MAXA AIR CONDITIONING

Air cooled water chiller with axial fans

Technical bulletin
Models

HWA1-A 02106-04349

05	10-2022	AL.B.	A.R.	Modification of technical data (for pressure drops), integration of data for W-8 (BT), integration flow rate in DS data, correction to 35% glycol in the relevant chapters, modification of the scheme for DS accessory and added indications for the connession of the DS. Correction of height (cap. 3.1.1).
04	06-2022	AL.B.	A.R.	Modified chap. 1.4, modified scheme chap. 1.6, revision of order code tables chap. 2.3, deleted accessories chap. 2.4, modified alert in chap. 3.3, modified scheme chap. 3.3.3.
03	11-2021	E.M	A.R.	Updated performance condition (8) sizes 02128, 04258, added grooved joint tightening, torque indications, added SS accessory indications, added warnings chap. 3.2, added chap. 6.3, modified water capacities chap. 8.1, modified UNI/TS 11300-3 data, modified position of vibration dampers, hydronic group data for water + ethylene glycol added, updated useful heads
02	11-2020	E.M	A.R.	SEER values and chiller performance were modified after unit revision for ErP 2021, battery treatment modification and KA accessory
01	10-2020	E.M	A.R.	Minimum water volume hydraulic circuit update, refrigerant charge update
00	03-2019	E.M	A.R.	First release
Rev	**Date**	**Compiled**	**Approved**	**Notes**
Code				**Serie**
BTE01300120001.05				**HWA1-A 02106-04349 AIR COOLED WATER CHILLER WITH AXIAL FANS**

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1. UNIT DESCRIPTION AND TECHNICAL FEATURES

The water chillers have been designed for commercial and industrial applications, they are very compact but still equipped with large surface air side heat exchangers; therefore they ensure high efficiency, with EER among the highest in their category. The use of high efficiency and particularly strong 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 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 non-standard applications.

1.1 FRAME STRUCTURE

All units of the series have a structure suitable for outdoor installation, made by painted hot-galvanized steel. The covering painting is made with polyester powders RAL 7035 / RAL 3020 (only some details) to ensure the best resistance to bad weather. All screws and inserts are made by galvanized steel.

1.2 COMPRESSORS

The compressors are scroll type, specifically designed for operating with R410A refrigerant gas, mounted on rubber anti-vibration dampers. A factory mounted electrical crankcase heater is activated when the compressor is off and is disabled when it starts again. It is suggested 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 EXCHANGERS

The air side heat exchangers are made entirely by aluminium in microchannel technology, which allows reducing both the airside pressure drops and the refrigerant charge. This technology ensures a greater heat exchange capacity for the same front surface compared to traditional heat exchangers.

1.4 WATER-SIDE HEAT EXCHANGERS

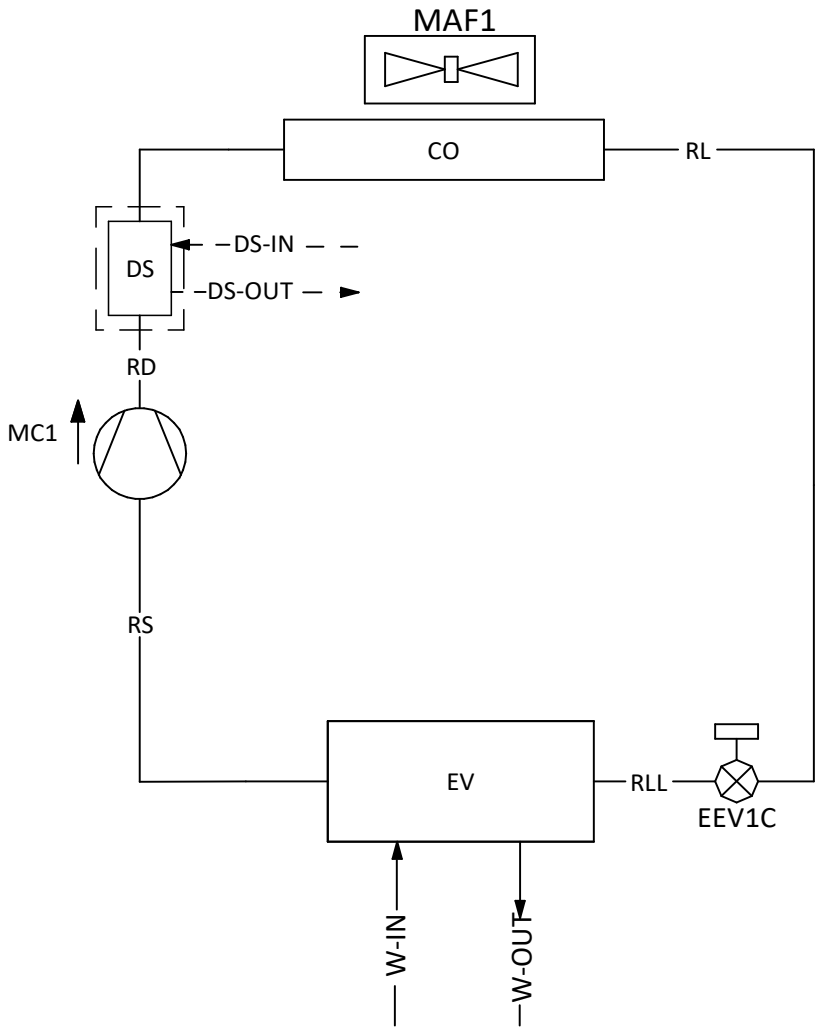
The user side heat exchanger is of the brazed plate type and is made of AISI 304 stainless steel for the monocircuit units and AISI 316 for the bicircuit units, insulated in the factory using closed cell material, and can be equipped with antifreeze electric heater (optional accessory KA). A differential 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 a protective grille. The exhaust air hole is made by a double flared profile on the inlet and the outlet side, with a specific shape for increasing the energy efficiency and the noise reduction. The motor has an IP54 protection degree according to la CEI EN 60529.

1.6 REFRIGERANT CIRCUIT

The cooling circuit is manufactured using components from leading international companies and in accordance with the UNI EN 13134 standard on braze welding processes. The refrigerant gas is R410A. The refrigeration circuit includes in its basic version: electronic expansion valve,
The refrigeration circuit includes in its basic version: electronic expansion valve, inspection valves for maintenance and control, safety device compliant with the technical rules (high and low-pressure switch), a 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 expansion valve and lock the circuit humidity, liquid sight glass to control the refrigerant charge, solenoid valve and shut-off valves.
Below is the conceptual diagram of the chiller.



LEGEND			
MC1	Compressor	W-OUT	Water outlet
CO	Condenser	RS	Suction line
EV	Evaporator	RD	Delivery line
MAF1	Axial fan	RL	Liquid line
EEV1C	Electronic expansion valve	RLL	Low pressure liquid line
W-IN	Water inlet	DS	Desuperheater
DS-IN	Desuperheater water inlet	DS-OUT	Desuperheater water outlet
____	Optional		

1.7 ELECTRIC 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 disconnector 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 superheat control logic managed according to the signals sent by the pressure transducers and the temperature probes. The CPU also controls the following functions: water temperature adjustment, frost 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 transducer, delivery temperature probe on the compressors, safety on the low and high pressure side, temperature probe on compressors suction, external air temperature probe, thermal protection of the fans, thermal protection on each compressor, differential pressure switch on the water side to protect the evaporator, high pressure switch with manual reset installed on the discharge pipe of the compressors.

1.10 HYDRAULIC CIRCUIT

The heat pumps of the series can be equipped with a built-in hydronic unit, which includes, in addition to the differential pressure switches, a single or double pump (one reserve to the other) with AC motor, suitable for the use of chilled and direct water managed by the machine control. It is also possible to install an internal inertial storage tank externally insulated with closed cell foam material with adequate capacity to avoid excessive start and stop of the compressor.

2. VERSION AND ACCESSORY DESCRIPTION

SERIES	Capacity	Version with Desuperheater/Low water temperature device	Acoustic configuration	Hydronic kit
HWA1-A	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 -Standard chiller
/DS - Chiller 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 about the 20% of the otherwise lost condensation heat to be recovered and used to supply the after-heating water coils of an UTA or for domestic hot water flywheel or any other process use.
In this version, no circulator is supplied, on the water side and no probe for recovery management. It remains the responsability of the system designer to provide for their presence and correct connection.

/BT— BT chiller version (for low water temperatures)

The BT version unit allows 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.

2.2 ACOUSTIC CONFIGURATION

It is possible to choose the acoustic configuration among the following options:

/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.

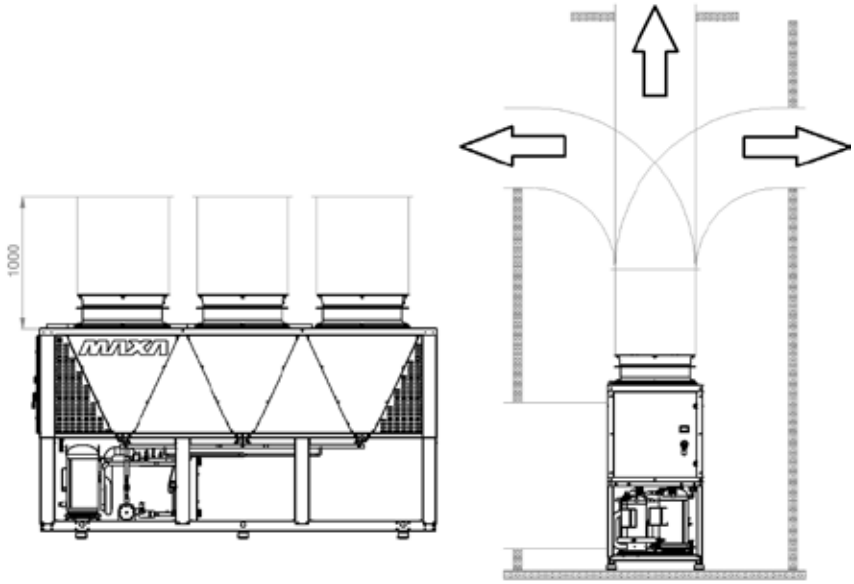
/SSL – Super silenced version

The super silenced unit (equipped with SSL accessory) provides, in addition to the thermo-acoustic cover 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 sound pressure and energy consumption. In this way it is possible to save substantial amounts of electricity for each fan.

/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.

The figure shows an example of a possible ducted installation. 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.
Upper pressure drops on the duct do not ensure the declared performance.

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

Model HWA1-A	Additional static head ductable version compared to standard version	
	Pa	mmH2O
02106	61,92	6,31
02120	61,56	6,28
02128	59,76	6,09
02140	70,11	7,15
04155	67,63	6,90
04177	63,38	6,46
04184	64,43	6,57
04209	68,54	6,99
04239	63,35	6,46
04258	59,66	6,08
04305	69,11	7,05
04349	64,03	6,53

/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

It is possibile to select an hydronic configuration among the following:

- /PS – Reverse cycle heat pump only standard prevalence pump version
- /PSAP – Reverse cycle heat pump only high prevalence pump version
- /PD – Reverse cycle heat pump double standard prevalence pump version
- /PDAP – Reverse cycle heat pump double high prevalence pump version
- /PS/SI – Reverse cycle heat pump standard prevalence pump and tank
- /PSAP/SI – Reverse cycle heat pump high prevalence pump version and tank
- /PD/SI – Reverse cycle heat pump double standard prevalence pump version and tank
- /PDAP/SI – Reverse cycle heat pump double high prevalence pump version and tank

The unit code is composed of:

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

2 fans – digits 01221
3 fans – digits 01321
4 fans – digits 01421
6 fans – digits 01521

- the # symbol as a separator
- nr. 18 variable digits (camp) that identify sizes, versions and factory-fitted accessories

- nr. 2 digits that identify any customisations

XXXXX#(RV)(PCF)(TA)(CI1)(TE)(KS)(KA)(EL)(EL2)(VF)(FAN)(SIL)(TR)(AC1)(AC2)(MC)

Order code	RV – Configuration *****		PCF – Size		TA – Recovery		CI1 – Hydronic configration		TE – Specific sealing	
	00	Cooling only								
	54	BT version								
	56	Process Chiller (No ErP)								
01221#	....		**106**	02106						
			120	02120						
			128	02128						
01321#	....		**140**	02140						
			155	04155						
			177	04177						
			184	04184						
01421#	....		**209**	04209						
			239	04239						
			258	04258						
01521#	....		**305**	04305						
			349	04349						
					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)(CI1)(TE)

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

XXXXX#(RV)(PCF)(TA)(CI1)(TE)(KS)(KA)(EL)(EL2)(VF)

FAN – Fan		SIL – Muffling		TR – Heat exchanger treatment		AC1		AC2 – Electrical accessories		MC	
0	Standard (EC)	**0**	-	**0**	-	-		**0**	-	-	
3	Phase cut AC **	**1**	Silenced (SL)	**7**	With AERO treatment (TR1)			**2**	Circuit breakers (IM)		
6	Phase cut AC with condensation control (CT) **	**2**	Super-silenced (SSL) ***			**0**	-			**01**	-
7	Standard EC with condensation control (CC)	**4**	Ductable (C) ***								
		5	Ductable with compressor acoustic insulation (C(S)) ***								

* Not possible if CI1=0
** Not possible if RV=00 and RV=54
*** Not possible if FAN=3 or FAN=6
**** Not possible if KS=0
***** IMPORTANT NOTE, the product is available in different versions, which also differ in their field application

- cooling only - The unit meets the regulation (UE) 2016/2281
- comfort chillers BT version - The unit meets the regulation (UE) 2016/2281
- process chiller - The unit does not meet the regulation (UE) 2016/2281 but it meets Regulation (UE) 2015/1095.

2.4 ACCESSORY LIST

The available accessories are listed below.

Description	Optional	Standard	Factory fitted	Supplied separately/ activated after delivery
SS Soft starter	x		x	
SAS Remote probe	x			x
Three-phase relays for maximum and minimum voltage/sequence/shortage monitoring		x	x	
On/off compressors status signalization		x	x	
Machine block signalling		x	x	
Digital input for double set point		x	x	
CM Modbus enabling	x		x	
ISK Serial converter USB/RS485	x			x
IM Magnetotherms on 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	
Modification of the dynamic set-point – climatic curve (via the external air probe in the unit)		x	x	
LQ Electrical board lighting	x		x	
SH Schuko plug (with thermomagnetic)	x		x	
CC Condensation control up to –20°C		x	x	
Microchannel coil		x	x	
TR1 Microchannel coil with Aero treatment	x		x	
Solenoid valve on liquid line		x	x	
Liquid side / humidity indicator		x	x	
Differential pressure switch (signaling presence of flow)		x	x	
RFM Cooling circuit shut-off valve on discharge line	x		x	
KA1 exchanger and pump antifreeze heater (if present)	x		x	
KA2 exchanger, pump and tank antifreeze heater (if present) - includes KA1	x		x	
AG rubber vibration dampers	x			x
AM Spring vibration dampers	x			x
GR1 Anti-intrusion kit for refrigeration circuit compartment	x		x	
GR2 Battery compartment anti-intrusion kit	x		x	
2SFV Double security valve with changerover valve	x		x	
EEV - Electronic valve		x	x	
FY Y filter	x			x
TE1 Special mechanical seal for glycol over40%	x		x	
RV "Grooved" connection joint	x			x
KS Lifting bracket kit	x		x	
EC Fans (includes control CC)		x	x	

2.5 ACCESSORY DESCRIPTION

2.5.1 Factory fitted standard components

Three-phase relays for maximum and minimum voltage/sequence/shortage monitoring – signals 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.

On/off compressors signalization – auxiliary contactors that provide a clean contact, allowing to remotely signal the activation of the compressors.

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

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 that allows the unit to be switched on and off.

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

Condensation control up 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 through the modulation of the brushless motor directly controlled by the 0-10V signal of the controller. This adjustment is particularly suitable for outside air temperatures below -10°C and down to -20°C.

Microchannel coil – made of aluminum, it allows to significantly reduce both the air side pressure drops and the refrigerant charge, while guaranteeing a greater exchange capacity for the same front surface compared to traditional exchangers.

Solenoid valve on liquid line – inlet valve to the refrigerant circuit, used for pump down, to avoid the presence of liquid at the compressor inlet..

Liquid/humidity indicator - 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 factory-fitted accessories

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 expetted 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.

		02106	02120	02128	02140	04155	04177	04184	04209	04239	04258	04305	04349
Maximum inrush current at SS	A	196,3	224,3	234,7	241,1	217,3	261,6	267,6	279,3	317,7	338,5	375,4	409,0

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

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 making maintenance easier for the operator.

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

Micro-channel coil with Aero treatment – the treatment is based on spay application of a special water-based paint, composed of new resins with very high chemical resistance. The product is flexible to resist against thermal contractions/expansions, resistant to UV rays, anti-dirt, mechanically resistant, with very limited heat transmission losses and with practically no effects on air side pressure drops.

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

KA1 exchanger and pump antifreeze heater (if present) - electric heater placed on the front side of the plate heat exchanger, which is activated when the water temperature inside the heat exchanger drops below +4°C, and electric heater that protects the pump from ice formation. The pump resistor protects the component from ice formation.

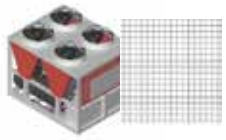
KA2 exchanger, pump and tank antifreeze heater (if present) - includes KA1 - A resistance immersed in the tank is added to the KA1 accessory. The kit consists of:

- 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

Anti-intrusion kit for refrigeration circuit compartment **(GR1)** – 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 to prevent the intrusion of foreign bodies into the battery and to protect the battery from accidental contact such as things or people.

Double security valve with changeover 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/activated after delivery

Remote probe (SAS) – NTC 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 on-board controller can process the manage correctly. The remote system probe termoregulates the heat pump only during the compressor start-up phase; shutdown is managed by the probe on the return of the unit.

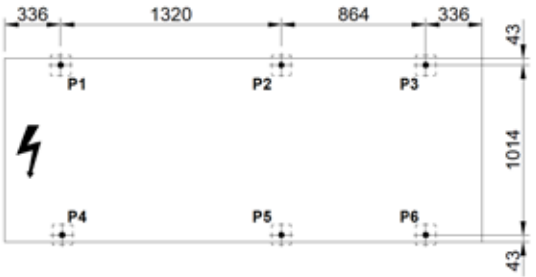
Serial converter USB RS485 (ISK) - interface device capable of reading and writing the registers of the control via the RS485 standard and converting it into a USB port that can be connected to any supervision system.

Touchscreen remote control (Hi-TV415) - allows you to view the status of the unit remotely; to be mounted in the most comfortable place for the user.

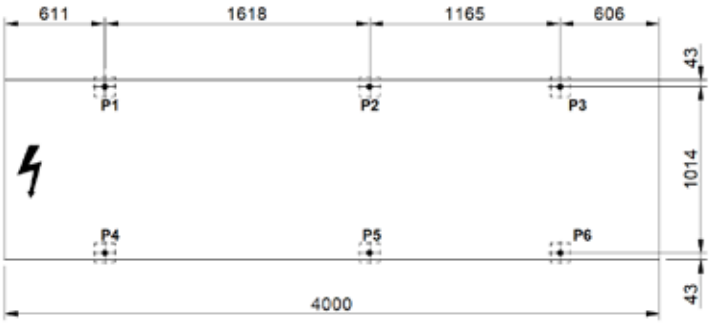
Remote control (i-CR) – Modbus remote control with negative LCD and capacitive keys. The device must be used as a remote machine keyboard with local temperature detection, it replicates the functionality of the on-board control.

Rubber vibration dampers (AG) and spring vibration dampers (AM) — are intended to prevent the transmission of vibrations to the structure; they are to be mounted under the unit, in special holes.
The ideal vibration-damping installation positions for each type of machine are shown below.

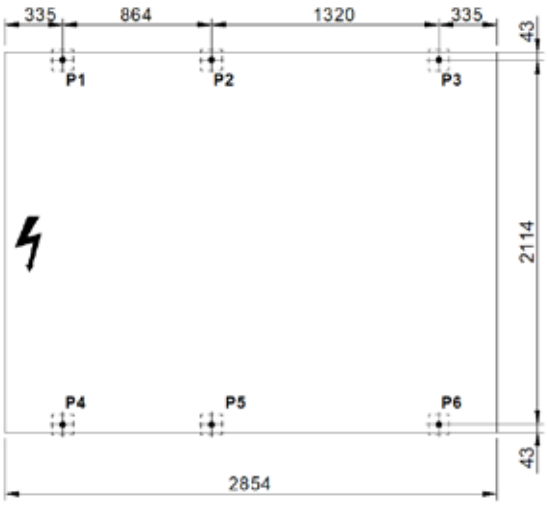
HWA1-A 2 fans: 02106, 02120, 02128



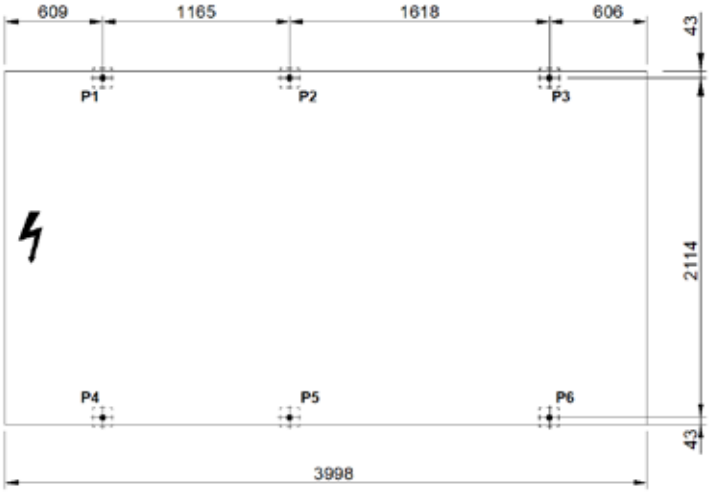
HWA1-A 3 fans: 02140, 04155, 04177, 04184



HWA1-A 4 fans: 04209, 04239, 04258



HWA1-A 6 fans: 04305, 04349

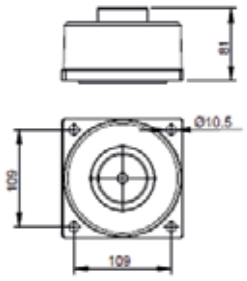
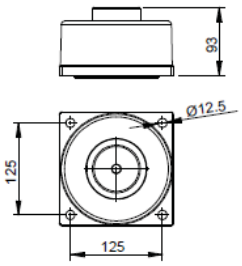
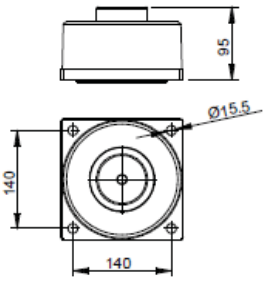
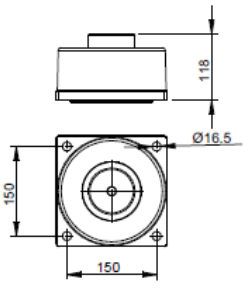


The types of antivibration mounts are two: rubber made and spring.
For each of these, the recommended optimum flow rates are given, depending on the size of the machine.

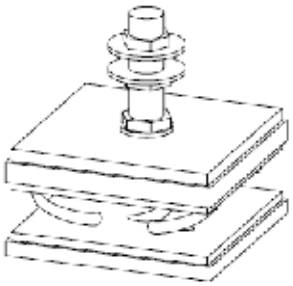
Model HWA1-A	Spring anti-vibration mount P1÷P6 [daN]
02106, 02120, 02128	300-400
02140, 04155, 04177, 04184, 04209, 04239, 04258	400-600
04305	600-800
04349	800-1000

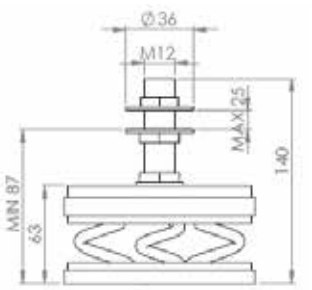
	Spring anti-vibration dampers P1÷P6 [daN]					
Model HWA1-A	**P1:**	**P2:**	**P3:**	**P4:**	**P5:**	**P6:**
02106	330	330	290	330	330	290
02120	330	330	290	330	330	290
02128	330	330	290	330	330	290
02140	600	460	330	600	460	300
04155	600	460	330	600	460	300
04177	600	460	330	600	460	300
04184	600	460	330	600	460	300
04209	560	510	460	560	510	460
04239	560	510	460	560	510	460
04258	560	510	460	560	510	460
04305	860	750	560	860	750	560
04349	860	750	560	860	750	560

Technical details of the rubber dampers related to each chiller size

HWA1-A 02106, 02120, 02128	HWA1-A 02140, 04155, 04177, 04184, 04209, 04239, 04258	HWA1-A 04305	HWA1-A 04349
			

and spring ones, which are dimensionally identical for all sizes.

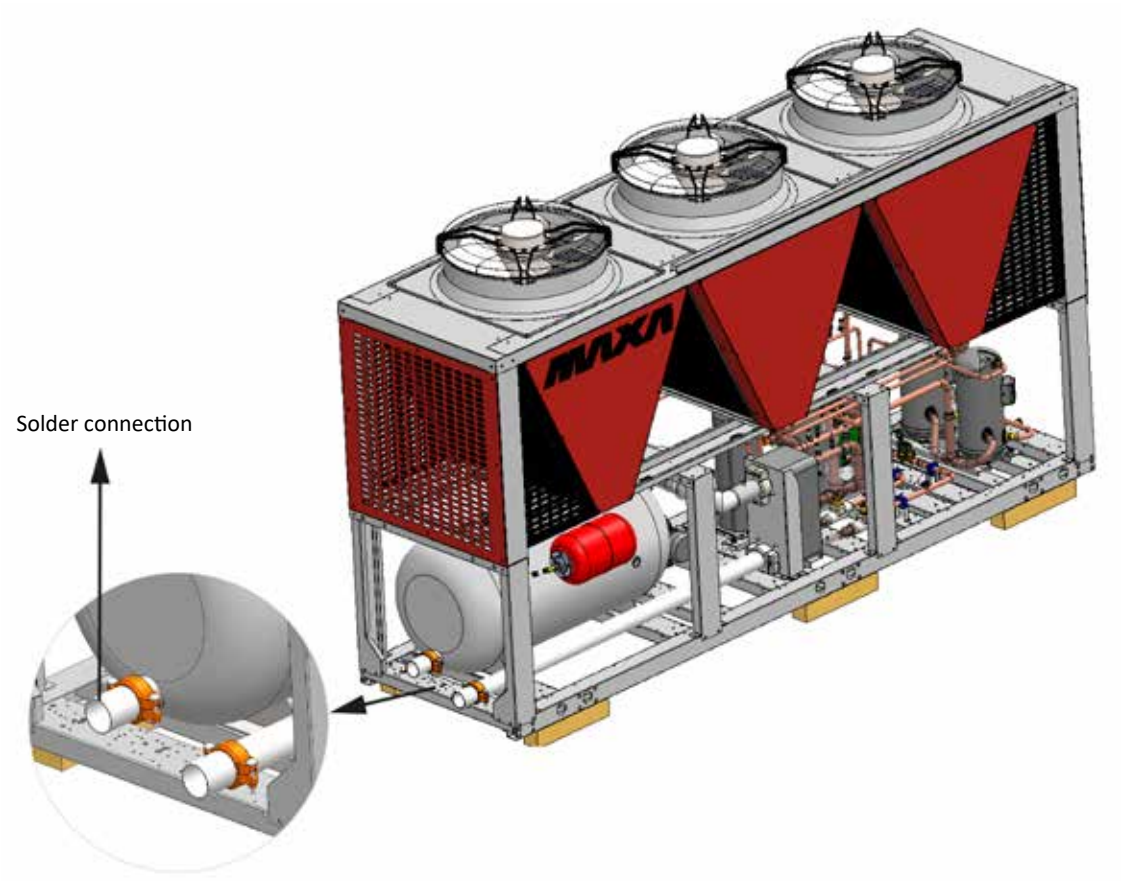




Y Filter(FY) – it contains a stainless steel mesh sieve that collects the solid materials present in the water. Filtration allows to avoid the obstruction and / or damage of the devices installed downstream of the filter.

"Grooved" connection joint (RV) – joints the unit's grooved connections, ensuring a perfect seal.
The starter kit consists of 2 jaws and 2 smooth sockets, 120 mm long, grooved on one side and welded on the other.
The recommended tightening torques for each model should be in the range 120-150 Nm.

ATTENTION: at start-up, check that there are no leaks at the junction points between the pipes, possibly 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.

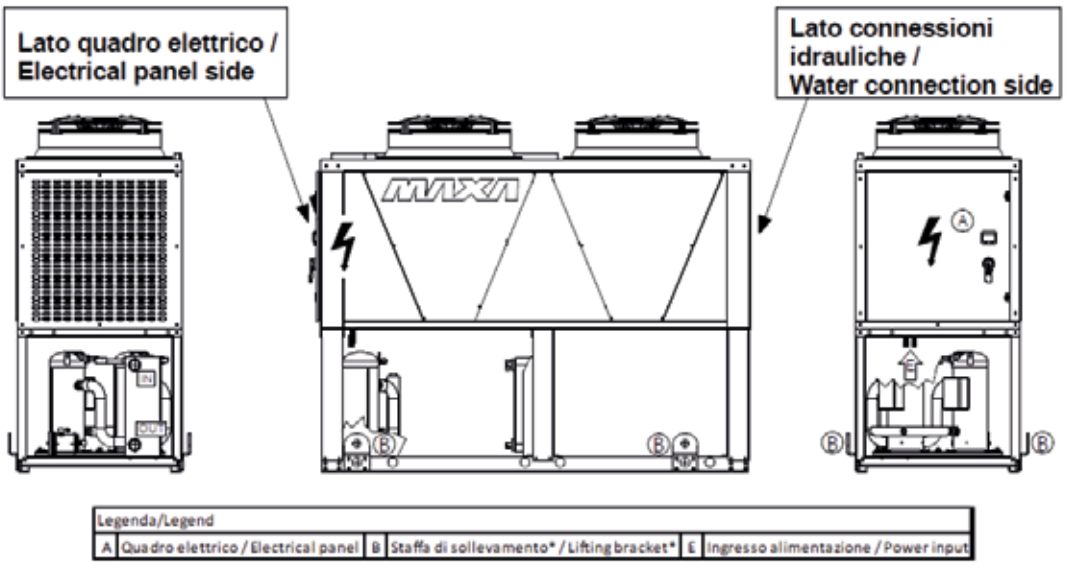
3.1 UNIT DIMENSIONS, HYDRULIC CONNECTIONS, WEIGHTS AND CENTRE OF GRAVITY POSITION

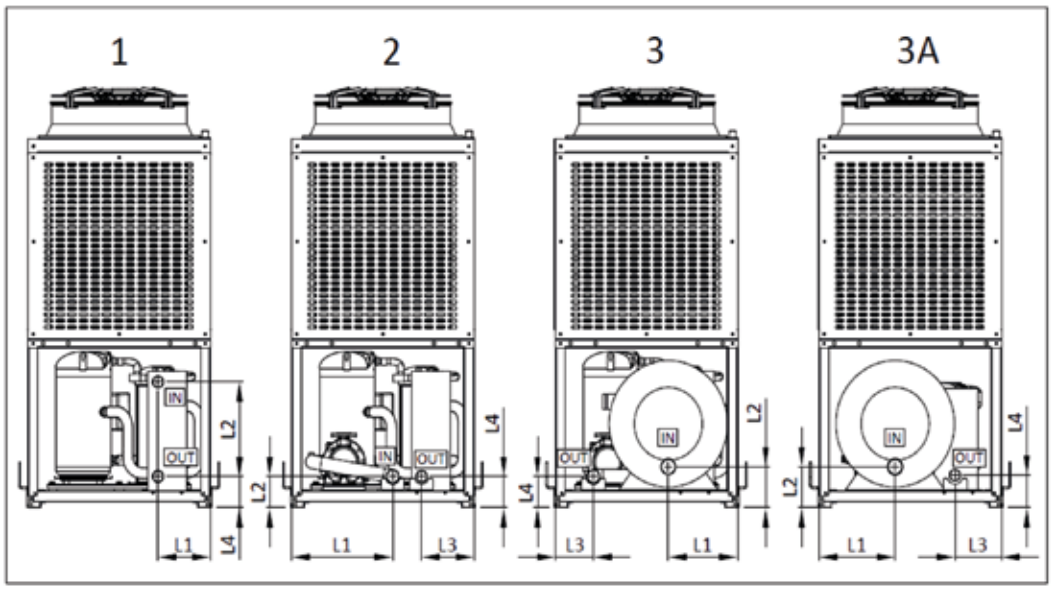
3.1.1 Net dimensions and packaging

Model HWA1-A	Lenght [mm]	Width [mm]	Height [mm]	Height version SSL and C [mm]	Max height packaging [mm]	Max height packaging version or C [mm]
02106, 02120, 02128	2860	1100	2389	2446	2470	2530
02140, 04155, 04177, 04184	4060	1100	2389	2446	2470	2530
04209, 04239, 04258	2860	2200	2389	2446	2470	2530
04305, 04349	4060	2200	2389	2446	2470	2530

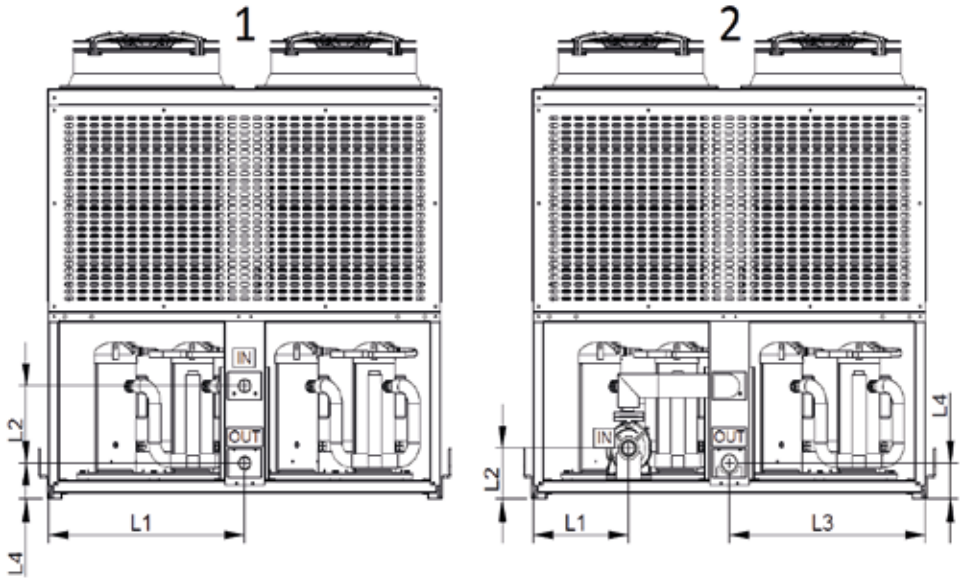
3.1.2 Position and connection details

The following tables show 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.





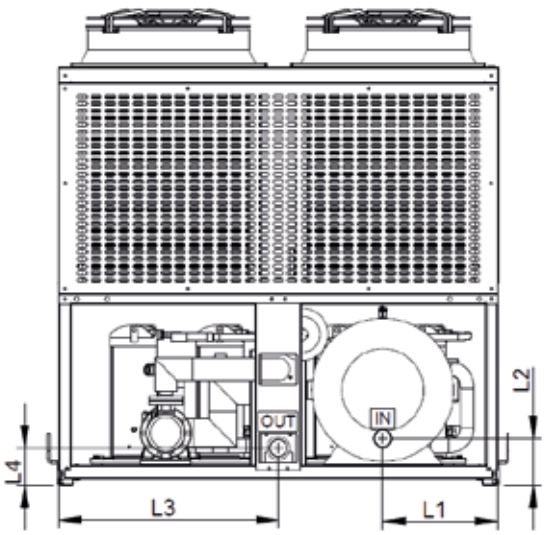
	Model	Version	Ref. Imagine	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	ØIN	ØOUT
2 fans	**HWA1-A**								
	02106 02120 02128	Standard	1	314	530	-	176	2"1/2	2"1/2
		Single/double pump	2	593	176	314			
		Single/double pump + tank	3	416	229	248			
3 fans	**HWA1-A**								
	02140	Standard	1	314	530	-	176	2"1/2	2"1/2
		Single/double pump	2	605	176	314			
		Single/double pump + tank	3	416	231	228			
	04155 04177 04184	Standard	1	278	390	-	183	3"	3"
		Single/double pump	2	605	183	278			
		Single/double pump + tank	3A	455	231	278			



Standard

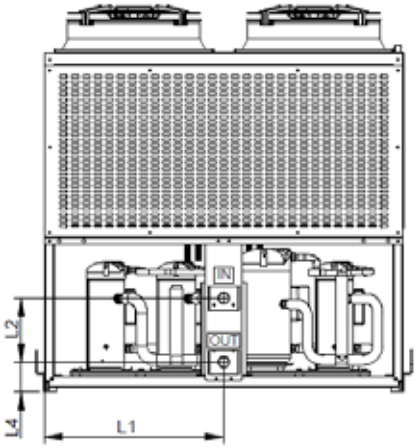
Single/double pump

3



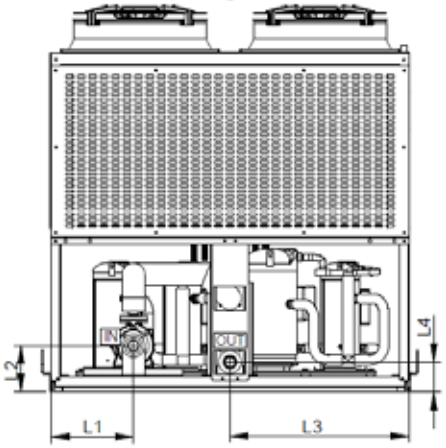
Single/double pump + tank

4



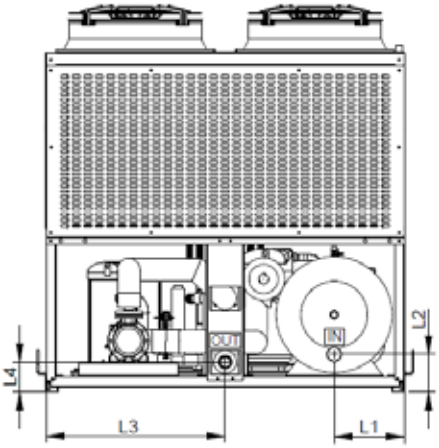
Standard

5



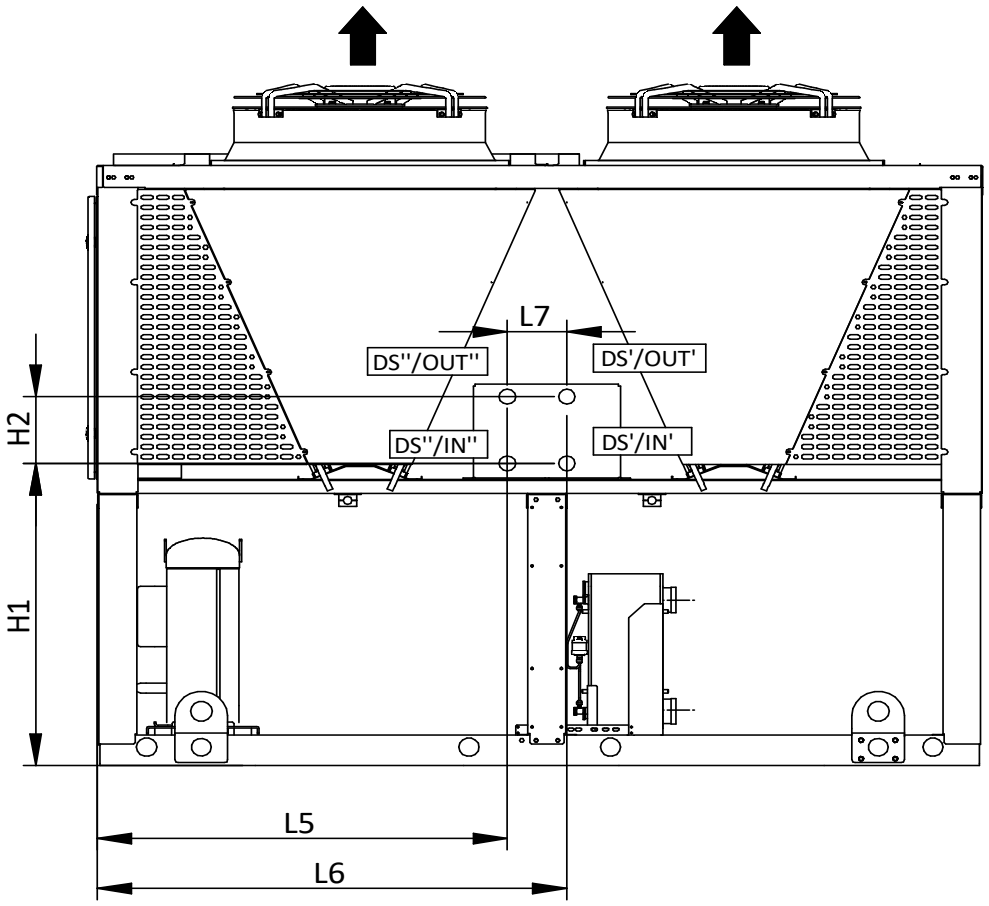
Single/double pump

6



Single/double pump + tank

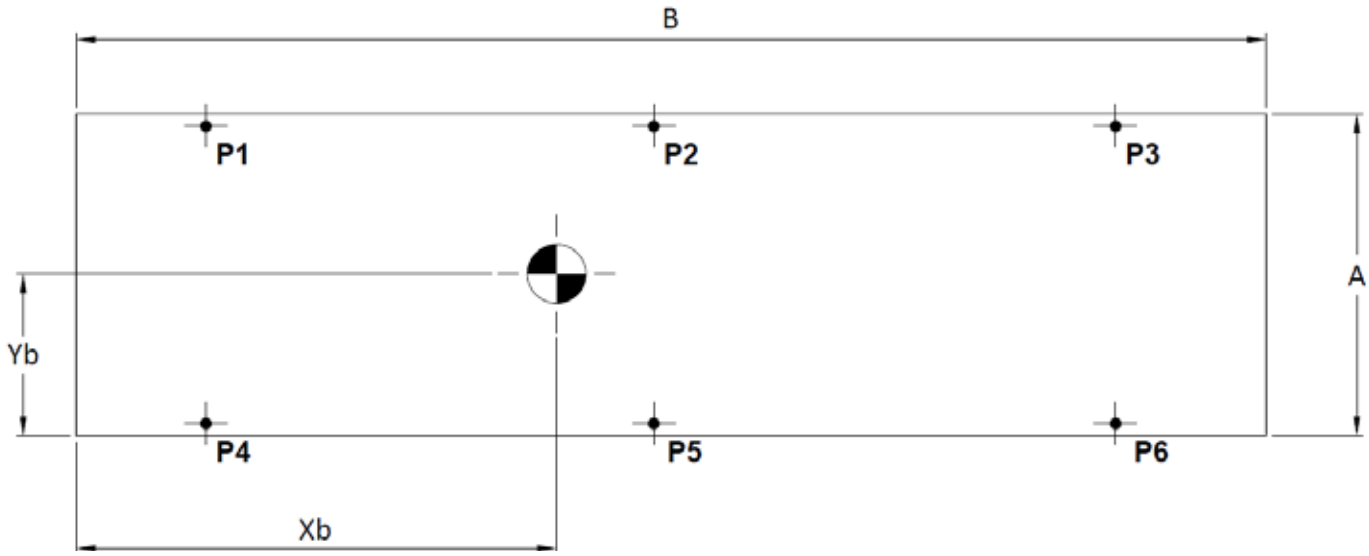
	Model	Version	Ref. Image	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	ØIN	ØOUT
4 fans	**HWA1-A**								
	04209 04239 04258	Standard	1	1100	390	-	183	3"	3"
		Single pump	2	534	258	1100		3" 4" per 04258	3" 4" per 04258
		Double pump	2	392	258				
		Single/double pump + tank	3	574	231			3"	
6 fans	**HWA1-A**								
	04305 04349	Standard	4	1100	390	-	183	3"	3"
		Single/double pump	5	506	311	1100		4"	4"
		Single/double pump + tank	6	474	231			3"	4"



	Model	Version	L5 [mm]	L6 [mm]	L7 [mm]	H1 [mm]	H2 [mm]	Ø DS' IN	Ø DS' OUT	ØDS'' IN	Ø DS'' OUT
2/3 fans	**HWA1-A -DS**										
	02106 02120 02128	with desuperheater	-	1527	-	1060	234	1"1/2 G ISO 228-1	1"1/2 G ISO 228-1	-	-
	02140 04155 04177 04184	with desuperheater	1325	1517	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
4/6 fans	**HWA1-A -DS**										
	04209 04239 04258	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
	04305 04349		1322	1514	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

3.1.3 Weights and position of the CENTRE of gravity

The position of the center of gravity of each machine is indicated in the tables, 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	Version	Net shipping weight [kg]	Operating weights [kg]	A [mm]	B [mm]	Xb [mm]	Yb [mm]
02106	Standard	1080	1090	1100	2860	1070	575
	/PDAP/SI	1310	1710			1418	587
02120	Standard	1080	1090	1100	2860	1069	576
	/PDAP/SI	1360	1760			1409	583
02128	Standard	1090	1100	1100	2860	1105	562
	/PDAP/SI	1360	1760			1422	577
02140	Standard	1510	1520	1100	4060	1617	555
	/PDAP/SI	1870	2590			2064	581
04155	Standard	1620	1630	1100	4060	1670	541
	/PDAP/SI	1920	2350			2046	516
04177	Standard	1620	1630	1100	4060	1667	531
	/PDAP/SI	1930	2360			2036	514
04184	Standard	1620	1630	1100	4060	1667	531
	/PDAP/SI	1930	2360			2036	514
04209	Standard	1950	1960	2200	2860	1128	1119
	/PDAP/SI	2230	2760			1391	1177

Model HWA1-A	Version	Net shipping weight [kg]	Operating weights [kg]	A [mm]	B [mm]	Xb [mm]	Yb [mm]
04239	Standard	1960	1970	2200	2860	1151	1118
	/PDAP/SI	2300	2840			1386	1168
04258	Standard	1960	1980	2200	2860	1148	1102
	/PDAP/SI	2310	2840			1402	1165
04305	Standard	2670	2690	2200	4060	1538	1096
	/PDAP/SI	3140	3870			1991	1203
04349	Standard	2850	2870	2200	4060	1465	1106
	/PDAP/SI	3400	4120			1949	1195

3.2 SERVICE AND TECHNICAL SPACES

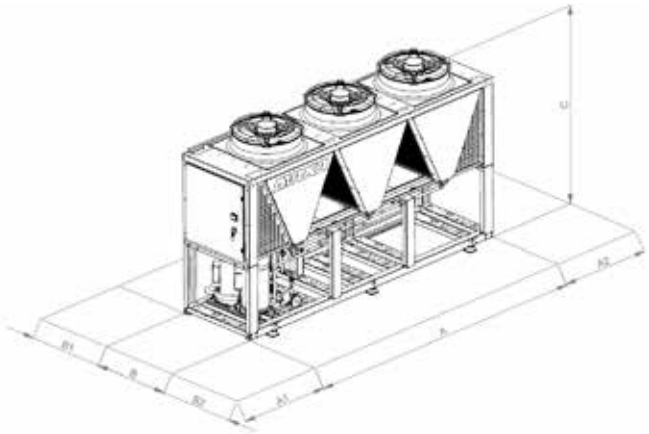
The whole series is designed and built for outdoor installations.
It is good practice to create a support slab of adequate size to that of the unit. The units transmit a low level of vibration to the ground: it is however advisable to place anti-vibration supports between the base frame and the support surface.

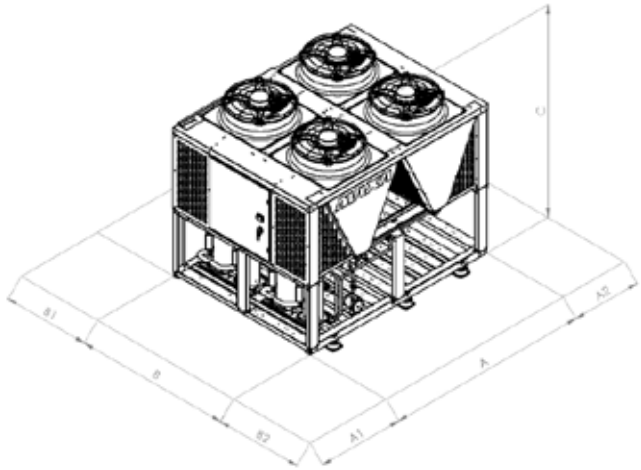
The support surface must have a sufficient capacity to support the weight of the unit, which can be seen on the technical label affixed to the machine and in the dedicated chapter of this manual. The support surface must not be inclined to ensure correct operation of the unit and to prevent it from tipping over. The installation surface of the unit must not be smooth, to avoid the deposit of water/ice, potential sources of danger.

The installation site of the unit must be free of foliage, dust, etc. that could clog or cover the heat exchanger coils. Installation should be avoided inreas subject to stagnation or falling water, for example from gutters. Also avoid locations subject to accumulations of snow (such as corners of buildings with pitched roofs). When installing in areas subject to snow-fall, mount the unit on a base 20 to 30 cm above the ground to prevent snow from accumulating around the unit.

Installation of the unit under roofs of any kind such as roofs, canopies and the lik, should be avoided.

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. It is necessary to guarantee the minimum service spaces shown below.

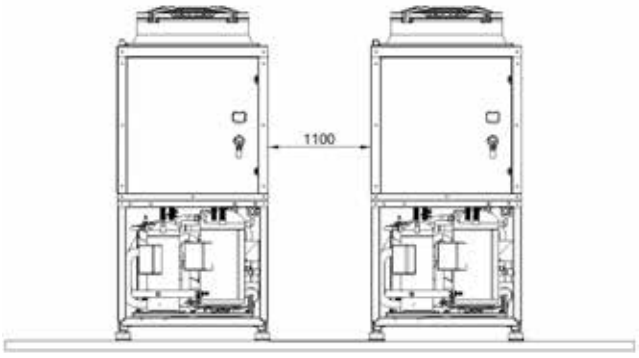


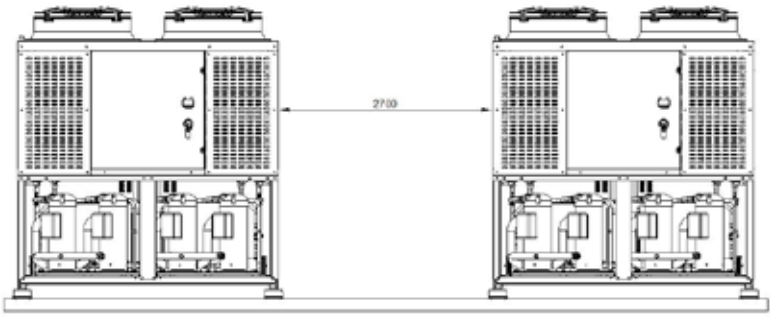
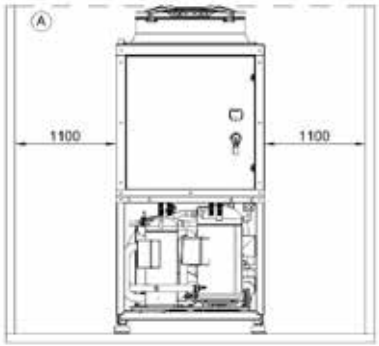
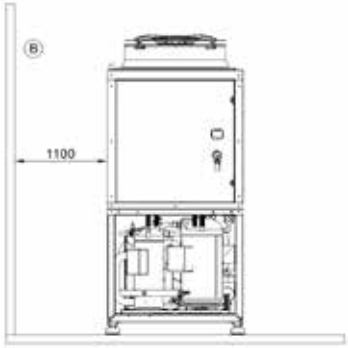
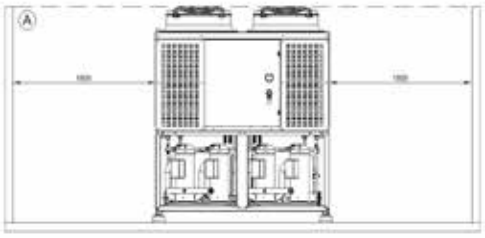
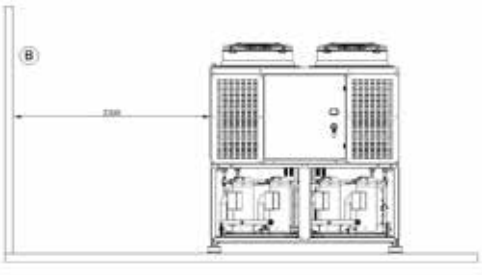
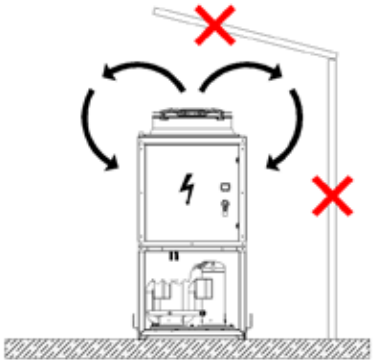
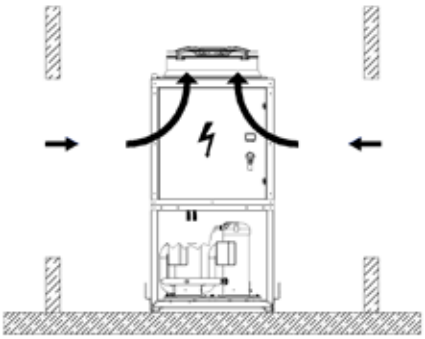


Model		A1	A2	B1	B2
HWA1-A	mm	1000	800	1000	1000

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 keep the fan powered at all times, thus preventing its unintentional rotation.

In case of side by side units, the minimum distance Lmin between them is 1100 mm for units with a width of 1100 mm:
HWA1-A 02106, 02120, 02128, 02140, 04155, 04177, 04184



2700 mm for units with a width of 2200 mm: HWA1-A 04209, 04239, 04258, 04305, 04349	
Units with width 1100 mm: HWA1-A 02106, 02120, 02128, 02140, 04155, 04177, 04184 In the case of units surrounded by walls or obstacles of equal height(-CASE A), the installation should be at a distance of not less than 1100 mm on both sides and 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.	 
Units with width 2200 mm: HWA1-A 04209, 04239, 04258, 04305, 04349 In the case of units surrounded by walls or obstacles of equal height (CASE A), the installation should be at a distance of no less than 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.	 
Covering with canopies or positioning near plants or walls should be avoided in order to prevent air circulation.	
In the case of winds with speeds in excess of 13.9-17.1 m/s (strong winds according to the Beaufort scale), the use of windbreaks is recommended.	

It is always advisable to make an environmental impact assessment 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 del 14/11/1997. An assessment 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 and / 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 new flexible joints, not reused. 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 to the system.
- Pressure gauge for measuring the outlet water pressure and the approximate determination of the water flow.
- Loading group ad 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: At start up, check that there are no leaks at the pipe junctions, 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 release valve must be installed at the highest point of the 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. It is the responsibility of the installer to verify the actual capacity of the system and to provide an expansion vessel 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 pressure switch (factory installed). If the pressure switch is tampered with or removed, the warranty will be not considered valid. Refer to the wiring diagram enclosed with the unit for the connection of the pressure-switch. Never jumper the pressure switch connections in the terminal block.**
	**The heating system and safety valves must comply with the requirements of EN 12828.**

3.3.1 Plant 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.

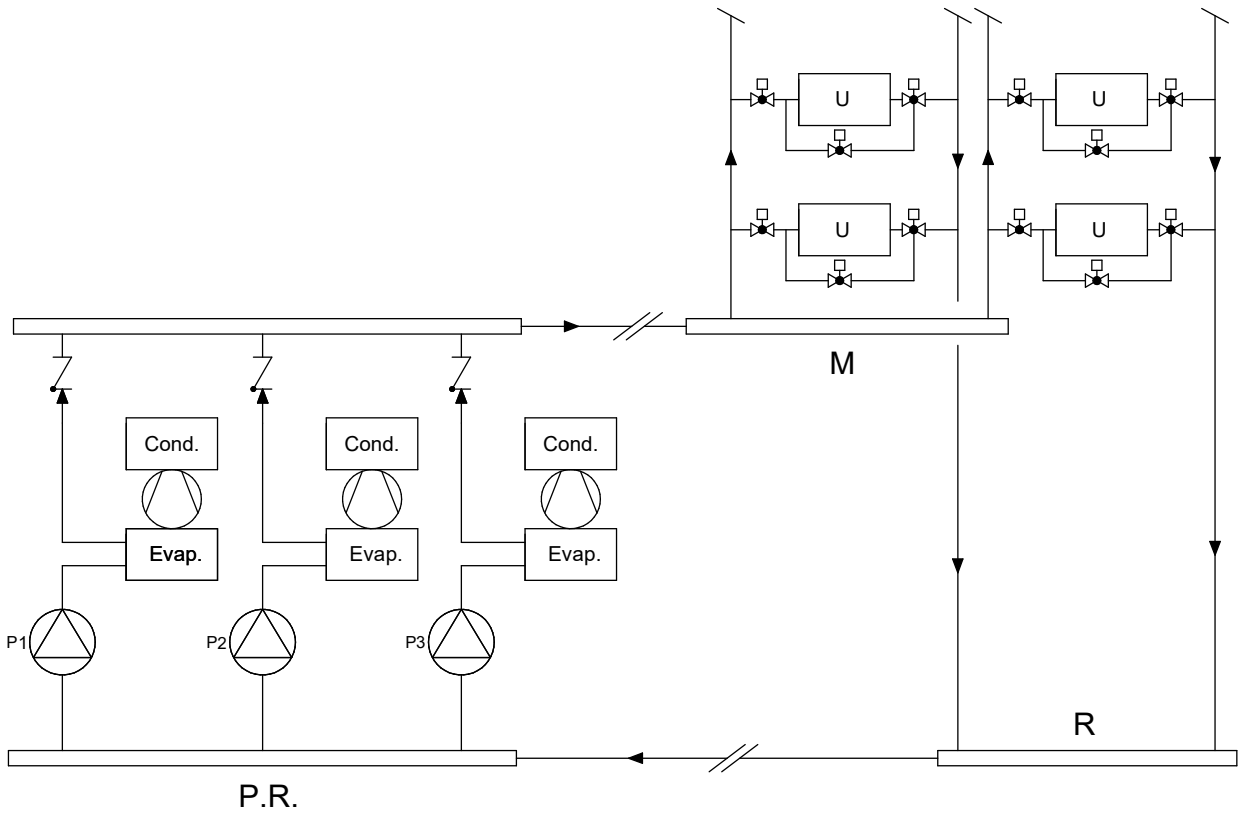
MAXIMUM CHEMICAL-PHYSICAL CHARACTERISTICS ALLOWED FOR THE PLANT WATER	
PH	7,5 - 9
Electrical conductivity	100 - 500 µS/cm
Total hardness	4,5 – 8,5 dH
Temperature	< 65°C
Quantity of Oxygen	< 0,1 ppm

MAXIMUM CHEMICAL-PHYSICAL CHARACTERISTICS ALLOWED FOR THE PLANT WATER	
Max. quantity of glycole	50 %*
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 ions (NH4)	None
Silica (SiO2)	< 30 ppm

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

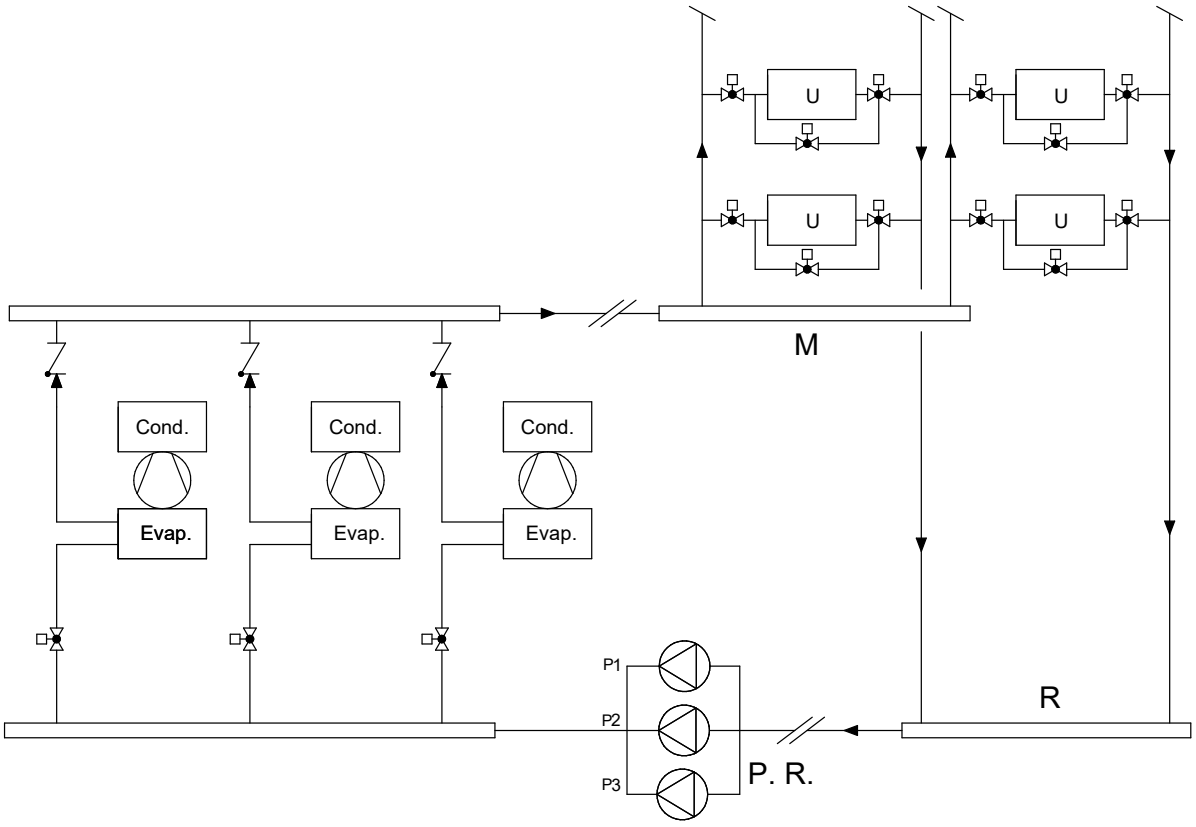
3.3.2 Typical hydraulic scheme

Possible hydraulic schemes are shown below 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 pumps (constant flow)
U = user side
M = supply
R = return

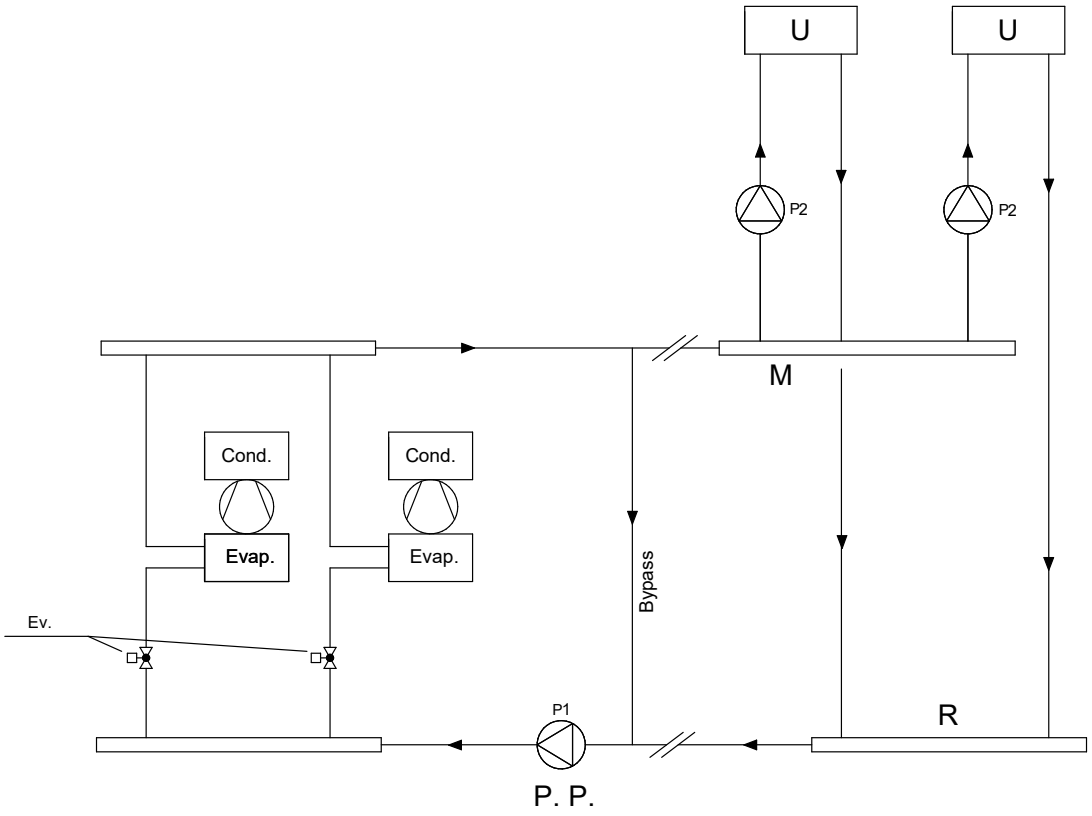
- Since there is no division between the primary and secondary circuit, the flow rate of the pumps must be sized on the sum of the design flow rates of all the terminals, without considering contemporaneity.
- The flow rate circulating in the system is constant in any operating condition.
- The units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



P. R. = chiller pumps (constant flow)
U = user side
M = supply
R = return

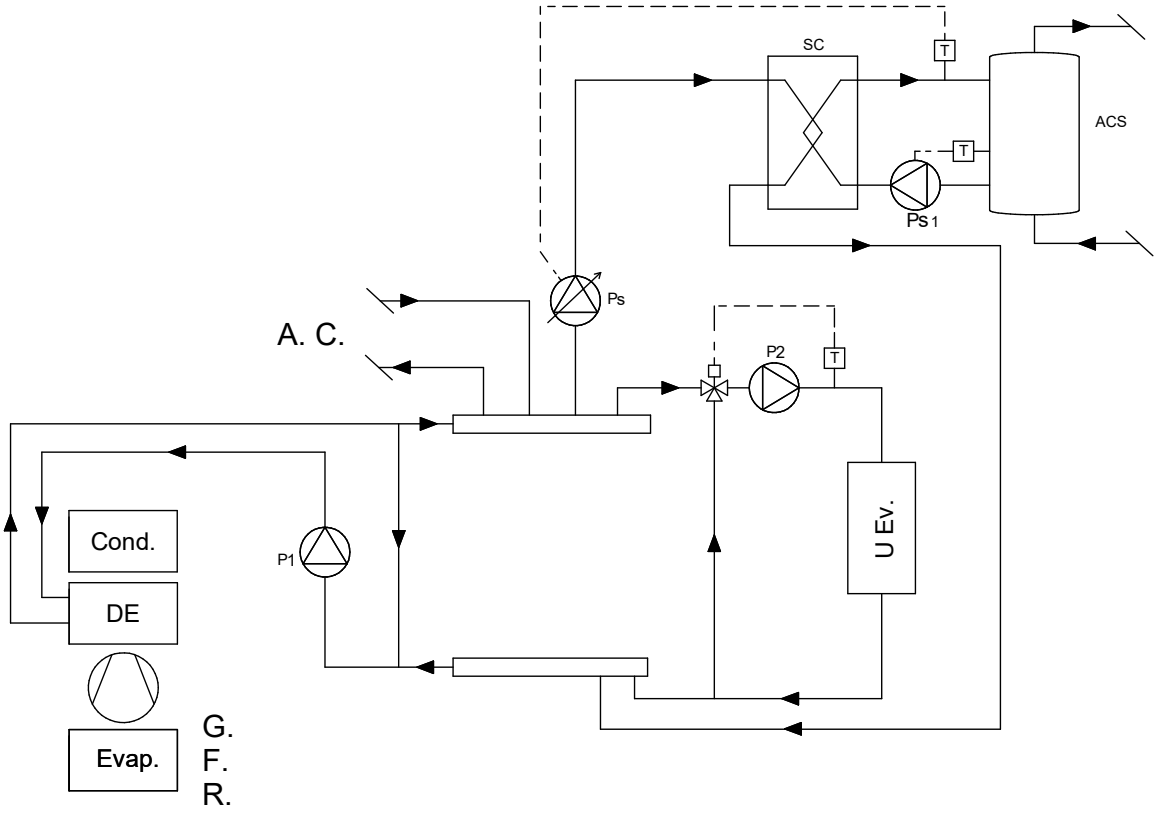
Since there is no division between the primary and secondary circuit, the flow rate of the pumps must be sized on the sum of the design flow rates of all the terminals, without considering contemporaneity.

- 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 a unit would cause control of the water delivery temperature to be lost.



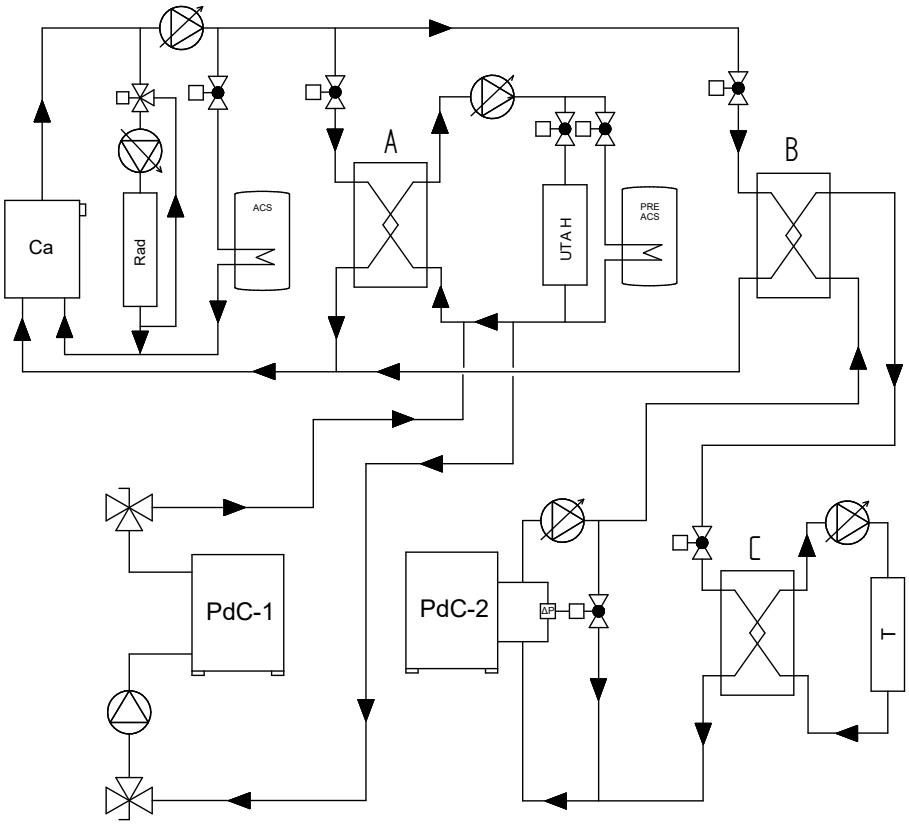
P. P. = primary pump (constant flow)
Ev. = potential
M = supply
R = return

- 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 a unit would cause control of the water delivery temperature to be lost.



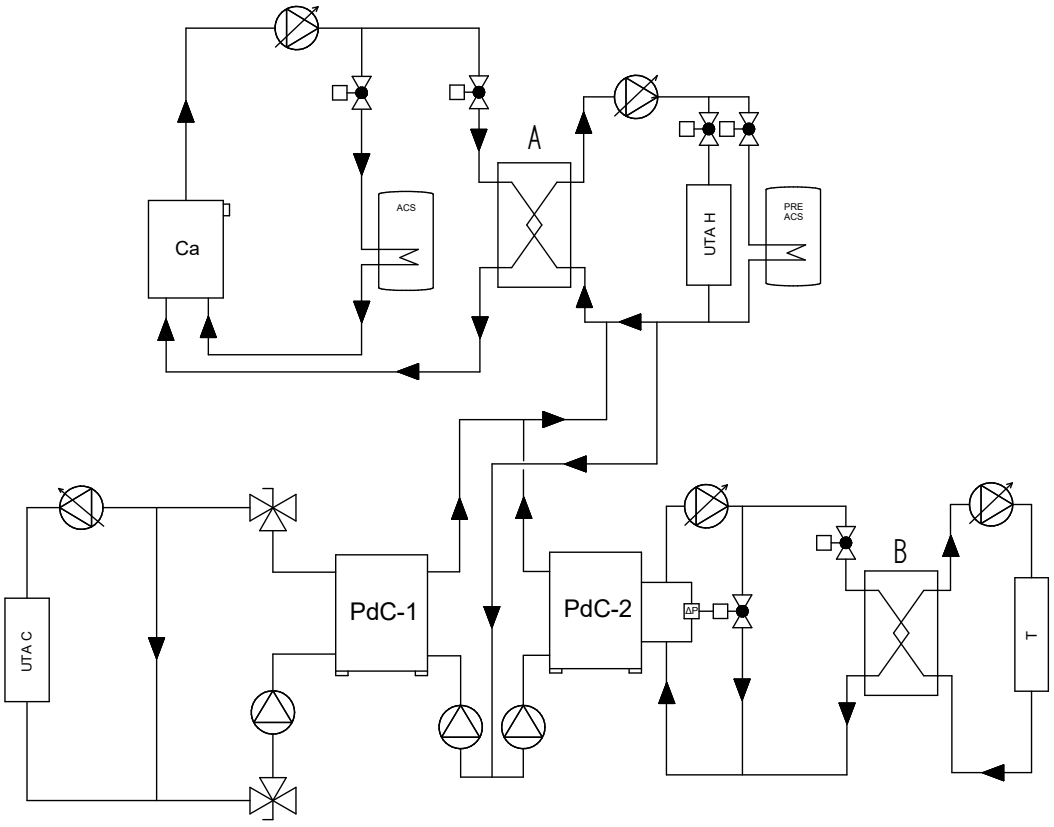
DE = Desuperheater
G. F. R. = Recovery cooling unit
A. C. = to the boiler
U Ev. = other hypotetical user sides

- With the use of 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 pump Ps is controlled to maintain the desired set-point value at the outlet of the exchanger SC.



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

- Heat generators supply the high-temperature circuits consisting of the heating and hot water systems.
- The PdC-1 group produces hot water that is fed into the low temperature network that supplies the hot coils of the air handling units (AHUs) and the pre-heating of the domestic hot water. If the efficiency of the heat pump is too low, so the system is not efficient enough, or in the event of a fault, the hot water is produced entirely via the A exchanger powered by the boilers.
- The PdC-2 group also produces low temperature hot water, which passes through exchanger B and supplies C. Again, in the absence of convenience or due to faults, hot water is produced by the exchanger B supplied by the boilers.

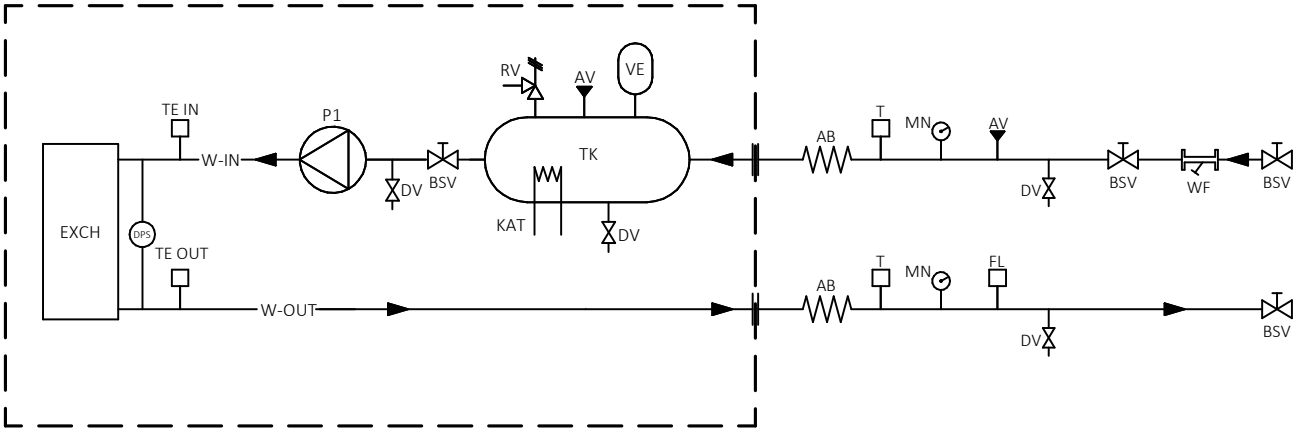


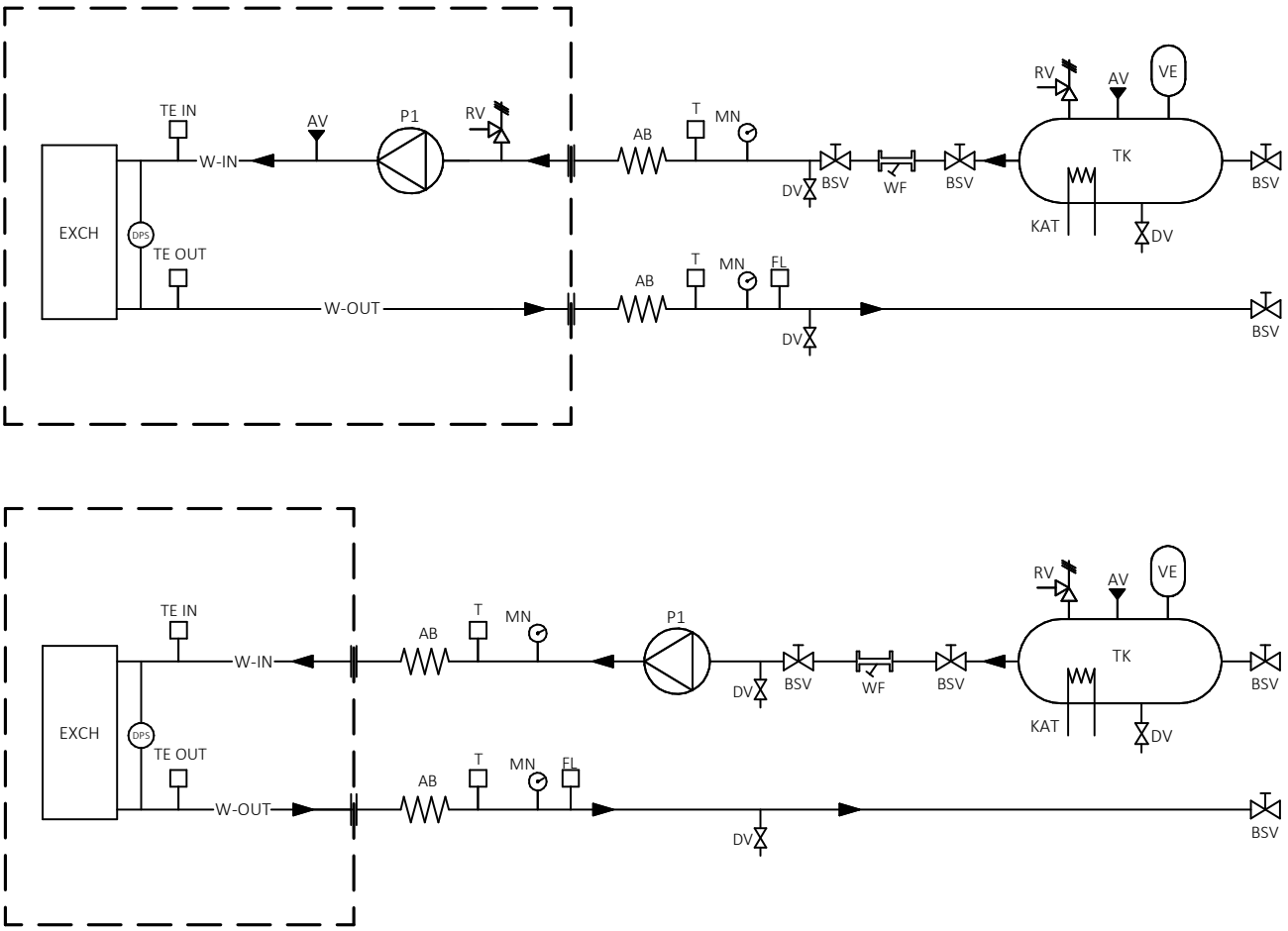
Ca = boiler
UTA H =heating AHU
UTA C =cooling AHU
T = terminals

- 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 works as a water chiller producing water for the cold batteries of the AHU.
- It i good to equip the two heat pump refrigerationunits 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 terminals, as these provide lower summer temperature values than the minimum 4°C accepted by the chillers.

3.3.3 Hydraulic scheme inside the unit

Below are the hydraulic connection diagrams for the unit, respectively for units with PS / SI hydronic kit (pump and tank), 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 upplied.
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	Intertial tank
DPS	Differential pressure switch	AV	Air discharge valve
T	Temperature probe	VE	Expansion vessel
P1	Pump	MN	Manometer
DV	Discharge tap	FL	Flow witch
BSV	Interception valve	WF	Water filter
RV	Safety valve	W-IN	User side inlet water
KAT	Tank electrical resistance	W-OUT	User side outlet water
TE IN	Plant inlet temperature probe	TE OUT	Plant outlet temperature probe
AB	Vibration dampers		

In each unit equipped with hydronic kit with tank (PS/SI, PSAP/SI, PD/SI, PDAP/SI configurations) expansion tank and safety valve are included. 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	02106	02120	02128	02140	04155	04177	04184	04209	04239	04258	04305	04349
Number of expansion vessels	1	1	1	2	1	1	1	1	1	1	2	2
Expansion vessel volume [l]	25											

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

3.3.4 Minimum water and content hydraulic circuit volumes

The table shows the minimum recommended water content of the system per unit and the volume of the storage tank (if any). The volume of the hydraulic circuit is also indicated in the case of units with hydronic kit pump + tank (configurations PS/SI, PSAP/SI, PD/SI, PDAP/SI). 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 for this difference. The necessary supplementary volume is shown in the table.

HWA1-A	02106	02120	02128	02140	04155	04177	04184	04209	04239	04258	04305	04349
Minimum content of water in the plant [l]	427	535	535	699	409	533	533	533	669	669	874	874
Tank volume [l]	390	390	390	705	420	420	420	520	520	520	705	705
Hydraulic circuit volume [l]	414	414	417	733	448	450	450	557	561	574	786	787
Neccessary addiitonal volume external to the unit [l]	13	121	118	-	-	83	83	-	108	95	88	87

3.3.5 Condensate drain system

Any condensation that may percolate from the pipes of the plumbing system and the gas circuit is free to fall on the unit's support surface, as there is no continuous base but is formed by long rails and brackets.

ATTENTION: Water (possible ice in winter) could be depositate on the base of the supporting structure and around the unit, resulting in a risk of slipping/falling.

3.3.6 Plant charge/discharge

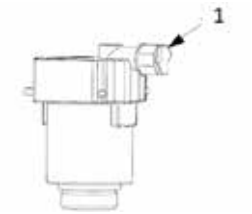
ATTENTION: supervise all loading / replenishment operations.

ATTENTION: before proceeding with the loading / replenishment of the system, disconnect the power supply to the units.

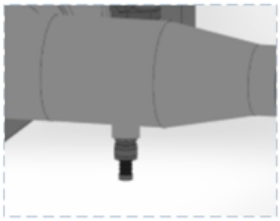
ATTENTION: the loading / replenishment of the system must always take place under controlled pressure conditions (1÷3 bar). Make sure that a pressure reducer and a safety valve have been installed on the filling / replenishment line.

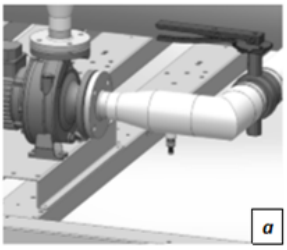
ATTENTION: The water in the filling/reintegration line must be properly pre-filtered from impurities and suspended particles. Ensure that a removable cartridge filter and a defangator have been installed.

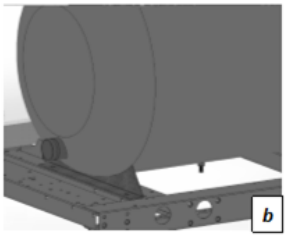
ATTENTION: periodocally check and vent theair that accumulates in the system.



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







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 (im. a);
- Hydronic kit with single / double pump + tank — tap under the tank (im. 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.

If the unit must be completely drained, first close the manual inlet and outlet gates (not supplied) and then disconnect the pipes externally fitted to 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 between the unit and the manual gates on the water inlet and outlet).

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

If a water leak is noticed, it is mandatory to replace the component by unscrewing it with a spanner, as shown in the image below.

4. TECHNICAL DATA

4.1 CHILLER TECHNICAL DATA

Technical specifications		Unit	HWA1-A model					
			02106	02120	02128	02140	04155	04177
Cooling	Cooling capacity (1)	kW	105	119	130	139	155	176
	Total power input (1)	kW	33,5	38,3	44,2	44,3	49,9	56,7
	EER (1)	W/W	3,13	3,10	2,93	3,15	3,11	3,10
	Cooling capacity (2)	kW	139	155	164	185	204	230
	Total power input Potenza (2)	kW	35,7	40,8	46,8	47,5	52,9	60,9
	EER (2)	W/W	3,88	3,79	3,50	3,89	3,87	3,77
	SEER (3)	W/W	4,13	4,12	4,11	4,27	4,11	4,11
	IPLV (9)		4,99	5,09	4,71	5,02	5,13	5,13
	Cooling capacity (8)	kW	61,9	70,6	77,8	82,0	91,5	103
	Total power input (8)	kW	29,9	34,1	39,3	39,5	45,4	50,8
	EER (8)	W/W	2,07	2,07	1,98	2,08	2,02	2,04
	Water flow (1)	l/s	5,0	5,7	6,2	6,7	7,4	8,4
	Press. drop on use-side heat exch. (1)	kPa	31,68	39,65	24,67	41,78	45,07	40,44
Compressor	Type		SCROLL					
	Refrigerant oil type (type)		Emkarate RL 32 3MAF					
	Nr compressors	Nr	2	2	2	2	4	4
	Capacity steps Std	Nr	2	3	2	3	4	4
	Oily charge (Circuit 1)	l	4,44 + 4,44	4,44 + 4,44	4,44 + 4,44	6,3 + 4,44	3,25 + 3,25	4,44 + 4,44
	Oil charge (Circuit 2)	l	-	-	-	-	3,25 + 3,25	3,25 + 3,25
	Refrigerant circuits	Nr	1	1	1	1	2	2
Refrigerant	Type		R410A					
	Refrigerant charge (Circuit 1) (4)	kg	10,5	10,5	10,5	15	13,0	13,0
	Refrigerant charge (Circuit 2) (4)	kg	-	-	-	-	10,5	10,5
	Quantity of CO2 equivalent (4)	ton	21,9	21,9	21,9	31,3	49,1	49,1
	Design pressure (high/low)	bar	40,5/4	40,5/4	40,5/4	40,5/4	40,5/4	40,5/4
Exterrnal zone fan motors	Fan motors type		AXIAL					
	Nr of fans	Nr	2	2	2	3	3	3
	Rated power (1)	kW	1,5	1,5	1,5	1,4	1,4	1,4
	Max power input	kW	3,8	3,8	3,8	5,7	5,7	5,7
	Max input current	A	3,9	3,9	3,9	3,9	3,9	3,9
	Standard air flow	l/s	10614	10714	11143	14649	14467	15868
Internal heat exchanger	Internal Heat exchanger type		PHE - PLATE					
	Nr of internal H-exchangers	Nr	1	1	1	1	1	1
	Water content	l	6,87	6,87	9,90	7,88	9,30	11,40
Hydraulic circuit	Max pressure on water-side	bar	12	12	12	12	12	12
	Max pressure 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	3"	3"
	Min content of water plant (5)	l	427	535	535	699	409	533
Sound levels	Sound power (6)	dB (A)	86 std/ 85 SL/ 83 SSL	86 std/ 85 SL/ 83 SSL	87 std/ 86 SL/ 84 SSL	87 std/ 86 SL/ 84 SSL	87 std/ 86 SL/ 84 SSL	88 std/ 87 SL/ 85 SSL
	Sound pressure (7)	dB (A)	54 std/ 53 SL/ 51 SSL	54 std/ 53 SL/ 51 SSL	55 std/ 54 SL/ 52 SSL	54,9 std/ 53,9 SL/ 51,9 SSL	54,9 std/ 53,9 SL/ 51,9 SSL	55,9 std/ 54,9 SL/ 52,9 SSL
Electrical data	Power supply		400V/3P/50Hz					
	Max power input (no access. version)	kW	48,9	55,0	61,1	66,9	82,4	87,4
	Max curr. input (no access. version)	A	83,0	93,4	103,8	113,5	139,9	148,3
	Max sart-up curr. (no access. version)	A	285,6	332,3	342,7	358,1	279,9	350,9
Dimensions and weights	A - Lenght	mm	2860	2860	2860	4060	4060	4060
	B - Width	mm	1100	1100	1100	1100	1100	1100
	C - Height	mm	2350	2350	2350	2350	2350	2350
	Shipping net weight	kg	1080	1080	1090	1510	1620	1620
	Weight in operation	kg	1090	1090	1100	1520	1630	1630

Technical specifications		Unit	HWA1-A model					
			04184	04209	04239	04258	04305	04349
Cooling	Cooling capacity (1)	kW	182	208	238	257	305	348
	Total power input (1)	kW	62,9	67,1	76,8	88,5	98,3	112
	EER (1)	W/W	2,90	3,10	3,10	2,90	3,10	3,10
	Cooling capacity (2)	kW	239	277	314	333	405	458
	Total power input Potenza (2)	kW	67,8	71,6	81,9	94,6	105	121
	EER (2)	W/W	3,52	3,87	3,84	3,52	3,85	3,78
	SEER (3)	W/W	4,10	4,14	4,24	4,10	4,16	4,12
	IPLV (9)		4,95	4,99	4,94	4,37	4,92	5,05
	Cooling capacity (8)	kW	109	123	144	158	184	211
	Total power input (8)	kW	55,8	59,7	68,8	79,4	88,5	101
	EER (8)	W/W	1,95	2,06	2,09	1,99	2,08	2,10
	Water flow (1)	l/s	8,7	9,9	11,4	12,3	14,6	16,6
	Press. drop on use-side heat exch. (1)	kPa	43,31	55,47	42,98	49,56	40,76	52,52
Compressor	Type		SCROLL					
	Refrigerant oil type (type)		Emkarate RL 32 3MAF					
	Nr compressors	Nr	4	4	4	4	4	4
	Capacity steps Std	Nr	4	4	6	4	6	4
	Oily charge (Circuit 1)	l	4,44 + 4,44	4,44 + 4,44	4,44 + 4,44	4,44 + 4,44	4,44 + 6,3	6,3 + 6,3
	Oil charge (Circuit 2)	l	4,44 + 4,44	4,44 + 4,44	4,44 + 4,44	4,44 + 4,44	4,44 + 6,3	6,3 + 6,3
	Refrigerant circuits	Nr	2	2	2	2	2	2
Refrigerant	Type		R410A					
	Refrigerant charge (Circuit 1) (4)	kg	13,0	13,0	13,5	13,5	19,5	20,0
	Refrigerant charge (Circuit 2) (4)	kg	10,5	13,0	13,5	13,5	19,5	20,5
	Quantity of CO2 equivalent (4)	ton	49,1	54,3	56,4	56,4	81,4	84,6
	Design pressure (high/low)	bar	40,5/4	40,5/4	40,5/4	40,5/4	40,5/4	40,5/4
Exterrnal zone fan motors	Fan motors type		AXIAL					
	Nr of fans	Nr	3	4	4	4	6	6
	Rated power (1)	kW	1,5	1,4	1,5	1,5	1,4	1,5
	Max power input	kW	5,7	7,6	7,6	7,6	11,4	11,4
	Max input current	A	3,9	3,9	3,9	3,9	3,9	3,9
	Standard air flow	l/s	15892	20647	20471	22231	29279	33255
Internal heat exchanger	Internal Heat exchanger type		PHE - PLATE					
	Nr of internal H-exchangers	Nr	1	1	1	1	1	1
	Water content	l	11,40	11,40	15,50	22,10	22,10	22,10
Hydraulic circuit	Max pressure on water-side	bar	12	12	12	12	12	12
	Max pressure 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 (5)	l	533	533	669	669	874	874
Sound levels	Sound power (6)	dB (A)	88 std/ 87 SL/ 85 SSL	88 std/ 87 SL/ 85 SSL	88 std/ 87 SL/ 85 SSL	88 std/ 87 SL/ 85 SSL	88 std/ 87 SL/ 85 SSL	90 std/ 89 SL/ 87 SSL
	Sound pressure (7)	dB (A)	55,9 std/ 54,9 SL/ 52,9 SSL	55,9 std/ 54,9 SL/ 52,9 SSL	55,9 std/ 54,9 SL/ 52,9 SSL	55,9 std/ 54,9 SL/ 52,9 SSL	55,8 std/ 54,8 SL/ 52,8 SSL	57,8 std/ 56,8 SL/ 54,8 SSL
Electrical data	Power supply		400V/3P/50Hz					
	Max power input (no access. version)	kW	90,9	97,8	110,0	122,3	146,0	165,8
	Max curr. input (no access. version)	A	154,3	166,0	186,8	207,6	247,8	281,4
	Max sart-up curr. (no access. version)	A	356,9	368,6	425,7	446,5	492,4	526,0
Dimensions and weights	A - Lenght	mm	4060	2860	2860	2860	4060	4060
	B - Width	mm	1100	2200	2200	2200	2200	2200
	C - Height	mm	2350	2350	2350	2350	2350	2350
	Shipping net weight	kg	1620	1950	1960	1960	2670	2850
	Weight in operation	kg	1630	1960	1970	1980	2690	2870

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) Cooling: inlet/outlet water temperature 7/12°C.
(4) Indicative data and subject to variation. For the correct data, always refer to the technical label on the unit.
(5) The volume indicated refers to the total necessary, the designer must satisfy this considering the quantity already present inside the unit depending on the hydronic kit chosen (please check this value in the data sheet).
(6) Condition (1); value determined on the basis of measurements carried out in accordance with UNI EN ISO 9614-1.
(7) Value calculated from the sound power level using ISO 3744:2010, referred to 10 m distance from the unit.
(8) BT version cooling: external air temperature 35°C, internal exchanger water temperature = -3/-8°C. Fluid treated with 35% ethylene glycol.
(9) Calculated according to the standard AHRI 551/591 (SI).

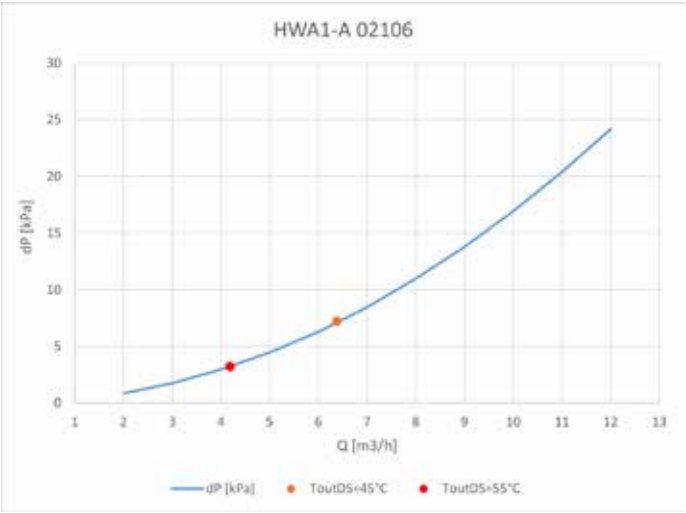
The performance data shown are indicative and may be subject to change. The yields declared in points (1), (2), (8) are to be understood as referring to the instantaneous power according to UNI EN 14511. The data declared in point (3) are determined according to UNI EN 14825.

4.2 DATA SHEET FOR UNIT WITH DESUPERHEATER

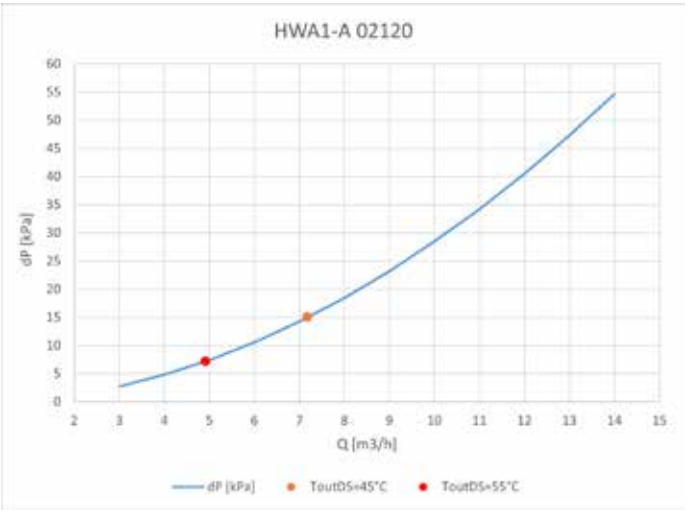
The performances are reported below under the conditions (1) of the previous technical data sheets, in the case of units equipped with a desuperheater, for water temperatures leaving the desuperheater of 45 °C and 55 °C, with input-output temperature difference of 5 °C.
The unit with this version has 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	T_{out}DS=45°C					T_{out}DS=55°C				
	Cooling capacity [kW]	Absorbed power [kW]	EER [W/W]	DS heating capacity [kW]	DS pressure drops [kPa]	Cooling capacity [kW]	Absorbed power [kW]	EER [W/W]	DS heating capacity [kW]	DS Ptressure drops [kPa]
02106	106,9	32,5	3,29	37,1	7,1	105,7	33,2	3,18	24,3	3,3
02120	121,5	37,0	3,28	41,7	15,7	120,1	37,8	3,18	28,6	8,0
02128	129,5	42,8	3,03	47,3	20,2	128,0	43,7	2,93	33,1	10,6
02140	136,2	42,0	3,24	44,5	10,4	135,1	42,8	3,16	29,6	4,9
04155	150,9	49,0	3,08	55,4	7,9	148,7	50,2	2,96	38,3	4,1
04177	172,7	55,6	3,10	63,3	9,9	170,3	57,1	2,98	43,8	5,1
04184	187,2	60,2	3,11	72,9	12,3	183,9	61,9	2,97	51,1	6,6
04209	211,5	65,0	3,26	73,1	8,3	209,3	66,4	3,15	48,6	4,0
04239	242,1	74,8	3,24	89,3	11,8	239,1	76,6	3,12	60,0	5,6
04258	261,5	85,2	3,07	102,7	15,1	257,8	87,5	2,95	70,1	7,6
04305	324,5	91,0	3,57	107,6	13,0	321,4	92,8	3,47	72,8	6,3
04349	356,7	108,9	3,28	132,0	33,7	352,0	111,4	3,16	88,4	16,4

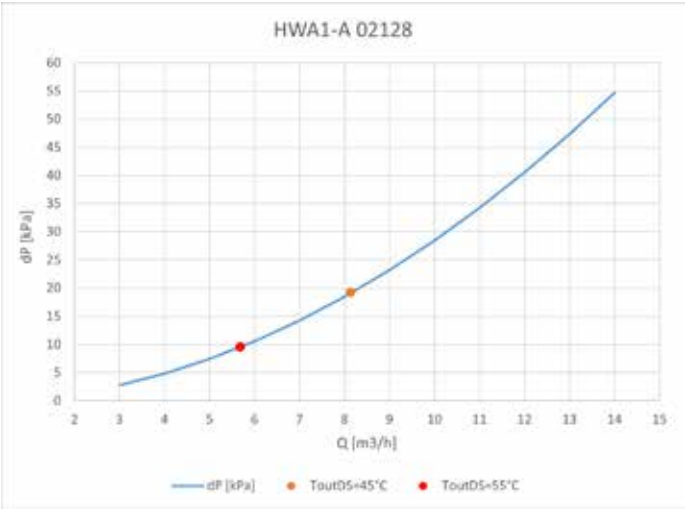
HWA1-A 02106	
DS Water flow [m³/h]	DS pressure drops[k-Pa]
3,0	1,76
4,0	2,98
5,0	4,47
6,0	6,27
7,0	8,46
8,0	10,97
9,0	13,80
10,0	16,95
11,0	20,41
12,0	24,18
13,0	28,27
14,0	32,66



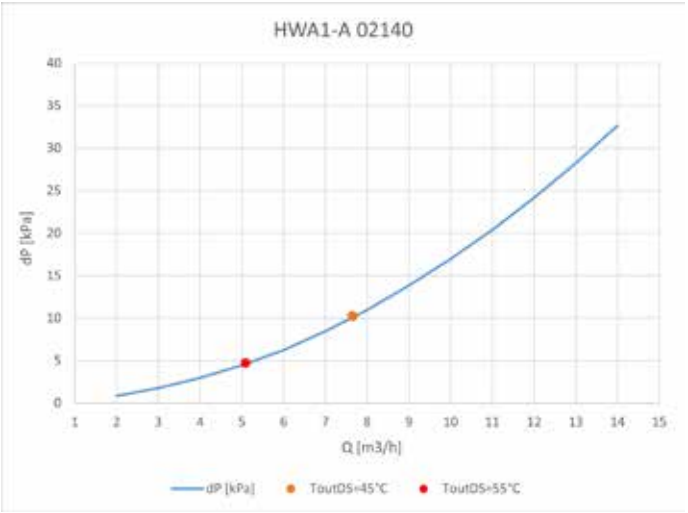
HWA1-A 02120	
DS Water flow [m³/h]	**DS pressure drops [kPa]**
3,0	2,76
4,0	4,82
5,0	7,42
6,0	10,57
7,0	14,25
8,0	18,46
9,0	23,20
10,0	28,46
11,0	34,24
12,0	40,53
13,0	47,34
14,0	54,65



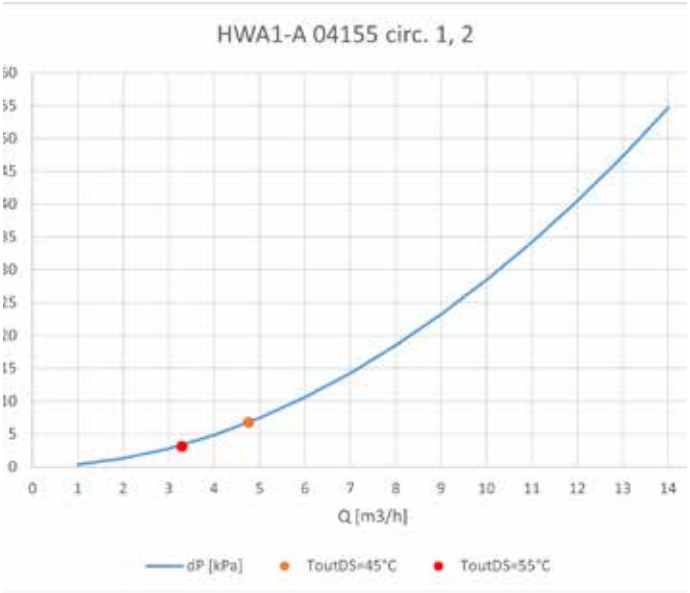
HWA1-A 02128	
DS Water flow [m³/h]	**DS Pressure drops [kPa]**
3,0	2,76
4,0	4,82
5,0	7,42
6,0	10,57
7,0	14,25
8,0	18,46
9,0	23,20
10,0	28,46
11,0	34,24
12,0	40,53
13,0	47,34
14,0	54,65



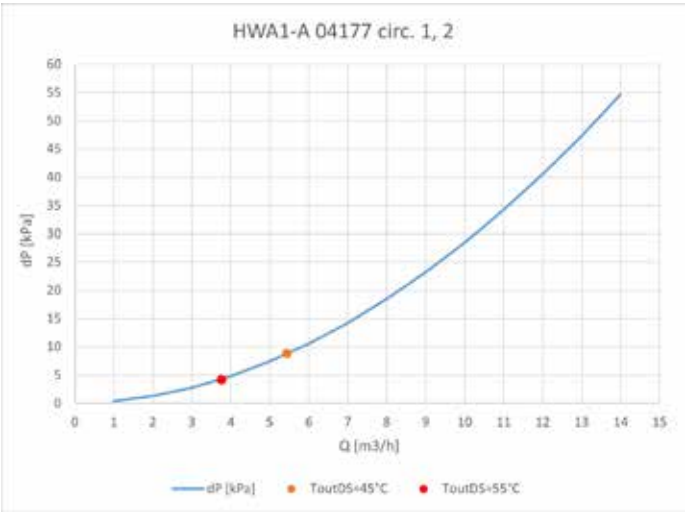
HWA1-A 02140	
DS Water flow [m³/h]	**DS Pressure drops [kPa]**
3,0	1,76
4,0	2,98
5,0	4,47
6,0	6,27
7,0	8,46
8,0	10,97
9,0	13,80
10,0	16,95
11,0	20,41
12,0	24,18
13,0	28,27
14,0	32,66



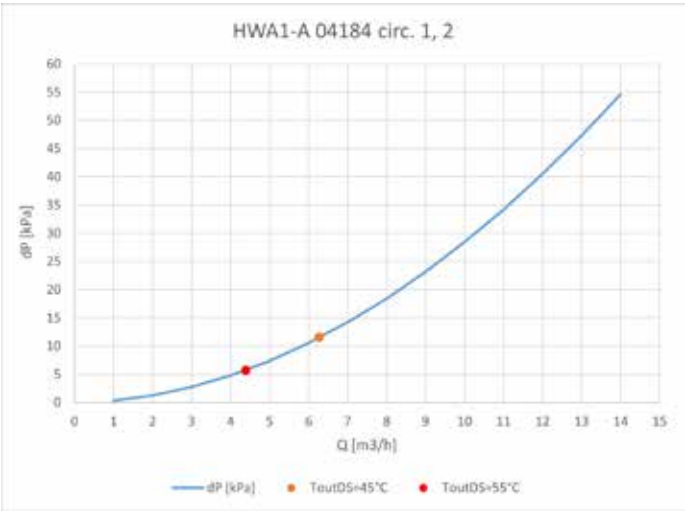
HWA1-A 04155 circuit 1 and 2	
DS Water flow [m³/h]	**DS pressure drops [kPa]**
1,0	0,38
2,0	1,30
3,0	2,76
4,0	4,82
5,0	7,42
6,0	10,57
7,0	14,25
8,0	18,46
9,0	23,20
10,0	28,46
11,0	34,24
12,0	40,53
13,0	47,34



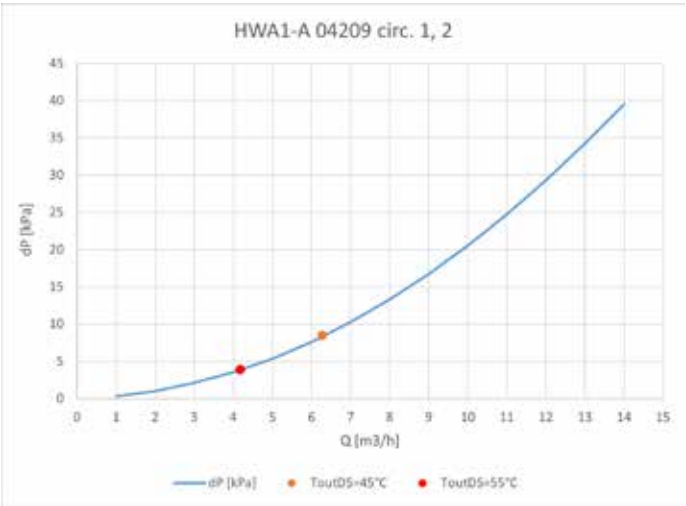
HWA1-A 04177 circ. 1 and 2	
DS Water flow [m³/h]	**DS Pressure drops [kPa]**
1,0	0,38
2,0	1,30
3,0	2,76
4,0	4,82
5,0	7,42
6,0	10,57
7,0	14,25
8,0	18,46
9,0	23,20
10,0	28,46
11,0	34,24
12,0	40,53
13,0	47,34



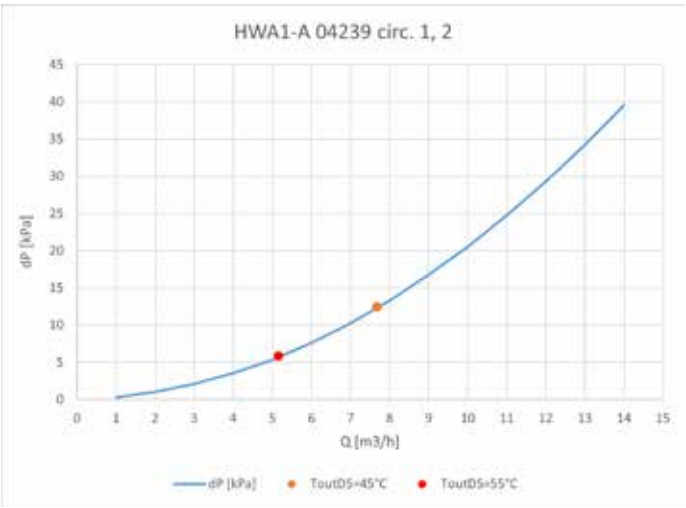
HWA1-A 04184 circ. 1 and 2	
DS Water flow [m³/h]	**DS Pressure drops [kPa]**
1,0	0,38
2,0	1,30
3,0	2,76
4,0	4,82
5,0	7,42
6,0	10,57
7,0	14,25
8,0	18,46
9,0	23,20
10,0	28,46
11,0	34,24
12,0	40,53
13,0	47,34



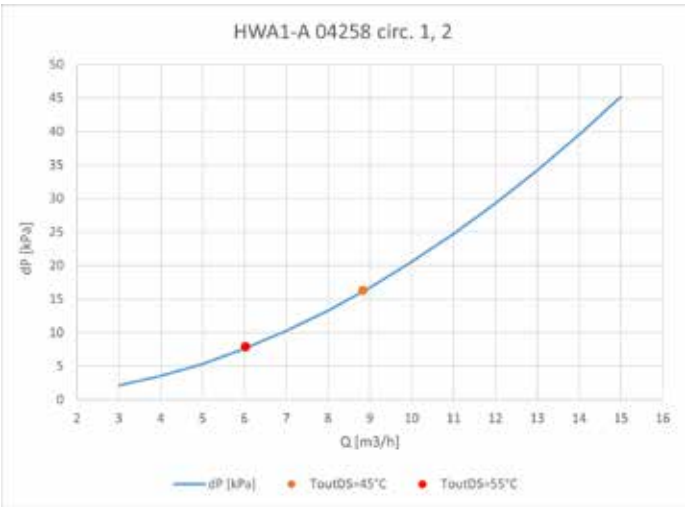
HWA1-A 04209 circuit 1 and 2	
DS Water flow [m³/h]	**DS Pressure drops [kPa]**
1,0	0,29
2,0	1,02
3,0	2,12
4,0	3,57
5,0	5,34
6,0	7,61
7,0	10,27
8,0	13,31
9,0	16,74
10,0	20,55
11,0	24,73
12,0	29,29
13,0	34,22



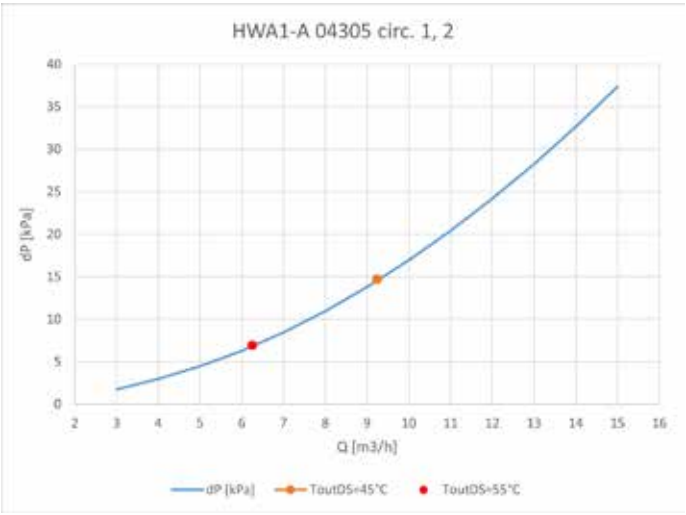
HWA1-A 04239 circ. 1 and 2	
DS Water flow [m³/h]	**DS Pressure drops [kPa]**
1,0	0,29
2,0	1,02
3,0	2,12
4,0	3,57
5,0	5,34
6,0	7,61
7,0	10,27
8,0	13,31
9,0	16,74
10,0	20,55
11,0	24,73
12,0	29,29
13,0	34,22



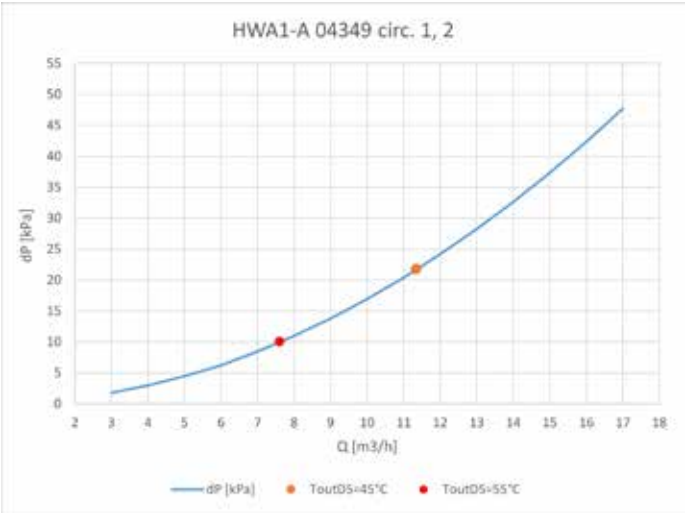
HWA1-A 04258 circ. 1 and 2	
DS Water flow [m³/h]	**DS Pressure drops [kPa]**
3,0	2,12
4,0	3,57
5,0	5,34
6,0	7,61
7,0	10,27
8,0	13,31
9,0	16,74
10,0	20,55
11,0	24,73
12,0	29,29
13,0	34,22



HWA1-A 04305 circuit 1 and 2	
DS Water flow [m³/h]	**DS Pressure drops [kPa]**
3,0	1,76
4,0	2,98
5,0	4,47
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



HWA1-A 04349 circ. 1, 2	
DS Water flow [m³/h]	**DS Pressure drops [kPa]**
3,0	1,76
4,0	2,98
5,0	4,47
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



4.3 AUXILIARY DEVICES ELECTRICAL DATA

Unit power supply	V/~/Hz	400/3PH+PE/50
On-board control circuit	V/~/Hz	12/1/50
Remote 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 characteristics label applied on the right side panel of the unit.

Dimensions	Unit	HWA1-A model					
		02106	02120	02128	02140	04155	04177
F.L.A. Input current input at the maximum allowable conditions							
F.L.A. Compressor 1	A	38,2	38,2	48,6	38,2	34,0	38,2
F.L.A. Compressor 2	A	38,2	48,6	48,6	65,4	34,0	38,2
F.L.A. Compressor 3	A	-	-	-	-	31	31,0
F.L.A. Compressor 4	A	-	-	-	-	31	31,0
F.L.A. Fan motors	A	6,6	6,6	6,6	9,9	9,9	9,9
L.R.A. Startup current (locked rotor)							
L.R.A. Compressor 1	A	240,8	240,8	287,5	240,8	174,0	240,8
L.R.A. Compressor 2	A	240,8	287,5	287,5	310,0	174,0	240,8
L.R.A. Compressor 3	A	-	-	-	-	140,0	140,0
L.R.A. Compressor 4	A	-	-	-	-	140,0	140,0
Whole unit							
Max power input	kW	48,9	55,0	61,1	66,9	82,4	87,4
Max current input	A	83,0	93,4	103,8	113,5	139,9	148,3
L.R.A.	A	285,6	332,3	342,7	358,1	279,9	350,9
F.L.A.	A	83,0	93,4	103,8	113,5	139,9	148,3
F.L.I.	kW	42,6	48,5	55,6	56,3	63,9	72,7

Dimensions	Unit	HWA1-A model					
		04184	04209	04239	04258	04305	04349
F.L.A. Input current input at the maximum allowable conditions							
F.L.A. Compressor 1	A	38,2	38,2	38,2	48,6	48,6	65,4
F.L.A. Compressor 2	A	38,2	38,2	48,6	48,6	65,4	65,4
F.L.A. Compressor 3	A	34,0	38,2	38,2	48,6	48,6	65,4
F.L.A. Compressor 4	A	34,0	38,2	48,6	48,6	65,4	65,4
F.L.A. Fan motors	A	9,9	13,2	13,2	13,2	19,8	19,8
L.R.A. Startup current (locked rotor)							
L.R.A. Compressor 1	A	240,8	240,8	240,8	287,5	287,5	310,0
L.R.A. Compressor 2	A	240,8	240,8	287,5	287,5	310,0	310,0
L.R.A. Compressor 3	A	174,0	240,8	240,8	287,5	287,5	310,0
L.R.A. Compressor 4	A	174,0	240,8	287,5	287,5	310,0	310,0
Whole unit							
Max power input	kW	90,9	97,8	110	122	146	166
Max current input	A	154,3	166,0	186,8	207,6	247,8	281,4
L.R.A.	A	356,9	368,6	425,7	446,5	492,4	526,0
F.L.A.	A	154,3	166,0	186,8	207,6	247,8	281,4
F.L.I.	kW	78,7	85,3	97,0	112	125	143

5. CORRECTIVE FACTORS

5.1 CORRECTIVE FACTORS FOR WATER WITH GLYCOLE

The corrective 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 in order to maintain the same temperature difference that would be obtained without the use of glycol. The pressure drop correction factor is applied to the correct water flow rate value of the water flow rate corrective factor.

Percentage of glycole	Freezing point [°C]	Yeld corrective factor	Absolute power corrective factor	Corrective factor of the water flow	Pressure drop correction factor
10%	-3,2	0,985	1	1,02	1,08
20%	-7,8	0,98	0,99	1,05	1,12
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 °C/kW	Corrector factor of the power output	Correction factor of the absorbed power
0,44 x 10^{-4}	1,00	1,00
0,88 x 10^{-4}	0,99	1,00
1,76 x 10^{-4}	0,98	1,00

5.3 CALIBRATION AND CONTROL PROTECTION

Description	Value
High pressure safety valve	45 bar
High pressure switch	41,5 bar
High pressure alarm	40,5 bar (±1)
Low pressure alarm standard version / BT version	4 bar / 2,5 bar
Low pressure safety valve	29,5 bar
Maximum number of restarts after low pressure alarm	3
Frost protection set (except BT version)	3°C
Hydronic circuit safety valve (available with hydronic kit)	6 bar
Maximum water circuit pressure without hydronic kit	25 bar

5.4 CORRECTION FACTORS RELATED TO THE ALTITUDE

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

Altitude [m]	500	1000	1500	2000
Cooling performance corrective factor	0,9927	0,9848	0,9769	0,9667
Absorbed power corrective factor	1,0096	1,0202	1,0320	1,0448

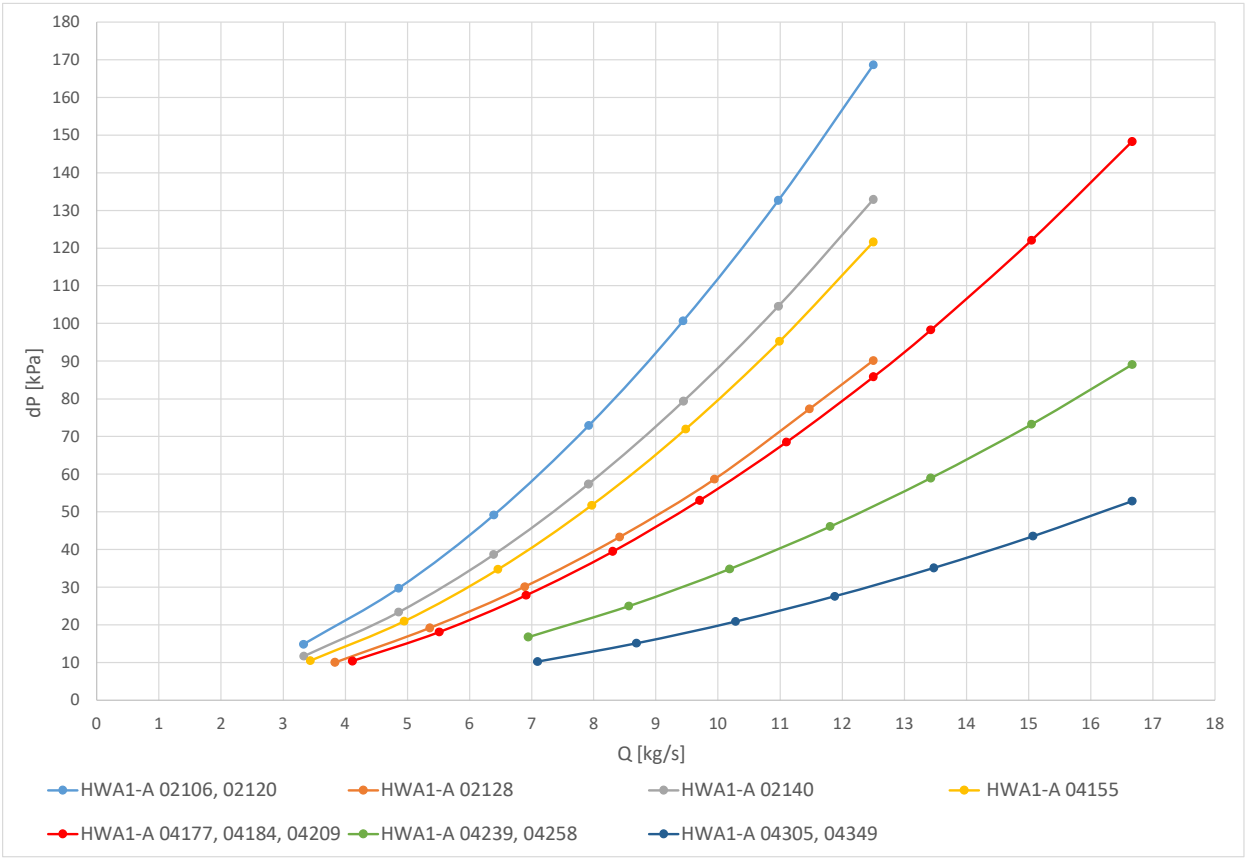
6. HYDRONIC MODULE DATA

6.1 PRESSURE DROPS

The load losses of the heat exchangers on the user side are reported according to the flow rate, 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.

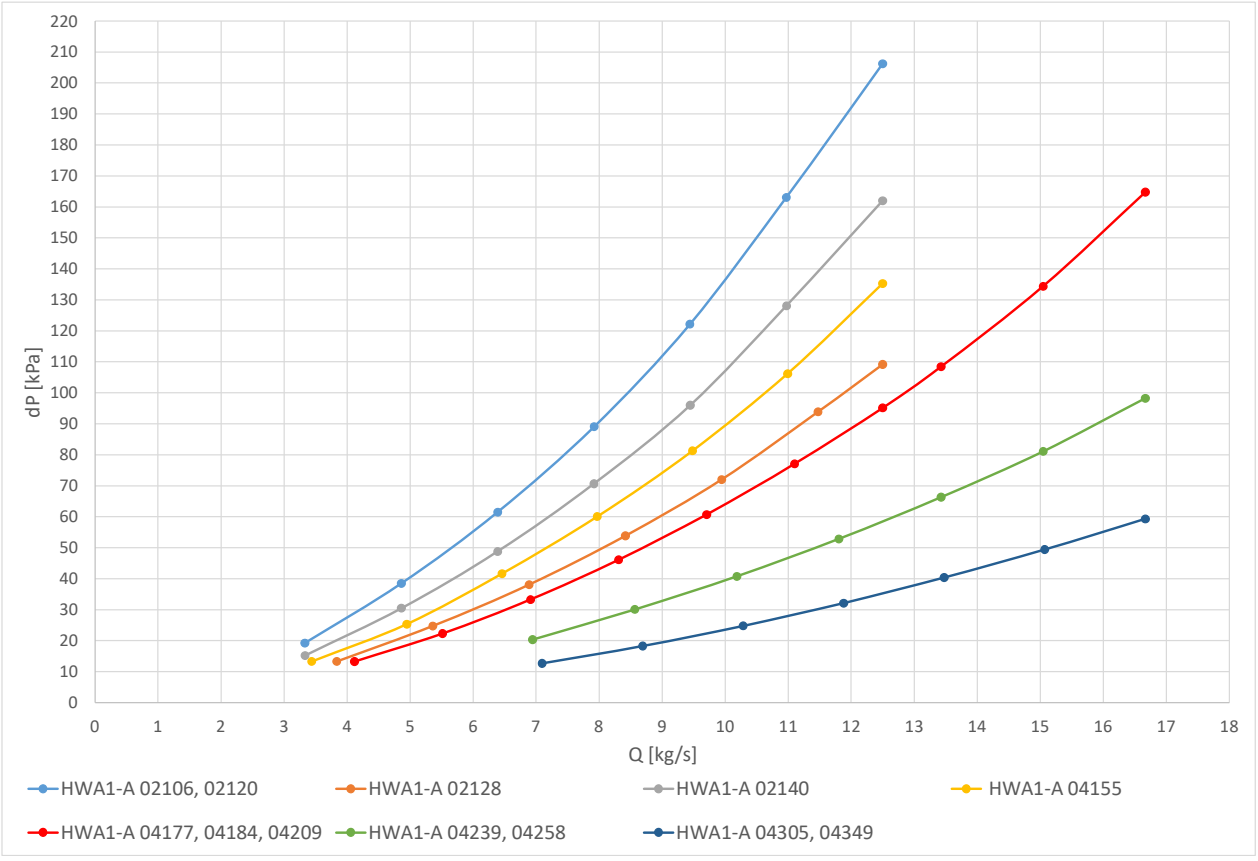
	Flow [kg/s]	Water pressure drops [kPa]	Water + 35% ethylene glycol pressure drops [kPa]
HWA1-A 02106, 02120	3,3	14,8	19,2
	4,9	29,7	38,5
	6,4	49,2	61,5
	7,9	72,9	89,1
	9,4	100,7	122,2
	11,0	132,7	163,1
	12,5	168,7	206,2
HWA1-A 02128	3,8	10,0	13,3
	5,4	19,2	24,7
	6,9	30,1	38,1
	8,4	43,3	53,9
	9,9	58,6	72,0
	11,5	77,3	93,8
	12,5	90,2	109,2
HWA1-A 02140	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 04155	3,4	10,5	13,3
	4,9	21,0	25,3
	6,5	34,7	41,6
	8,0	51,8	60,0
	9,5	72,0	81,3
	11,0	95,3	106,2
	12,5	121,6	135,3
HWA1-A 04177, 04184, 04209	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 04239, 04258	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 04305, 04349	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 = plate heat exchanger pressure drop
Q = water flow

Carrier fluid = water + 35% ethylene glycol

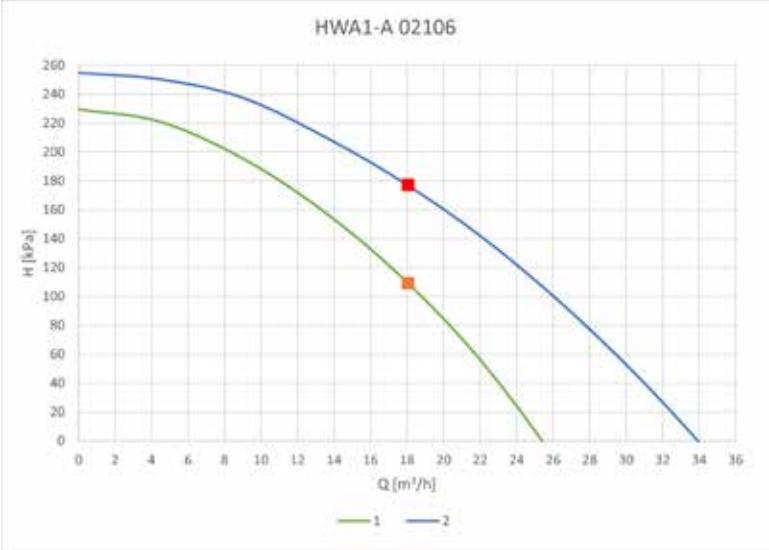


dP = plate heat exchanger pressure drop
Q = water flow + 35% ethylene glycol flow rate

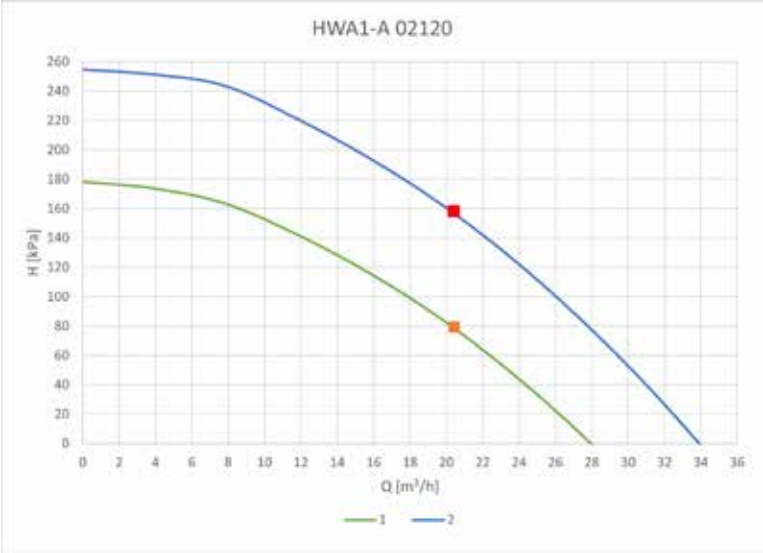
6.2 USEFUL HEAD FOR WATER AS CARRIER FLUID

Below are the head (H) - flow (Q) characteristic curves net of the pressure drops of the hydronic kit with the pump at maximum speed. Curve one (1) is related to the standard pressure pump and curve two (2) is related to the high pressure pump. On each curve the optimal operating point is highlighted under the conditions (1) of the technical data. The plant must be designed in such a way as to guarantee the nominal flow rate relative to the work points shown. Data are referred to water as carrier fluid.

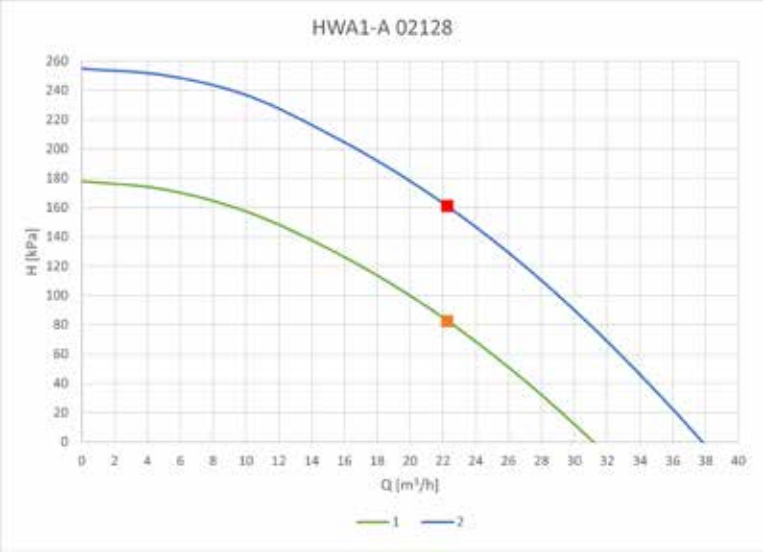
HWA1-A 02106			
Standard head pump		High head pump	
Water flow [m³/h]	Available pressure [kPa]	Water flow [m³/h]	Available pressure [kPa]
0,0	229,5	0,0	254,7
4,4	221,0	4,4	250,3
8,9	196,3	8,9	237,9
13,3	159,8	13,3	211,5
17,8	112,5	17,8	179,0
22,2	52,9	22,2	139,9



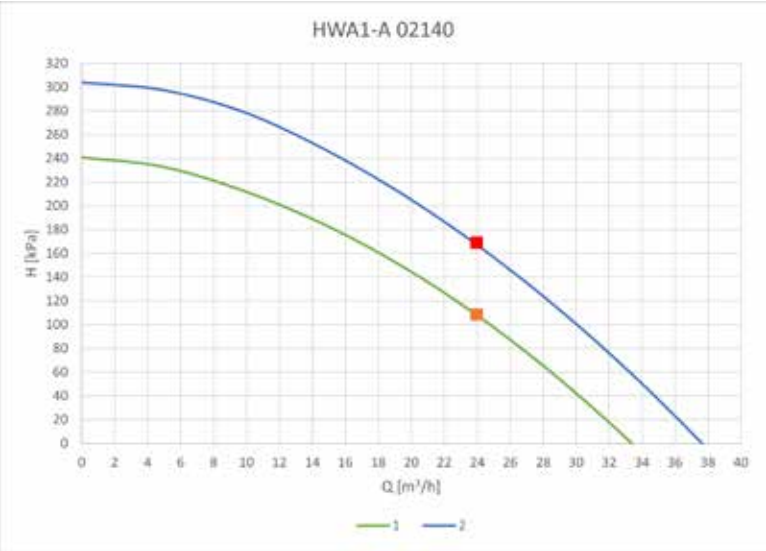
HWA1-A 02120			
Standard head pump		High head pump	
Water flow [m³/h]	Available pressure [kPa]	Water flow [m³/h]	Available pressure [kPa]
0,0	178,1	0,0	254,7
3,9	173,7	3,9	251,3
7,8	163,5	7,8	243,8
11,7	143,0	11,7	221,9
15,6	117,6	15,6	195,9
19,4	87,2	19,4	165,3
23,3	50,8	23,3	128,9
27,2	8,6	27,2	86,7



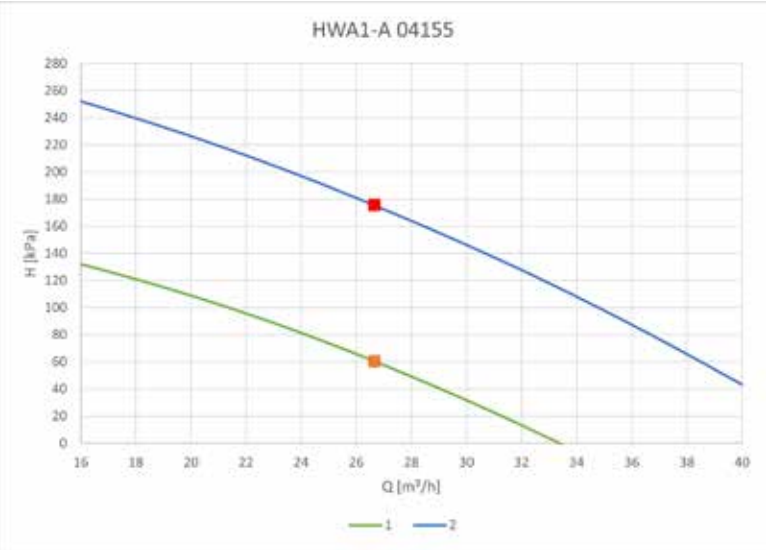
HWA1-A 02128			
Standard head pump		High head pump	
Water flow [m³/h]	Available pressure [kPa]	Water flow [m³/h]	Available pressure [kPa]
0,0	178,1	0,0	254,7
5,0	172,5	5,0	250,3
10,0	157,4	10,0	236,8
15,0	132,1	15,0	210,5
20,0	99,9	20,0	178,0
25,0	59,9	25,0	138,0
30,0	12,1	30,0	90,0



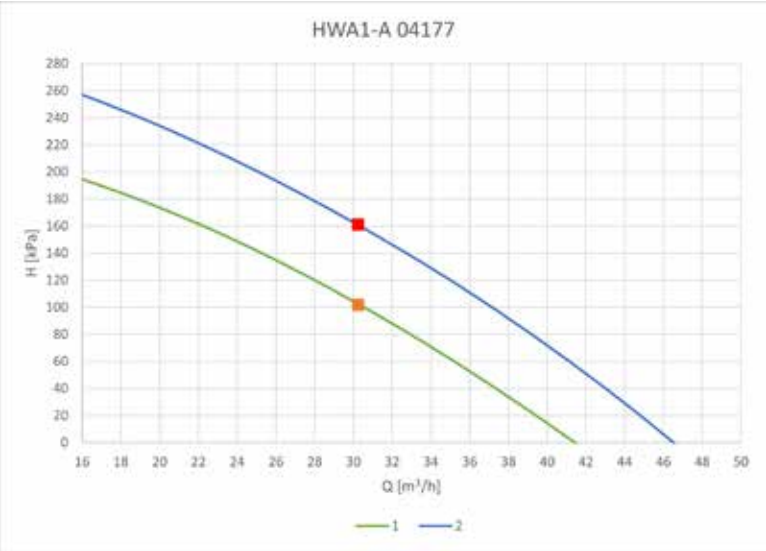
HWA1-A 02140			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
0,0	241,0	0,0	304,0
5,0	232,9	5,0	297,3
10,0	211,9	10,0	278,0
15,0	182,5	15,0	245,7
20,0	144,6	20,0	205,1
25,0	97,8	25,0	156,7
30,0	42,3	30,0	100,6



HWA1-A 04155			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
10,0	159,8	10,0	283,9
13,3	145,5	13,3	267,5
16,7	128,5	16,7	248,1
20,0	108,9	20,0	226,4
23,3	86,3	23,3	202,3
26,7	60,4	26,7	175,4
30,0	31,8	30,0	146,3
33,3	0,4	33,3	114,7

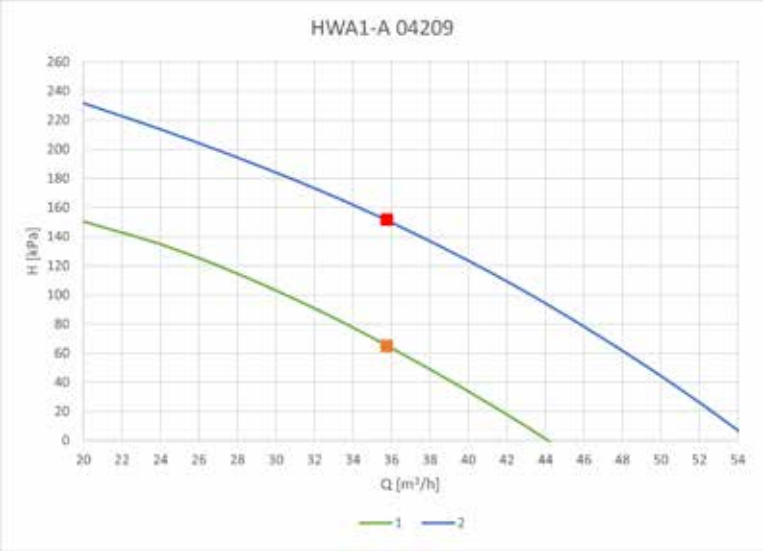


HWA1-A 04177			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
15,0	199,5	15,0	262,6
18,9	179,9	18,9	240,9
22,8	156,7	22,8	216,2
26,7	130,0	26,7	188,6
30,6	99,9	30,6	158,2
34,4	66,9	34,4	125,1
38,3	30,7	38,3	88,6



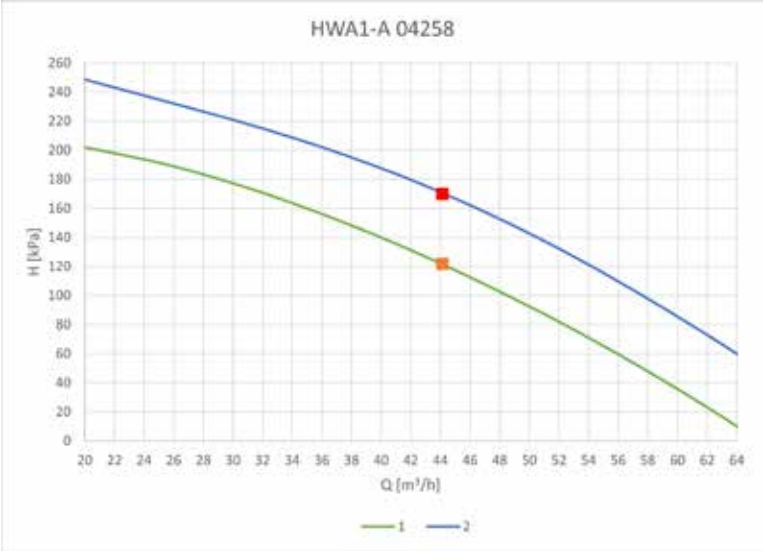
HWA1-A 04184			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
15,0	199,5	15,0	262,6
18,9	179,9	18,9	240,9
22,8	156,7	22,8	216,2
26,7	130,0	26,7	188,6
30,6	99,9	30,6	158,2
34,4	66,9	34,4	125,1
38,3	30,7	38,3	88,6

HWA1-A 04209			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
20,0	150,4	20,0	231,8
24,4	132,8	24,4	211,7
28,9	109,6	28,9	189,9
33,3	82,2	33,3	165,9
37,8	50,6	37,8	138,4
42,2	16,1	42,2	107,8

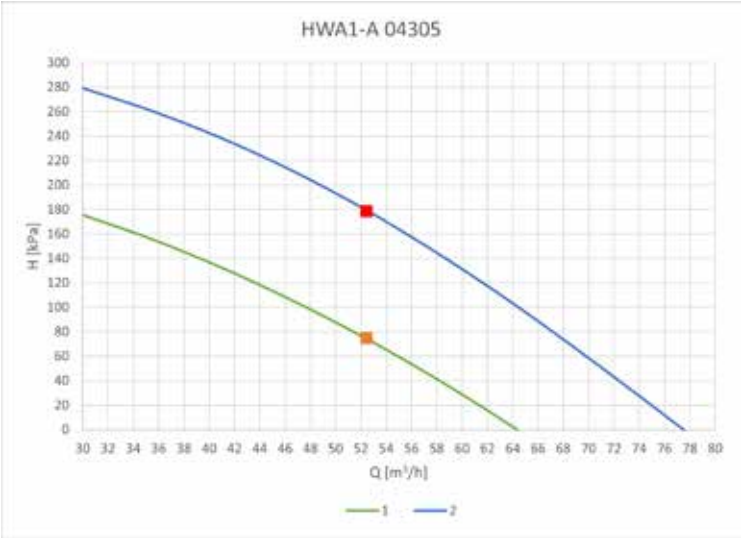


HWA1-A 04239			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
20,0	157,8	20,0	239,2
25,0	141,4	25,0	220,3
30,0	119,0	30,0	200,0
35,0	92,0	35,0	177,2
40,0	61,1	40,0	150,9
45,0	27,1	45,0	120,7

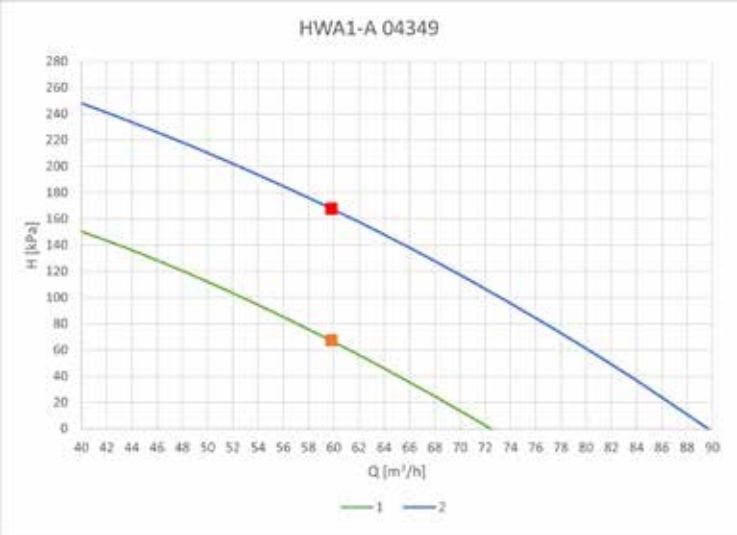
HWA1-A 04258			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
20,0	202,0	20,0	248,7
25,6	190,0	25,6	233,4
31,1	173,6	31,1	217,7
36,7	153,5	36,7	199,9
42,2	130,2	42,2	178,9
47,8	103,8	47,8	153,9
53,3	74,7	53,3	125,2
58,9	42,4	58,9	92,6
64,4	7,2	64,4	57,3



HWA1-A 04305			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
30,0	175,5	30,0	279,2
35,6	155,3	35,6	260,2
41,1	131,8	41,1	237,7
46,7	105,1	46,7	211,2
52,2	75,5	52,2	180,6
57,8	42,7	57,8	146,0
63,3	6,8	63,3	108,1



HWA1-A 04349			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
30,0	179,3	30,0	281,2
36,7	161,2	36,7	259,6
43,3	138,6	43,3	236,1
50,0	112,0	50,0	210,2
56,7	82,1	56,7	181,9
63,3	49,4	63,3	151,2
70,0	13,7	70,0	117,4



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

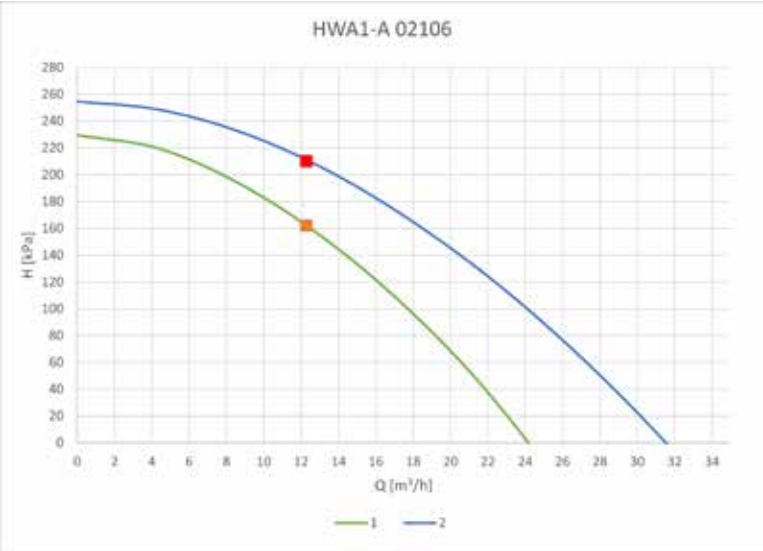
The following are the characteristic curves of the power H - rate Q net of load losses of the hydronic kit with pump at maximum speed. Curve 1 refers to standard pressure pump, curve 2 to high pressure pump.
On each curve is highlighted the minimum possibile working point with BT configuration (Tout=-8°C). The nominal data at -8°C are given in the following table:

Technical characteristics	Unit of measurement	Model HWA1-A -BT											
		02106	02120	02128	02140	04155	04177	04184	04209	04239	04258	04305	04349
Cooling capacity	kW	61,9	70,6	77,8	82,0	91,5	103	109	123	144	158	184	211
Water flow rate	l/s	3,4	3,9	4,3	4,5	5,0	5,7	6,0	6,8	7,9	8,7	10,1	11,6
Pump head P* (8)	kPa	162	120	122	164	113	164	157	125	118	168	145	135
Pump head P*AP (8)	kPa	210	199	201	226	232	224	217	201	199	213	250	232

(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.

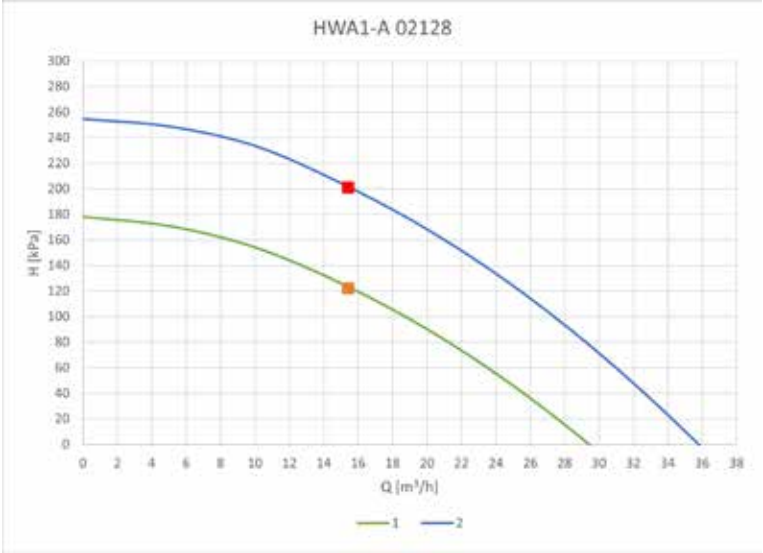
ATTENTION: In this case it is necessary to carefully evaluate the volumetric flow rate of the working point and verify the resulting pressure. In most cases only the high pressure pump (hydronic kit /PSAP, /PDAD, /PSAP/SI, /PDAP/SI) satisfy the needs.

HWA1-A 02106			
Standard head pump		High head pump	
Water flow [m³/h]	Available pressure [kPa]	Water flow [m³/h]	Available pressure [kPa]
0,0	229,5	0,0	254,7
4,4	219,3	4,4	248,5
8,9	191,9	8,9	231,3
13,3	151,5	13,3	203,9
17,8	99,2	17,8	166,9
22,2	34,0	22,2	121,8
26,7	-49,9	26,7	68,1



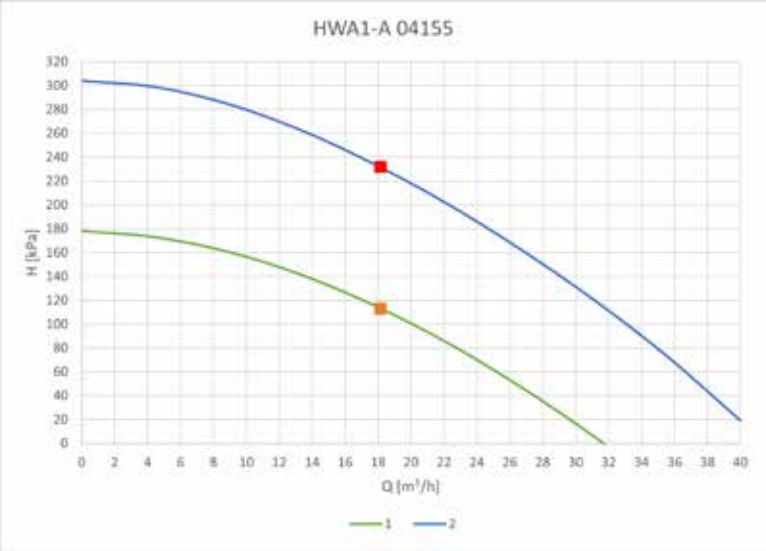
HWA1-A 02120			
Standard head pump		High head pump	
Water flow [m³/h]	Available pressure [kPa]	Water flow [m³/h]	Available pressure [kPa]
0,0	178,1	0,0	254,7
3,9	172,1	3,9	249,8
7,8	158,5	7,8	236,7
11,7	136,7	11,7	215,1
15,6	107,9	15,6	186,3
19,4	72,7	19,4	151,2
23,3	30,8	23,3	109,3
27,2	-17,1	27,2	61,2
31,1	-71,6	31,1	6,4

HWA1-A 02128			
Standard head pump		High head pump	
Water flow [m³/h]	Available pressure [kPa]	Water flow [m³/h]	Available pressure [kPa]
0,0	178,1	0,0	254,7
5,0	171,0	5,0	248,8
10,0	154,3	10,0	233,7
15,0	126,1	15,0	204,5
20,0	90,2	20,0	168,4
25,0	46,1	25,0	124,2
30,0	-6,5	30,0	71,4
35,0	-66,6	35,0	10,4



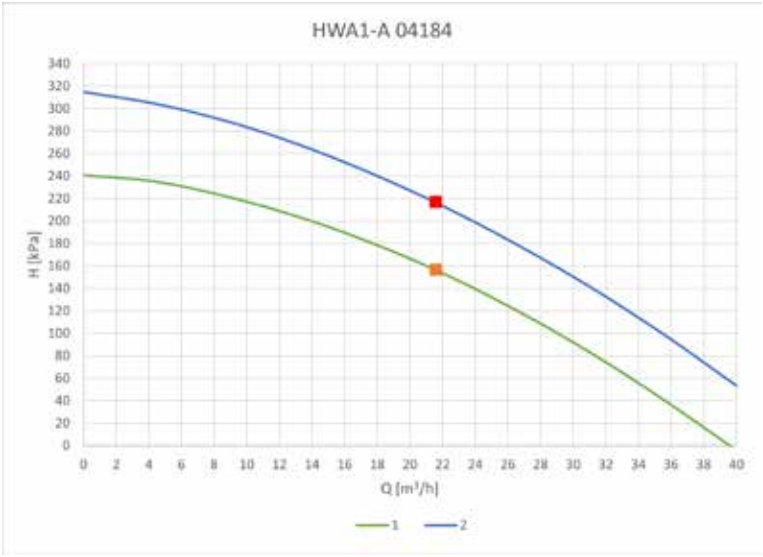
HWA1-A 02140			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
0,0	241,0	0,0	304,0
5,0	231,1	5,0	295,6
10,0	207,5	10,0	273,7
15,0	174,2	15,0	237,3
20,0	131,3	20,0	191,8
25,0	78,8	25,0	137,7
30,0	16,9	30,0	75,3
35,0	-54,6	35,0	3,7
40,0	-135,1	40,0	-35,2

HWA1-A 04155			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
0,0	178,1	0,0	304,0
4,4	172,9	4,4	298,8
8,9	160,6	8,9	284,6
13,3	141,3	13,3	262,5
17,8	115,5	17,8	234,1
22,2	84,3	22,2	200,8
26,7	47,3	26,7	162,6
31,1	5,7	31,1	120,4
35,6	-40,9	35,6	73,0

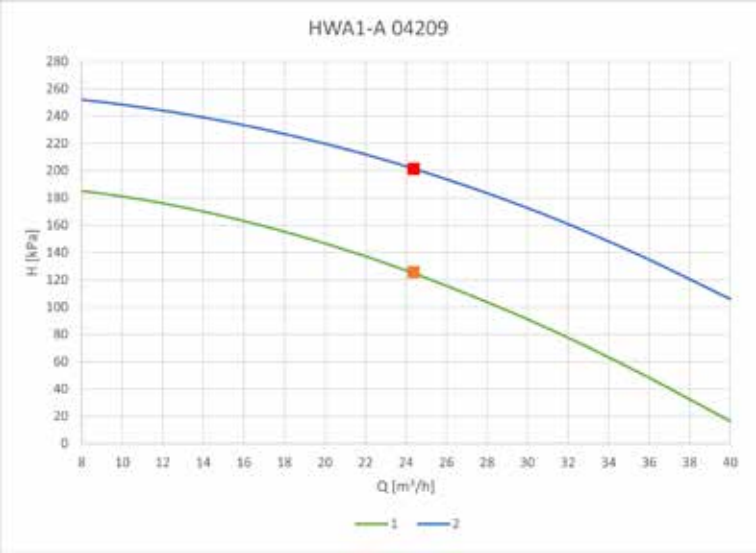


HWA1-A 04177			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
0,0	241,0	0,0	314,7
4,4	235,1	4,4	304,1
8,9	221,5	8,9	288,3
13,3	203,0	13,3	267,2
17,8	179,9	17,8	241,4
22,2	152,2	22,2	211,8
26,7	119,5	26,7	178,1
31,1	82,5	31,1	140,7
35,6	40,9	35,6	99,1

HWA1-A 04184			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
0,0	241,0	0,0	314,7
4,4	235,1	4,4	304,1
8,9	221,5	8,9	288,3
13,3	203,0	13,3	267,2
17,8	179,9	17,8	241,4
22,2	152,2	22,2	211,8
26,7	119,5	26,7	178,1
31,1	82,5	31,1	140,7
35,6	40,9	35,6	99,1



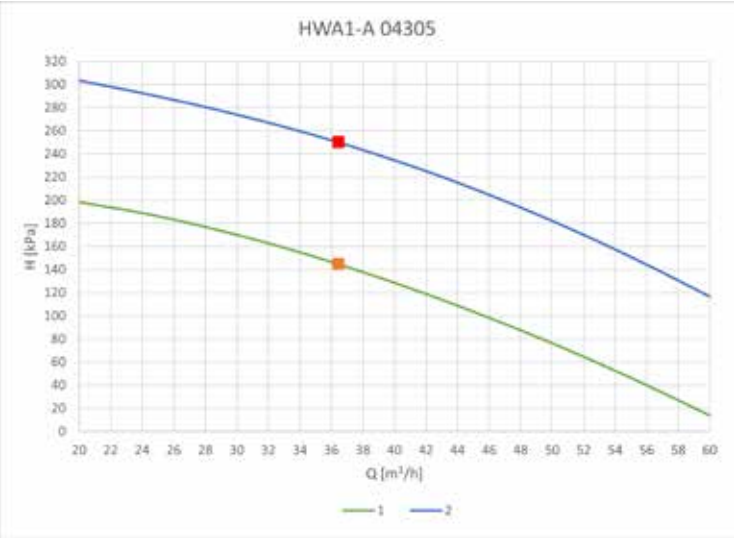
HWA1-A 04209			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
0,0	191,2	0,0	259,8
4,4	189,6	4,4	256,4
8,9	183,4	8,9	250,4
13,3	172,1	13,3	240,8
17,8	156,2	17,8	227,6
22,2	136,1	22,2	210,9
26,7	111,7	26,7	190,4
31,1	83,7	31,1	166,2
35,6	51,7	35,6	137,9



HWA1-A 04239			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
10,0	183,9	10,0	251,1
14,4	174,1	14,4	243,3
18,9	160,3	18,9	232,5
23,3	143,1	23,3	218,9
27,8	122,3	27,8	201,9
32,2	98,4	32,2	181,9
36,7	71,2	36,7	158,3
41,1	41,3	41,1	131,5
45,6	8,3	45,6	101,2

HWA1-A 04258			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
10,0	214,9	10,0	254,0
14,4	209,8	14,4	249,5
18,9	202,2	18,9	242,9
23,3	192,4	23,3	234,3
27,8	179,9	27,8	223,3
32,2	165,1	32,2	210,0
36,7	147,6	36,7	194,2
41,1	127,8	41,1	176,0
45,6	105,7	45,6	155,2

HWA1-A 04305			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
20,0	198,4	20,0	303,3
24,4	187,8	24,4	291,3
28,9	174,1	28,9	277,6
33,3	157,7	33,3	262,1
37,8	138,9	37,8	244,2
42,2	118,0	42,2	224,0
46,7	94,9	46,7	200,9
51,1	70,0	51,1	175,4
55,6	42,9	55,6	147,1



HWA1-A 04349			
Standard head pump		High head pump	
Water flow [m³/h]	Useful head [kPa]	Water flow [m³/h]	Useful head [kPa]
20,0	195,9	20,0	291,6
24,4	187,7	24,4	282,9
28,9	177,1	28,9	272,3
33,3	164,5	33,3	260,1
37,8	149,8	37,8	246,0
42,2	133,4	42,2	230,4
46,7	115,1	46,7	213,1
51,1	95,4	51,1	194,4
55,6	74,1	55,6	174,1
60,0	51,5	60,0	152,6

6.4 PUMP ABSORPTIONS

The nominal absorption of the pumps are shown below.

HWA1-A		02106	02120	02128	02140	04155	04177	04184	04209	04239	04258	04305	04349
Standard head pump	kW	1,72	1,72	1,72	2,55	1,72	2,55	2,55	2,55	2,55	3,44	3,44	4,56
	A	3,8	3,8	4,7	4,7	4,7	4,7	4,7	4,7	4,7	6,4	6,4	8,7
High head 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 at full load and under normal test conditions in cooling mode, according to the provisions of EU Regulation 2016/2281 (bs outdoor air temperature = 35 ° C, inlet-outlet water temperature = 12-7 ° 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 EN 12102-1:2017, which describes 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 STANDARD VERSION NOISE POWER AND PRESSURE

Model HWA1-A	Sound power level by octave bands [dB(A)]							Level of noise power Lw(A) [dB(A)]	Level of noise pressure at 1mt [dB(A)]	Level of noise pressure at 10mt [dB(A)]
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz			
02106	57,6	74,2	78,1	79,8	82,4	76,2	66,2	86,0	67,6	54,0
02120	57,6	75,1	78,0	79,7	82,3	76,1	66,4	86,0	67,6	54,0
02128	58,3	76,8	78,8	80,6	83,2	76,9	67,3	87,0	68,6	55,0
02140	58,0	75,3	80,5	82,0	82,0	76,6	67,4	87,0	68,0	54,9
04155	59,7	75,9	81,7	82,0	79,6	76,7	69,7	87,0	68,0	54,9
04177	59,0	75,8	81,1	81,8	83,8	78,1	68,9	88,0	69,0	55,9
04184	58,9	75,7	81,0	81,8	83,9	78,2	69,1	88,0	69,0	55,9
04209	59,6	76,5	80,3	81,8	84,4	78,2	68,3	88,0	68,9	55,9
04239	59,6	77,4	80,2	81,7	84,3	78,1	68,5	88,0	68,9	55,9
04258	59,5	78,2	80,1	81,7	84,2	78,1	68,7	88,0	68,9	55,9
04305	59,2	77,9	81,6	82,9	83,0	77,7	69,2	88,0	68,3	55,8
04349	60,0	79,0	84,0	85,5	84,1	79,4	70,9	90,0	70,3	57,8

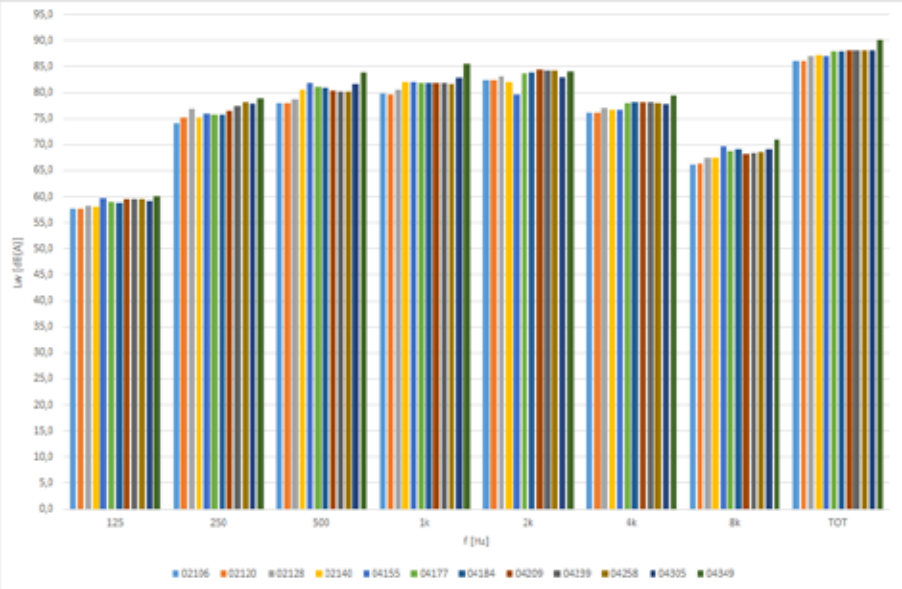
7.2 NOISE POWER AND PRESSURE OF SL SILENCED VERSION

Model HWA1-A	Sound power level by octave bands [dB(A)]							Level of noise power Lw(A) [dB(A)]	Level of noise pressure at 1mt [dB(A)]	Level of noise pressure at 10mt [dB(A)]
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz			
02106	57,6	73,8	77,2	78,9	81,0	75,3	65,2	85,0	66,6	53,0
02120	57,6	74,7	77,1	78,8	81,0	75,2	65,4	85,0	66,6	53,0
02128	58,2	76,4	77,9	79,7	81,8	76,0	66,3	86,0	67,6	54,0
02140	57,9	74,8	79,6	81,0	80,6	75,7	66,4	86,0	67,0	53,9
04155	59,6	75,4	80,7	81,0	78,1	75,7	68,7	86,0	67,0	53,9
04177	58,9	75,3	80,2	80,9	82,4	77,2	67,9	87,0	68,0	55,9
04184	58,8	75,3	80,1	80,9	82,5	77,2	68,1	87,0	68,0	55,9
04209	59,5	76,1	79,4	80,9	83,1	77,3	67,4	87,0	67,9	54,9
04239	59,5	77,0	79,3	80,8	83,0	77,2	67,5	87,0	67,9	54,9
04258	59,5	77,7	79,2	80,8	82,9	77,1	67,7	87,0	67,9	54,9
04305	59,1	77,5	80,7	82,0	81,6	76,7	68,2	87,0	67,3	54,8
04349	59,9	78,5	83,0	84,5	82,7	78,4	69,9	89,0	69,3	56,8

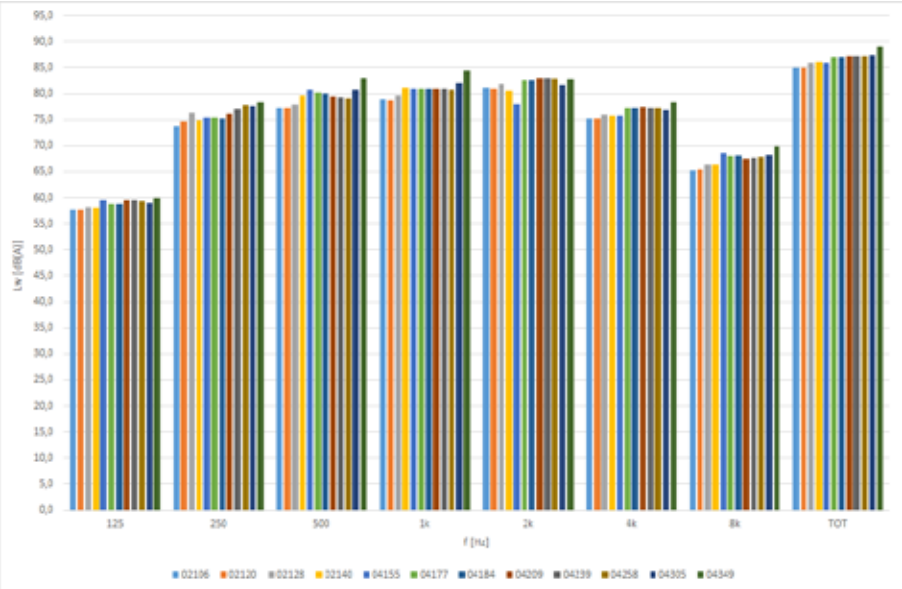
7.3 NOISE POWER AND PRESSURE SSL SUPER SILENT VERSION

Model HWA1-A	Sound power level by octave bands [dB(A)]							Level of noise power Lw(A) [dB(A)]	Level of noise pressure at 1mt [dB(A)]	Level of noise pressure at 10mt [dB(A)]
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz			
02106	56,9	74,2	76,3	75,2	78,5	72,8	62,5	83,0	64,6	51,0
02120	56,8	74,9	76,1	75,1	78,4	72,7	62,7	83,0	64,6	51,0
02128	57,4	76,5	76,9	76,0	79,2	73,5	63,7	84,0	65,6	52,0
02140	57,2	75,0	78,1	78,1	78,0	73,2	63,9	84,0	65,0	51,9
04155	59,0	76,1	79,3	77,1	75,2	73,0	66,3	84,0	65,0	51,9
04177	58,2	75,8	78,8	77,4	79,9	74,9	65,5	85,0	66,0	52,9
04184	58,2	75,7	78,6	77,5	80,0	74,9	65,8	85,0	66,0	52,9
04209	58,8	76,4	78,5	77,3	80,5	74,9	64,7	85,0	65,9	52,9
04239	58,7	77,2	78,3	77,2	80,4	74,8	64,9	85,0	65,9	52,9
04258	58,7	77,8	78,2	77,1	80,2	74,7	65,1	85,0	65,9	52,9
04305	59,0	77,4	79,5	79,0	78,7	74,1	65,4	85,0	65,3	52,8
04349	59,8	78,4	81,8	81,7	79,7	75,8	67,2	87,0	67,3	54,8

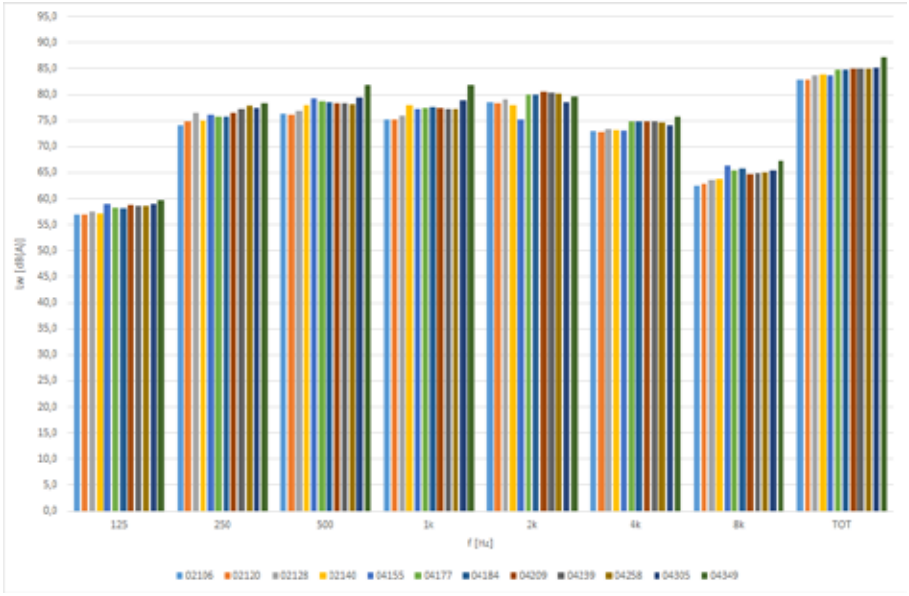
HWA1-A standard version



HWA1-A Silenced version



HWA1-A 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.

Insufficient water flow rates can cause evaporation temperatures to fall too low, triggering the safety devices and shutting down the unit and, in some extreme cases, leading to ice formation in the evaporator and consequently to serious faults in the refrigeration circuit.

For greater precision, we enclose below the tables with the minimum flow rates to be ensured to the plate heat exchanger to guarantee correct operation according to the model (please note: the safety device is used to prevent the anti-freeze probe from tripping due to lack of flow but does not guarantee the minimum water flow rate required for correct operation of the unit).

HWA1-A model	02106	02120	02128	02140	04155	04177	04184	04209	04239	04258	04305	04349
Minimum water flow to be assured in chiller mode (condition (1) technical sheet) [l/s]	3,1	3,6	3,8	4,2	4,6	5,3	5,5	6,2	7,1	7,7	9,1	10,4
Maximum water flow to be assured in chiller mode (condition (1) technical sheet) [l/s]	8,4	9,5	10,2	11,1	12,3	14,1	14,6	16,6	19,0	20,5	24,3	27,8
Minimum safety device water flow rate* [l/s]	1,72	1,72	2,43	1,96	2,18	2,62	2,62	2,62	3,44	4,55	4,55	4,55
Maximum safety device water flow rate* [l/s]	1,85	1,85	2,61	2,11	2,33	2,81	2,81	2,81	3,69	4,89	4,89	4,89

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

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 speed 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

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 feasibility study and evaluation of changes to be made according to requests. The maximum temperature that can be kept steady at the evaporator outlet is 18 ° C.

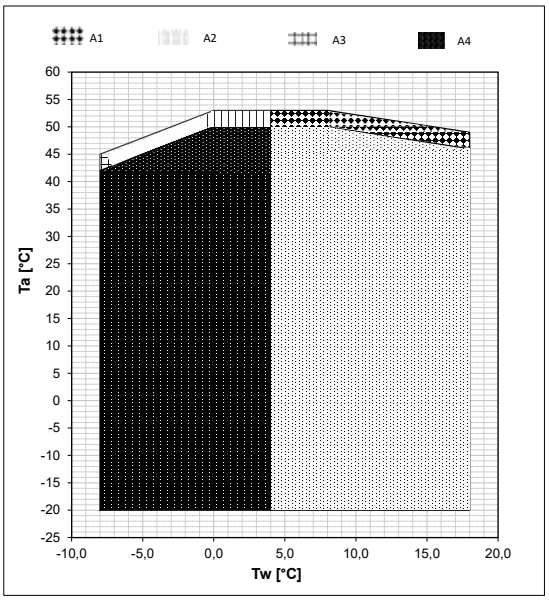
8.3 AMBIENT AIR TEMPERATURE AND SUMMARY TABLE

The outdoor air temperature can go up to +50°C under certain water conditions, falling to +46°C when the outgoing water is +18°C

HWA1-A		
Standard version ambient temperature	Minimum -20°C	Maximum 50°C
Standard version outlet water temperature	Minimun 4°C	Maximum 18°C
Ambient temperature BT version	Minimum -20°C	Maximum 50°C
Water outlet temperature BT version	Minimum -8°C	Maximum 18°C

Below are the graphed operating limits.

CHILLER MODE



A1 = HWA1-A partial load
A2 = HWA1-A
A3 = HWA1-A BT partial load
A4 = HWA1-A BT

9. PERFORMANCE TABLE

The table show the values capacity, power input and efficiency values for different outside air temperatures. The data shown are calculated according to EN 14511:2018. The following is indicative and may be subject to change

COOLING																		
Model HWA1-A	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]
02106	20	111	25,9	4,26	117	26,4	4,45	128	27,1	4,74	134	27,3	4,92	144	27,7	5,18	156	28,6	5,46
	25	107	27,8	3,86	114	28,3	4,03	125	29,0	4,29	130	29,3	4,46	139	29,6	4,70	151	30,6	4,96
	30	103	30,2	3,43	110	30,7	3,58	120	31,4	3,82	126	31,7	3,98	135	32,1	4,20	146	33,0	4,43
	35	99,1	33,1	3,00	105	33,5	3,13	115	34,4	3,35	121	34,6	3,49	129	34,9	3,69	139	35,7	3,88
	40	93,7	36,3	2,58	99,5	36,8	2,71	109	37,5	2,90	114	37,6	3,02	121	37,9	3,20	131	38,7	3,39
	45	87,6	39,6	2,21	92,9	40,0	2,32	102	40,7	2,50	106	40,8	2,61	114	41,0	2,77	123	41,9	2,94
02120	20	125	30,0	4,17	133	30,5	4,35	145	31,3	4,62	151	31,6	4,79	162	32,1	5,04	175	33,0	5,31
	25	122	32,1	3,79	129	32,6	3,95	140	33,5	4,20	147	33,8	4,35	157	34,2	4,58	170	35,2	4,83
	30	117	34,6	3,38	124	35,2	3,53	136	36,1	3,76	142	36,4	3,90	151	36,8	4,10	164	37,8	4,34
	35	112	37,7	2,97	119	38,3	3,10	130	39,2	3,32	136	39,5	3,44	144	39,9	3,62	155	40,8	3,79
	40	106	41,2	2,57	112	41,8	2,69	122	42,6	2,87	128	42,9	2,98	136	43,2	3,15	147	44,2	3,33
	45	99,0	44,8	2,21	105	45,4	2,32	115	46,3	2,48	120	46,5	2,58	128	46,8	2,73	138	47,8	2,89
02128	20	135	34,7	3,88	143	35,3	4,04	155	36,3	4,29	162	36,5	4,43	171	37,0	4,64	186	38,0	4,89
	25	130	37,1	3,52	138	37,7	3,67	151	38,6	3,90	157	38,9	4,03	167	39,4	4,23	180	40,5	4,46
	30	126	39,9	3,16	134	40,5	3,29	145	41,6	3,50	152	41,9	3,62	161	42,3	3,80	174	43,4	4,01
	35	121	43,3	2,78	130	44,2	2,93	139	45,0	3,09	144	45,3	3,19	153	45,7	3,34	164	46,8	3,50
	40	113	47,1	2,41	120	47,8	2,51	131	48,8	2,68	136	49,1	2,77	144	49,4	2,91	155	50,6	3,07
	45	106	51,2	2,07	112	51,9	2,16	122	52,9	2,31	127	53,1	2,40	135	53,5	2,53	146	54,8	2,67
02140	20	146	34,1	4,30	156	34,7	4,48	170	35,7	4,76	178	36,1	4,92	189	36,6	5,17	206	37,9	5,43
	25	142	36,5	3,89	151	37,2	4,06	165	38,3	4,31	173	38,6	4,47	184	39,2	4,69	200	40,4	4,94
	30	137	39,7	3,45	146	40,3	3,61	159	41,5	3,84	166	41,8	3,98	177	42,3	4,19	193	43,6	4,42
	35	131	43,6	3,01	139	44,3	3,15	152	45,4	3,36	159	45,7	3,49	170	46,2	3,68	185	47,5	3,89
	40	125	48,2	2,58	132	48,8	2,71	144	49,8	2,90	151	49,9	3,02	160	50,2	3,20	174	51,3	3,39
	45	116	52,7	2,20	123	53,2	2,32	135	54,1	2,49	141	54,2	2,60	150	54,3	2,76	163	55,5	2,94
04155	20	165	38,4	4,28	175	39,0	4,48	191	39,9	4,78	200	40,2	4,97	214	40,7	5,26	232	41,7	5,56
	25	159	41,3	3,86	169	41,9	4,04	184	42,8	4,31	193	43,1	4,48	207	43,6	4,74	224	44,7	5,01
	30	153	44,8	3,41	162	45,4	3,57	177	46,4	3,82	186	46,7	3,98	199	47,2	4,21	215	48,4	4,44
	35	146	49,2	2,96	155	49,9	3,11	169	50,9	3,32	177	51,2	3,45	189	51,7	3,65	204	52,9	3,87
	40	137	54,5	2,52	146	55,1	2,65	159	56,2	2,84	167	56,4	2,96	178	56,7	3,14	193	57,8	3,33
	45	128	60,0	2,13	136	60,5	2,24	148	61,5	2,41	155	61,6	2,52	166	61,8	2,69	180	62,9	2,86
04177	20	187	44,1	4,23	198	44,8	4,42	216	46,0	4,71	226	46,5	4,86	240	47,3	5,07	261	48,9	5,33
	25	181	47,3	3,82	192	48,0	4,00	210	49,2	4,26	219	49,8	4,40	233	50,6	4,60	253	52,1	4,85
	30	174	51,2	3,40	185	52,0	3,55	202	53,3	3,79	211	53,8	3,92	224	54,5	4,11	243	56,1	4,33
	35	166	56,0	2,97	176	56,7	3,10	193	58,1	3,32	201	58,6	3,43	213	59,4	3,60	230	60,9	3,77
	40	157	61,5	2,55	166	62,4	2,67	181	63,6	2,85	189	64,0	2,95	201	64,5	3,11	217	66,1	3,29
	45	146	67,3	2,17	155	68,1	2,28	169	69,3	2,44	177	69,7	2,54	188	70,2	2,68	204	71,7	2,84
04184	20	195	49,1	3,97	207	49,9	4,14	226	51,3	4,40	237	51,8	4,57	253	52,6	4,81	275	54,1	5,07
	25	189	52,6	3,59	200	53,4	3,74	218	54,9	3,97	229	55,4	4,13	245	56,2	4,36	265	57,9	4,58
	30	181	56,8	3,20	193	57,7	3,34	210	59,2	3,55	220	59,8	3,67	234	60,7	3,86	253	62,6	4,05
	35	173	61,9	2,79	182	62,9	2,90	199	64,5	3,09	209	65,2	3,20	223	66,1	3,37	239	67,8	3,52
	40	162	67,9	2,39	172	68,8	2,50	188	70,3	2,67	196	70,9	2,77	209	71,7	2,92	226	73,5	3,07
	45	151	73,9	2,05	161	74,9	2,14	175	76,5	2,29	183	76,8	2,38	196	77,3	2,54	212	78,0	2,72
04209	20	219	52,0	4,20	232	52,9	4,39	254	54,3	4,67	267	54,9	4,86	286	55,7	5,14	311	57,4	5,41
	25	212	55,8	3,80	226	56,7	3,98	246	58,2	4,23	259	58,7	4,41	278	59,5	4,67	302	61,3	4,92
	30	205	60,4	3,39	217	61,4	3,54	238	62,9	3,78	250	63,4	3,94	268	64,2	4,17	291	66,0	4,41
	35	196	66,1	2,97	208	67,1	3,10	228	68,7	3,32	240	69,2	3,46	257	69,9	3,68	277	71,6	3,87
	40	186	72,7	2,56	197	73,6	2,68	215	75,0	2,87	226	75,4	3,00	242	75,9	3,19	262	77,6	3,38
	45	174	79,1	2,20	185	80,0	2,31	202	81,5	2,47	212	81,8	2,59	227	82,2	2,76	246	83,9	2,93

COOLING																		
Model HWA1-A	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]
04239	20	251	60,3	4,15	266	61,3	4,33	289	62,9	4,60	304	63,5	4,78	325	64,5	5,04	351	66,3	5,30
	25	243	64,5	3,77	258	65,5	3,93	281	67,1	4,18	294	67,7	4,35	315	68,7	4,59	342	70,7	4,83
	30	234	69,5	3,37	248	70,6	3,52	271	72,3	3,74	284	72,9	3,90	305	73,8	4,13	330	75,9	4,35
	35	224	75,7	2,97	238	76,8	3,10	260	78,5	3,31	272	79,1	3,44	291	79,9	3,65	314	81,9	3,84
	40	213	82,5	2,58	225	83,6	2,70	245	85,4	2,87	257	85,8	2,99	275	86,3	3,18	297	88,3	3,36
	45	198	89,9	2,21	210	90,9	2,31	229	92,6	2,47	240	93,0	2,58	257	93,5	2,75	279	95,5	2,92
04258	20	272	70,1	3,87	287	71,3	4,03	312	73,1	4,26	327	73,9	4,43	350	75,0	4,67	378	77,2	4,89
	25	263	74,8	3,52	278	76,0	3,66	303	78,0	3,88	318	78,7	4,03	340	79,9	4,26	367	82,2	4,47
	30	253	80,5	3,15	268	81,7	3,28	292	83,8	3,49	306	84,5	3,62	328	85,6	3,83	354	88,0	4,02
	35	243	87,3	2,78	257	88,5	2,90	279	90,6	3,07	292	91,4	3,19	311	92,4	3,37	333	94,6	3,52
	40	228	95,0	2,40	241	96,3	2,51	262	98,2	2,67	274	98,9	2,77	293	99,8	2,94	316	102	3,09
	45	213	103	2,07	226	105	2,16	245	107	2,30	257	107	2,40	275	108	2,55	297	110	2,69
04305	20	321	76,5	4,20	340	77,8	4,37	371	80,0	4,63	389	80,9	4,81	417	82,3	5,07	452	85,0	5,31
	25	312	81,9	3,81	330	83,2	3,97	360	85,5	4,21	378	86,4	4,37	405	87,7	4,61	438	90,5	4,84
	30	300	88,6	3,39	318	90,0	3,54	347	92,2	3,76	364	93,1	3,91	390	94,4	4,14	423	97,1	4,35
	35	287	96,9	2,97	305	98,3	3,10	332	101	3,30	349	101	3,44	375	103	3,65	405	105	3,85
	40	273	107	2,56	289	108	2,68	314	110	2,86	330	110	2,98	353	111	3,17	382	114	3,36
	45	254	116	2,18	269	118	2,29	294	120	2,46	308	120	2,57	331	120	2,75	358	123	2,92
04349	20	369	87,7	4,21	392	89,4	4,38	427	92,2	4,63	448	93,5	4,79	479	95,6	5,01	519	99,1	5,24
	25	358	93,6	3,82	379	95,5	3,98	413	98,2	4,21	433	99,6	4,35	463	102	4,56	503	105	4,78
	30	344	101	3,40	365	103	3,55	398	106	3,76	417	107	3,90	446	109	4,10	484	113	4,30
	35	329	110	2,98	348	112	3,10	381	115	3,31	399	116	3,44	427	118	3,62	458	121	3,78
	40	311	121	2,57	329	123	2,68	358	125	2,86	375	126	2,97	400	128	3,14	433	131	3,32
	45	289	132	2,18	307	134	2,29	334	136	2,45	350	137	2,55	374	138	2,71	406	141	2,87

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

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

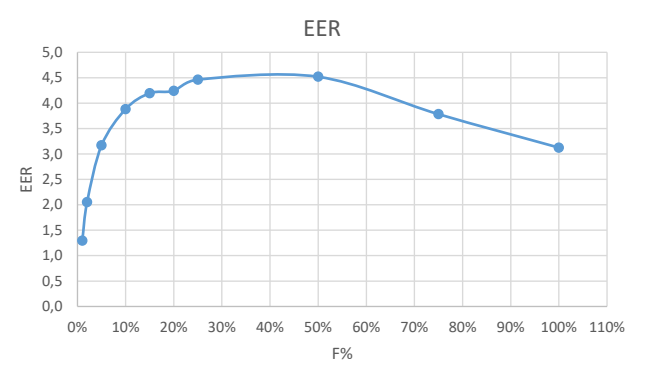
Test	Load factor	Outdoor air dry bulb temperature	Chilled water inlet / outlet temperature of fan coils
1	100%	35	12/7
2	75%	30	*)/7
3	50%	25	*)/7
4	25%	20	*)/7

*) inlet water temperature depends by the full load water flow

9.1.1 Model HWA1-A 02106

Outdoor air dry bulb temperature [°C]	Load factor F%	EER
35	100%	3,13
30	75%	3,78
25	50%	4,52
20	25%	4,46

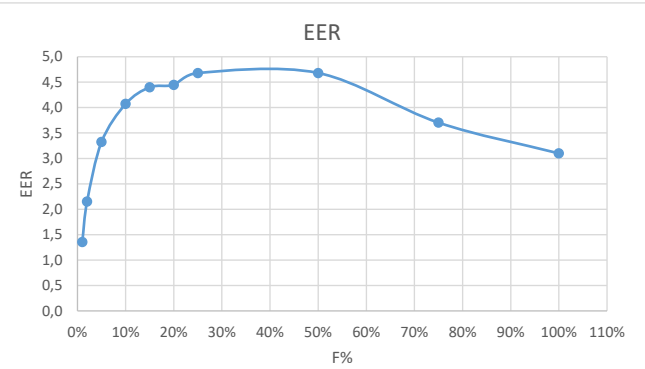
C	Load factor F%	EER @20°C xC
0,95	20%	4,24
0,94	15%	4,20
0,87	10%	3,88
0,71	5%	3,17
0,46	2%	2,05
0,29	1%	1,29



9.1.2 Model HWA1-A 02120

Outdoor air dry bulb temperature [°C]	Load factor F%	EER
35	100%	3,10
30	75%	3,70
25	50%	4,68
20	25%	4,68

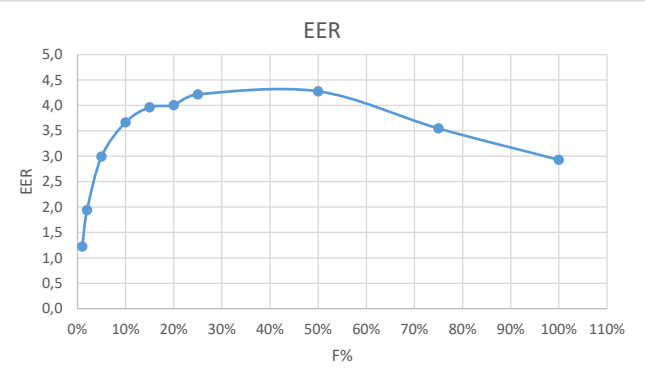
C	Load factor F%	EER @20°C xC
0,95	20%	4,45
0,94	15%	4,40
0,87	10%	4,07
0,71	5%	3,32
0,46	2%	2,15
0,29	1%	1,36



9.1.3 Model HWA1-A 02128

Outdoor air dry bulb temperature [°C]	Load factor F%	EER
35	100%	2,93
30	75%	3,55
25	50%	4,28
20	25%	4,22

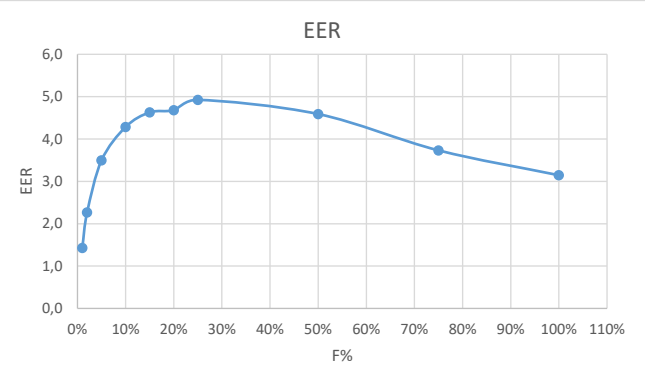
C	Load factor F%	EER @20°C xC
0,95	20%	4,01
0,94	15%	3,96
0,87	10%	3,67
0,71	5%	2,99
0,46	2%	1,94
0,29	1%	1,22



9.1.4 Model HWA1-A 02140

Outdoor air dry bulb temperature [°C]	Load factor F%	EER
35	100%	3,15
30	75%	3,73
25	50%	4,59
20	25%	4,93

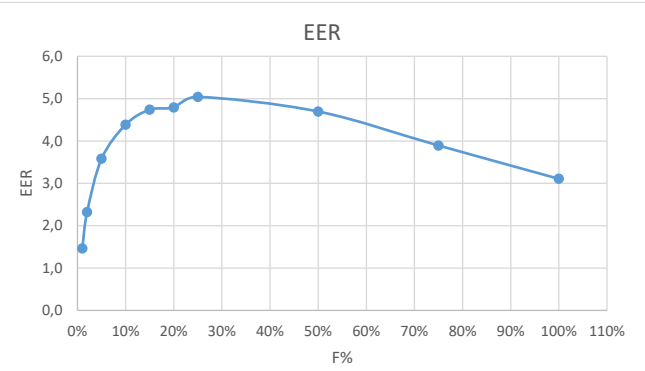
C	Load factor F%	EER @20°C xC
0,95	20%	4,68
0,94	15%	4,63
0,87	10%	4,28
0,71	5%	3,50
0,46	2%	2,27
0,29	1%	1,43



9.1.5 Model HWA1-A 04155

Outdoor air dry bulb temperature [°C]	Load factor F%	EER
35	100%	3,11
30	75%	3,89
25	50%	4,70
20	25%	5,04

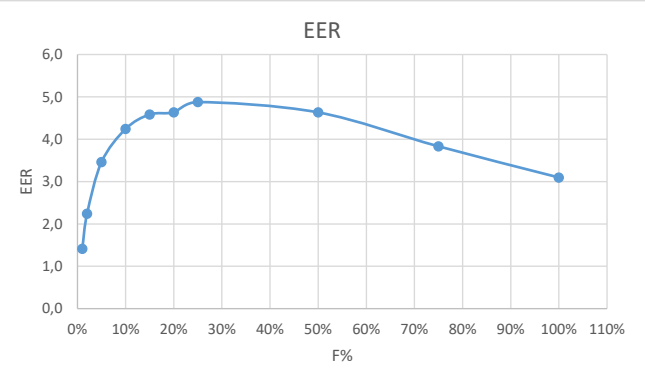
C	Load factor F%	EER @20°C xC
0,95	20%	4,79
0,94	15%	4,74
0,87	10%	4,39
0,71	5%	3,58
0,46	2%	2,32
0,29	1%	1,46



9.1.6 Model HWA1-A 04177

Outdoor air dry bulb temperature [°C]	Load factor F%	EER
35	100%	3,10
30	75%	3,83
25	50%	4,63
20	25%	4,88

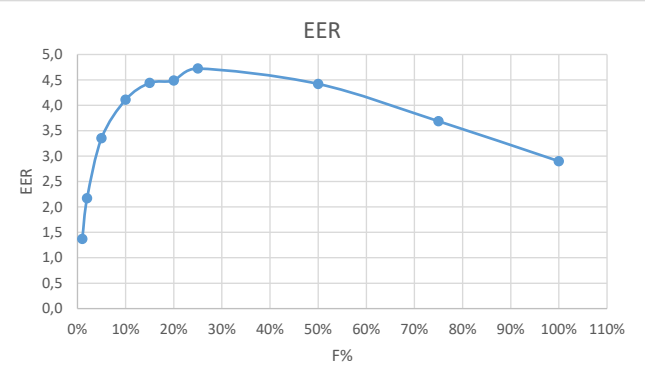
C	Load factor F%	EER @20°C xC
0,95	20%	4,63
0,94	15%	4,58
0,87	10%	4,24
0,71	5%	3,46
0,46	2%	2,24
0,29	1%	1,41



9.1.7 Model HWA1-A 04184

Outdoor air dry bulb temperature [°C]	Load factor F%	EER
35	100%	2,90
30	75%	3,69
25	50%	4,42
20	25%	4,72

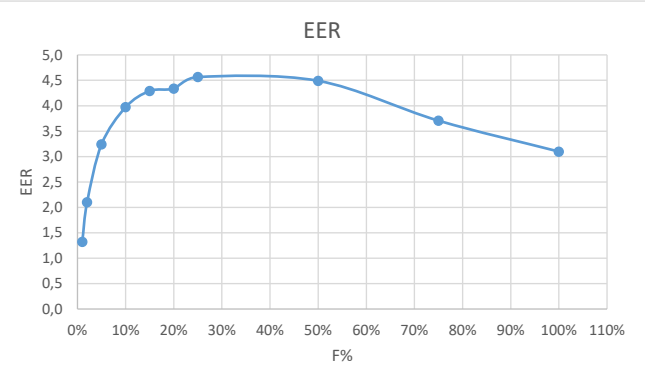
C	Load factor F%	EER @20°C xC
0,95	20%	4,49
0,94	15%	4,44
0,87	10%	4,11
0,71	5%	3,35
0,46	2%	2,17
0,29	1%	1,37



9.1.8 Model HWA1-A 04209

Outdoor air dry bulb temperature [°C]	Load factor F%	EER
35	100%	3,10
30	75%	3,71
25	50%	4,49
20	25%	4,56

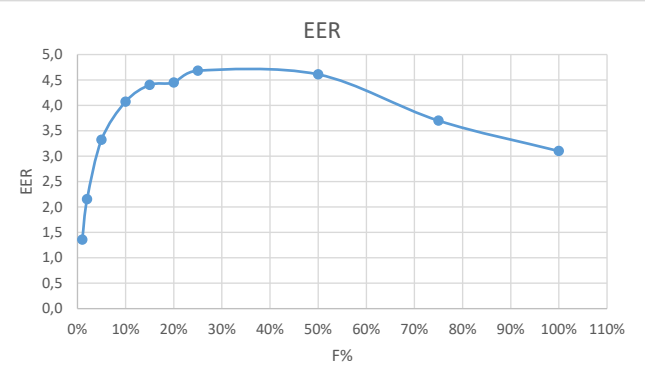
C	Load factor F%	EER @20°C xC
0,95	20%	4,34
0,94	15%	4,29
0,87	10%	3,97
0,71	5%	3,24
0,46	2%	2,10
0,29	1%	1,32



9.1.9 Model HWA1-A 04239

Outdoor air dry bulb temperature [°C]	Load factor F%	EER
35	100%	3,10
30	75%	3,70
25	50%	4,61
20	25%	4,68

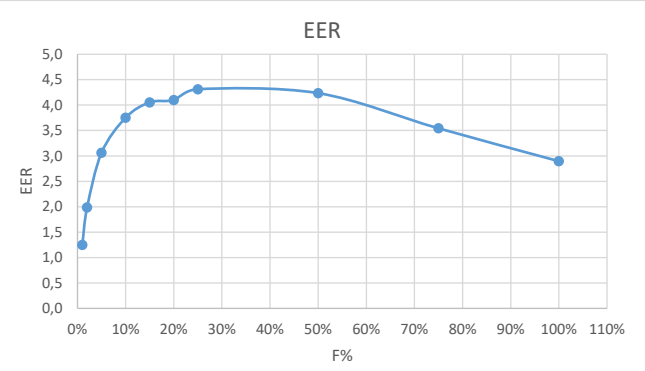
C	Load Factor%	EER @20°C xC
0,95	20%	4,45
0,94	15%	4,40
0,87	10%	4,07
0,71	5%	3,32
0,46	2%	2,15
0,29	1%	1,36



9.1.10 Model HWA1-A 04258

Outdoor air dry bulb temperature [°C]	Load factor F%	EER
35	100%	2,90
30	75%	3,54
25	50%	4,24
20	25%	4,31

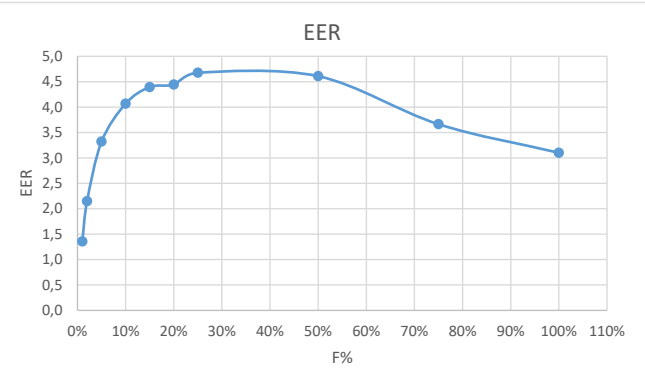
C	Load factor F%	EER @20°C xC
0,95	20%	4,10
0,94	15%	4,05
0,87	10%	3,75
0,71	5%	3,06
0,46	2%	1,98
0,29	1%	1,25



9.1.11 Model HWA1-A 04305

Outdoor air dry bulb temperature [°C]	Load factor F%	EER
35	100%	3,10
30	75%	3,66
25	50%	4,61
20	25%	4,68

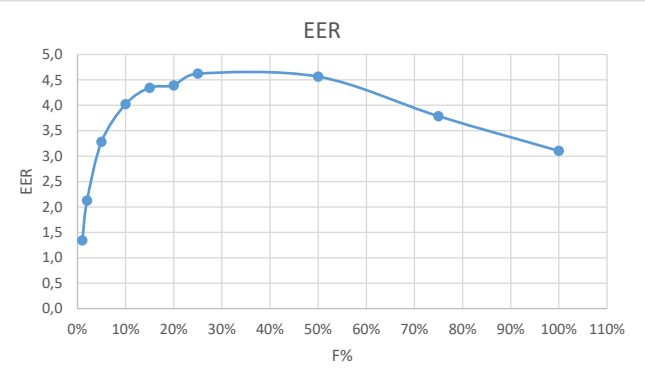
C	Load factor F%	EER @20°C xC
0,95	20%	4,44
0,94	15%	4,40
0,87	10%	4,07
0,71	5%	3,32
0,46	2%	2,15
0,29	1%	1,36



9.1.12 Model HWA1-A 04349

Outdoor air dry bulb temperature [°C]	Load factor F%	EER
35	100%	3,10
30	75%	3,79
25	50%	4,56
20	25%	4,62

C	Load factor F%	EER @20°C xC
0,95	20%	4,39
0,94	15%	4,35
0,87	10%	4,02
0,71	5%	3,28
0,46	2%	2,13
0,29	1%	1,34



10. REFRIGERANT 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/m³ 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, CO2) 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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