 | 61,8 | 3,15 | 192 | 67,7 | 2,84 | 190 | 74,7 | 2,55 | - | - | - | - | - | - | - | - | - | - | - | |
| | -7 | 206 | 61,5 | 3,36 | 204 | 67,5 | 3,02 | 202 | 74,4 | 2,71 | 200 | 82,1 | 2,43 | - | - | - | - | - | - | - | - | |
| | -2 | 229 | 61,2 | 3,74 | 226 | 66,9 | 3,38 | 223 | 73,2 | 3,05 | 219 | 81,6 | 2,69 | 216 | 90,1 | 2,39 | 212 | 99,7 | 2,13 | - | - | - |
| | 2 | 282 | 64,0 | 4,41 | 282 | 70,8 | 3,98 | 278 | 77,8 | 3,57 | 273 | 85,7 | 3,18 | 268 | 94,2 | 2,85 | 264 | 105 | 2,52 | 259 | 116 | 2,23 |
| | 7 | 329 | 65,4 | 5,03 | 322 | 71,5 | 4,51 | 316 | 78,3 | 4,04 | 310 | 86,2 | 3,59 | 303 | 94,7 | 3,20 | 297 | 105 | 2,83 | 291 | 115 | 2,52 |
| | 12 | 377 | 66,9 | 5,64 | 371 | 72,5 | 5,11 | 362 | 79,1 | 4,57 | 353 | 86,5 | 4,08 | 344 | 95,7 | 3,59 | 335 | 105 | 3,18 | 326 | 116 | 2,80 |
| | 15 | 389 | 68,1 | 5,72 | 381 | 74,0 | 5,15 | 372 | 80,3 | 4,64 | 363 | 87,7 | 4,14 | 354 | 95,3 | 3,71 | 345 | 104 | 3,31 | 334 | 115 | 2,91 |
| | 20 | 411 | 67,6 | 6,09 | 402 | 73,2 | 5,49 | 394 | 78,6 | 5,02 | 384 | 86,0 | 4,47 | 376 | 93,1 | 4,03 | 365 | 102 | 3,57 | 356 | 112 | 3,18 |
| | 25 | 444 | 67,6 | 6,57 | 438 | 70,7 | 6,19 | 427 | 76,5 | 5,59 | 416 | 83,0 | 5,01 | 404 | 90,7 | 4,46 | 391 | 100 | 3,91 | 380 | 110 | 3,47 |
| | 30 | 476 | 67,9 | 7,02 | 466 | 71,6 | 6,51 | 456 | 75,3 | 6,05 | 444 | 81,5 | 5,44 | 429 | 90,0 | 4,77 | 416 | 98,8 | 4,20 | 403 | 108 | 3,73 |
| 35 | 508 | 68,2 | 7,44 | 495 | 71,9 | 6,89 | 483 | 76,6 | 6,30 | 470 | 81,4 | 5,78 | 454 | 89,8 | 5,06 | 440 | 98,2 | 4,48 | 426 | 108 | 3,96 | |
| 04345 | -10 | 223 | 69,3 | 3,21 | 221 | 76,3 | 2,90 | 219 | 85,1 | 2,58 | - | - | - | - | - | - | - | - | - | - | - | |
| | -7 | 235 | 69,0 | 3,40 | 233 | 76,2 | 3,05 | 231 | 84,6 | 2,73 | 229 | 93,7 | 2,44 | - | - | - | - | - | - | - | - | |
| | -2 | 260 | 68,4 | 3,80 | 257 | 75,8 | 3,40 | 254 | 82,8 | 3,07 | 251 | 92,9 | 2,70 | 248 | 103 | 2,41 | 245 | 114 | 2,14 | - | - | - |
| | 2 | 289 | 69,3 | 4,17 | 291 | 76,9 | 3,78 | 294 | 85,9 | 3,42 | 297 | 95,3 | 3,12 | 301 | 107 | 2,81 | 301 | 120 | 2,51 | 297 | 134 | 2,22 |
| | 7 | 367 | 73,4 | 5,00 | 363 | 80,5 | 4,51 | 356 | 88,5 | 4,02 | 351 | 97,8 | 3,58 | 344 | 108 | 3,20 | 337 | 121 | 2,80 | 331 | 134 | 2,47 |
| | 12 | 422 | 74,8 | 5,65 | 415 | 82,0 | 5,06 | 406 | 89,7 | 4,53 | 398 | 98,7 | 4,03 | 390 | 108 | 3,61 | 381 | 121 | 3,16 | 372 | 134 | 2,77 |
| | 15 | 433 | 74,8 | 5,79 | 425 | 81,6 | 5,21 | 418 | 88,9 | 4,70 | 408 | 98,7 | 4,13 | 400 | 108 | 3,69 | 390 | 121 | 3,23 | 381 | 133 | 2,86 |
| | 20 | 456 | 75,5 | 6,04 | 448 | 82,4 | 5,44 | 439 | 90,1 | 4,87 | 430 | 98,9 | 4,35 | 421 | 109 | 3,87 | 411 | 120 | 3,43 | 401 | 133 | 3,01 |
| | 25 | 498 | 77,6 | 6,41 | 491 | 81,0 | 6,07 | 480 | 88,2 | 5,44 | 467 | 97,3 | 4,80 | 456 | 107 | 4,27 | 443 | 118 | 3,77 | 431 | 130 | 3,31 |
| | 30 | 534 | 79,1 | 6,76 | 523 | 83,4 | 6,27 | 512 | 87,7 | 5,83 | 499 | 96,4 | 5,17 | 484 | 106 | 4,56 | 471 | 117 | 4,04 | 457 | 129 | 3,54 |
| 35 | 570 | 79,2 | 7,20 | 557 | 83,6 | 6,66 | 544 | 89,4 | 6,08 | 530 | 95,2 | 5,57 | 514 | 106 | 4,87 | 499 | 116 | 4,30 | 483 | 128 | 3,76 | |

9.2 COOLING

| Model HWA1-A/H | | COOLING | | | | | | | | | | | | | | | | | | |
|--------------------------|---------------------|-----------------------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|------|------|--|
| | | T air outdoor [°C] | Tout [°C] | | | | | | | | | | | | | | | | | |
| | | | 5 | | | 7 | | | 10 | | | 12 | | | 15 | | | 18 | | |
| Cooling capacity [kW] | Power input [kW] | EER [W/W] | Cooling capacity [kW] | Power input [kW] | EER [W/W] | Cooling capacity [kW] | Power input [kW] | EER [W/W] | Cooling capacity [kW] | Power input [kW] | EER [W/W] | Cooling capacity [kW] | Power input [kW] | EER [W/W] | Cooling capacity [kW] | Power input [kW] | EER [W/W] | | | |
| 02109 | 20 | 114 | 25,4 | 4,48 | 121 | 25,9 | 4,67 | 132 | 26,4 | 5,02 | 140 | 27,0 | 5,18 | 152 | 27,7 | 5,49 | 165 | 28,5 | 5,79 | |
| | 25 | 110 | 27,4 | 4,00 | 117 | 27,9 | 4,19 | 127 | 28,6 | 4,46 | 135 | 29,0 | 4,65 | 147 | 29,9 | 4,91 | 159 | 30,7 | 5,19 | |
| | 30 | 105 | 30,0 | 3,51 | 112 | 30,4 | 3,67 | 122 | 31,1 | 3,91 | 128 | 31,6 | 4,06 | 139 | 32,5 | 4,27 | 149 | 33,5 | 4,45 | |
| | 35 | 98,0 | 33,0 | 2,97 | 103 | 33,8 | 3,05 | 113 | 34,2 | 3,31 | 120 | 34,7 | 3,44 | 129 | 35,6 | 3,63 | 139 | 36,5 | 3,81 | |
| | 40 | 90,4 | 36,4 | 2,49 | 95,8 | 36,9 | 2,60 | 105 | 37,7 | 2,78 | 111 | 38,2 | 2,90 | 120 | 39,1 | 3,06 | 130 | 40,1 | 3,23 | |
| | 45 | 83,0 | 40,2 | 2,07 | 87,9 | 40,5 | 2,17 | 96,5 | 40,8 | 2,36 | - | - | - | - | - | - | - | - | - | |
| 02121 | 20 | 126 | 29,6 | 4,23 | 133 | 30,1 | 4,42 | 145 | 30,8 | 4,71 | 153 | 31,5 | 4,87 | 166 | 32,3 | 5,16 | 180 | 33,2 | 5,42 | |
| | 25 | 121 | 32,0 | 3,78 | 128 | 32,5 | 3,95 | 140 | 33,3 | 4,19 | 148 | 33,9 | 4,36 | 160 | 34,6 | 4,63 | 172 | 35,7 | 4,82 | |
| | 30 | 115 | 34,8 | 3,30 | 122 | 35,4 | 3,44 | 132 | 36,3 | 3,64 | 139 | 36,9 | 3,77 | 150 | 38,1 | 3,94 | 162 | 39,0 | 4,14 | |
| | 35 | 107 | 38,4 | 2,78 | 113 | 38,9 | 2,90 | 123 | 39,8 | 3,08 | 130 | 40,5 | 3,20 | 140 | 41,7 | 3,35 | 151 | 42,7 | 3,53 | |
| | 40 | 98,3 | 42,3 | 2,32 | 104 | 42,9 | 2,43 | 113 | 43,9 | 2,58 | 120 | 44,6 | 2,68 | 130 | 44,9 | 2,88 | 142 | 45,9 | 3,10 | |
| | 45 | 90,4 | 46,3 | 1,95 | 96,1 | 46,9 | 2,05 | 105 | 47,2 | 2,23 | - | - | - | - | - | - | - | - | - | |
| 02142 | 20 | 142 | 31,4 | 4,52 | 151 | 31,8 | 4,75 | 165 | 32,3 | 5,09 | 174 | 32,7 | 5,32 | 190 | 33,2 | 5,71 | 205 | 34,0 | 6,02 | |
| | 25 | 138 | 33,9 | 4,05 | 145 | 34,6 | 4,19 | 158 | 35,3 | 4,49 | 168 | 35,6 | 4,71 | 182 | 36,2 | 5,03 | 198 | 36,9 | 5,35 | |
| | 30 | 131 | 37,4 | 3,50 | 139 | 37,8 | 3,69 | 152 | 38,5 | 3,94 | 160 | 39,3 | 4,08 | 174 | 39,7 | 4,39 | 189 | 40,4 | 4,67 | |
| | 35 | 124 | 41,1 | 3,01 | 132 | 41,3 | 3,19 | 142 | 42,4 | 3,36 | 151 | 42,7 | 3,54 | 163 | 43,6 | 3,75 | 177 | 44,1 | 4,01 | |
| | 40 | 115 | 45,1 | 2,54 | 122 | 45,6 | 2,67 | 135 | 46,6 | 2,90 | 140 | 47,1 | 2,97 | 152 | 47,7 | 3,18 | 165 | 48,4 | 3,41 | |
| | 45 | 107 | 48,9 | 2,18 | 111 | 50,4 | 2,21 | 123 | 50,9 | 2,41 | - | - | - | - | - | - | - | - | - | |
| 02148 | 20 | 151 | 33,2 | 4,55 | 161 | 33,7 | 4,77 | 176 | 34,5 | 5,10 | 186 | 35,2 | 5,28 | 204 | 35,7 | 5,72 | 222 | 36,8 | 6,03 | |
| | 25 | 145 | 36,3 | 3,99 | 154 | 36,9 | 4,17 | 169 | 37,6 | 4,49 | 179 | 38,1 | 4,70 | 195 | 39,0 | 5,01 | 212 | 39,9 | 5,32 | |
| | 30 | 138 | 39,9 | 3,46 | 147 | 40,5 | 3,62 | 161 | 41,5 | 3,87 | 170 | 41,9 | 4,07 | 186 | 42,7 | 4,35 | 201 | 43,6 | 4,62 | |
| | 35 | 131 | 43,6 | 2,99 | 138 | 44,4 | 3,11 | 151 | 45,2 | 3,33 | 159 | 46,0 | 3,45 | 173 | 46,8 | 3,69 | 188 | 47,7 | 3,94 | |
| | 40 | 120 | 48,4 | 2,48 | 128 | 48,7 | 2,62 | 139 | 49,9 | 2,79 | 146 | 50,8 | 2,87 | 160 | 51,5 | 3,10 | 175 | 52,2 | 3,35 | |
| | 45 | 110 | 53,3 | 2,07 | 117 | 53,7 | 2,18 | 128 | 55,1 | 2,32 | - | - | - | - | - | - | - | - | - | |
| 02160 | 20 | 165 | 37,2 | 4,43 | 175 | 37,6 | 4,67 | 191 | 38,7 | 4,94 | 204 | 38,9 | 5,23 | 221 | 40,1 | 5,51 | 238 | 41,4 | 5,75 | |
| | 25 | 158 | 40,6 | 3,89 | 168 | 41,1 | 4,08 | 183 | 41,9 | 4,38 | 194 | 42,5 | 4,58 | 213 | 43,1 | 4,93 | 230 | 44,6 | 5,16 | |
| | 30 | 150 | 44,5 | 3,38 | 160 | 45,2 | 3,53 | 174 | 46,0 | 3,79 | 185 | 46,5 | 3,97 | 200 | 47,5 | 4,22 | 218 | 48,2 | 4,52 | |
| | 35 | 140 | 49,2 | 2,84 | 148 | 49,8 | 2,97 | 162 | 50,5 | 3,21 | 172 | 51,1 | 3,36 | 187 | 52,0 | 3,59 | 202 | 53,0 | 3,82 | |
| | 40 | 130 | 54,1 | 2,39 | 136 | 55,0 | 2,48 | 149 | 55,8 | 2,68 | 158 | 56,3 | 2,81 | 173 | 57,2 | 3,02 | 188 | 58,3 | 3,22 | |
| | 45 | 118 | 60,0 | 1,97 | 126 | 60,5 | 2,08 | 137 | 60,9 | 2,26 | - | - | - | - | - | - | - | - | - | |
| 04176 | 20 | 181 | 39,4 | 4,59 | 192 | 39,8 | 4,81 | 209 | 40,5 | 5,16 | 221 | 41,0 | 5,39 | 241 | 41,8 | 5,75 | 261 | 42,7 | 6,11 | |
| | 25 | 174 | 42,8 | 4,05 | 184 | 43,3 | 4,26 | 201 | 44,1 | 4,56 | 213 | 44,6 | 4,78 | 232 | 45,3 | 5,11 | 251 | 46,2 | 5,44 | |
| | 30 | 165 | 47,0 | 3,51 | 176 | 47,5 | 3,70 | 192 | 48,3 | 3,97 | 203 | 48,9 | 4,16 | 221 | 49,7 | 4,45 | 240 | 50,7 | 4,74 | |
| | 35 | 156 | 52,0 | 3,00 | 165 | 52,6 | 3,14 | 181 | 53,3 | 3,39 | 191 | 53,9 | 3,54 | 207 | 54,8 | 3,77 | 224 | 55,7 | 4,01 | |
| | 40 | 143 | 57,6 | 2,49 | 153 | 58,1 | 2,63 | 166 | 58,9 | 2,83 | 176 | 59,5 | 2,96 | 191 | 60,4 | 3,17 | 207 | 61,5 | 3,37 | |
| | 45 | 131 | 63,9 | 2,04 | 139 | 64,4 | 2,16 | 153 | 65,2 | 2,34 | - | - | - | - | - | - | - | - | - | |
| 04199 | 20 | 204 | 45,0 | 4,54 | 217 | 45,6 | 4,75 | 236 | 46,6 | 5,07 | 250 | 47,3 | 5,28 | 272 | 48,2 | 5,64 | 294 | 49,6 | 5,93 | |
| | 25 | 196 | 48,8 | 4,02 | 208 | 49,4 | 4,22 | 228 | 50,4 | 4,52 | 241 | 51,1 | 4,72 | 262 | 52,2 | 5,02 | 284 | 53,4 | 5,31 | |
| | 30 | 188 | 53,3 | 3,52 | 199 | 54,1 | 3,68 | 218 | 55,1 | 3,95 | 231 | 55,8 | 4,14 | 250 | 57,0 | 4,39 | 270 | 58,2 | 4,64 | |
| | 35 | 177 | 58,6 | 3,01 | 187 | 59,4 | 3,15 | 203 | 60,5 | 3,36 | 215 | 61,4 | 3,50 | 233 | 62,5 | 3,73 | 252 | 63,8 | 3,95 | |
| | 40 | 162 | 64,8 | 2,51 | 173 | 65,5 | 2,63 | 188 | 66,6 | 2,83 | 199 | 67,5 | 2,95 | 216 | 68,9 | 3,13 | 233 | 70,2 | 3,33 | |
| | 45 | 149 | 71,7 | 2,07 | 158 | 72,5 | 2,18 | 173 | 73,7 | 2,34 | - | - | - | - | - | - | - | - | - | |
| 04215 | 20 | 231 | 50,3 | 4,58 | 245 | 50,9 | 4,81 | 267 | 52,0 | 5,14 | 283 | 52,9 | 5,36 | 306 | 54,3 | 5,64 | 333 | 55,3 | 6,03 | |
| | 25 | 221 | 54,9 | 4,02 | 235 | 55,6 | 4,23 | 256 | 56,6 | 4,53 | 271 | 57,4 | 4,73 | 294 | 58,8 | 5,01 | 319 | 60,2 | 5,31 | |
| | 30 | 211 | 60,3 | 3,50 | 224 | 61,1 | 3,66 | 244 | 62,1 | 3,93 | 258 | 62,8 | 4,10 | 279 | 64,1 | 4,36 | 301 | 65,8 | 4,57 | |
| | 35 | 204 | 66,4 | 3,07 | 208 | 67,2 | 3,10 | 227 | 68,3 | 3,32 | 240 | 69,1 | 3,47 | 261 | 70,3 | 3,71 | 282 | 71,6 | 3,94 | |
| | 40 | 183 | 72,5 | 2,53 | 192 | 74,3 | 2,58 | 210 | 75,3 | 2,78 | 222 | 76,1 | 2,92 | 242 | 77,4 | 3,12 | 261 | 78,9 | 3,32 | |
| | 45 | 168 | 80,2 | 2,09 | 178 | 81,3 | 2,19 | 193 | 81,9 | 2,36 | - | - | - | - | - | - | - | - | - | |
| 04237 | 20 | 252 | 58,0 | 4,34 | 267 | 59,3 | 4,50 | 289 | 60,9 | 4,76 | 307 | 61,3 | 5,00 | 331 | 63,3 | 5,23 | 356 | 64,8 | 5,50 | |
| | 25 | 241 | 63,5 | 3,79 | 255 | 64,3 | 3,97 | 278 | 65,5 | 4,25 | 296 | 65,7 | 4,50 | 320 | 67,6 | 4,74 | 347 | 68,8 | 5,04 | |
| | 30 | 228 | 69,6 | 3,28 | 242 | 70,4 | 3,44 | 263 | 71,7 | 3,67 | 278 | 72,6 | 3,83 | 302 | 73,7 | 4,10 | 319 | 76,0 | 4,20 | |
| | 35 | 212 | 76,7 | 2,76 | 225 | 77,5 | 2,90 | 245 | 78,8 | 3,10 | 258 | 79,8 | 3,24 | 278 | 81,8 | 3,40 | 301 | 83,2 | 3,62 | |
| | 40 | 195 | 84,8 | 2,30 | 207 | 85,6 | 2,42 | 226 | 86,9 | 2,60 | 239 | 88,0 | 2,71 | 258 | 90,1 | 2,86 | 279 | 91,9 | 3,04 | |
| | 45 | 179 | 92,3 | 1,94 | 190 | 92,9 | 2,05 | 208 | 93,5 | 2,23 | - | - | - | - | - | - | - | - | - | |

| COOLING | | | | | | | | | | | | | | | | | | | |
|-------------------|-----------------------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|--------------------------|---------------------|-----------|
| Model HWA1-A\H | T air outdoor [°C] | Tout [°C] | | | | | | | | | | | | | | | | | |
| | | 5 | | | 7 | | | 10 | | | 12 | | | 15 | | | 18 | | |
| | | Cooling capacity [kW] | Power input [kW] | EER [W/W] | Cooling capacity [kW] | Power input [kW] | EER [W/W] | Cooling capacity [kW] | Power input [kW] | EER [W/W] | Cooling capacity [kW] | Power input [kW] | EER [W/W] | Cooling capacity [kW] | Power input [kW] | EER [W/W] | Cooling capacity [kW] | Power input [kW] | EER [W/W] |
| 04273 | 20 | 286 | 59,9 | 4,78 | 303 | 61,2 | 4,95 | 331 | 62,4 | 5,31 | 351 | 63,1 | 5,56 | 382 | 64,9 | 5,89 | 414 | 67,7 | 6,11 |
| | 25 | 274 | 65,8 | 4,16 | 291 | 66,5 | 4,39 | 319 | 68,2 | 4,67 | 337 | 69,1 | 4,89 | 368 | 71,1 | 5,17 | 402 | 71,7 | 5,61 |
| | 30 | 262 | 72,4 | 3,62 | 278 | 73,5 | 3,78 | 305 | 74,1 | 4,11 | 321 | 75,8 | 4,23 | 349 | 77,3 | 4,51 | 378 | 78,8 | 4,79 |
| | 35 | 245 | 79,6 | 3,08 | 260 | 80,6 | 3,22 | 284 | 81,7 | 3,48 | 300 | 82,8 | 3,63 | 329 | 83,8 | 3,93 | 351 | 87,0 | 4,04 |
| | 40 | 229 | 86,6 | 2,64 | 241 | 88,4 | 2,73 | 263 | 90,1 | 2,92 | 278 | 91,3 | 3,05 | 303 | 92,8 | 3,27 | 329 | 94,4 | 3,48 |
| | 45 | 208 | 96,9 | 2,15 | 221 | 97,9 | 2,25 | 242 | 98,9 | 2,44 | - | - | - | - | - | - | - | - | - |
| 04304 | 20 | 322 | 69,6 | 4,62 | 341 | 71,5 | 4,76 | 371 | 72,5 | 5,12 | 393 | 73,6 | 5,34 | 427 | 75,5 | 5,66 | 463 | 78,0 | 5,93 |
| | 25 | 308 | 75,8 | 4,06 | 327 | 77,0 | 4,24 | 357 | 78,9 | 4,52 | 378 | 80,1 | 4,72 | 409 | 82,3 | 4,97 | 439 | 85,5 | 5,13 |
| | 30 | 295 | 82,4 | 3,58 | 311 | 84,0 | 3,70 | 337 | 86,6 | 3,90 | 357 | 87,1 | 4,10 | 385 | 89,6 | 4,30 | 414 | 92,6 | 4,47 |
| | 35 | 273 | 91,8 | 2,97 | 289 | 92,9 | 3,10 | 319 | 95,0 | 3,36 | 337 | 96,4 | 3,49 | 363 | 98,9 | 3,67 | 388 | 101 | 3,86 |
| | 40 | 251 | 102 | 2,47 | 267 | 102 | 2,60 | 293 | 103 | 2,83 | 307 | 106 | 2,91 | 332 | 108 | 3,07 | 360 | 110 | 3,27 |
| | 45 | 230 | 112 | 2,06 | 244 | 113 | 2,17 | 267 | 113 | 2,35 | - | - | - | - | - | - | - | - | - |
| 04345 | 20 | 360 | 84,1 | 4,28 | 382 | 85,6 | 4,46 | 415 | 87,8 | 4,73 | 440 | 88,8 | 4,96 | 474 | 92,8 | 5,10 | 513 | 94,6 | 5,43 |
| | 25 | 346 | 91,1 | 3,80 | 369 | 91,7 | 4,03 | 400 | 94,3 | 4,25 | 425 | 95,3 | 4,45 | 461 | 97,5 | 4,73 | 498 | 101 | 4,95 |
| | 30 | 330 | 99,9 | 3,30 | 350 | 101 | 3,46 | 381 | 103 | 3,69 | 399 | 106 | 3,78 | 435 | 107 | 4,07 | 472 | 109 | 4,32 |
| | 35 | 306 | 111 | 2,76 | 325 | 112 | 2,90 | 353 | 114 | 3,09 | 373 | 116 | 3,22 | 404 | 118 | 3,42 | 434 | 122 | 3,56 |
| | 40 | 282 | 123 | 2,30 | 299 | 124 | 2,40 | 326 | 126 | 2,58 | 344 | 128 | 2,68 | 373 | 131 | 2,84 | 405 | 132 | 3,06 |
| | 45 | 259 | 135 | 1,92 | 275 | 136 | 2,02 | 300 | 138 | 2,17 | - | - | - | - | - | - | - | - | - |

9.3 DATA FOR THE ENERGY CERTIFICATION OF BUILDINGS ACCORDING TO UNI/TS 11300-4 FOR HEAT PUMPS

Supplementary data on heat pumps for calculating the energy performance of buildings are given, according to UNI/TS 11300 part 4. The following are the characteristic quantities that will be provided for each model, according to schedule 31 of the standard.

| | | A T_{bival} | B | C | D |
|---|--|----------------------|-------------------------------|-------------------------------|-------------------------------|
| Reference temperatures | -10°C | -7°C | 2°C | 7°C | 12°C |
| PLR ($T_{des} = -10^{\circ}\text{C}$) | 100% | 88% | 54% | 35% | 15% |
| DC power at full load | | $DC_A = DC_{bival}$ | DCB | DCC | DCD |
| COP at partial load | | COPA | COPB | COPc | COPD |
| COP at full load | | COP'A | COP'B | COP'c | COP'D |
| CR | >1 | 1 | $(0,54 \times P_{des}) / DCB$ | $(0,35 \times P_{des}) / DCC$ | $(0,15 \times P_{des}) / DCD$ |
| Corrective factor Fp | 1 | 1 | COPB/COP'B | COPc/COP'c | COPD/COP'D |
| PLR | part load ratio or climatic load factor | | | | |
| CR | heat pump load factor | | | | |
| DC | full load power at specified temperatures | | | | |
| DC_{bival} | full load power at -7/35°C | | | | |
| P_{design} | at full load with climate A | | | | |
| COP | COP at CR load at same temperature conditions as COP' | | | | |
| COP' | COP at full load at the same temperature conditions as COP | | | | |

9.3.1 Model HWA1-A/H 02109

Operating limits

| COLD source: | | EXTERNAL AIR | |
|------------------------------------|--|---------------------|-------|
| Temperature of operation (cut-off) | | min | -10°C |
| | | max | 36°C |
| HOT source | | WATER | |
| Temperature of operation (cut-off) | | min | 25°C |
| | | max | 58°C |

Yield data measured under partial load conditions, according to UNI/TS 11300-4

| | A T_{bival} | B | C | D |
|---|----------------------|----------|----------|----------|
| Reference temperatures | -7°C | 2°C | 7°C | 12°C |
| PLR ($T_{des} = -10^{\circ}\text{C}$) | 88% | 54% | 35% | 15% |
| DC power at full load | 71,5 | 98,8 | 113 | 129 |
| COP at partial load | 2,76 | 3,58 | 3,74 | 3,33 |
| COP at full load | 2,79 | 3,64 | 4,09 | 4,64 |
| CR | 1 | 0,44 | 0,25 | 0,10 |
| Corrective factor Fp | 1 | 0,97 | 0,91 | 0,70 |

9.3.2 Model HWA1-A/H 02121

Operating limits

| COLD source | | EXTERNAL AIR | |
|------------------------------------|--|---------------------|-------|
| Temperature of operation (cut-off) | | min | -10°C |
| | | max | 36°C |
| HOT source | | WATER | |
| Temperature of operation (cut-off) | | min | 25°C |
| | | max | 58°C |

Yield data measured under partial load conditions, according to UNI/TS 11300-4

| | A T_{bival} | B | C | D |
|---|----------------------|----------|----------|----------|
| Reference temperatures | -7°C | 2°C | 7°C | 12°C |
| PLR ($T_{des} = -10^{\circ}\text{C}$) | 88% | 54% | 35% | 15% |

| | A T_{bival} | B | C | D |
|-----------------------|----------------------|----------|----------|----------|
| DC power at full load | 80,3 | 104 | 125 | 142 |
| COP at partial load | 2,72 | 3,61 | 3,80 | 3,45 |
| COP at full load | 2,73 | 3,41 | 4,05 | 4,54 |
| CR | 1 | 0,48 | 0,25 | 0,10 |
| Corrective factor Fp | 1 | 1,06 | 0,94 | 0,75 |

9.3.3 Model HWA1-A/H 02142

Operating limits

| COLD source | | EXTERNAL AIR | |
|------------------------------------|--|---------------------|-------|
| Temperature of operation (cut-off) | | min | -10°C |
| | | max | 36°C |
| HOT source | | WATER | |
| Temperature of operation (cut-off) | | min | 25°C |
| | | max | 58°C |

Yield data measured under partial load conditions, according to UNI/TS 11300-4

| | A T_{bival} | B | C | D |
|------------------------|----------------------|----------|----------|----------|
| Reference temperatures | -7°C | 2°C | 7°C | 12°C |
| PLR (T des = -10°C) | 88% | 54% | 35% | 15% |
| DC power at full load | 93,6 | 130 | 148 | 168 |
| COP at partial load | 2,76 | 3,43 | 3,58 | 3,26 |
| COP at full load | 2,71 | 3,58 | 4,04 | 4,53 |
| CR | 1 | 0,44 | 0,25 | 0,10 |
| Corrective factor Fp | 1 | 0,96 | 0,88 | 0,70 |

9.3.4 Model HWA1-A/H 02148

Operating limits

| COLD source | | EXTERNAL AIR | |
|------------------------------------|--|---------------------|-------|
| Temperature of operation (cut-off) | | min | -10°C |
| | | max | 36°C |
| HOT source | | WATER | |
| Temperature of operation (cut-off) | | min | 25°C |
| | | max | 58°C |

Yield data measured under partial load conditions, according to UNI/TS 11300-4

| | A T_{bival} | B | C | D |
|------------------------|----------------------|----------|----------|----------|
| Reference temperatures | -7°C | 2°C | 7°C | 12°C |
| PLR (T des = -10°C) | 88% | 54% | 35% | 15% |
| DC power at full load | 97,6 | 136 | 154 | 176 |
| COP at partial load | 2,72 | 3,42 | 3,68 | 3,63 |
| COP at full load | 2,74 | 3,60 | 4,08 | 4,56 |
| CR | 1 | 0,44 | 0,25 | 0,10 |
| Corrective factor Fp | 1 | 0,94 | 0,90 | 0,78 |

9.3.5 Model HWA1-A/H 02160

Operating limits

| COLD source | | EXTERNAL AIR | |
|------------------------------------|--|--------------|-------|
| Temperature of operation (cut-off) | | min | -10°C |
| | | max | 36°C |
| HOT source | | WATER | |
| Temperature of operation (cut-off) | | min | 25°C |
| | | max | 58°C |

Yield data measured under partial load conditions, according to UNI/TS 11300-4

| | A T _{bival} | B | C | D |
|------------------------|----------------------|------|------|------|
| Reference temperatures | -7°C | 2°C | 7°C | 12°C |
| PLR (T des = -10°C) | 88% | 54% | 35% | 15% |
| DC power at full load | 106 | 146 | 166 | 189 |
| COP at partial load | 2,71 | 3,54 | 3,69 | 3,44 |
| COP at full load | 2,73 | 3,57 | 4,01 | 4,51 |
| CR | 1 | 0,44 | 0,25 | 0,10 |
| Corrective factor Fp | 1 | 0,99 | 0,92 | 0,75 |

9.3.6 Model HWA1-A/H 04176

Operating limits

| COLD source | | EXTERNAL AIR | |
|------------------------------------|--|--------------|-------|
| Temperature of operation (cut-off) | | min | -10°C |
| | | max | 36°C |
| HOT source | | WATER | |
| Temperature of operation (cut-off) | | min | 25°C |
| | | max | 58°C |

Yield data measured under partial load conditions, according to UNI/TS 11300-4

| | A T _{bival} | B | C | D |
|-----------------------|----------------------|------|------|------|
| Reference temperature | -7°C | 2°C | 7°C | 12°C |
| PLR (T des = -10°C) | 88% | 54% | 35% | 15% |
| DC power at full load | 118 | 149 | 188 | 207 |
| COP at partial load | 2,68 | 3,49 | 3,86 | 3,98 |
| COP at full load | 2,69 | 3,44 | 4,08 | 4,54 |
| CR | 1 | 0,44 | 0,25 | 0,10 |
| Corrective factor Fp | 1 | 0,97 | 0,94 | 0,85 |

9.3.7 Model HWA1-A/H 04199

Operating limits

| COLD source | | EXTERNAL AIR | |
|------------------------------------|--|--------------|-------|
| Temperature of operation (cut-off) | | min | -10°C |
| | | max | 36°C |
| HOT source | | WATER | |
| Temperature of operation (cut-off) | | min | 25°C |
| | | max | 58°C |

Yield data measured under partial load conditions, according to UNI/TS 11300-4

| | A T _{bival} | B | C | D |
|------------------------|----------------------|-----|-----|------|
| Reference temperatures | -7°C | 2°C | 7°C | 12°C |
| PLR (T des = -10°C) | 88% | 54% | 35% | 15% |

| | A T_{bival} | B | C | D |
|-----------------------|----------------------|----------|----------|----------|
| DC power at full load | 131 | 182 | 207 | 237 |
| COP at partial load | 2,70 | 3,47 | 3,85 | 4,03 |
| COP at full load | 2,73 | 3,61 | 4,09 | 4,66 |
| CR | 1 | 0,44 | 0,25 | 0,10 |
| Corrective factor Fp | 1 | 0,97 | 0,94 | 0,87 |

9.3.8 Model HWA1-A/H 04215

Operating limits

| COLD source | | EXTERNAL AIR | |
|------------------------------------|--|---------------------|-------|
| Temperature of operation (cut-off) | | min | -10°C |
| | | max | 36°C |
| HOT source | | WATER | |
| Temperature of operation (cut-off) | | min | 25°C |
| | | max | 58°C |

Yield data measured under partial load conditions, according to UNI/TS 11300-4

| | A T_{bival} | B | C | D |
|------------------------|----------------------|----------|----------|----------|
| Reference temperatures | -7°C | 2°C | 7°C | 12°C |
| PLR (T des = -10°C) | 88% | 54% | 35% | 15% |
| DC power at full load | 142 | 194 | 223 | 255 |
| COP at partial load | 2,74 | 3,64 | 3,99 | 4,00 |
| COP at full load | 2,76 | 3,62 | 4,07 | 4,63 |
| CR | 1 | 0,45 | 0,25 | 0,10 |
| Corrective factor Fp | 1 | 1,01 | 0,97 | 0,85 |

9.3.9 Model HWA1-A/H 04237

Operating limits

| COLD source | | EXTERNAL AIR | |
|------------------------------------|--|---------------------|-------|
| Temperature of operation (cut-off) | | min | -10°C |
| | | max | 36°C |
| HOT source | | WATER | |
| Temperature of operation (cut-off) | | min | 25°C |
| | | max | 58°C |

Yield data measured under partial load conditions, according to UNI/TS 11300-4

| | A T_{bival} | B | C | D |
|------------------------|----------------------|----------|----------|----------|
| Reference temperatures | -7°C | 2°C | 7°C | 12°C |
| PLR (T des = -10°C) | 88% | 54% | 35% | 15% |
| DC power at full load | 159 | 194 | 246 | 281 |
| COP at partial load | 2,76 | 3,68 | 4,07 | 4,09 |
| COP at full load | 2,74 | 3,39 | 4,02 | 4,51 |
| CR | 1 | 0,50 | 0,25 | 0,10 |
| Corrective factor Fp | 1 | 1,11 | 1,01 | 0,90 |

9.3.10 Model HWA1-A/H 04273

Operating limits

| COLD source | | EXTERNAL AIR | |
|------------------------------------|--|--------------|-------|
| Temperature of operation (cut-off) | | min | -10°C |
| | | max | 36°C |
| HOT source | | WATER | |
| Temperature of operation (cut-off) | | min | 25°C |
| | | max | 58°C |

Yield data measured under partial load conditions, according to UNI/TS 11300-4

| | A T _{bival} | B | C | D |
|------------------------|----------------------|------|------|------|
| Reference temperatures | -7°C | 2°C | 7°C | 12°C |
| PLR (T des = -10°C) | 88% | 54% | 35% | 15% |
| DC power at full load | 180 | 251 | 286 | 326 |
| COP at partial load | 2,75 | 3,48 | 3,72 | 3,93 |
| COP at full load | 2,74 | 3,63 | 4,13 | 4,66 |
| CR | 1 | 0,44 | 0,25 | 0,10 |
| Corrective factor Fp | 1 | 0,96 | 0,90 | 0,84 |

9.3.11 Model HWA1-A/H 04304

Operating limits

| COLD source | | EXTERNAL AIR | |
|------------------------------------|--|--------------|-------|
| Temperature of operation (cut-off) | | min | -10°C |
| | | max | 36°C |
| HOT source | | WATER | |
| Temperature of operation (cut-off) | | min | 25°C |
| | | max | 58°C |

Yield data measured under partial load conditions, according to UNI/TS 11300-4

| | A T _{bival} | B | C | D |
|------------------------|----------------------|------|------|------|
| Reference temperatures | -7°C | 2°C | 7°C | 12°C |
| PLR (T des = -10°C) | 88% | 54% | 35% | 15% |
| DC power at full load | 202 | 278 | 316 | 362 |
| COP at partial load | 2,69 | 3,55 | 3,84 | 3,78 |
| COP at full load | 2,71 | 3,57 | 4,04 | 4,57 |
| CR | 1 | 0,44 | 0,25 | 0,10 |
| Corrective factor Fp | 1 | 0,99 | 0,95 | 0,82 |

9.3.12 Model HWA1-A/H 04345

Operating limits

| COLD source | | EXTERNAL AIR | |
|------------------------------------|--|--------------|-------|
| Temperature of operation (cut-off) | | min | -10°C |
| | | max | 36°C |
| HOT source | | WATER | |
| Temperature of operation (cut-off) | | min | 25°C |
| | | max | 58°C |

Yield data measured under partial load conditions, according to UNI/TS 11300-4

| | A T _{bival} | B | C | D |
|------------------------|----------------------|-----|-----|------|
| Reference temperatures | -7°C | 2°C | 7°C | 12°C |
| PLR (T des = -10°C) | 88% | 54% | 35% | 15% |

| | A T_{bival} | B | C | D |
|-----------------------|-----------------------------|----------|----------|----------|
| DC power at full load | 231 | 294 | 356 | 406 |
| COP at partial load | 2,73 | 3,65 | 4,09 | 4,34 |
| COP at full load | 2,73 | 3,42 | 4,02 | 4,53 |
| CR | 1 | 0,48 | 0,25 | 0,10 |
| Corrective factor Fp | 1 | 1,07 | 1,01 | 0,95 |

9.4 EER VALUES FOR THE CALCULATION OF ENERGY PERFORMANCE OF BUILDINGS ACCORDING TO UNI/TS 11300-3

The cooling capacity values and EER coefficients under partial load conditions are shown. The reference conditions at partial load specified by the UNI/TS 11300-3 standard are illustrated below. EER are also provide for load factors below 25%.

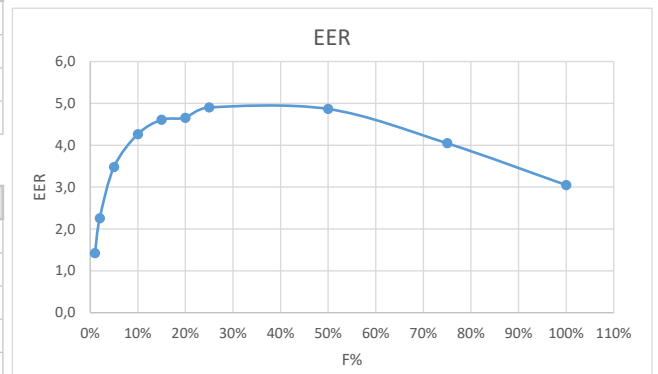
| Test | Load factor | Dry bulb outdoor temperature | Chilled water temperature at fan inlet/outlet |
|------|-------------|------------------------------|---|
| 1 | 100% | 35 | 12/7 |
| 2 | 75% | 30 | *)/7 |
| 3 | 50% | 25 | *)/7 |
| 4 | 25% | 20 | *)/7 |

*) temperature determined by water flow rate at full load.

9.4.1 Model HWA1-A/H 02109

| Outside air dry bulb temperature [°C] | Lod factor F% | EER |
|---------------------------------------|---------------|------|
| 35 | 100% | 3,05 |
| 30 | 75% | 4,05 |
| 25 | 50% | 4,87 |
| 20 | 25% | 4,90 |

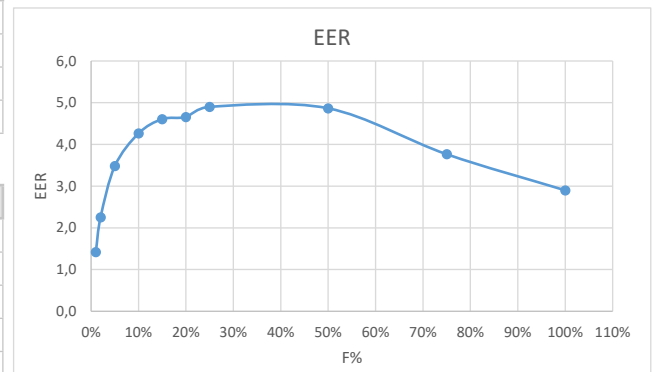
| C | Load factor F% | EER @20°C xC |
|------|----------------|--------------|
| 0,95 | 20% | 4,66 |
| 0,94 | 15% | 4,61 |
| 0,87 | 10% | 4,26 |
| 0,71 | 5% | 3,48 |
| 0,46 | 2% | 2,25 |
| 0,29 | 1% | 1,42 |



9.4.2 Model HWA1-A/H 02121

| Outside air dry bulb temperature [°C] | Load factor F% | EER |
|---------------------------------------|----------------|------|
| 35 | 100% | 2,90 |
| 30 | 75% | 3,77 |
| 25 | 50% | 4,87 |
| 20 | 25% | 4,90 |

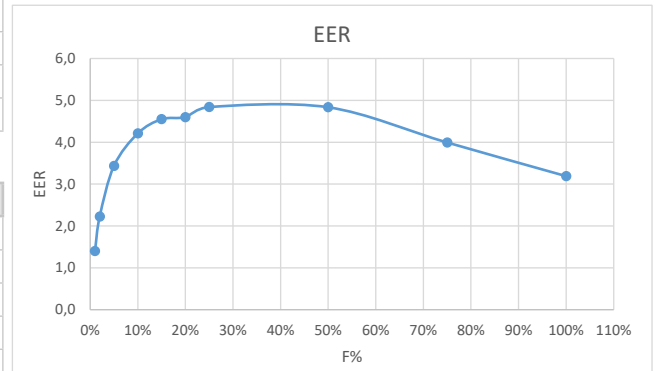
| C | Load factor F% | EER @20°C xC |
|------|----------------|--------------|
| 0,95 | 20% | 4,66 |
| 0,94 | 15% | 4,61 |
| 0,87 | 10% | 4,26 |
| 0,71 | 5% | 3,48 |
| 0,46 | 2% | 2,25 |
| 0,29 | 1% | 1,42 |



9.4.3 Model HWA1-A/H 02142

| Outside air dry bulb temperature [°C] | Load factor F% | EER |
|---------------------------------------|----------------|------|
| 35 | 100% | 3,19 |
| 30 | 75% | 3,99 |
| 25 | 50% | 4,84 |
| 20 | 25% | 4,84 |

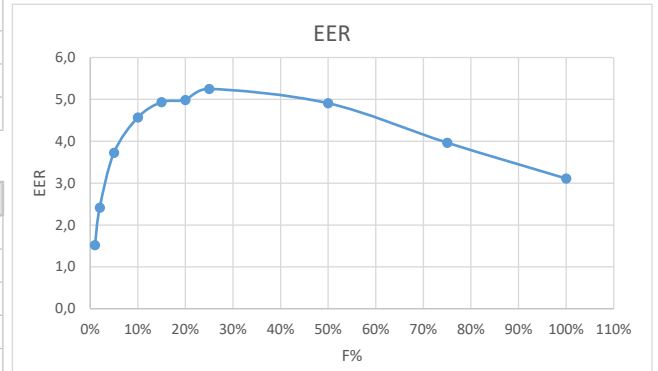
| C | Load factor F% | EER @20°C xC |
|------|----------------|--------------|
| 0,95 | 20% | 4,60 |
| 0,94 | 15% | 4,55 |
| 0,87 | 10% | 4,21 |
| 0,71 | 5% | 3,44 |
| 0,46 | 2% | 2,23 |
| 0,29 | 1% | 1,40 |



9.4.4 Model HWA1-A/H 02148

| Outside air dry bulb temperature [°C] | Load factor F% | EER |
|---------------------------------------|----------------|------|
| 35 | 100% | 3,11 |
| 30 | 75% | 3,97 |
| 25 | 50% | 4,91 |
| 20 | 25% | 5,25 |

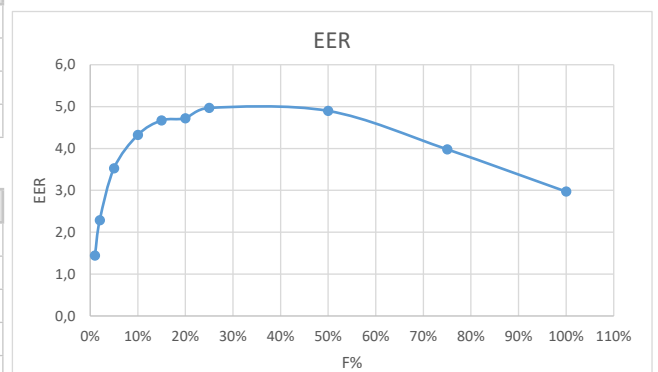
| C | Load factor F% | EER @20°C xC |
|------|----------------|--------------|
| 0,95 | 20% | 4,99 |
| 0,94 | 15% | 4,94 |
| 0,87 | 10% | 4,57 |
| 0,71 | 5% | 3,73 |
| 0,46 | 2% | 2,42 |
| 0,29 | 1% | 1,52 |



9.4.5 Model HWA1-A/H 02160

| Outside air dry bulb temperature [°C] | Load factor F% | EER |
|---------------------------------------|----------------|------|
| 35 | 100% | 2,97 |
| 30 | 75% | 3,98 |
| 25 | 50% | 4,90 |
| 20 | 25% | 4,97 |

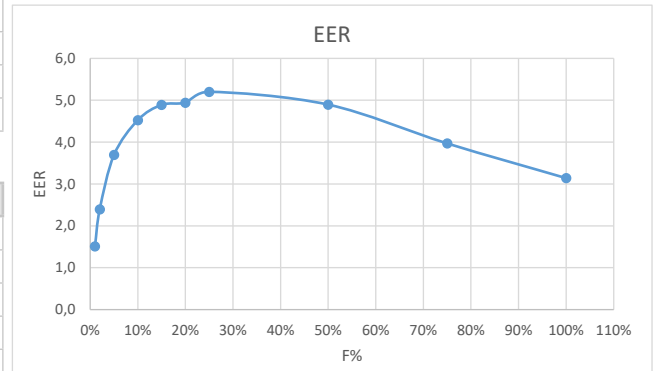
| C | Load factor F% | EER @20°C xC |
|------|----------------|--------------|
| 0,95 | 20% | 4,72 |
| 0,94 | 15% | 4,67 |
| 0,87 | 10% | 4,32 |
| 0,71 | 5% | 3,53 |
| 0,46 | 2% | 2,29 |
| 0,29 | 1% | 1,44 |



9.4.6 Model HWA1-A/H 04176

| Outside air dry bulb temperature [°C] | Load factor F% | EER |
|---------------------------------------|----------------|------|
| 35 | 100% | 3,14 |
| 30 | 75% | 3,97 |
| 25 | 50% | 4,90 |
| 20 | 25% | 5,20 |

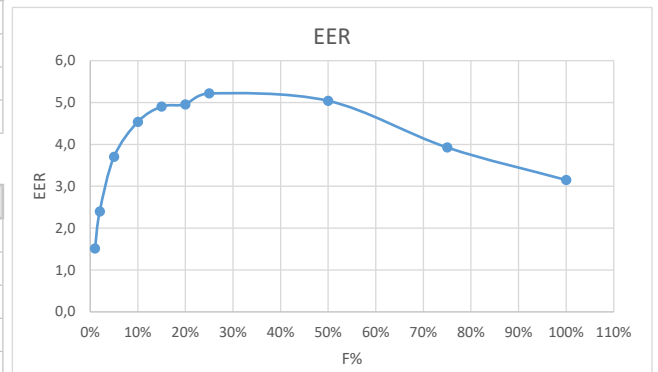
| C | Load factor F% | EER @20°C xC |
|------|----------------|--------------|
| 0,95 | 20% | 4,94 |
| 0,94 | 15% | 4,89 |
| 0,87 | 10% | 4,53 |
| 0,71 | 5% | 3,69 |
| 0,46 | 2% | 2,39 |
| 0,29 | 1% | 1,51 |



9.4.7 Model HWA1-A/H 04199

| Outside air dry bulb temperature [°C] | Load factor F% | EER |
|---------------------------------------|----------------|------|
| 35 | 100% | 3,15 |
| 30 | 75% | 3,93 |
| 25 | 50% | 5,04 |
| 20 | 25% | 5,22 |

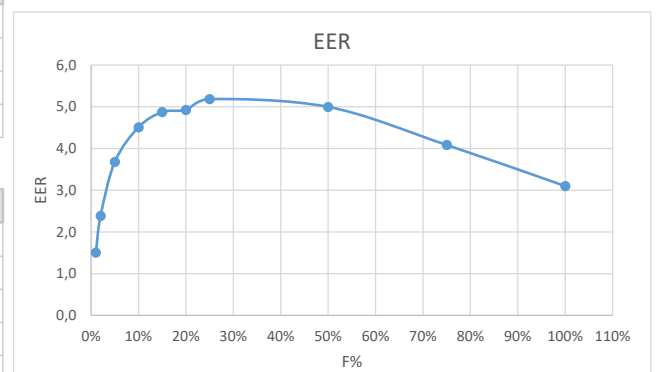
| C | Load factor F% | EER @20°C xC |
|------|----------------|--------------|
| 0,95 | 20% | 4,96 |
| 0,94 | 15% | 4,90 |
| 0,87 | 10% | 4,54 |
| 0,71 | 5% | 3,70 |
| 0,46 | 2% | 2,40 |
| 0,29 | 1% | 1,51 |



9.4.8 Model HWA1-A/H 04215

| Outside air dry bulb temperature [°C] | Load factor F% | EER |
|---------------------------------------|----------------|------|
| 35 | 100% | 3,10 |
| 30 | 75% | 4,09 |
| 25 | 50% | 5,00 |
| 20 | 25% | 5,18 |

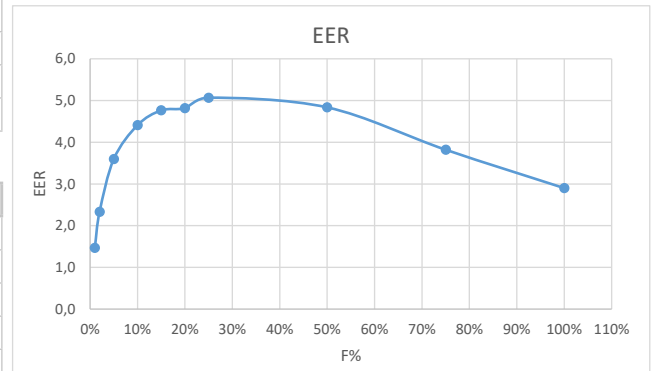
| C | Load factor F% | EER @20°C xC |
|------|----------------|--------------|
| 0,95 | 20% | 4,92 |
| 0,94 | 15% | 4,87 |
| 0,87 | 10% | 4,51 |
| 0,71 | 5% | 3,68 |
| 0,46 | 2% | 2,38 |
| 0,29 | 1% | 1,50 |



9.4.9 Model HWA1-A/H 04237

| Outside air dry bulb temperature [°C] | Load factor F% | EER |
|---------------------------------------|----------------|------|
| 35 | 100% | 2,90 |
| 30 | 75% | 3,82 |
| 25 | 50% | 4,84 |
| 20 | 25% | 5,07 |

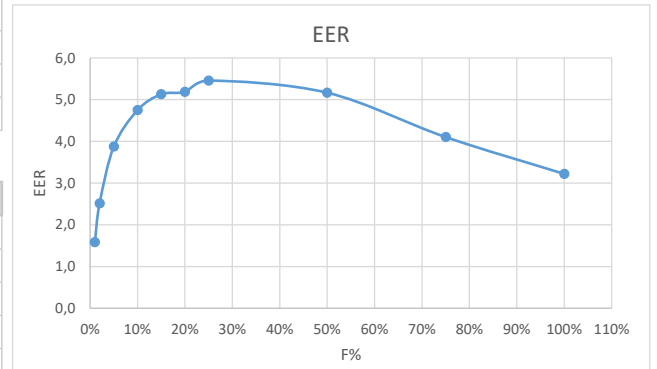
| C | Load factor F% | EER @20°C xC |
|------|----------------|--------------|
| 0,95 | 20% | 4,81 |
| 0,94 | 15% | 4,76 |
| 0,87 | 10% | 4,41 |
| 0,71 | 5% | 3,60 |
| 0,46 | 2% | 2,33 |
| 0,29 | 1% | 1,47 |



9.4.10 Model HWA1-A/H 04273

| Outside air dry bulb temperature [°C] | Load factor F% | EER |
|---------------------------------------|----------------|------|
| 35 | 100% | 3,22 |
| 30 | 75% | 4,10 |
| 25 | 50% | 5,17 |
| 20 | 25% | 5,46 |

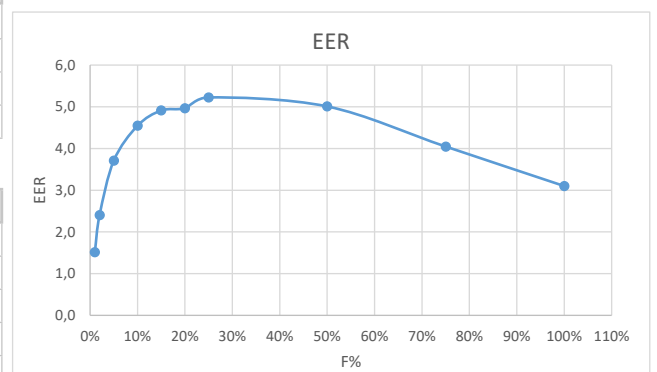
| C | Load factor F% | EER @20°C xC |
|------|----------------|--------------|
| 0,95 | 20% | 5,18 |
| 0,94 | 15% | 5,13 |
| 0,87 | 10% | 4,75 |
| 0,71 | 5% | 3,87 |
| 0,46 | 2% | 2,51 |
| 0,29 | 1% | 1,58 |



9.4.11 Model HWA1-A/H 04304

| Outside air dry bulb temperature [°C] | Load factor F% | EER |
|---------------------------------------|----------------|------|
| 35 | 100% | 3,10 |
| 30 | 75% | 4,05 |
| 25 | 50% | 5,01 |
| 20 | 25% | 5,23 |

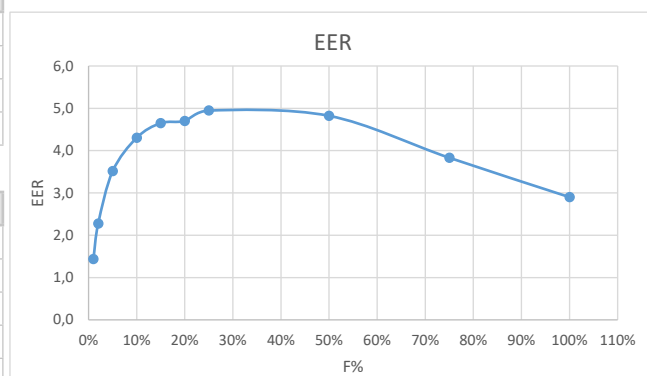
| C | Load factor F% | EER @20°C xC |
|------|----------------|--------------|
| 0,95 | 20% | 4,96 |
| 0,94 | 15% | 4,91 |
| 0,87 | 10% | 4,55 |
| 0,71 | 5% | 3,71 |
| 0,46 | 2% | 2,40 |
| 0,29 | 1% | 1,52 |



9.4.12 Model HWA1-A/H 04345

| Outside air dry bulb temperature [°C] | Load factor F% | EER |
|---------------------------------------|----------------|------|
| 35 | 100% | 2,90 |
| 30 | 75% | 3,83 |
| 25 | 50% | 4,82 |
| 20 | 25% | 4,95 |

| C | Load factor F% | EER @20°C xC |
|------|----------------|--------------|
| 0,95 | 20% | 4,70 |
| 0,94 | 15% | 4,65 |
| 0,87 | 10% | 4,30 |
| 0,71 | 5% | 3,51 |
| 0,46 | 2% | 2,28 |
| 0,29 | 1% | 1,43 |



10. REFRIGERATN SAFETY DATA SHEET

| | |
|---|--|
| Name: | R410A (50% Difluoromethane (R32); 50% Pentafluoroethane (R125)). |
| RISKS INDICATIONS | |
| Major risks: | Asphyxia |
| Specific risks: | The rapid evaporation may cause freezing. |
| FIRST AID | |
| General information: | Never give anything by mouth to an unconscious person. |
| Inhalation: | Move to fresh air. Oxygen or artificial respiration if necessary. Do not administer adrenaline or similar drugs. |
| Eyes contact: | Rinse carefully with water for at least 15 minutes and consult a doctor. |
| Contact with skin: | Wash immediately with plenty of water. Take off immediately the contaminated clothing. |
| FIRE PREVENTION | |
| Extinguishing Media: | Whatever. |
| Specific risks: | Increasing in pressure. |
| Specific methods: | Use water spray to cool containers. |
| ACCIDENTAL RELEASE ACTIONS | |
| Personal precautions: | Evacuate personnel to safe areas. Provide adequate ventilation. Use personal protective equipment. |
| Environmental precautions: | Evaporate. |
| Cleaning method: | Evaporate. |
| HANDLING AND STORAGE | |
| Manipulation Action/technical precautions: | Provide sufficient air exchange and/or suction in work places. |
| Recommendations for safe use: | Do not breathe vapors or aerosol. |
| Storage: | CClose tightly and store in a cool, dry and well ventilated place. Store in original container. Incompatible products: explosive, flammable materials, Organic peroxide. |
| EXPOSURE CONTROL / PERSONAL PROTECTION | |
| Control parameters: | AEL (8-h e 12-h TWA) = 1000 ml/m ³ for each of the two components. |
| Respiratory protection: | For rescue and maintenance operation in storage tanks use self-contained respirator apparatus. The vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing. |
| Eyes protection: | Safety glasses. |
| Protection of hands: | Rubber gloves. |
| Hygiene measures: | Do not smoke. |
| PHYSICAL AND CHEMICAL PROPERTIES | |
| Color: | Colorless. |
| Odor: | Light. |
| Boiling point: | -52.8°C at atmospheric pressure. |
| Lighting point: | It does not ignite. |
| Density: | 1.08 kg/l at 25°C. |
| Solubility in water: | Negligible. |
| STABILITY AND REACTIVITY | |
| Stability: | No reactivity when used with the appropriate instructions. |
| Materials to avoid: | Highly oxidizing materials. Incompatible with magnesium, zinc, sodium, potassium and aluminum. The incompatibility is more serious if the metal is present in powdered form or if the surfaces were, recently, unprotected. |
| Decomposition products | These products are halogenated compounds, hydrogen fluoride, carbon oxides (CO, CO ₂) and carbonyl halides |
| TOXICOLOGICAL INFORMATION | |
| Acute toxicity: | (R32) LC50/ inhalation /4 hours/on rat >760 ml/l (R125) LC50/ inhalation /4 hours/on rat >3480 mg/l |
| Local effects: | Concentrations substantially above the TLV may cause narcotic effects. Inhalation of decomposed products of high concentrations may cause respiratory failure (pulmonary edema). |
| Long term toxicity: | Did not show any carcinogenic potential, teratogenic or mutagenic effects in animal experiments. |
| ECOLOGICAL INFORMATION | |
| Global Warming Potential GWP (R744=1): | 2088 |
| Ozone Depletion Potential ODP (R11=1): | 0 |
| Disposal considerations: | Usable with reconditioning. |

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