

Chillers and Inverter Air/Water heat pumps with axial fans

## Technical Bulletin

### Chillers

HWA1-A 02106÷04349



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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
<b>Rev</b>	<b>Date</b>	<b>Edited</b>	<b>Approved</b>	<b>Notes</b>
Catalogo / Catalogue / Katalog / Catalogue  <b>BTE01300120001.02</b>				Serie / Series / Serie / Serie / Série  <b>HWA1-A 02106-04349 AIR COOLED WATER CHILLER WITH AXIAL FANS</b>

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## 1. UNIT DESCRIPTION AND TECHNICAL FEATURES

The HWA1-A 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 HWA1-A 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 Airside heat exchangers

The airside 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 water-side heat exchanger is made by AISI 316 stainless steel brazed plates type. The plate heat exchanger is factory insulated by closed-cell insulation panel. A differential pressure switch, installed on the water-side circuit, ensure the water flow confirmation avoiding ice formation 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.

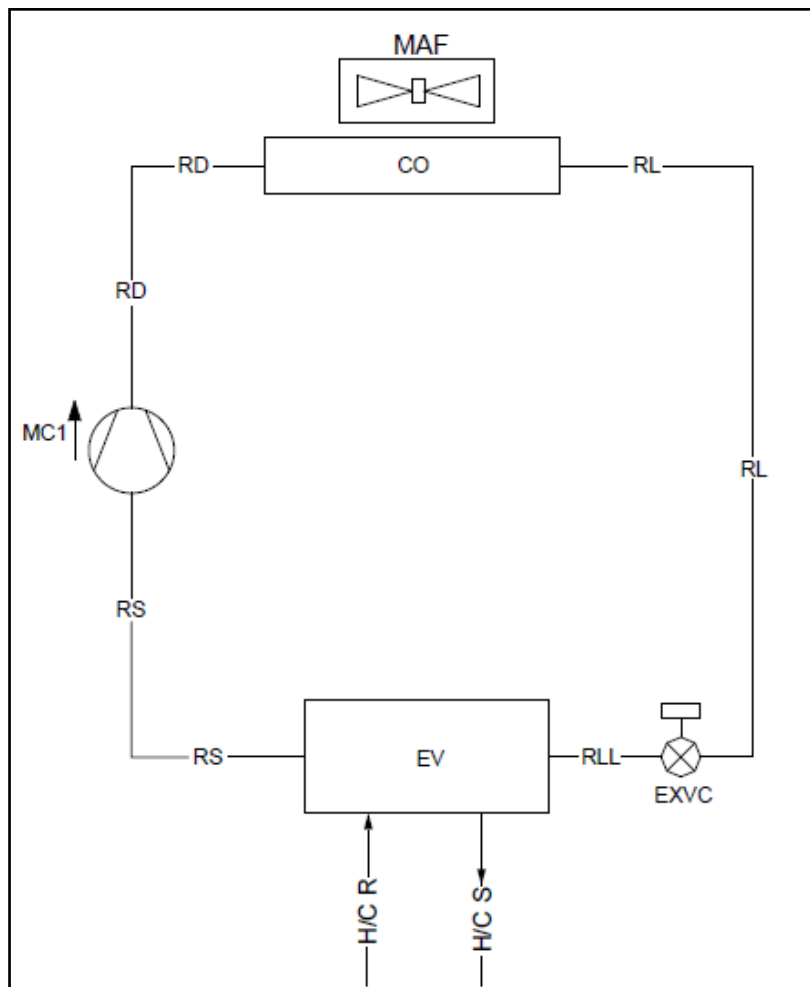
### 1.6 Fan speed regulation (only if EC fans required)

The electric motor uses a brushless EC motor to modulate the speed, directly coupled, and equipped with integrated thermal protection.

### 1.7 Refrigerant circuit

The refrigerant circuit is filled with R410A refrigerant gas, and it's made according to UNI EN 13134 concerning braze welding processes. 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.

Simplified scheme of the circuit is reported below.



<b>MC1</b>	Compressor	<b>EVXC</b>	Electronic expansion valve	<b>RD</b>	Delivery line
<b>CO</b>	Condenser	<b>H/CR</b>	Water inlet	<b>RL</b>	Liquid line
<b>EV</b>	Evaporator	<b>H/CS</b>	Water outlet	<b>RLL</b>	Low pressure liquid line
<b>MAF</b>	Axial fan	<b>RS</b>	Suction line		

### 1.8 Electrical panel

The electrical panel is completely built and wired in accordance with EN 60204 and includes a power section and a control section. To access the electrical panel, the 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.

### 1.9 Control system

All HWA1-A 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.

### **11.10 Control and protection devices**

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

### **1.11 Hydraulic circuit**

The chillers of the HWA1-A 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 the chillers 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.

- /BT— BT chiller version (with low water temperature device)

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.

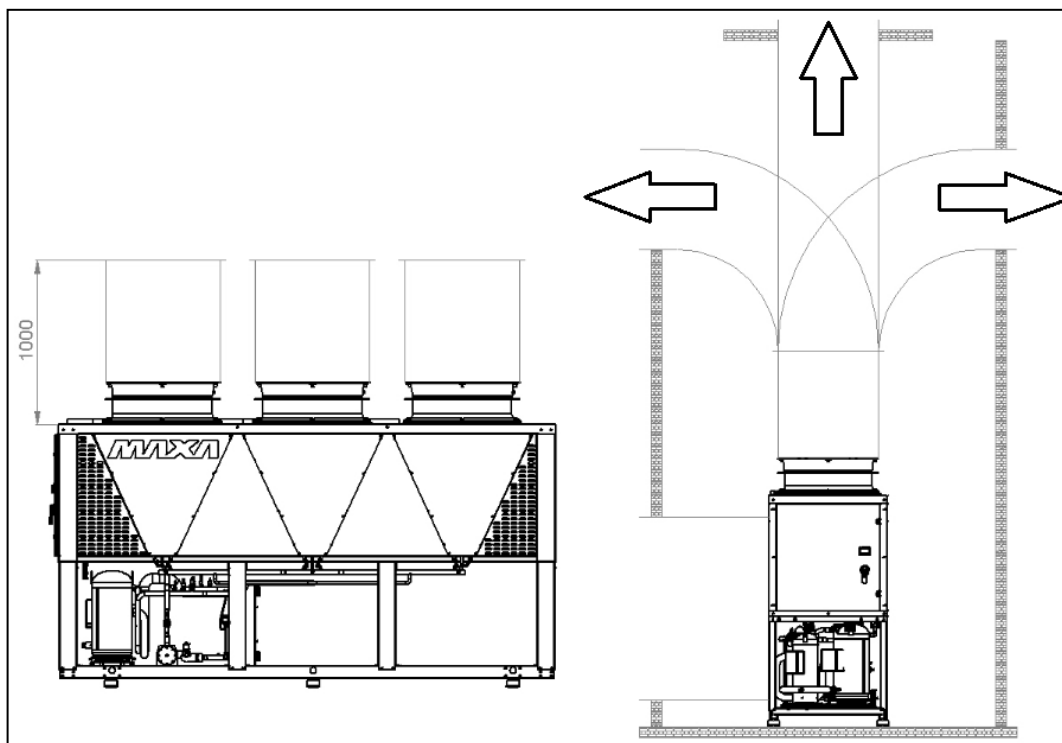
### 2.2 Acoustic configuration

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.



In the picture is shown an example of a possible ducted installation



A quantitative indication of the additional 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.**

Size HWA1-A	Ductable version additional prevalence compared to the standard unit	
	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

## 2.3 Hydronic kit

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

- /PS – Chiller with standard prevalence pump
- /PSAP – Chiller with high prevalence pump
- /PD – Chiller with double standard prevalence pumps
- /PDAP – Chiller with double high prevalence pumps
- /PS/SI – Chiller with standard prevalence pump and tank
- /PSAP/SI – Chiller with high prevalence pump and tank
- /PD/SI – Chiller with double standard prevalence pumps and tank
- /PDAP/SI – Chiller with double high prevalence pumps and tank

## 2.4 Accessory list

In the table below the chiller accessories are listed.

Description	Optional	Standard	Factory fitted	Supplied separately
SS Soft starter	X		X	
SAS Remote probe	X			X
Sequence control device, phase failure + Minimum and maximum voltage relay		X	X	
on/off compressors status signalization		X	X	
Unit lockout signalization		X	X	
Digital input for double set point		X	X	
CM Modbus Activation	X		X	
ISK Serial Converter USB/RS485	X			X
IS to Bacnet/Lonworks	X			X
IS to Bacnet/Konnex	X			X
IM Magnetothermic switch for compressors and fans		X	X	
HI-T2 Touch screen wire controller	X			X
I-CR Remote control	X			X
ON / OFF digital input		X	X	
Dynamic set-point - climatic curve		X	X	

Description	Accessory	Standard	Factory fitted	Loose accessory
LQ Electrical board lighting	X		X	
SH Schuko plug (with magnetothermal switch)	X		X	
CC Condensation control up to -20°C		X	X	
Microchannel coil		X	X	
TR1 Micro-channel 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 H-exchanger and pump antifreeze heater (if present)	X		X	
KA2 H-exchanger antifreeze heater, pump and tank (if present) includes KA1	X		X	
AG Rubber Shock absorbers	X			X
AM Spring shock absorbers	X			X
GR1 Cooling circuit anti-intrusion grid	X		X	
GR2 Condenser anti-intrusion grid	X		X	
2SFV Double security valve with changeover valve	X		X	
EEV - electronic valve		X	X	
FY—Y filter	X			X
TE1 - Special pump gasket seal for glycole concentration over 40%	X		X	
RV—Grooved connection joint	X			X
KS—Hoist ring kit	X		X	
EC fans (includes CC)		X	X	

## 2.5 Accessory description

### 2.5.1 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.

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



**Sequence control device, phase failure + Minimum and maximum voltage relay** – 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 compressor 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.

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

**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.

**Gateway Modbus RTU (RS485) to BACnet / Lonworks** - device that allows the conversion between Modbus RTU and BACnet / Lonworks, allowing the unit control to be configured as a normal device in the BACnet / Lonworks network.



**Gateway Modbus RTU (RS485) to BACnet / Konnex** - device that allows the conversion between Modbus RTU and BACnet / Konnex, allowing the unit control to be configured as a normal device in the network BACnet / Konnex.

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



**ON/OFF digital input** - contact in the terminal block that allows the unit to be switched on and off.

**Dynamic set-point - climatic curve** - 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)** - 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.

In the image you can see the % savings in terms of electrical power absorbed using the EC fan accessory, as the fan speed changes.

**Electrical board lighting (LQ)** - light to illuminate the interior of the electrical panel.

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

**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.

**Micro-channel coil with Aero treatment** - the treatment is based on spray 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.

**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.

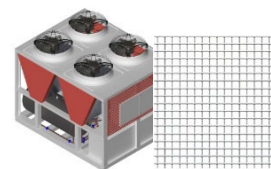
**Differential pressure switch (water flow verification)** – by monitoring the pressure difference, it ensures that there is sufficient flow for correct machine operation.

**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 H-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 exchanger drops below + 4°C, and electric heater that protects the pump from ice formation.

**KA2 H-exchanger, pump and tank antifreeze heater (if present)** - includes KA1 - electric heater located 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 heaters that protect the pump and the storage tank from ice formation.

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



**Condenser anti-intrusion grid (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 simultaneous or alternative use of 2 safety valves facilitating periodic verification or replacement ensuring the operation of the system and the maintenance of the safety system.

**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.

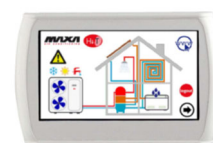
**Special pump gasket seal for glycol concentration over 40% (TE1)** - for mixtures of water and glycol higher than a weight percentage of 40% and up to 50%, a different mechanical seal is used to ensure correct operation of the electric pump.

**Hoist ring kit (KS)** – facilitate the lifting and positioning of the unit.

## 2.5.2 Loose accessories

**Remote probe (SAS)** – NTC probe co-molded with IP 67 thermoplastic rubber strip, 4 m long, operating in the temperature range  $-50^{\circ}\text{C}+120^{\circ}\text{C}$ .

**Touch screen display (Hi-T2)** - allows you to view the status of the unit remotely; to be mounted in the most comfortable place for the user.

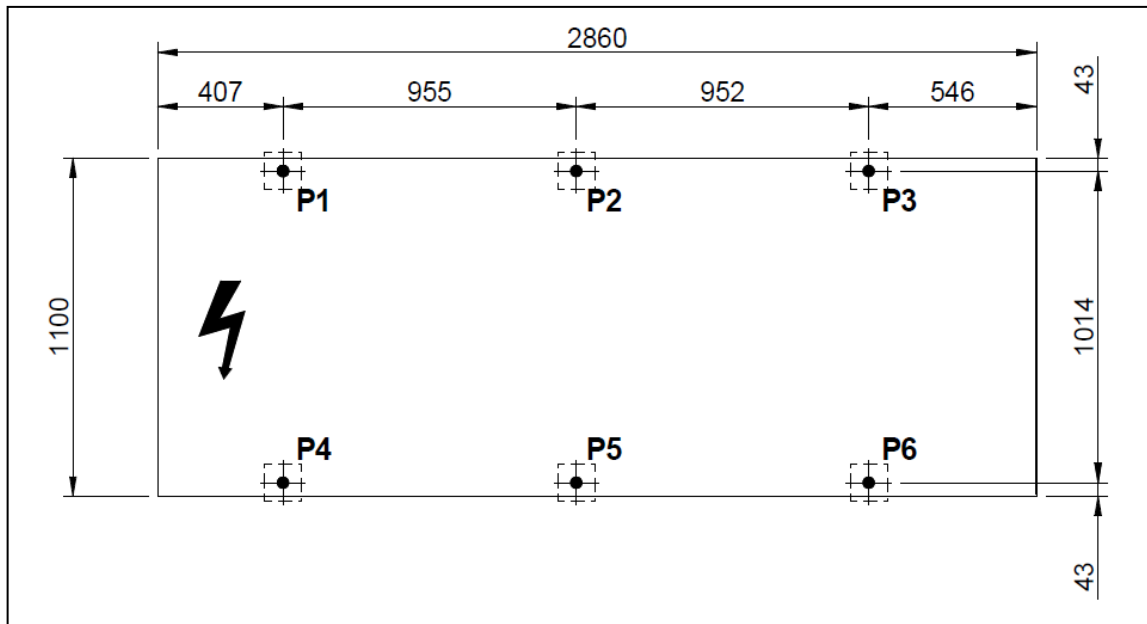


**Remote control (i-CR)** – Modbus remote control with negative LCD and capacitive keys. The device must be used as a remote machine keyboard with local temperature detection, it replicates the functionality of the on-board control.

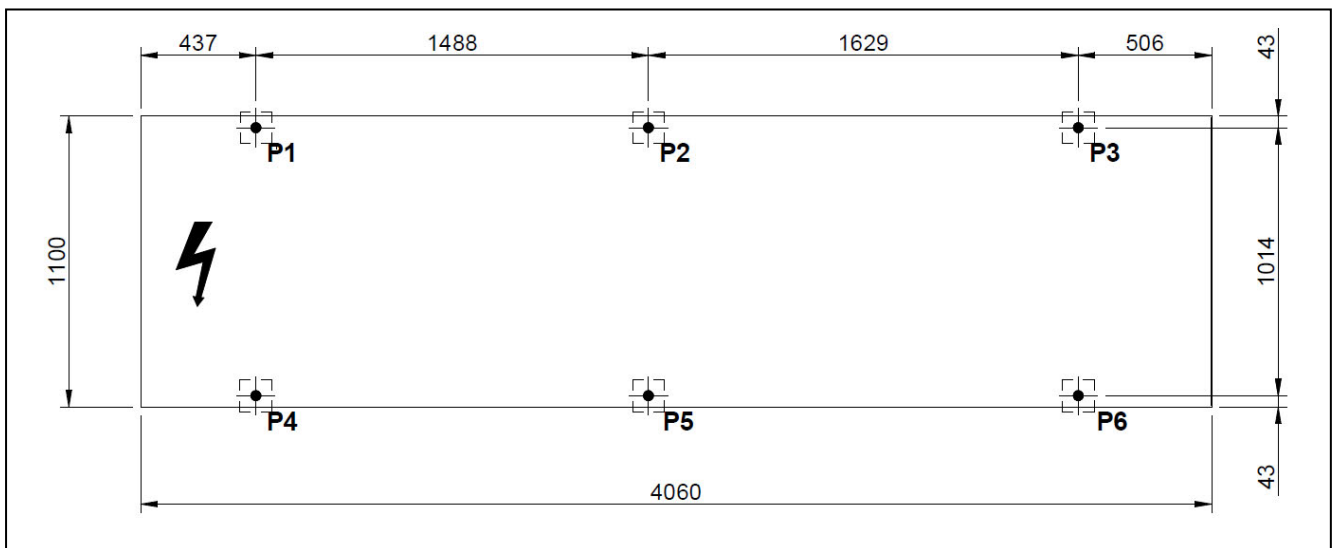


**Antivibration rubber mounts (AG) and spring mounts (AM)** — they have the purpose of not transmitting vibrations to the structure; they are to be mounted under the unit, in special holes.

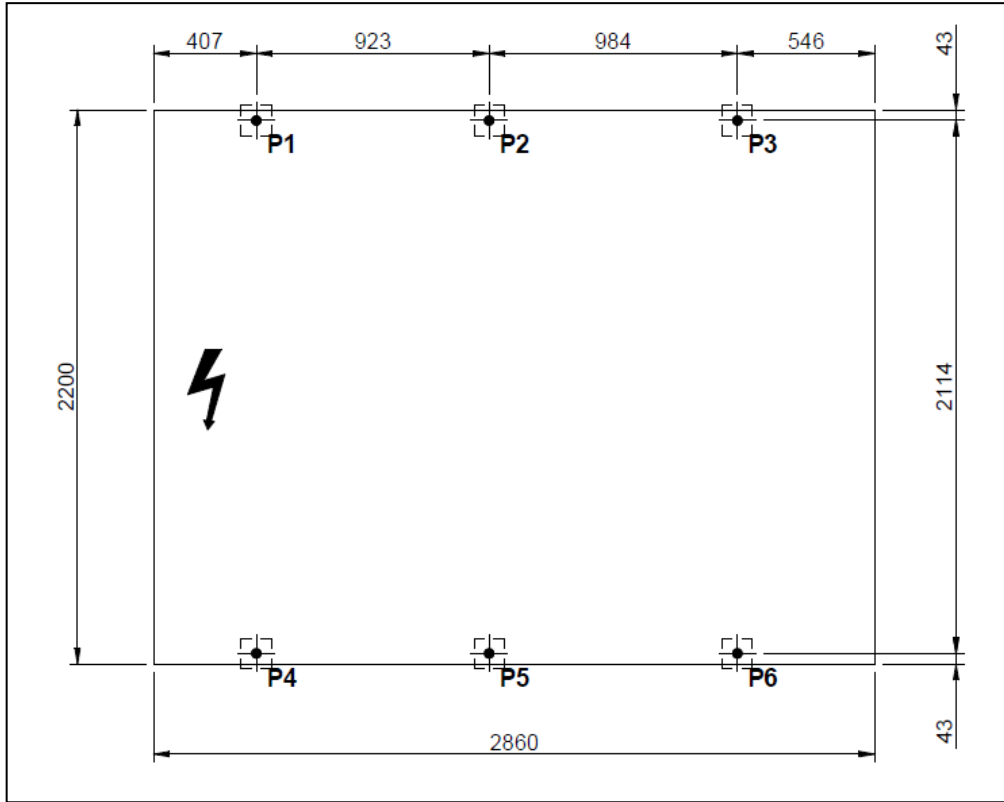
The ideal installation positions of the vibration dampers for each type of machine are shown below.



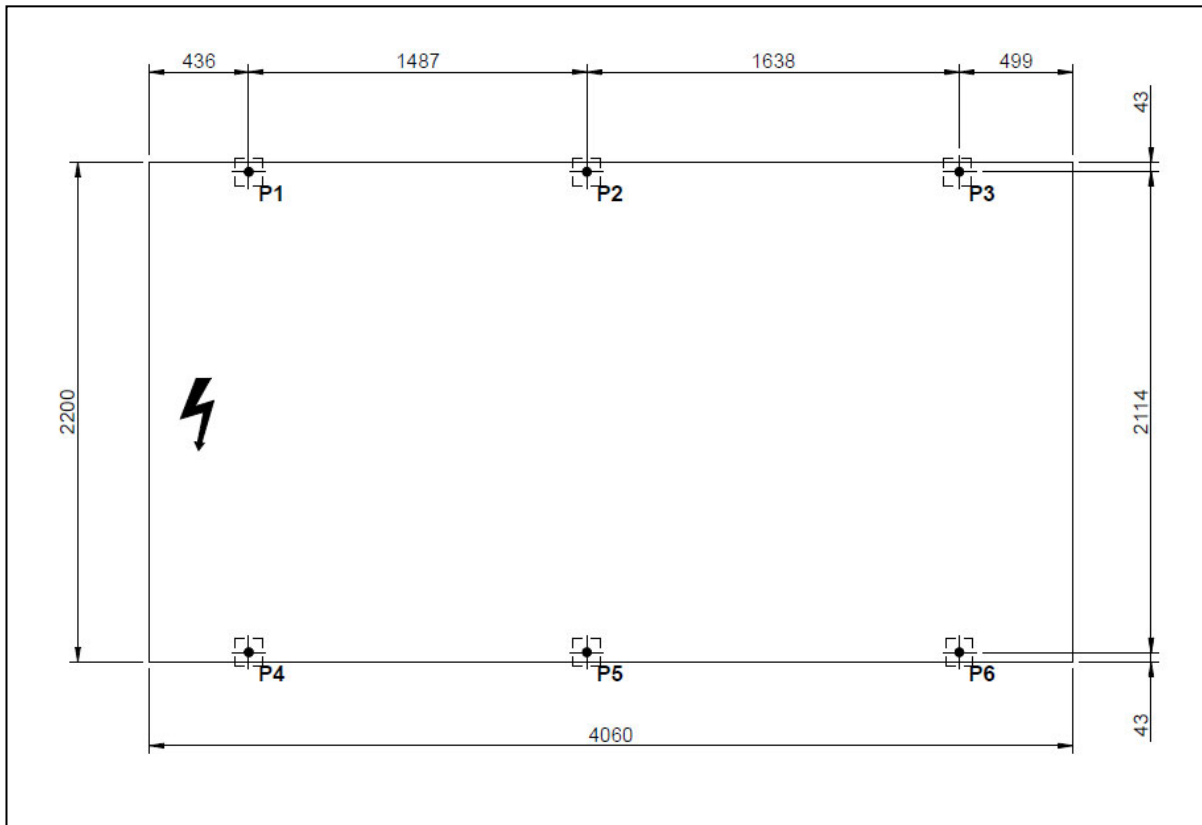
**HWA1-A 2 Fans:** 02106, 02120, 02128



**HWA1-A 3 Fans:** 02140, 04155, 04177, 04184



**HWA1-A 4 Fans: 04209, 04239, 04258**



**HWA1-A 6 Fans: 04305, 04349**



The types of anti vibration mounts are two: rubber made and spring.

For each one of them we state the optimal carrying capacity according to the size of the unit.

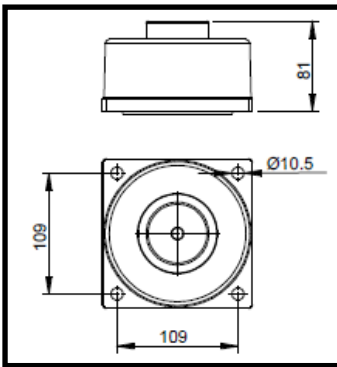
<b>Modello HWA1-A</b>	<b>Spring anti-vibration mount P1÷P6 [daN]</b>
02106, 02120, 02128	300-400
02140, 04155, 04177, 04184, 04209, 04239, 04258	400-600
04305	600-800
04349	800-1000



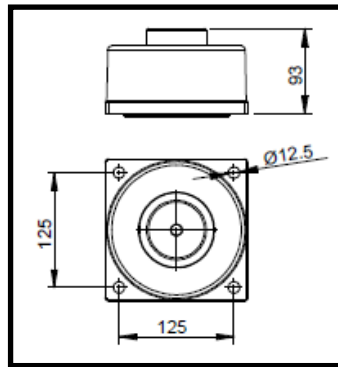
<b>Modello HWA1-A</b>	<b>Spring anti-vibration mount P1÷P6 [daN]</b>					
	<b>P1:</b>	<b>P2:</b>	<b>P3:</b>	<b>P4:</b>	<b>P5:</b>	<b>P6:</b>
<b>02106</b>	330	330	290	330	330	290
<b>02120</b>	330	330	290	330	330	290
<b>02128</b>	330	330	290	330	330	290
<b>02140</b>	600	460	330	600	460	300
<b>04155</b>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



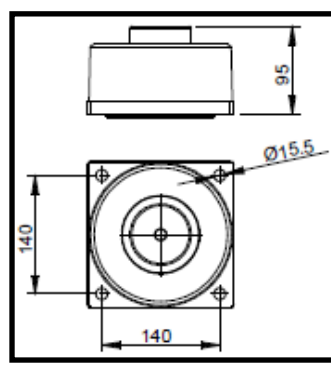
Technical details of the rubber dampers related to each chiller size



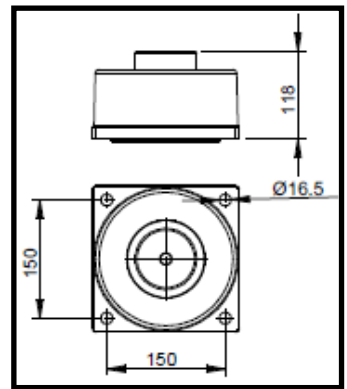
HWA1-A 02106, 02120,  
02128



HWA1-A 02140, 04155,  
04177, 04184, 04209,  
04239, 04258

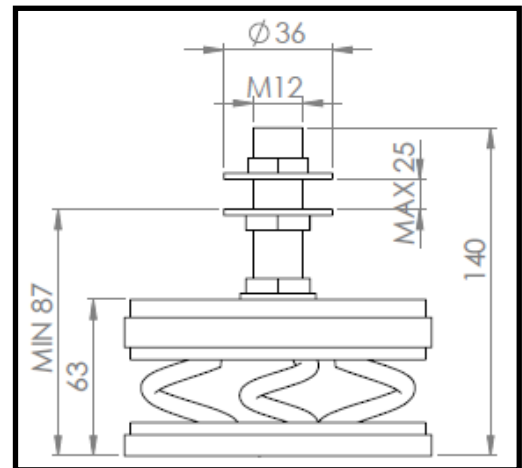
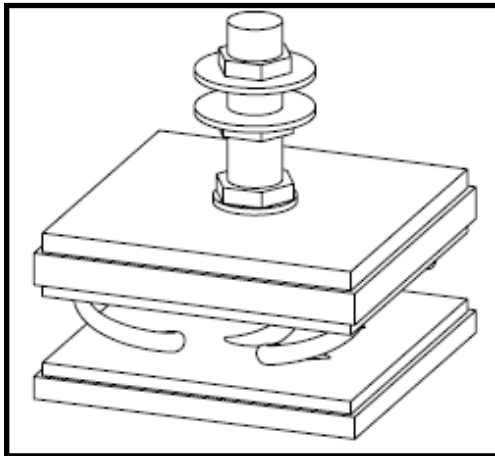


HWA1-A 04305



HWA1-A 04349

Technical details of the spring dampers.



**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)** – joins pipes or grooved fittings, ensuring perfect sealing between the two components.

### IMPORTANT NOTE

ONLY THE OPTIONAL ACCESSORIES CAN BE REQUESTED SUBSEQUENTLY TO THE ORDER OF THE UNIT.  
FACTORY FITTED ACCESSORIES CANNOT BE REQUESTED AFTER THE ORDER OF THE UNIT.

IT IS RECOMMENDED TO ASK FOR THE DIMENSIONAL DESIGN ONCE SELECTED THE UNIT

### 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.

The minimum temperature allowed for the storage of the units is 5 ° C.

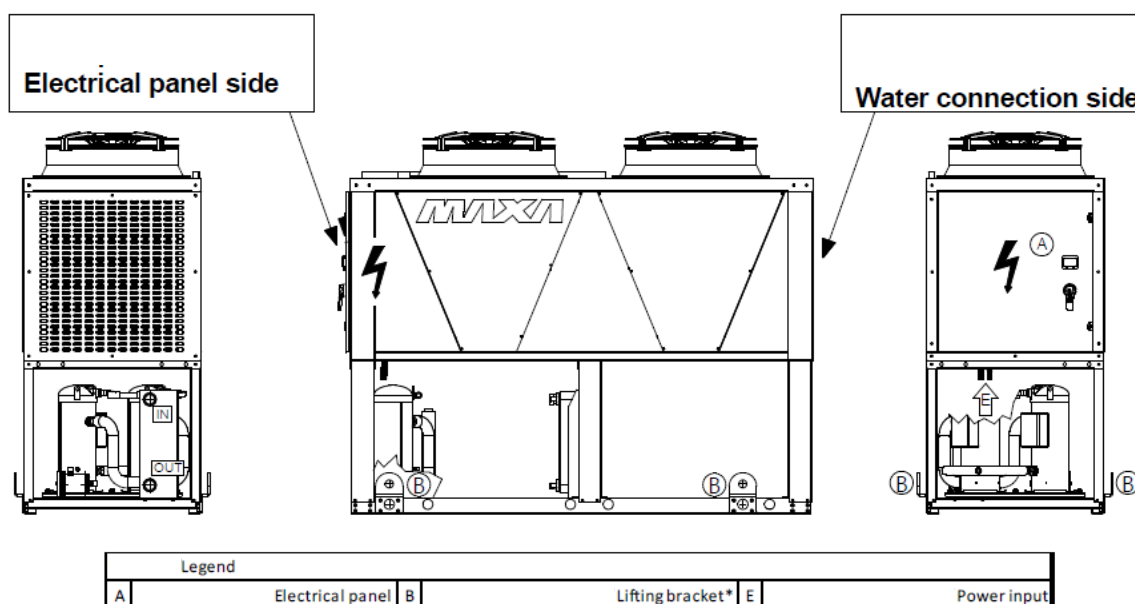
#### 3.1 Unit dimensions, water connections, weights and barycentre position

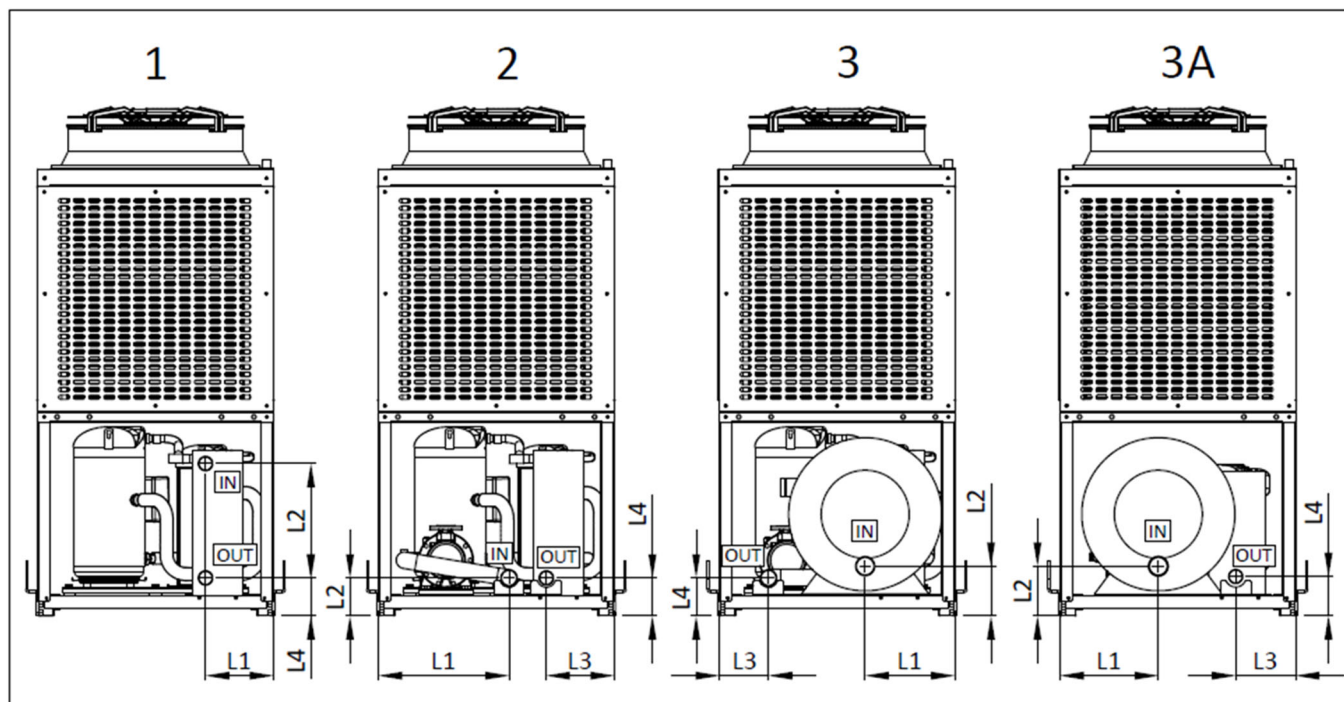
Model HWA1-A	Lenght [mm]	Width [mm]	Height [mm]	Height version SSL e C [mm]	Max height packaging [mm]	Max height packaging ver- sion SSL o C [mm]
02106, 02120, 02128	2860	1100	2350	2415	2430	2495
02140, 04155, 04177, 04184	4060	1100	2350	2415	2430	2495
04209, 04239, 04258	2860	2200	2350	2415	2430	2495
04305, 04349	4060	2200	2350	2415	2430	2495

#### 3.1.2 Details of connection and position

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.



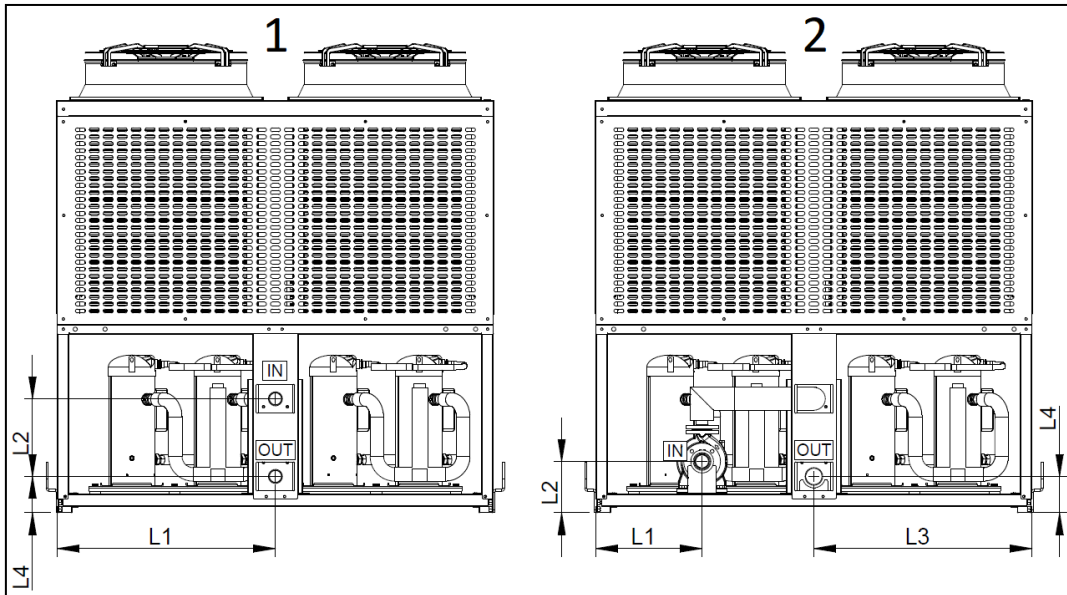


Standard

Single/Double pump

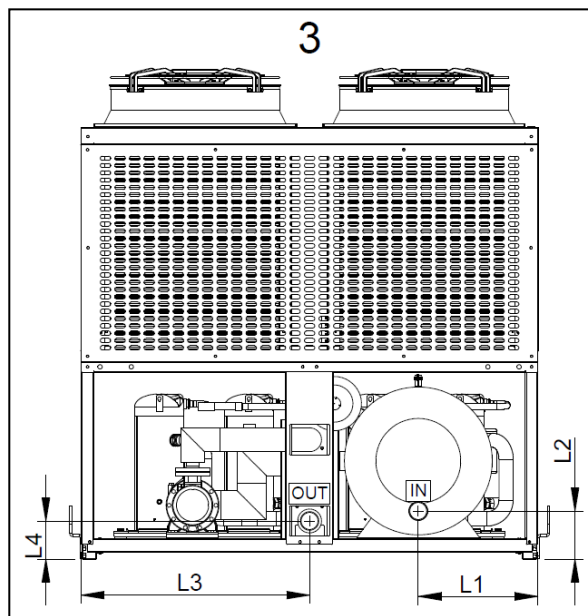
Single/double pump + tank

	Model	Version	Rif. Im- agine	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	ØIN	ØOUT
<b>2 Fans</b>	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			
<b>3 Fans</b>	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				

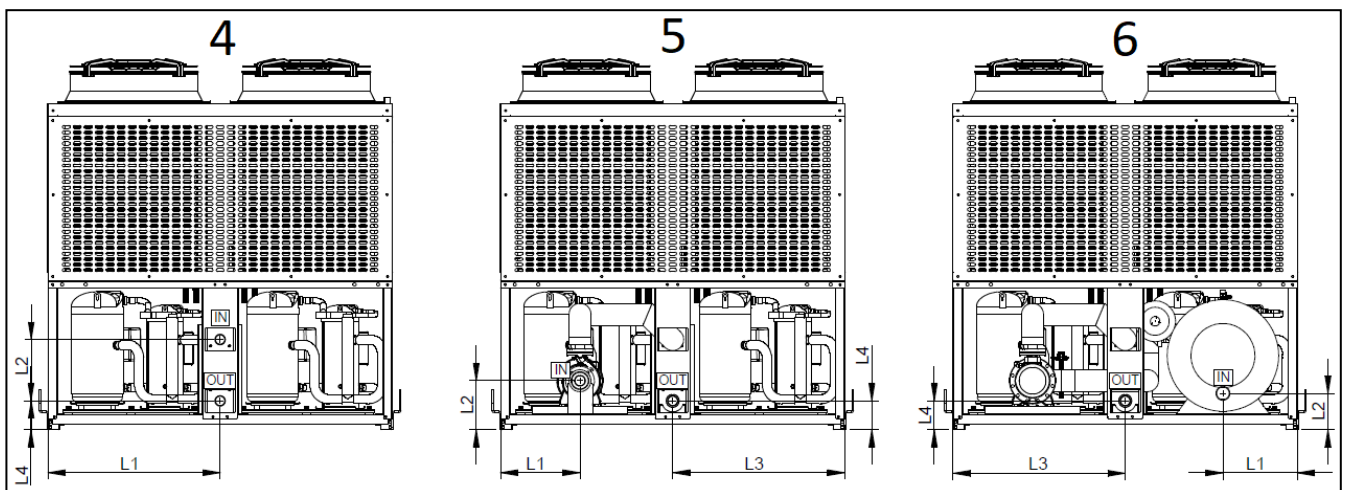


Standard

Single/double pump



Single/double pump + tank



Standard

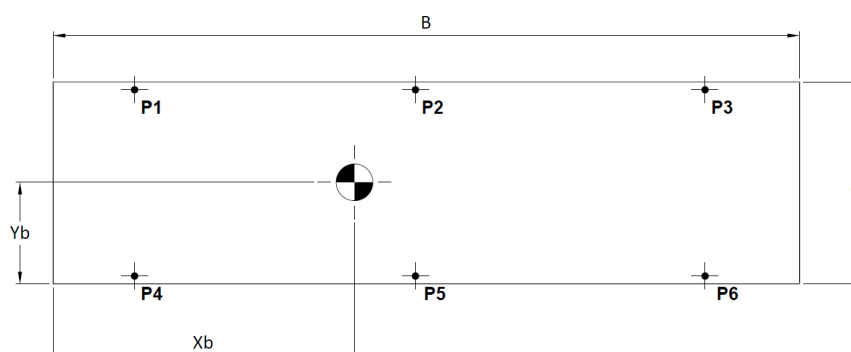
Single/double pump

Single/double pump + tank

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

### 3.1.3 Weights and position of the center of the barycenter

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



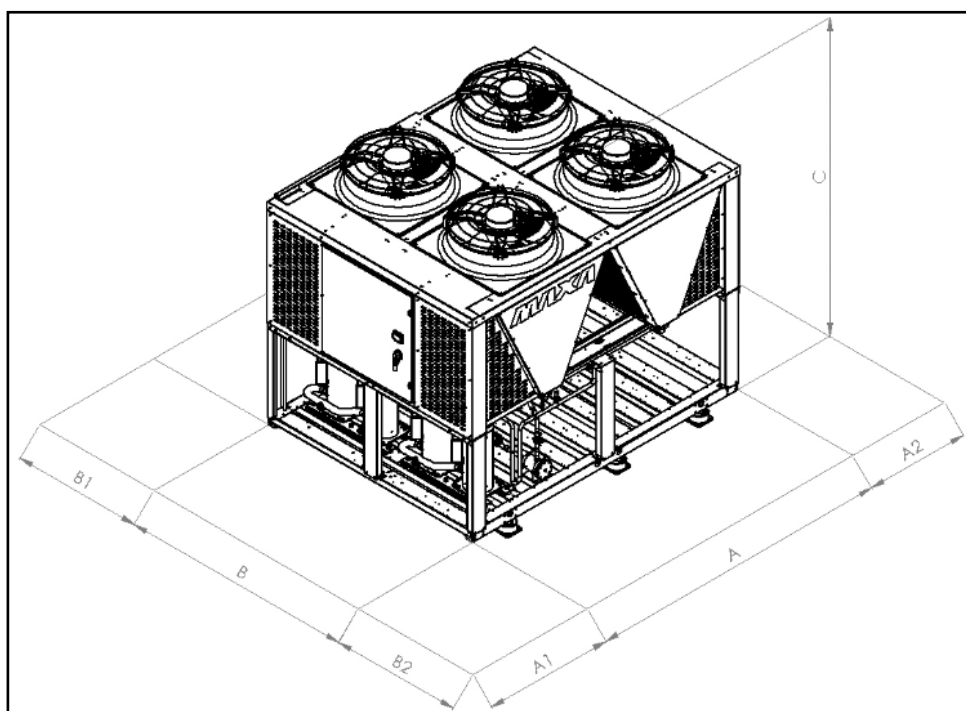
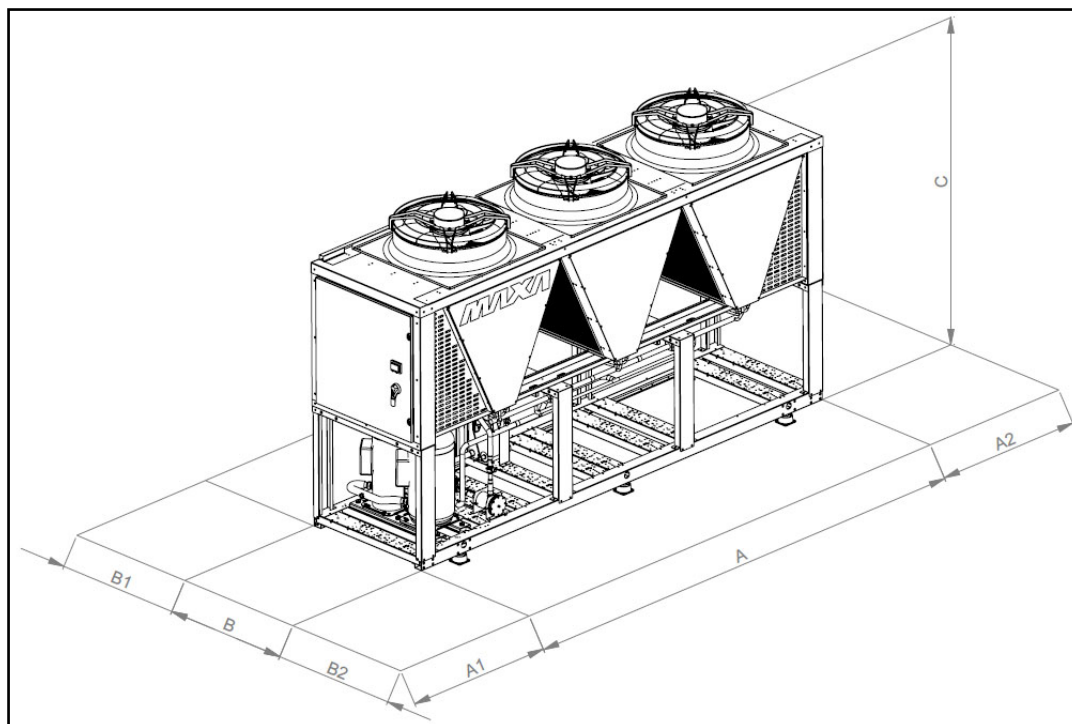
Model HWA1-A	Version	Net shipping weight [kg]	Operating weight [kg]	A [mm]	B [mm]	X <sub>b</sub> [mm]	Y <sub>b</sub> [mm]
02106	Standard	1080	1090	1100	2860	1070	575
	/PDAP/SI	1310	1710			1418	587
02120	Standard	1080	1090	1100	2860	1069	576
	/PDAP/SI	1360	1760			1409	583
02128	Standard	1090	1100	1100	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
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; coverage with canopies or positioning near plants or walls should be avoided in order to avoid air recirculation. 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. An environmental impact assessment is always required on the basis of the power and sound pressure data reported in chapter 4 "General technical data" and the noise emission limits based on the installation area of the unit.

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



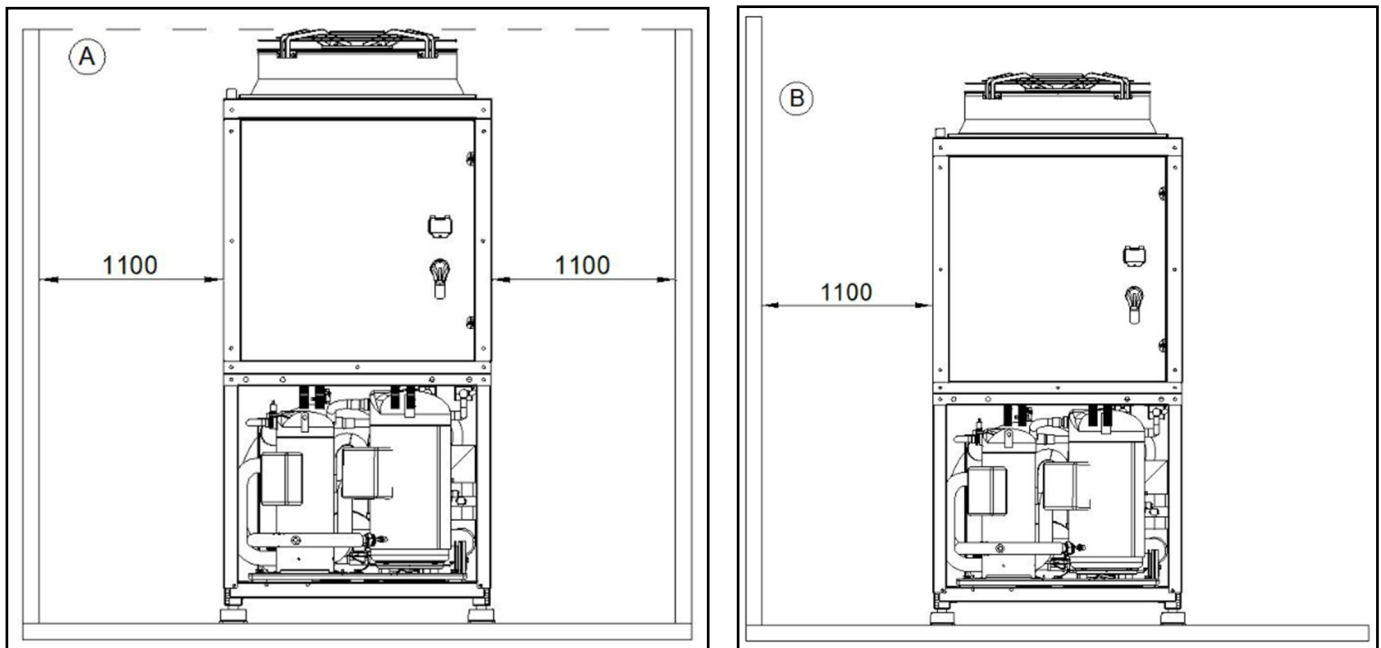
Serie	Clereance spaces			
	A1 [mm]	A2 [mm]	B1 [mm]	B2 [mm]
HWA1-A 02106-04349	1000	800	1000	1000



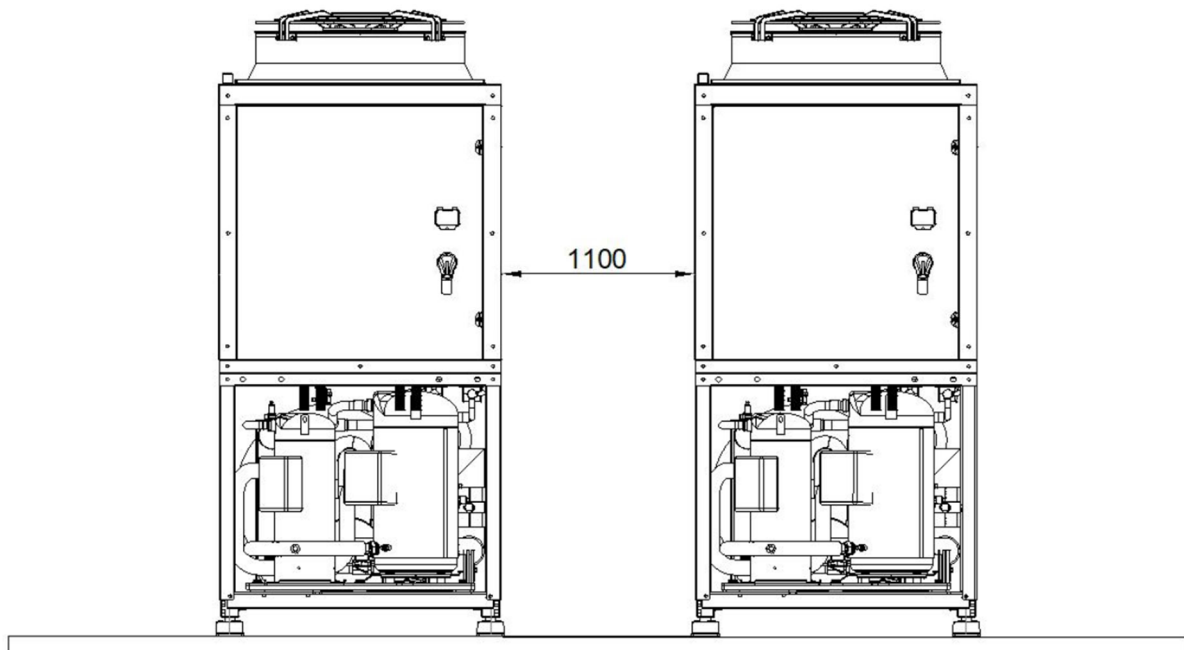
In the presence of walls or other units nearby, the spaces to be respected are shown below

**Unit with width 1100 mm**

**HWA1-A 02106, 02120, 02128, 02140, 04155, 04177, 04184**

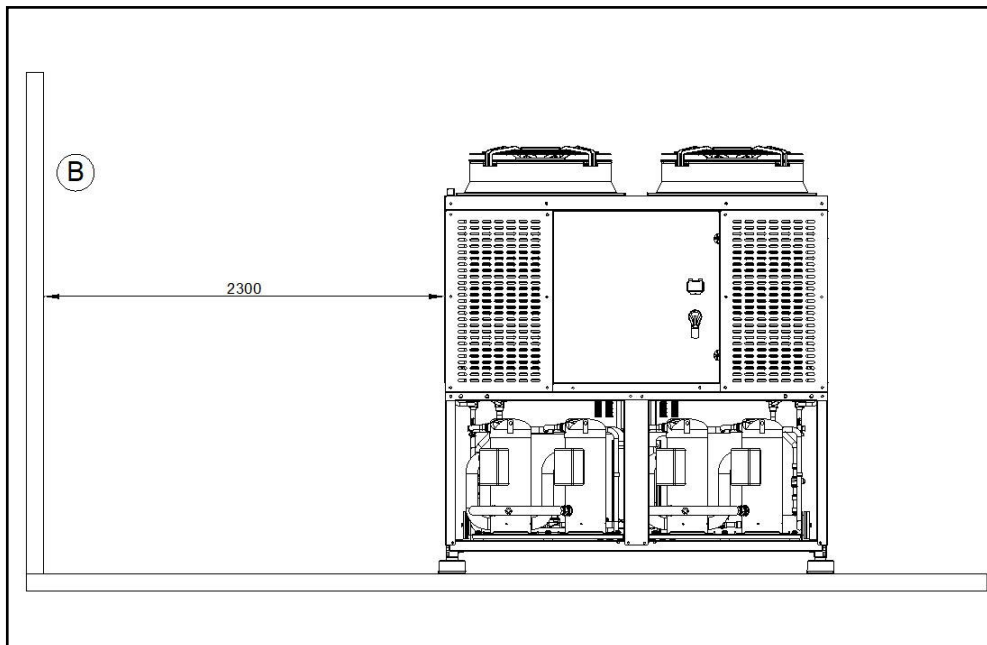
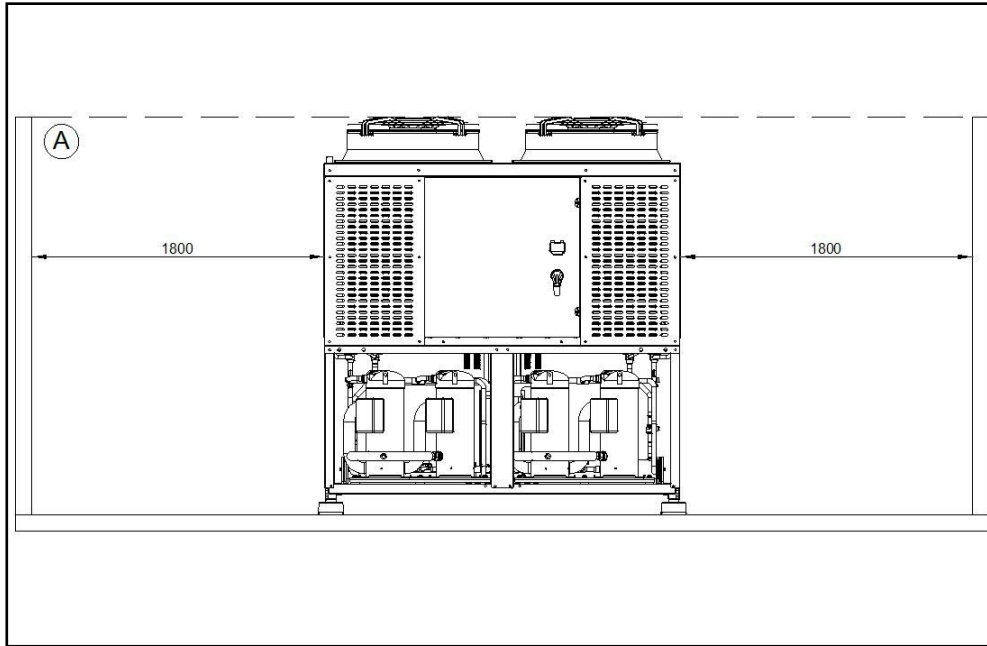


In the case of units surrounded by walls or obstacles of **equal** height (CASE A), the installation must be carried out at a distance of not less than 1100 mm on both sides while if the wall or single obstacle is greater than the height units (CASE B) use a minimum clearance of 1100 mm or contact MAXA sales technical support

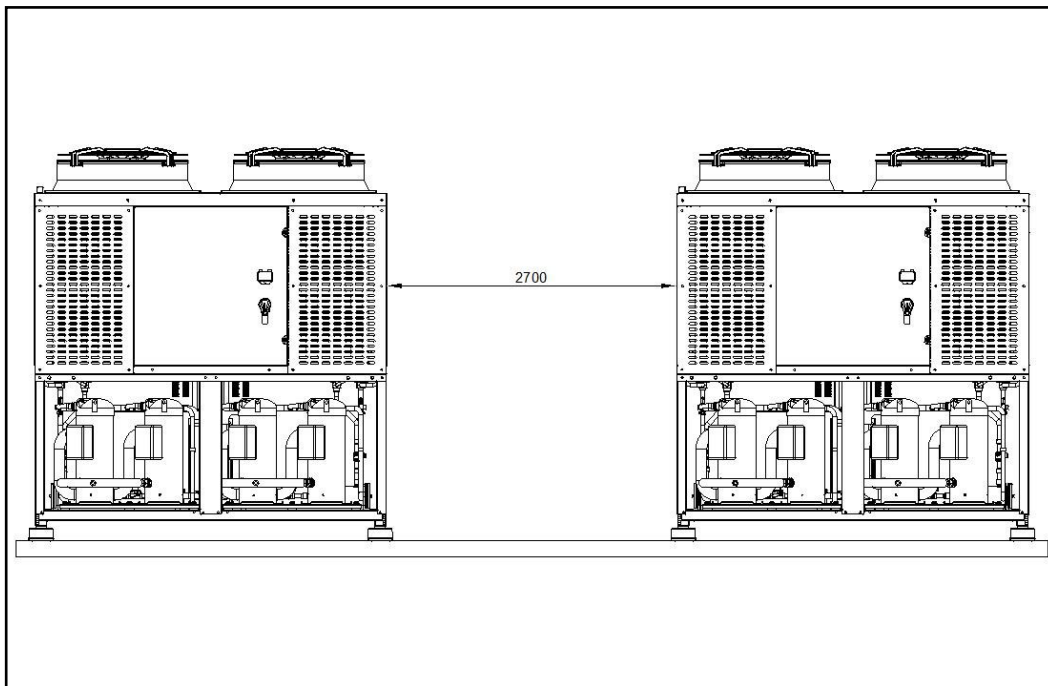


In the case of **two** units installed in a free field, it is recommended to maintain a minimum distance between the units of 1100 mm

**Unit 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 must take place at a distance of not less than 1800 mm on both sides while if the wall or single obstacle is greater than the height units (CASE B) use a minimum clearance of 2300 mm.




In the case of **two** units installed in a free field, it is recommended to maintain a minimum distance between the units of 2700 mm.

### 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 chiller must be connected to the pipes using grooved joints. It is recommended to install the following components in the hydraulic circuit:

- Well thermometers for detecting the temperature in the circuit.
- Manual gate valves to isolate the chiller from the hydraulic circuit.
- Metal Y filter (installed on the return pipe from the system) with a metal mesh of no more than 1 mm.
- 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 and discharge valve where necessary.

	<p><b>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).</b></p>
	<p><b>ATTENTION: in the HWA1-A 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.</b></p>
	<p><b>ATTENTION: The return pipe from the system must be in correspondence with the "WATER INLET" label otherwise the evaporator could freeze.</b></p>
	<p><b>ATTENTION: It is mandatory to install a metal filter (with mesh no greater than 1 mm) on the return pipe from the system labeled "WATER INLET". If the flow switch is manipulated or altered, or if the metal filter is not present on the system, the warranty expires immediately. The filter must be kept clean, therefore it must be ensured that after the installation of the unit it is still clean and checked periodically.</b></p>
	<p><b>ATTENTION: All units leave the company equipped with a flow switch (factory installed). If the flow switch is altered, removed, or if the water filter is not present in the unit, the warranty will not be considered valid. Refer to the wiring diagram attached to the unit for connecting the flow switch.</b></p>
	<p><b>ATTENTION: The water on the loading / replenishing line must be properly pre-filtered from any impurities and suspended particles using a cartridge filter (washable, wrapped wire, etc.) of at least 100 microns.</b></p>
	<p><b>ATTENTION: Check the hardness of the water with which to load and top up the system. With particularly hard water, the use of a water softener is required. For the treatment of the system water, however, refer to the UNI 8065 standards and the characteristics shown below.</b></p>
	<p><b>ATTENTION: Both for new installations and in the case of replacing a previously installed machine, a system wash must be carried out beforehand in order to prevent any residues from clogging the plate exchanger.</b></p> <p><b>ATTENTION: Following breakage of the plate heat exchanger due to: tampering with the flow switch, continuous manual restarts after alarm of the flow switch, lack of washing of the system or lack / tampering with the Y filter the company reserves the right not to pass the replacement of the component as a guarantee.</b></p>

### 3.3.1 Plant water characteristics

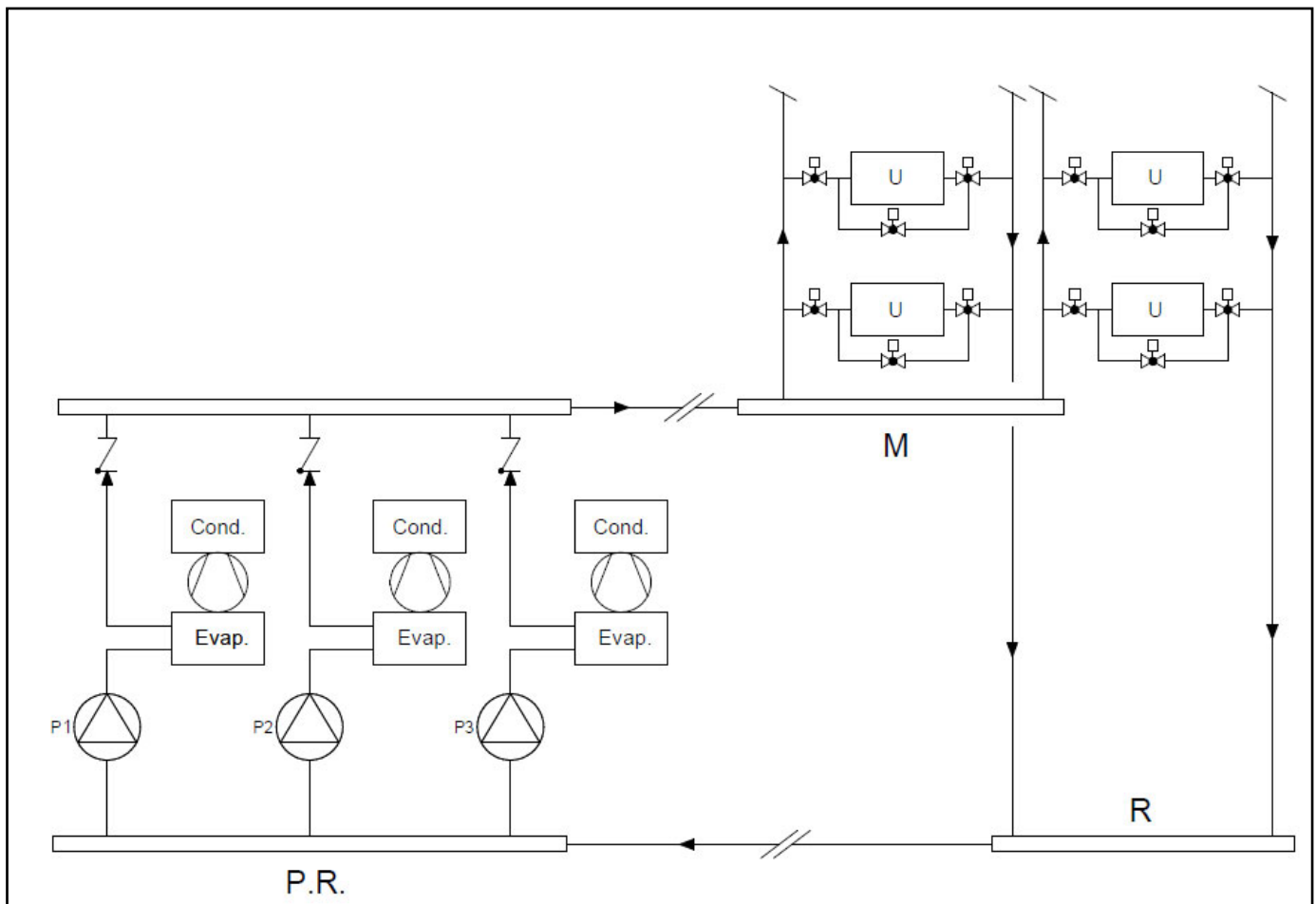
To ensure the correct operation of the unit, the water must be adequately filtered (see what is reported at the beginning of this paragraph) and that the quantities of dissolved substances must be minimal. Below are the maximum allowed values

Maximum chemical-physical characteristics allowed for the plant water	
PH	7,5 - 9
Electrical conductivity	100 - 500 $\mu$ S/cm
Total hardness	4,5 – 8,5 dH
Temperature	< 65°C
Quantity of Oxygen	< 0,1 ppm
Max. quantity of glycole	50 %
Phosphates (PO <sub>4</sub> )	< 2ppm
Manganese (Mn)	< 0,05 ppm
Iron (Fe)	< 0,3 ppm
Alkalinity (HCO <sub>3</sub> )	70 – 300 ppm
Chlorine ions (Cl <sup>-</sup> )	< 50 ppm
Sulphate ions (SO <sub>4</sub> )	< 50 ppm
Sulfide ions (S)	None
Ammonium ions (NH <sub>4</sub> )	None
Silica (SiO <sub>2</sub> )	< 30 ppm

### 3.3.2 Typical water 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

#### Coupled primary and secondary circuit — one pump for each refrigeration unit



P. R. = chillers pumps (constant flow)

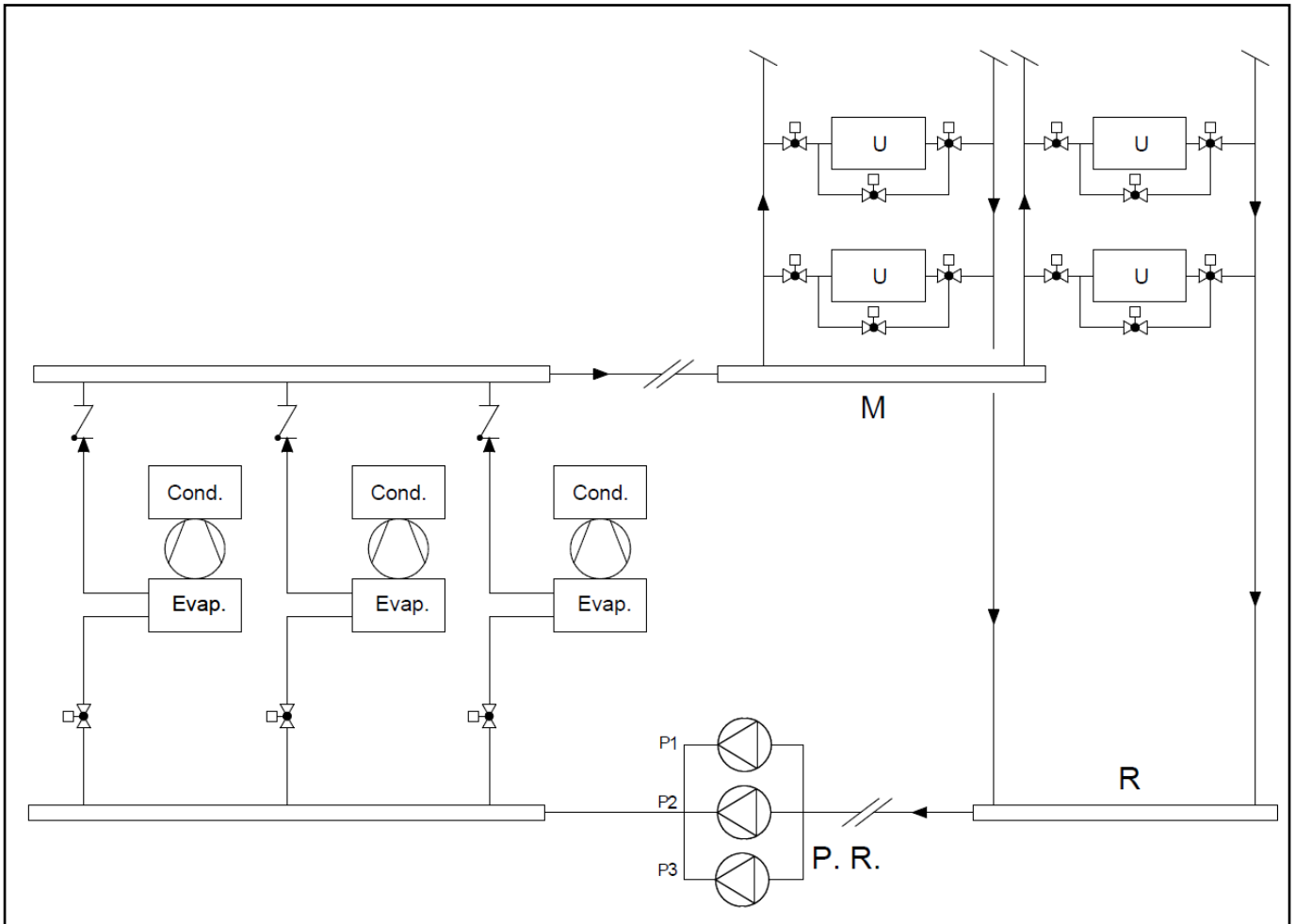
U = user side

M = supply

R = return

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

**Coupled primary and secondary circuit— pumps in common for the refrigeration units**



P. R. = chillers pumps (constant flow)

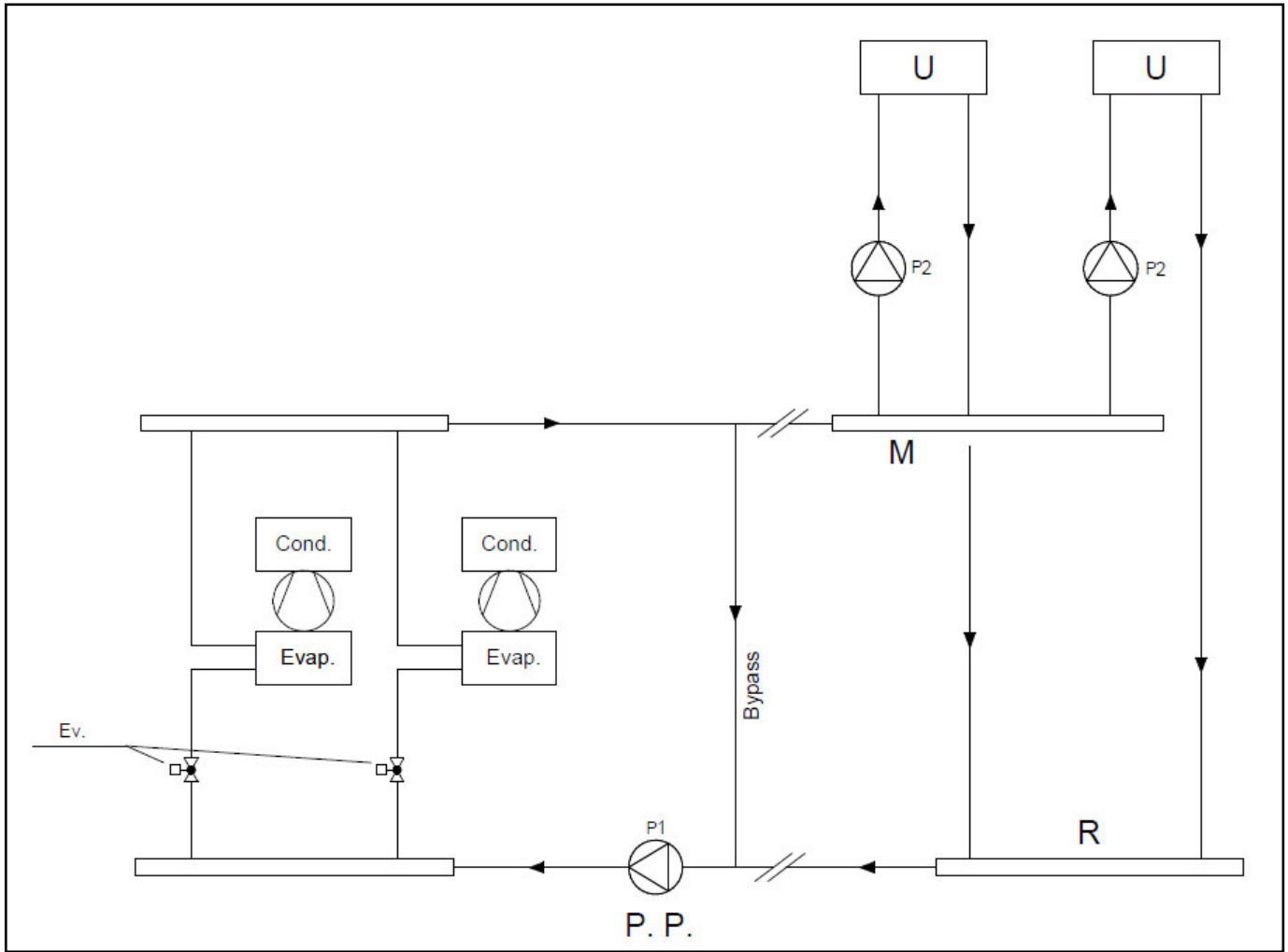
U = user side

M = supply

R = return

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

**Decoupled primary and secondary circuit - single pump for refrigeration and secondary groups with own pump**



P. P. = primary pump (constant flow)

Ev. = potential

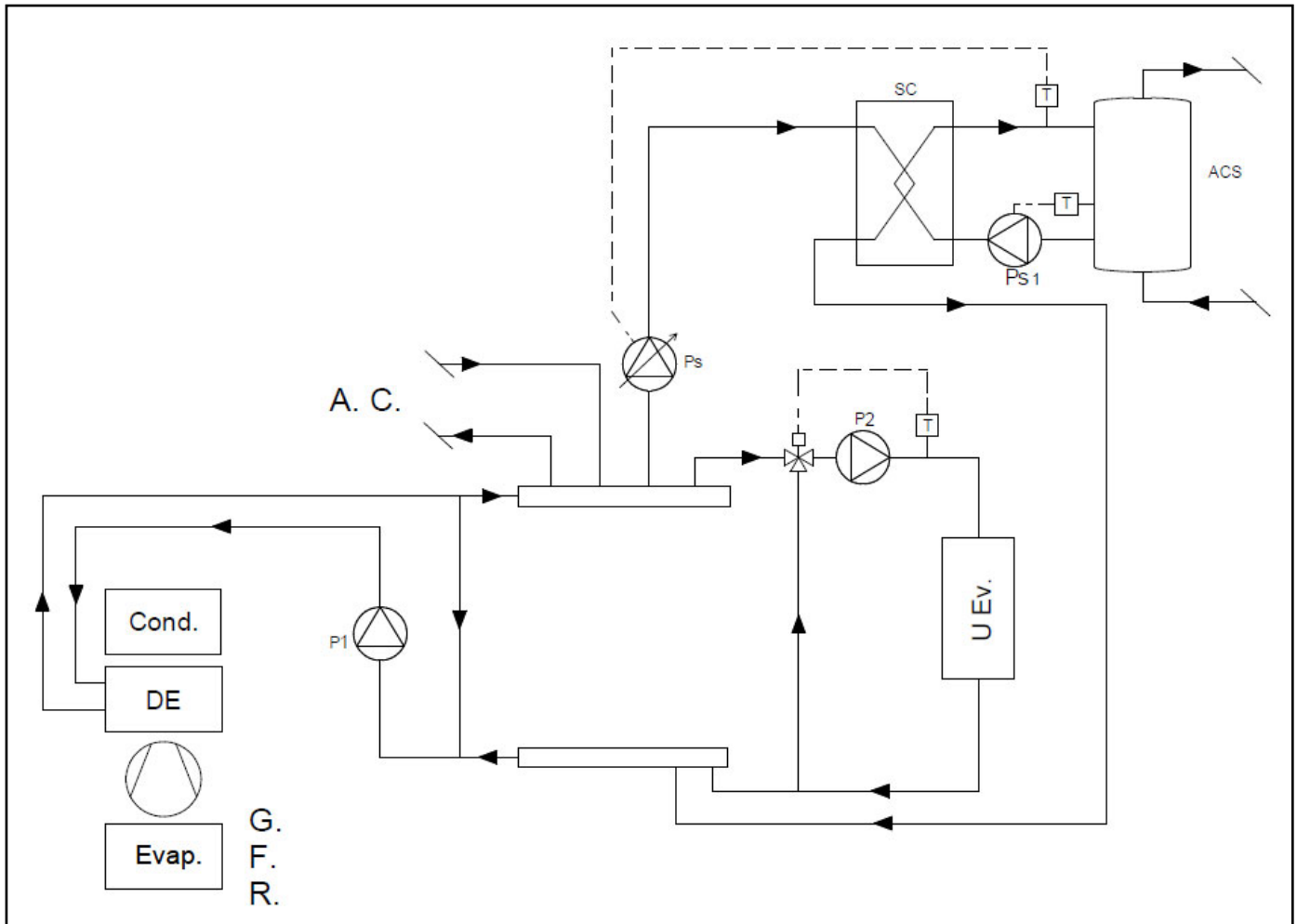
M = supply

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.



## Production of domestic hot water from partial or total recovery chillers



DE = Desuperheater

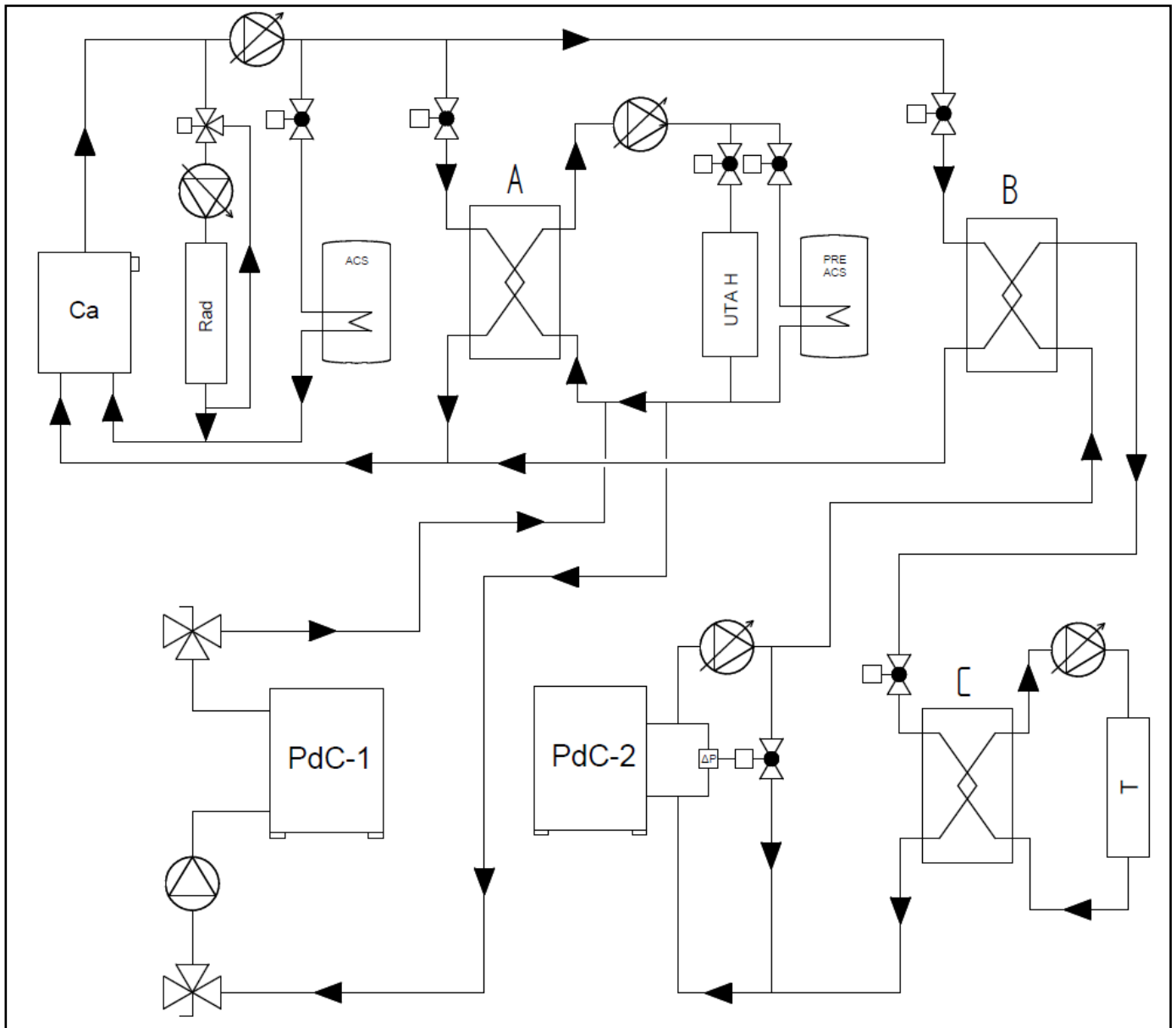
G. F. R. = Recovery chiller

A. C. = to the boiler

U Ev. = other hypothetical 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.

**Heating and cooling unit serving primary air-conditioning systems plus radiant panels or cold beams - system with reversible heat pump cooling units**



Ca = boiler

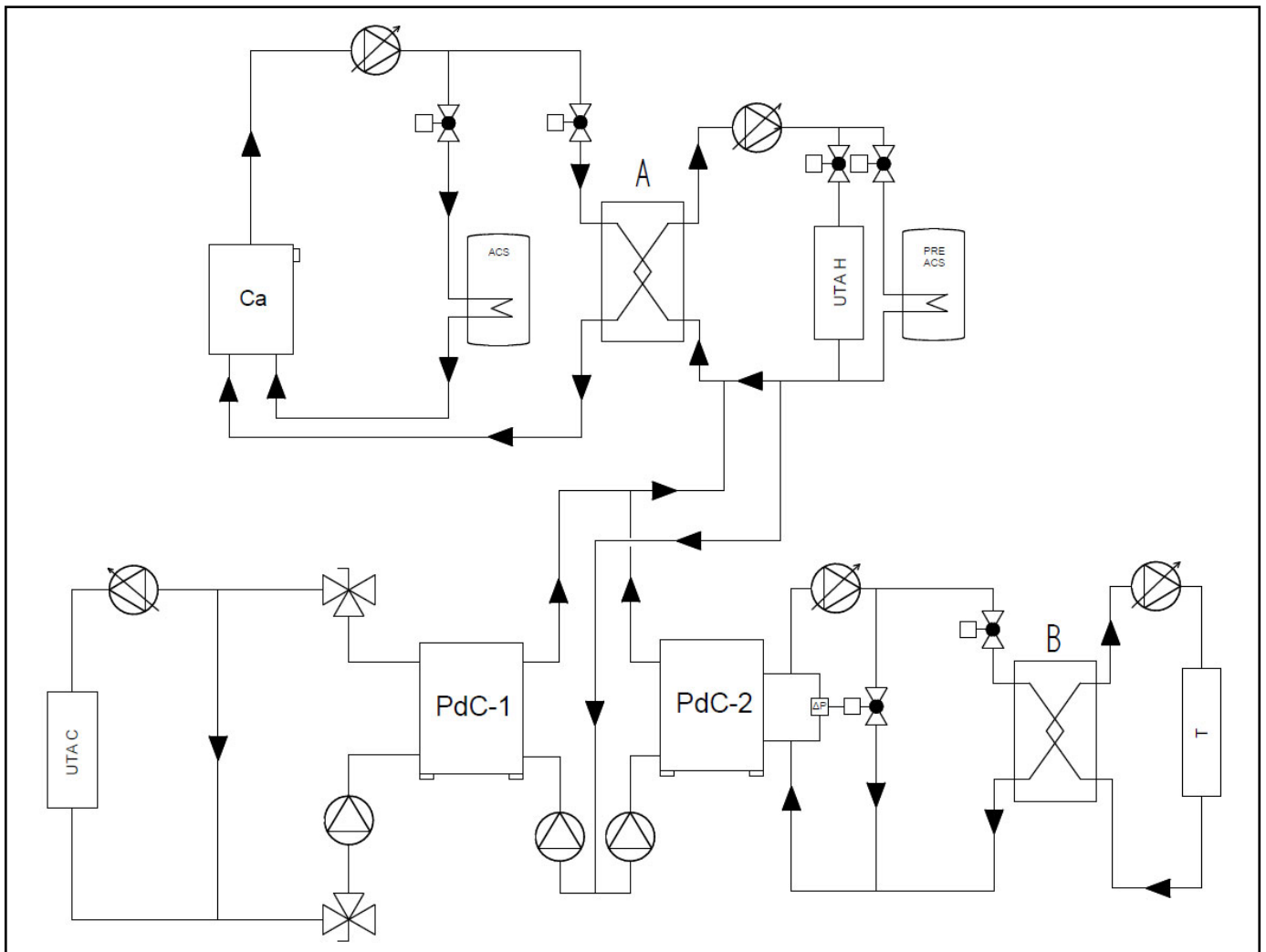
Rad = radiators

UTA H = heating AHU

T = terminals

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

**Thermo-refrigerating plant serving primary primary air conditioning systems plus radiant panels or cold beams - system with reversible heat pump refrigeration units**



Ca = boiler

UTA H = heating AHU

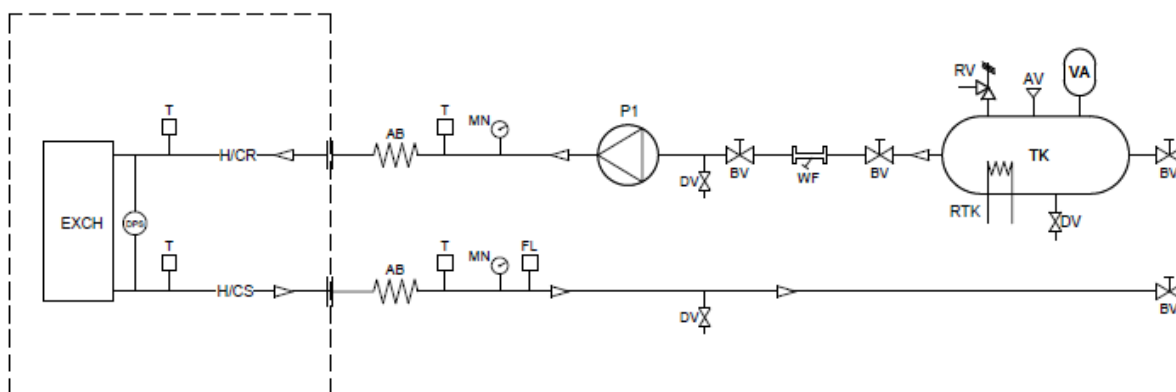
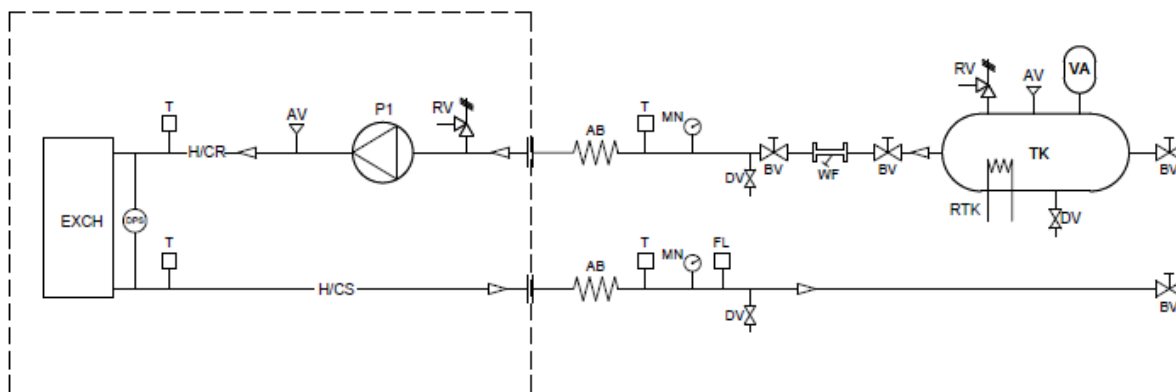
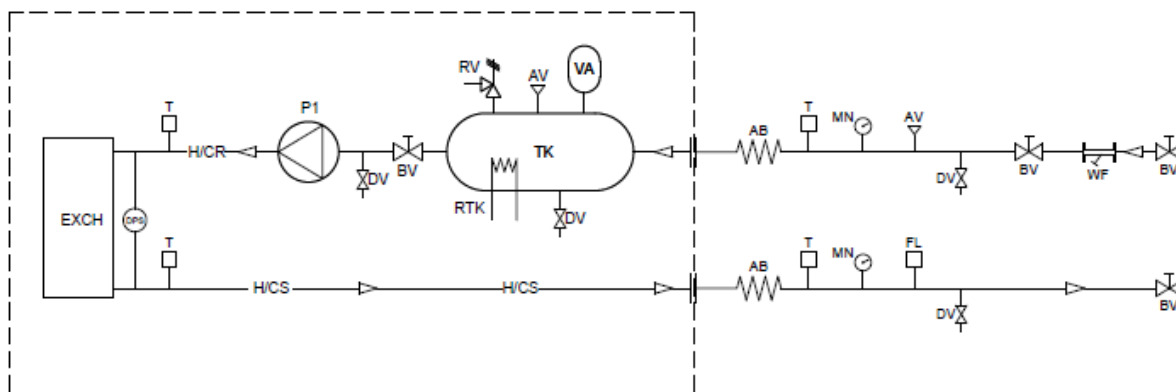
UTA C = cooling AHU

T = terminals

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



<b>EXCH</b>	Plate heat exchanger	<b>TK</b>	Interstitial tank
<b>DPS</b>	Differential pressure switch	<b>AV</b>	Air discharge vale
<b>T</b>	Temperature probe	<b>VA</b>	Expansion vessel
<b>P1</b>	Pump	<b>MN</b>	Manometer
<b>DV</b>	Discharge tap	<b>FL</b>	Flow switch
<b>BV</b>	Interception valve	<b>WF</b>	Water filter
<b>RV</b>	Safety valve	<b>H/CR</b>	User side inlet water
<b>RTK</b>	Tank electrical resistance	<b>H/CS</b>	User side outlet water
<b>AB</b>	Shock absorbers		

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	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 content e 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.

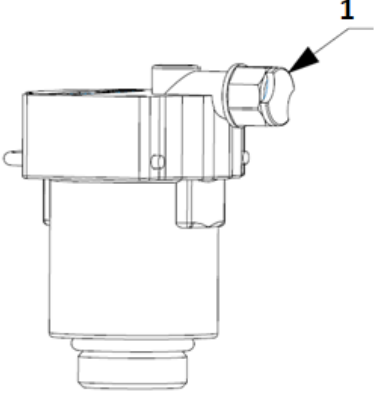
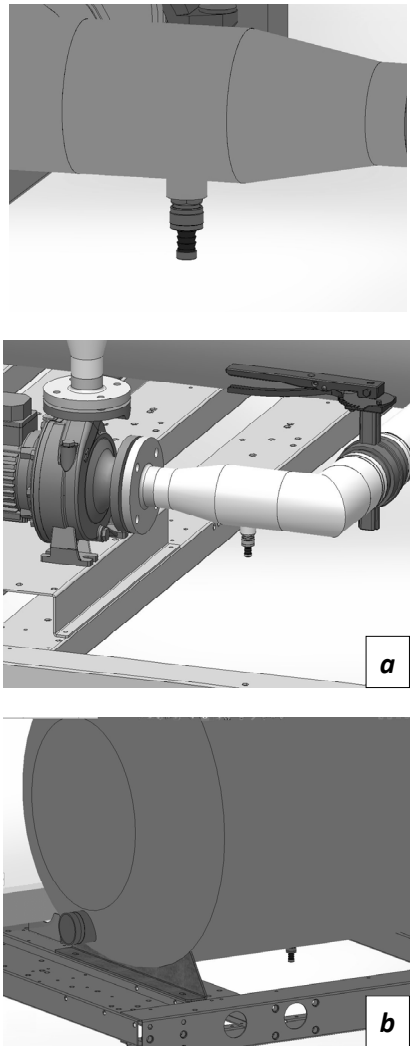
HWA1-A	02106	02120	02128	02140	04155	04177	04184	04209	04239	04258	04305	04349
Minimum content of water in the plant [l]	427	535	535	699	409	533	533	533	669	669	874	874
Tank volume [l]	390	390	390	705	420	420	420	520	520	520	705	705
Hydraulic circuit volume [l]	414	414	417	733	448	450	450	557	561	574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

### 3.3.5 Condensate drain system

All HWA1-A units are equipped with holes on the base for the discharge of any condensate that may percolate from the pipes of the hydraulic system and gas circuit.

### 3.3.6 System charge

	<b>ATTENTION:</b> supervise all loading / replenishment operations.
	<b>ATTENTION:</b> before proceeding with the loading / replenishment of the system, disconnect the power supply to the units.
	<b>ATTENTION:</b> the loading / replenishment of the system must always take place under controlled pressure conditions (max 1 bar). Make sure that a pressure reducer and a safety valve have been installed on the filling / replenishment line.
	<b>ATTENTION:</b> <i>the water on the loading / replenishment line must be properly pre-filtered from any impurities and suspended particles. Make sure that a removable cartridge filter has been installed.</i>
	<b>ATTENTION:</b> before proceeding with loading / replenishing the system, unscrew the cap of the air vent valve. Screw the cap back on once the plant loading / replenishment operations are complete.

	<p>During loading / replenishment operations, the vent valve cap must be partially unscrewed to allow air to flow freely outside the valve.</p> <p>(1) vent valve cap</p>
	<p>If it is necessary to top up the system, drain the quantity of water inside the system or adjust the percentage of glycol, you can use the service tap.</p> <p>This tap has a different location depending on the hydronic kit present:</p> <ul style="list-style-type: none"> <li>• Absence of hydronic kit - tap not present;</li> <li>• Hydronic kit with single / double pump - tap along the suction section of the pump (im. A);</li> <li>• Hydronic kit with single / double pump + tank - tap under the tank (picture b).</li> </ul> <p>To perform one of the aforementioned operations, unscrew the tap of the service tap and connect a 14 mm tube (internal diameter) connected to the water supply to the hose connector, then load the system by unscrewing the appropriate ring nut. After the operation, tighten the ring nut again and screw the cap back on. In any case, the use of an external tap whose preparation is the responsibility of the installer is recommended for loading the system.</p>

### 3.3.7 Plant discharge

If the unit has to be completely drained, first close the manual inlet and outlet gate valves (not supplied) and then disconnect the pipes arranged externally on the water inlet and outlet in order to let the liquid contained in the unit escape (to make easy operation, it is advisable to install two drain cocks externally between the unit and the manual gate valves on the water inlet and outlet).

## 4. GENERAL TECHNICAL DATA

### 4.1 Standard version

Technical features		Unit of measure	Model HWA1-A					
			02106	02120	02128	02140	04155	04177
Cooling	Cooling capacity (1)	kW	105,0	118,7	129,5	139,3	155,0	175,9
	Total absorbed power (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	138,8	154,9	163,7	184,9	204,4	229,7
	Total absorbed power (2)	kW	35,73	40,82	46,8	47,5	52,9	60,85
	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	76,3	82,0	91,5	103,4
	Total absorber power (8)	kW	29,9	34,1	39,1	39,5	45,4	50,8
	EER (8)	W/W	2,07	2,07	1,95	2,08	2,02	2,04
	Water flow (1)	l/s	5,02	5,67	6,19	6,45	7,19	8,40
	Heat exchanger pressure drops(1)	kPa	17,48	20,72	16,14	27,84	21,08	16,69
Compressor	Type of compressors		SCROLL					
	Refrigerant oil (type)		Emkarate RL 32 3MAF					
	Number of compressors	Nr	2	2	2	2	4	4
	Capacity steps	Nr	2	3	2	3	4	4
	Oil 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 circuit	Nr	1	1	1	1	2	2
Refrigerant	Type		R410A					
	Refrigerant load (Circuit 1) (4)	kg	10,5	10,5	10,5	15,0	13,0	13,0
	Refrigerant load (Circuit 2) (4)	kg	-	-	-	-	10,5	10,5
	Tons of equivalent CO <sub>2</sub> (4)	ton	21,9	21,9	21,9	31,3	49,1	49,1
	Desigt pressure (high/low)	bar	40,5/4	40,5/4	40,5/4	40,5/4	40,5/4	40,5/4



Technical features		Unit of measure	Model HWA1-A					
			02106	02120	02128	02140	04155	04177
External area fans	Type of fans		AXIAL					
	N° fans	Nr	2	2	2	3	3	3
	Nominal power (1)	kW	1,5	1,5	1,5	1,4	1,4	1,4
	Maximum power	kW	3,8	3,8	3,8	5,7	5,7	5,7
	Maximum absorbed power	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	Type of internal heat exchanger		PHE - plate type					
	Number of internal heat exchanger	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 water side	bar	12	12	12	12	12	12
	Maximum hydronic kit pressure (safety 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"
	Plant side minimum content of water	l	427	535	535	699	409	533
Noise emissions	Noise 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
	Noise 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					
	Standard unit Maximum absorbed power	kW	48,9	55,0	61,1	66,9	82,4	87,4
	Standard unit Maximum absorbed power	A	83,0	93,4	103,8	113,5	139,9	148,3
	Standard unit maximum inrush current	A	285,6	332,3	342,7	358,1	279,9	350,9
Dimensions and weights	A - Length	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
	Transport net weight	kg	1080	1080	1090	1510	1620	1620
	Operating weight	kg	1090	1090	1100	1520	1630	1630

Technical features		Unit of measure	Model HWA1-A					
			04184	04209	04239	04258	04305	04349
Cooling	Cooling capacity (1)	kW	182,4	207,9	238,1	256,6	304,8	347,7
	Total absorbed power (1)	kW	62,9	67,1	76,8	88,5	98,3	112,2
	EER (1)	W/W	2,90	3,10	3,10	2,90	3,10	3,10
	Cooling capacity (2)	kW	238,8	277,3	314,3	332,8	405,3	458,3
	Total absorbed power (2)	kW	67,76	71,58	81,9	94,63	105,2	121,1
	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	108,9	122,9	144,1	157,1	183,8	210,6
	Total absorbed power (8)	kW	55,8	59,7	68,8	79,2	88,5	100,5
	EER (8)	W/W	1,95	2,06	2,09	1,98	2,08	2,10
	Water flow (1)	l/s	8,71	9,93	11,40	12,26	14,69	16,61
	Heat exchanger pressure drops user side (1)	kPa	19,11	24,81	34,23	35,42	31,97	28,82
	Compressor	Type of compressors		SCROLL				
Refrigerant oil (type)			Emkarate RL 32 3MAF					
N° compressors		Nr	4	4	4	4	4	4
Capacity steps		Nr	4	4	6	4	6	4
Oil 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 circuit		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 circuit (Circuit 2) (4)	kg	10,5	13,0	13,5	13,5	19,5	20,5
	CO <sub>2</sub> Tons Equivalent (4)	ton	49,1	54,3	56,4	56,4	81,4	84,6
	Project pressure (high/low)	bar	40,5/4	40,5/4	40,5/4	40,5/4	40,5/4	40,5/4

Technical features		Unit of measure	Model HWA1-A					
			04184	04209	04239	04258	04305	04349
Fans zona esterna	Tipo fans		ASSIALE					
	N° fans	Nr	3	4	4	4	6	6
	Nominal capacity (1)	kW	1,5	1,4	1,5	1,5	1,4	1,5
	Maximum power	kW	5,7	7,6	7,6	7,6	11,4	11,4
	Maximum absorbed power	A	3,9	3,9	3,9	3,9	3,9	3,9
	Standard Air Flow	l/s	15892	20647	20471	22231	29279	33255
Scambiatore interno	Internal heat exchanger type		PHE - A PIASTRE					
	Number of internal heat 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	Water side maximum pressure	bar	12	12	12	12	12	12
	Maximum hydronic kit pressure (safety valve calibration )	bar	6	6	6	6	6	6
	Water connections		3"	3"	3"	3"	3"	3"
	Minimum content of water (5)	l	533	533	669	669	874	874
Noise emissions	Noise 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
	Noise 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					
	Standard unit maximum absorbed power	kW	90,9	97,8	110,0	122,3	146,0	165,8
	Standard unit maximum absorbed power	A	154,3	166,0	186,8	207,6	247,8	281,4
	Standard unit maximum inrush current	A	356,9	368,6	425,7	446,5	492,4	526,0
Dimensions and weights	A - Length	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
	Transport net weight	kg	1620	1950	1960	1960	2670	2850
	Operating weight	kg	1630	1960	1970	1980	2690	2870

**Performance referred to the following conditions::**

- (1) Internal exchanger water temperature = 12/7 ° C, air entering the external exchanger 35 ° C .
- (2) Internal exchanger water temperature = 23/18 ° C, air entering the external exchanger 35°C.
- (3) Internal exchanger water reference temperature= 12/7°C.
- (4) Indicative data and subject to variation. For the correct data, always refer to the technical label on the unit.
- (5) The calculated value of the minimum volume of water to the system does not consider the volume of water contained in the internal exchanger (evaporator). With applications with low outdoor air temperature or low average loads required, the minimum volume of water to the system is obtained by doubling the indicated value.
- (6) Condition (3); value determined on the basis of measurements carried out in accordance with UNI EN ISO 9614-2, in compliance with the requirements of the Eurovent certification
- (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 ethylene glycol al .
- (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 EN 14511. The data declared in point (3) are determined according to UNI EN 14825.**

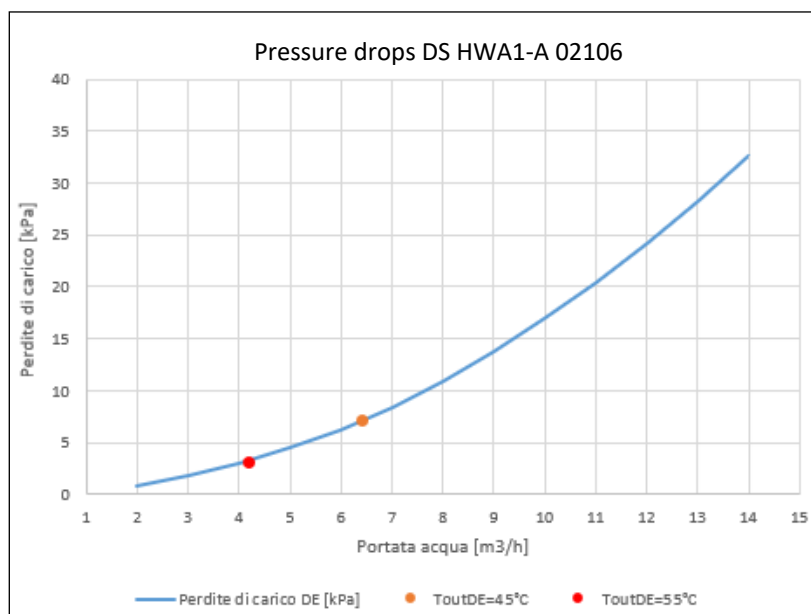
## 4.2 Desuperheater version

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.

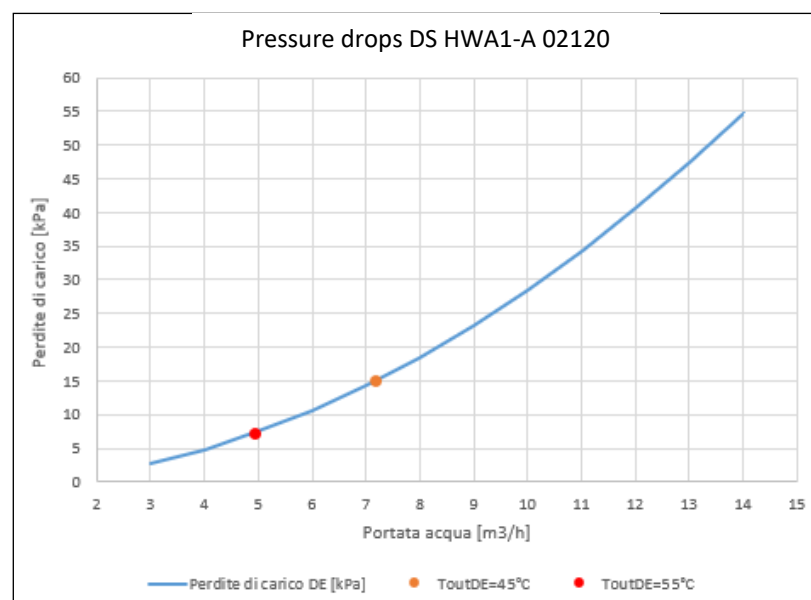
The unit with this version has no hydraulic circuit and no control, therefore it is the responsibility of the designer to verify that partial recovery is effective in any operating condition.

Model HWA1-A	T <sub>out</sub> DS=45°C					T <sub>out</sub> 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 Pressure 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

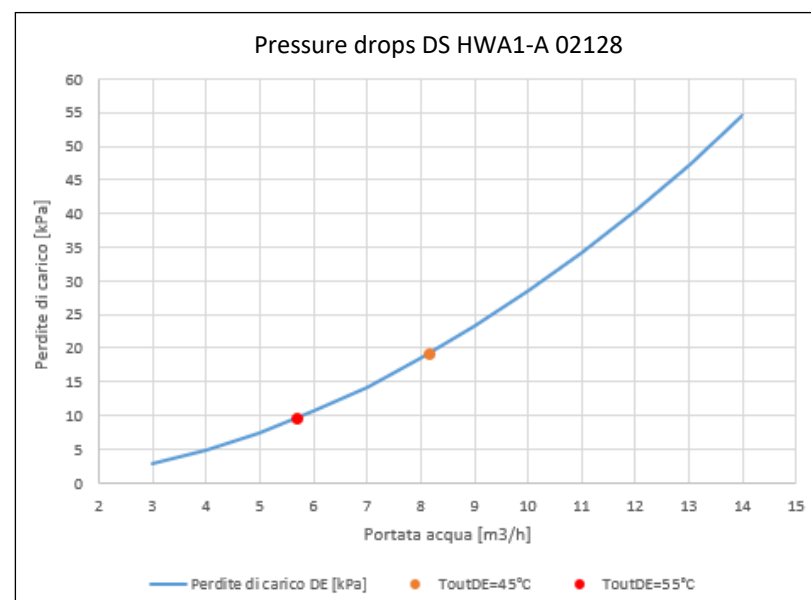
HWA1-A 02106	
DS Water flow [m <sup>3</sup> /h]	DS Pressure drops [kPa]
3,0	1,76
4,0	2,98
5,0	4,47
6,0	6,27
7,0	8,46
8,0	10,97
9,0	13,80
10,0	16,95
11,0	20,41
12,0	24,18
13,0	28,27
14,0	32,66



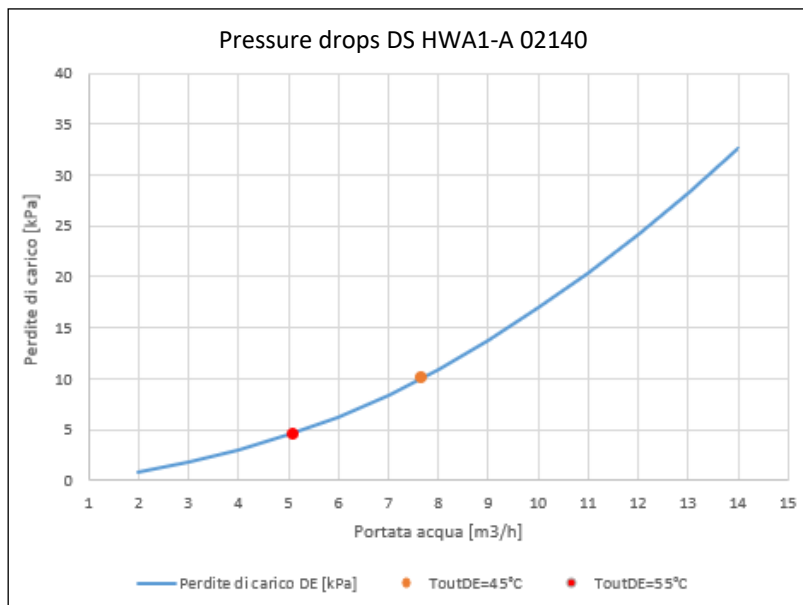
HWA1-A 02120	
DS Water flow [m <sup>3</sup> /h]	DS Pressure drops [kPa]
3,0	2,76
4,0	4,82
5,0	7,42
6,0	10,57
7,0	14,25
8,0	18,46
9,0	23,20
10,0	28,46
11,0	34,24
12,0	40,53
13,0	47,34
14,0	54,65



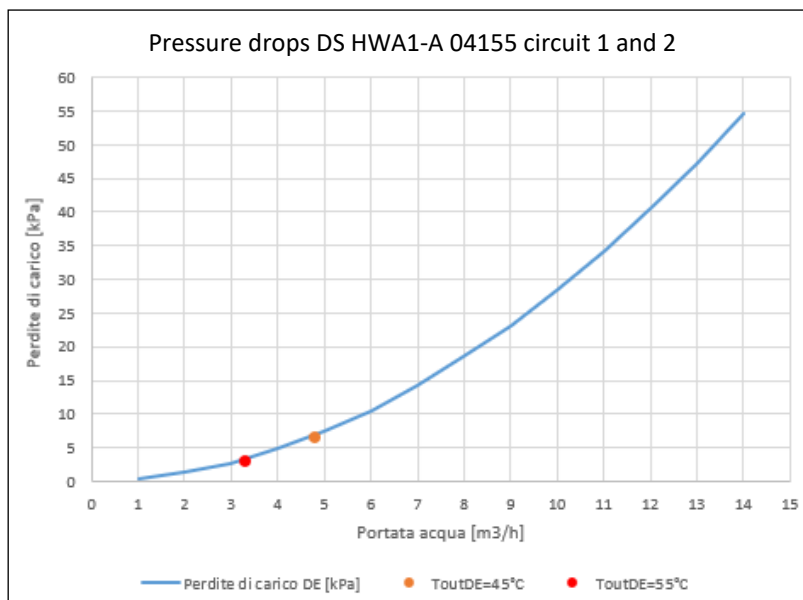
HWA1-A 02128	
DS Water flow [m <sup>3</sup> /h]	DS Pressure drops [kPa]
3,0	2,76
4,0	4,82
5,0	7,42
6,0	10,57
7,0	14,25
8,0	18,46
9,0	23,20
10,0	28,46
11,0	34,24
12,0	40,53
13,0	47,34
14,0	54,65



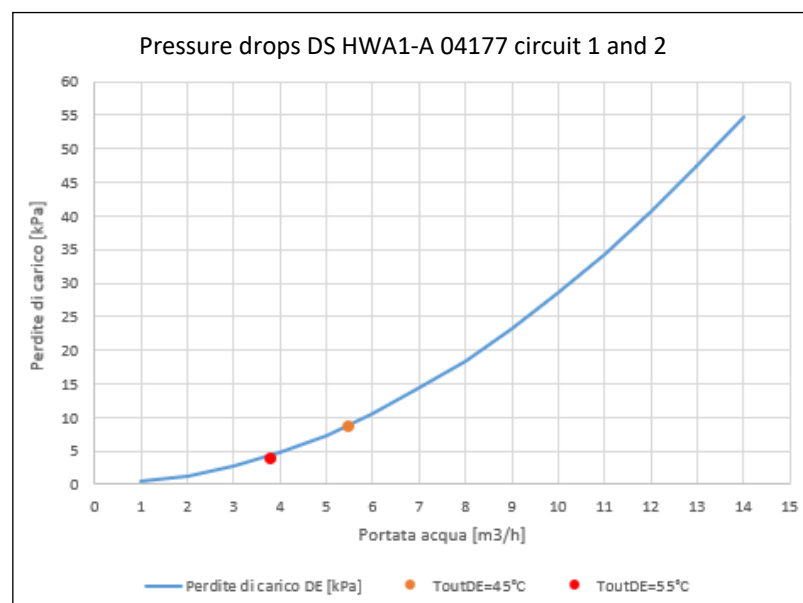
HWA1-A 02140	
DS Water flow [m3/h]	DS Pressure drops [kPa]
3,0	1,76
4,0	2,98
5,0	4,47
6,0	6,27
7,0	8,46
8,0	10,97
9,0	13,80
10,0	16,95
11,0	20,41
12,0	24,18
13,0	28,27
14,0	32,66



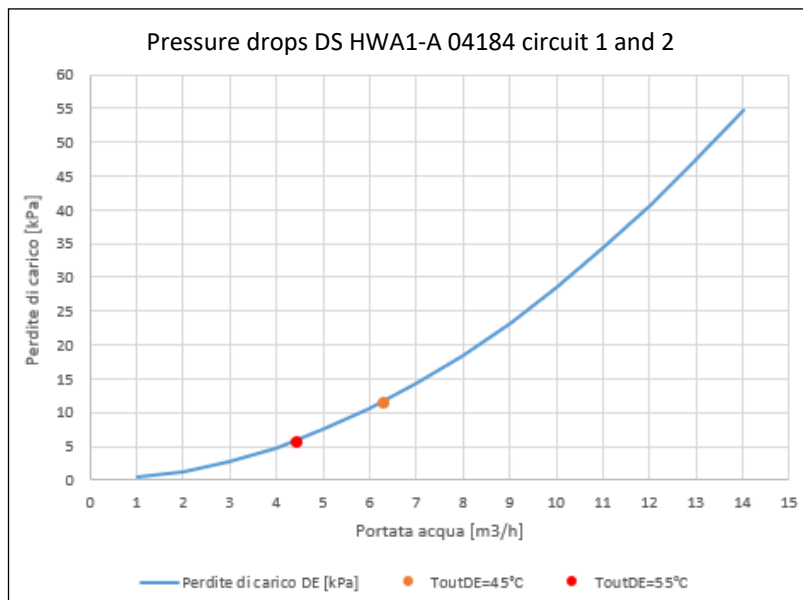
HWA1-A 04155 circuito 1 e 2	
DS Water flow [m3/h]	DS Pressure drops [kPa]
1,0	0,38
2,0	1,30
3,0	2,76
4,0	4,82
5,0	7,42
6,0	10,57
7,0	14,25
8,0	18,46
9,0	23,20
10,0	28,46
11,0	34,24
12,0	40,53
13,0	47,34



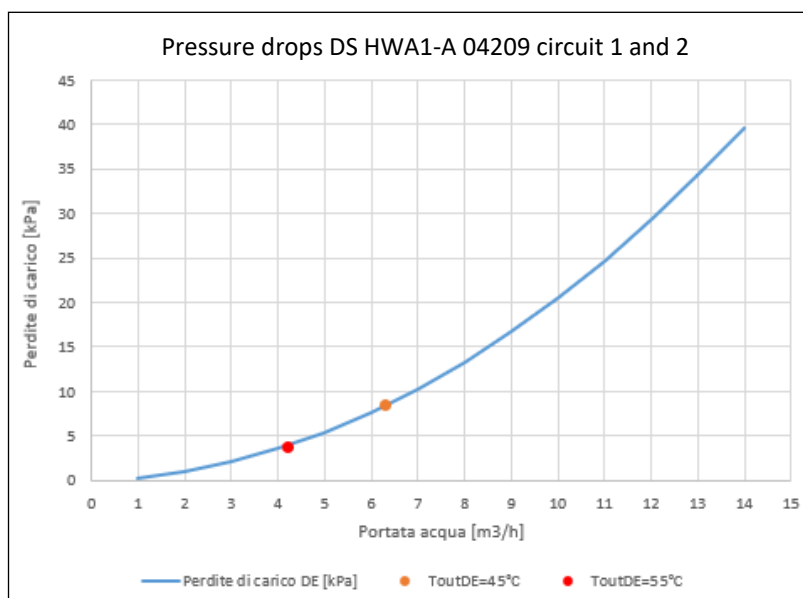
HWA1-A 04177 circuito 1 e 2	
DS Water flow [m3/h]	DS Pressure drops [kPa]
1,0	0,38
2,0	1,30
3,0	2,76
4,0	4,82
5,0	7,42
6,0	10,57
7,0	14,25
8,0	18,46
9,0	23,20
10,0	28,46
11,0	34,24
12,0	40,53
13,0	47,34



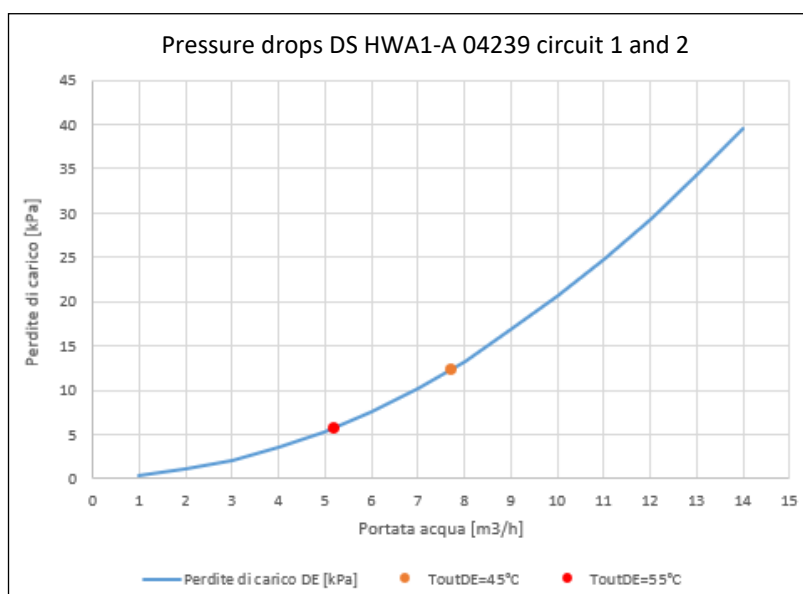
HWA1-A 04184 circuito 1 e 2	
DS Water flow [m3/h]	DS Pressure drops [kPa]
1,0	0,38
2,0	1,30
3,0	2,76
4,0	4,82
5,0	7,42
6,0	10,57
7,0	14,25
8,0	18,46
9,0	23,20
10,0	28,46
11,0	34,24
12,0	40,53
13,0	47,34



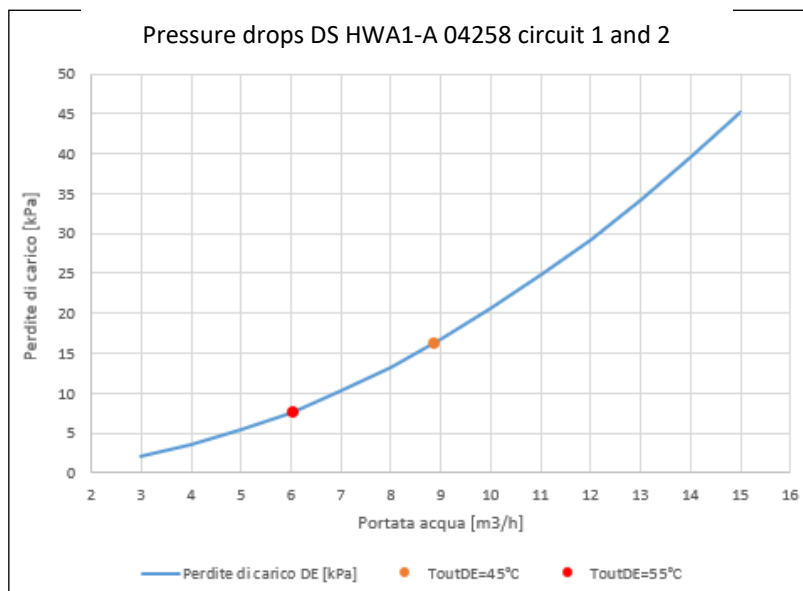
HWA1-A 04209 circuito 1 e 2	
DS Water flow [m3/h]	DS Pressure drops [kPa]
1,0	0,29
2,0	1,02
3,0	2,12
4,0	3,57
5,0	5,34
6,0	7,61
7,0	10,27
8,0	13,31
9,0	16,74
10,0	20,55
11,0	24,73
12,0	29,29
13,0	34,22



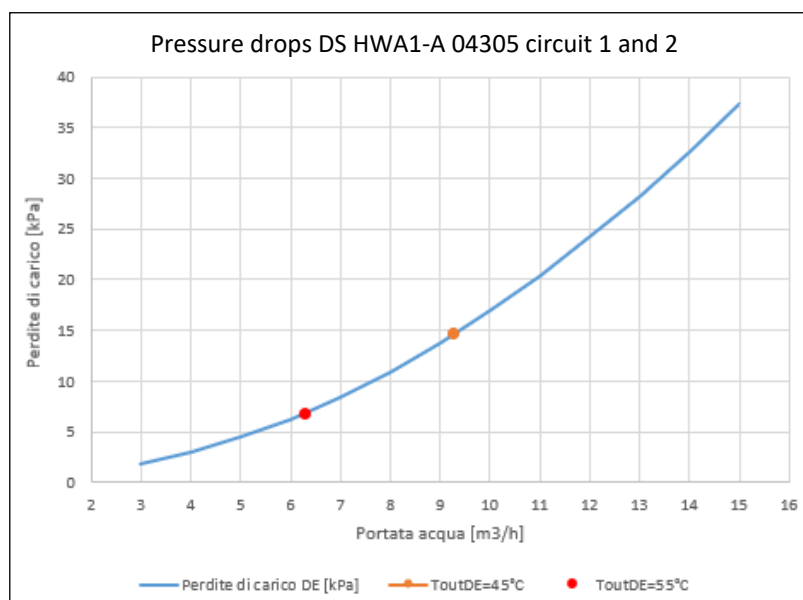
HWA1-A 04239 circuito 1 e 2	
DS Water flow [m3/h]	DS Pressure drops [kPa]
1,0	0,29
2,0	1,02
3,0	2,12
4,0	3,57
5,0	5,34
6,0	7,61
7,0	10,27
8,0	13,31
9,0	16,74
10,0	20,55
11,0	24,73
12,0	29,29
13,0	34,22



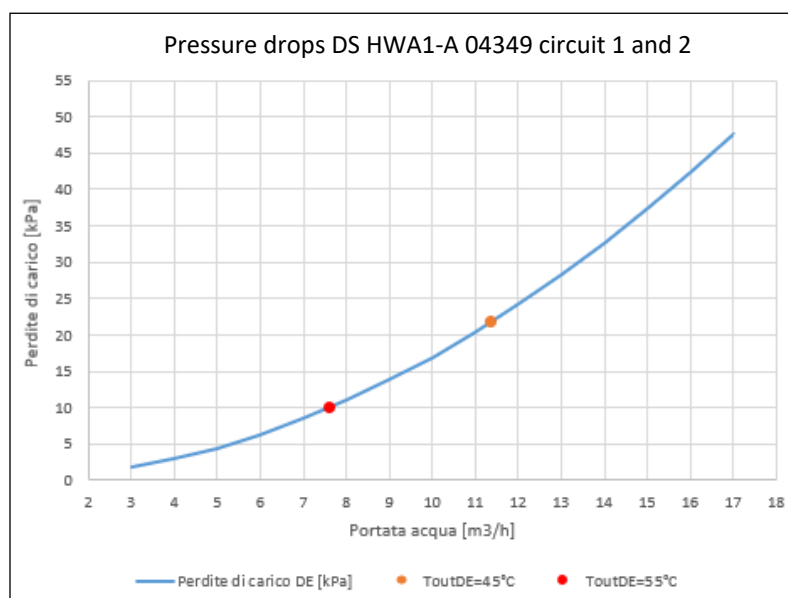
HWA1-A 04258 circuito 1 e 2	
DS Water flow [m3/h]	DS Pressure drops [kPa]
3,0	2,12
4,0	3,57
5,0	5,34
6,0	7,61
7,0	10,27
8,0	13,31
9,0	16,74
10,0	20,55
11,0	24,73
12,0	29,29
13,0	34,22



HWA1-A 04305 circuito 1 e 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 circuito 1 e 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	400/3+PE/50
On-board control circuit	V/~ /Hz	12/1/50
Remoto control circuit	V/~ /Hz	12/1/50
Fans power supply	V/~ /Hz	230/1/50

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.

Magnitudes	Unit of measure	Model HWA1-A					
		02106	02120	02128	02140	04155	04177
<b>F.L.A. Current absorbed at the maximum allowed conditions</b>							
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	-	-	-	-	31,0	31,0
F.L.A. Compressor 4	A	-	-	-	-	31,0	31,0
F.L.A. Fans	A	6,6	6,6	6,6	9,9	9,9	9,9
<b>L.R.A. Inrush current (with locked rotor)</b>							
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
<b>Unit total</b>							
Maximum absorbed power	kW	48,9	55	61,1	66,9	82,4	87,4
Maximum absorbed power	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

Magnitudes	Unit of measure	Model HWA1-A					
		04184	04209	04239	04258	04305	04349
<b>F.L.A. Current absorbed at the maximum allowed conditions</b>							
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. Fans	A	9,9	13,2	13,2	13,2	19,8	19,8
<b>L.R.A. Inrush current (with locked rotor)</b>							
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	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
<b>Unit total</b>							
Maximum absorbed power	kW	90,9	97,8	110,0	122,3	146,0	165,8
Maximum absorbed power	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	112,0	124,7	143,4

## 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 by mass of ethylene glycol	Freezing point (°C)	Yield 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 .

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

### 5.3 Calibration and control protection

Description	Value
High pressure safety valve	45 bar
High pressure switch	41,5 bar
High pressure alarm	41 bar
Low pressure switch	4 bar
Low pressure alarm	5 bar
Low pressure safety valve	29,5
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

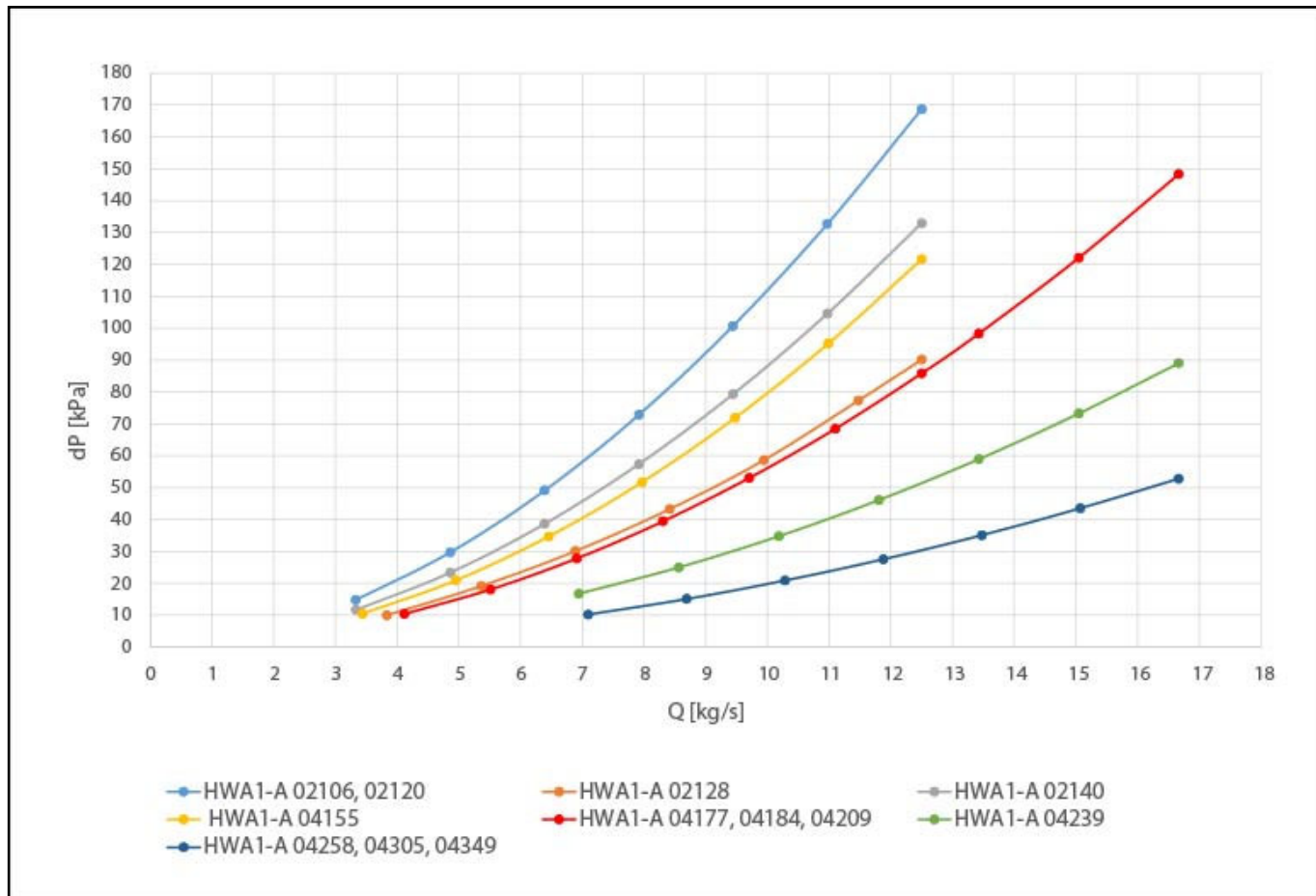
<b>HWA1-A</b>				
<b>Altitude [mt]</b>	<b>500</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>
<b>Cooling performance corrective factor</b>	0,9927	0,9848	0,9769	0,9667
<b>Absorbed power corrective factor</b>	1,0096	1,0202	1,0320	1,0448

## 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..

	Flow [kg/s]	Pressure drops [kPa]
HWA1-A 02106, 02120	3,3	14,8
	4,9	29,7
	6,4	49,2
	7,9	72,9
	9,4	100,7
	11,0	132,7
	12,5	168,7
HWA1-A 02128	3,8	10,0
	5,4	19,2
	6,9	30,1
	8,4	43,3
	9,9	58,6
	11,5	77,3
	12,5	90,2
HWA1-A 02140	3,3	11,7
	4,9	23,4
	6,4	38,7
	7,9	57,4
	9,4	79,4
	11,0	104,6
	12,5	132,9
HWA1-A 04155	3,4	10,5
	4,9	21,0
	6,5	34,7
	8,0	51,8
	9,5	72,0
	11,0	95,3
	12,5	121,6
HWA1-A 04177, 04184, 04209	4,1	10,4
	5,5	18,1
	6,9	27,8
	8,3	39,5
	9,7	53,1
	11,1	68,5
	12,5	85,8
	13,4	98,3
	15,0	122,1
16,7	148,3	
HWA1-A 04239	6,9	16,8
	8,6	25,0
	10,2	34,8
	11,8	46,1
	13,4	58,9
	15,0	73,3
	16,7	89,1
HWA1-A 04258, 04305, 04349	7,1	10,2
	8,7	15,1
	10,3	20,9
	11,9	27,6
	13,5	35,1
	15,1	43,6
	16,7	52,8



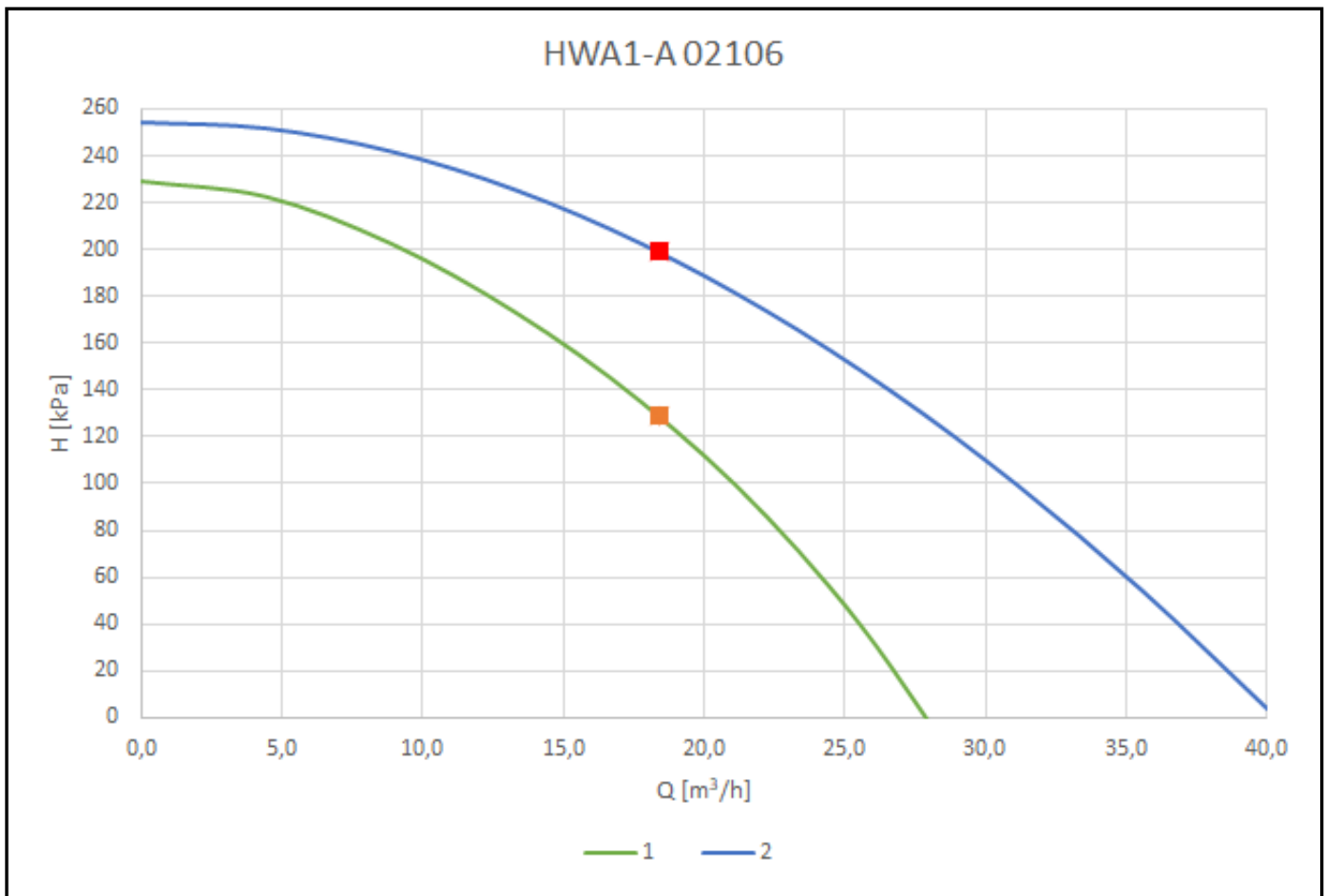
dP = plate heat exchanger pressure drop

Q = water flow

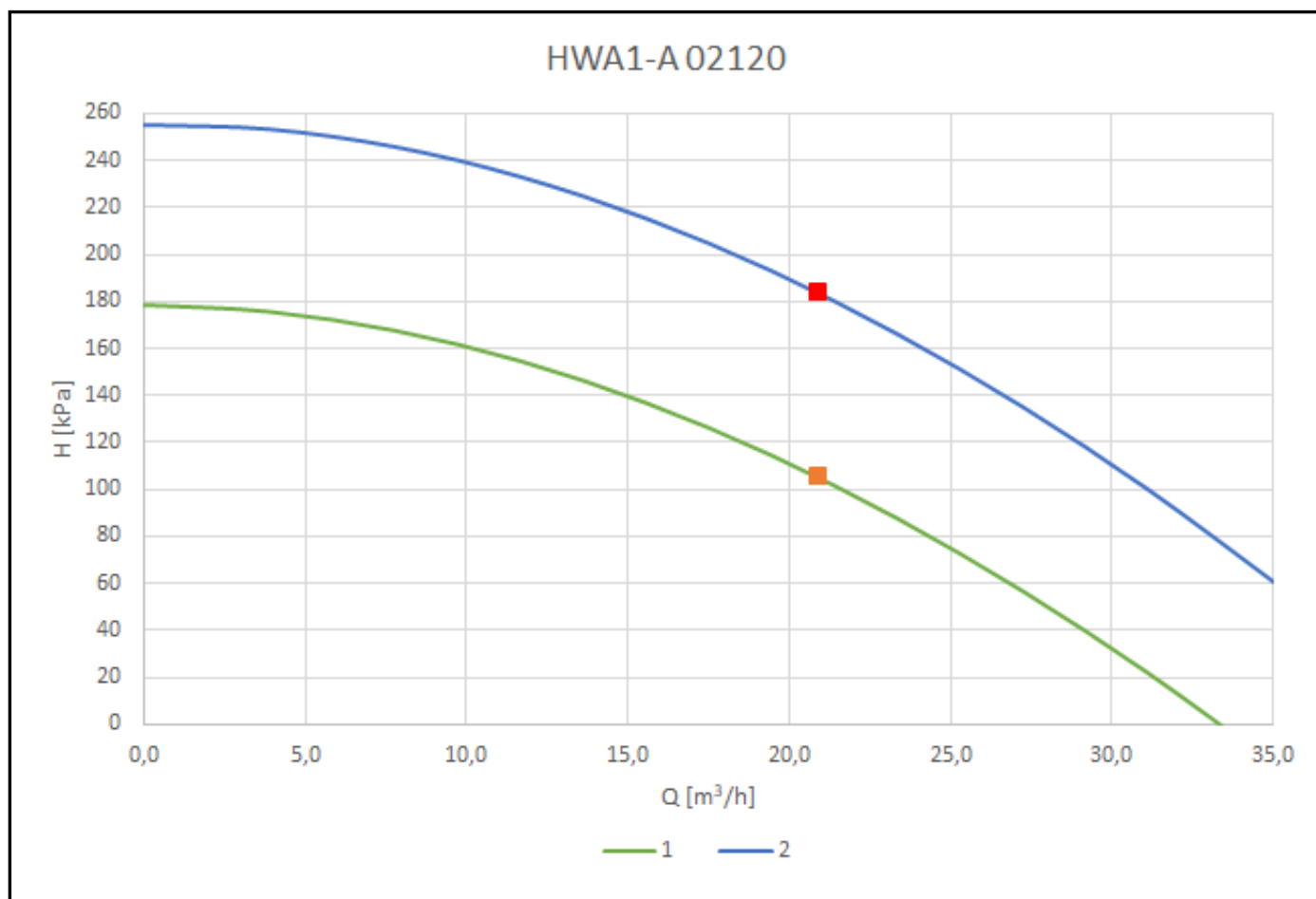
## 6.2 Available head pressure

Below are the head (H) - flow (Q) characteristic curves net of the pressure drops of the hydronic kit with the circulator 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. .

HWA1-A 02106			
Standard available head pressure pump		High available head pressure pump	
Water flow [m <sup>3</sup> /h]	Available pressure [kPa]	Water flow [m <sup>3</sup> /h]	Available pressure [kPa]
0,0	229,5	0,0	254,7
4,4	222,9	4,4	252,2
8,9	202,9	8,9	242,4
13,3	173,3	13,3	225,8
17,8	135,2	17,8	202,9
22,2	86,3	22,2	174,1
26,7	21,7	26,7	139,7

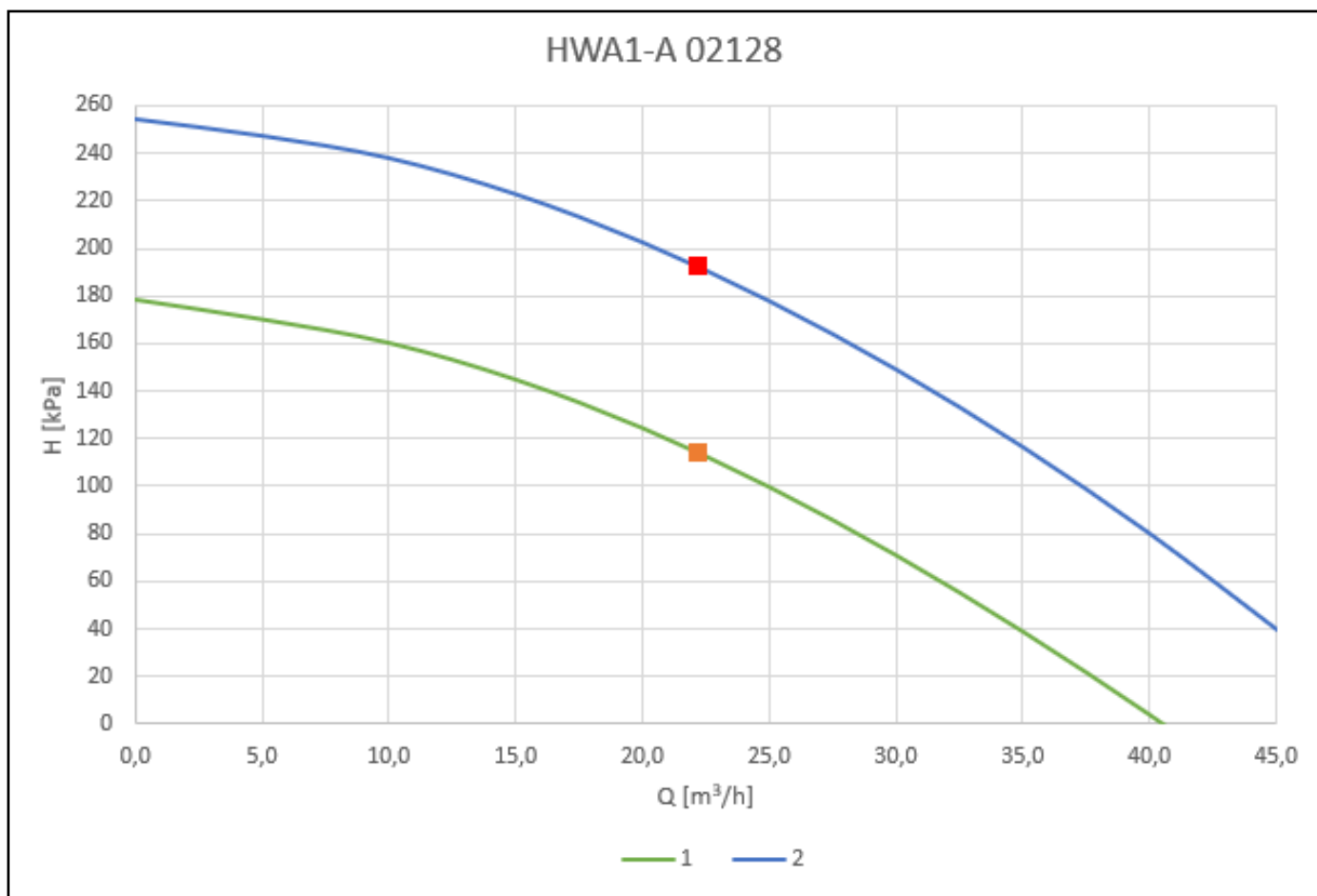


HWA1-A 02120			
Standard available head pressure pump		High available head pressure pump	
Water flow [m <sup>3</sup> /h]	Available pressure [kPa]	Water flow [m <sup>3</sup> /h]	Available pressure [kPa]
0,0	178,1	0,0	254,7
3,9	175,3	3,9	252,9
7,8	167,3	7,8	245,5
11,7	154,3	11,7	232,8
15,6	136,6	15,6	215,1
19,4	114,3	19,4	192,8
23,3	87,6	23,3	166,0
27,2	56,7	27,2	135,0
31,1	21,8	31,1	99,8

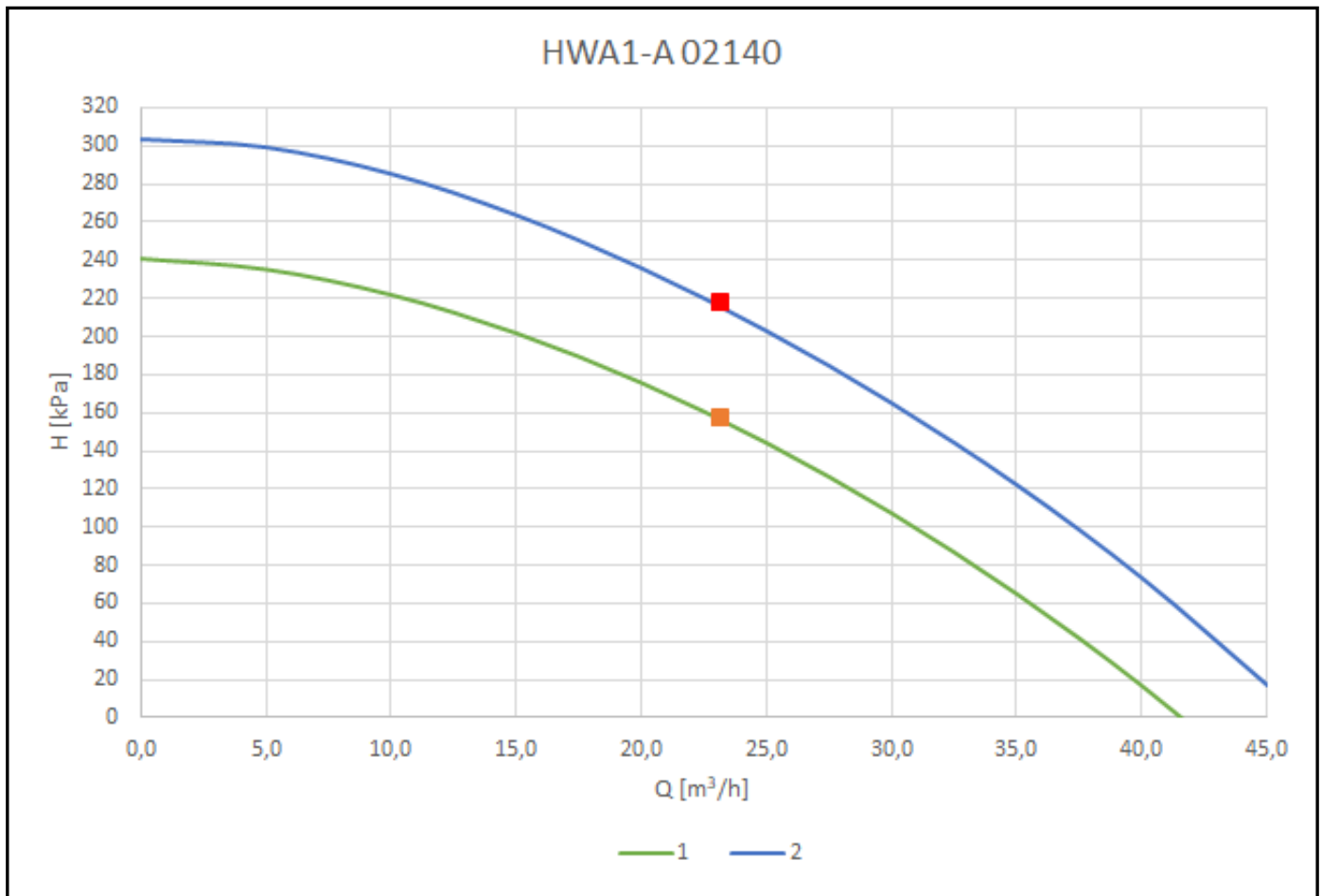




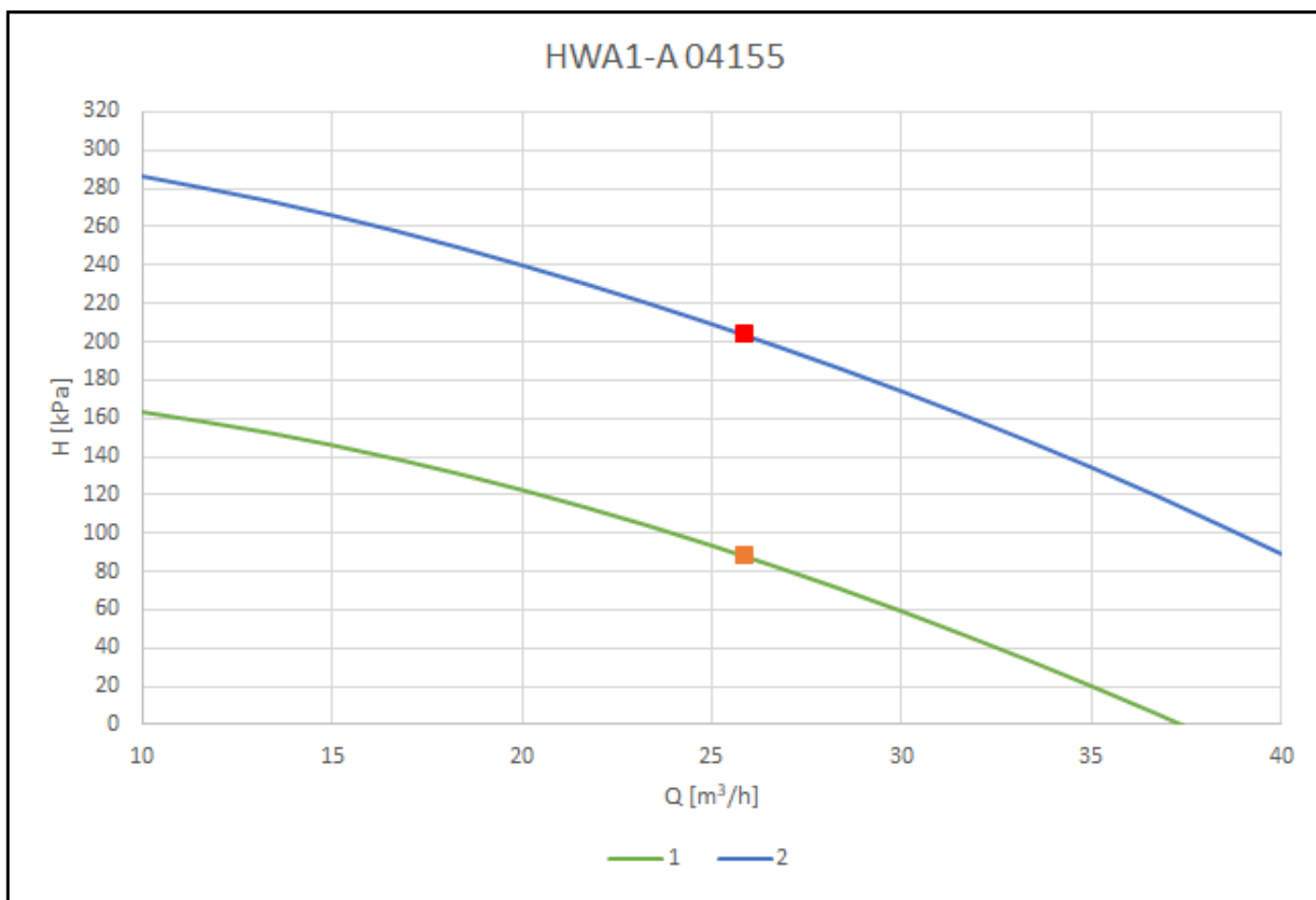
HWA1-A 02128			
Standard available head pressure pump		High available head pressure pump	
Water flow [m <sup>3</sup> /h]	Available pressure [kPa]	Water flow [m <sup>3</sup> /h]	Available pressure [kPa]
0,0	178,1	0,0	254,7
5,0	169,9	5,0	247,7
10,0	160,0	10,0	238,3
15,0	144,6	15,0	223,1
20,0	124,3	20,0	202,8
25,0	99,5	25,0	178,0
30,0	70,9	30,0	149,0
35,0	38,9	35,0	116,3



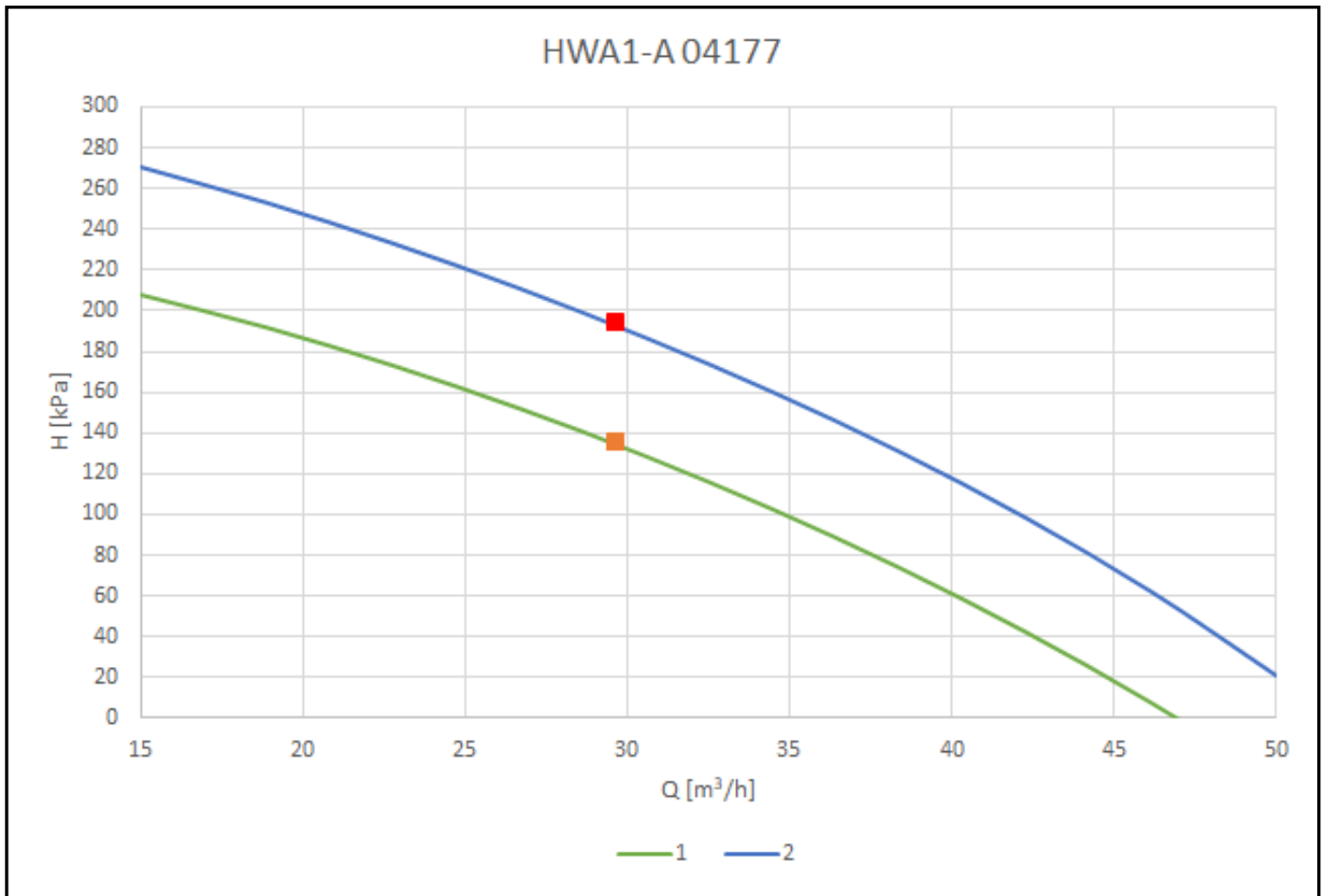
HWA1-A 02140			
Standard available head pressure pump		High available head pressure pump	
Water flow [m <sup>3</sup> /h]	Available pressure [kPa]	Water flow [m <sup>3</sup> /h]	Available pressure [kPa]
0,0	241,0	0,0	304,0
5,0	235,4	5,0	299,8
10,0	222,0	10,0	285,8
15,0	201,9	15,0	264,2
20,0	175,8	20,0	236,3
25,0	144,2	25,0	203,2
30,0	107,3	30,0	165,3
35,0	64,9	35,0	122,2
40,0	16,6	40,0	73,2



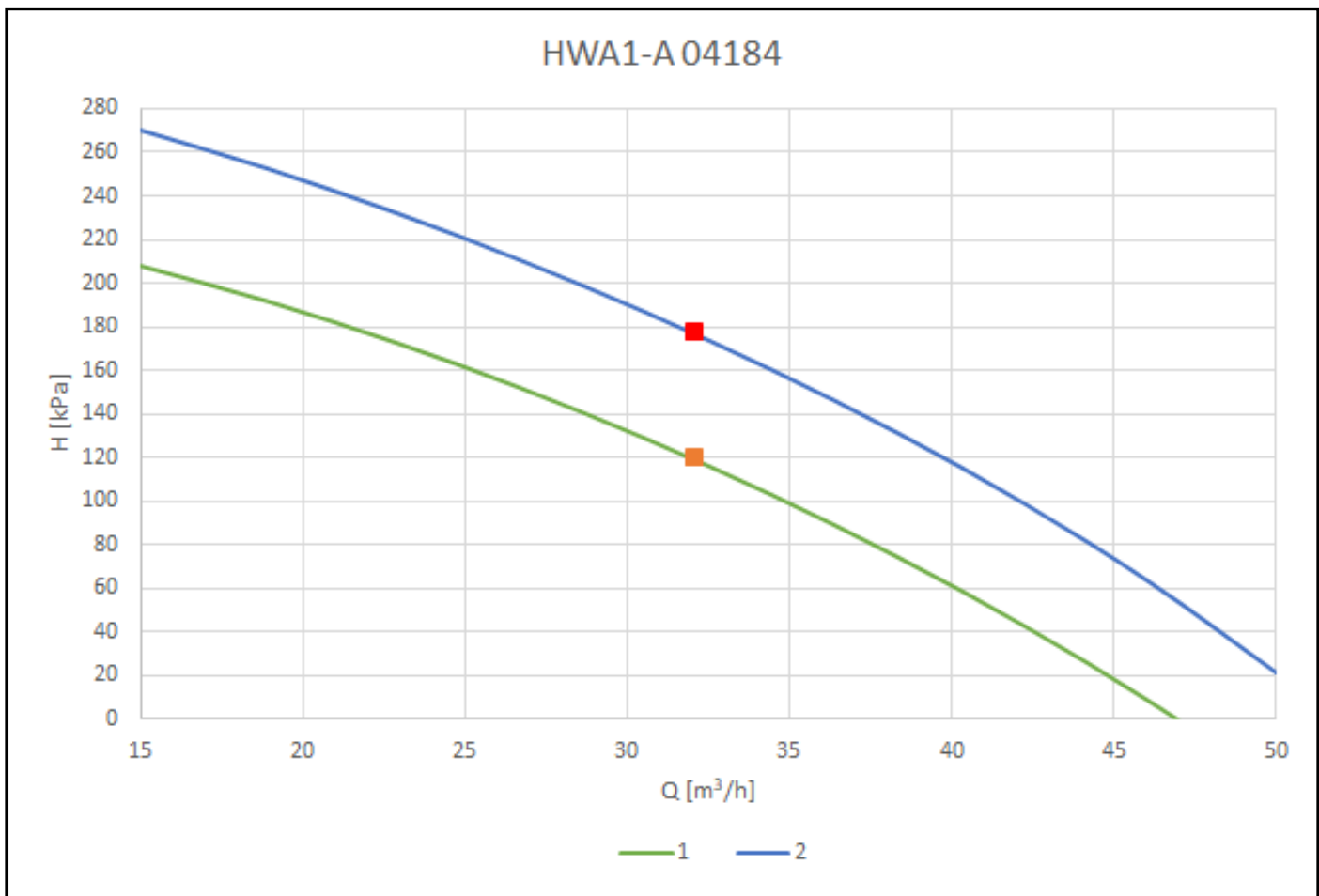
HWA1-A 04155			
Standard available head pressure pump		High available head pressure pump	
Water flow [m <sup>3</sup> /h]	Available pressure [kPa]	Water flow [m <sup>3</sup> /h]	Available pressure [kPa]
10,0	163,5	10,0	286,8
13,3	152,7	13,3	273,9
16,7	139,1	16,7	258,2
20,0	122,8	20,0	240,2
23,3	104,0	23,3	220,1
26,7	82,8	26,7	198,0
30,0	59,3	30,0	174,0
33,3	33,6	33,3	147,9
36,7	6,0	36,7	119,6



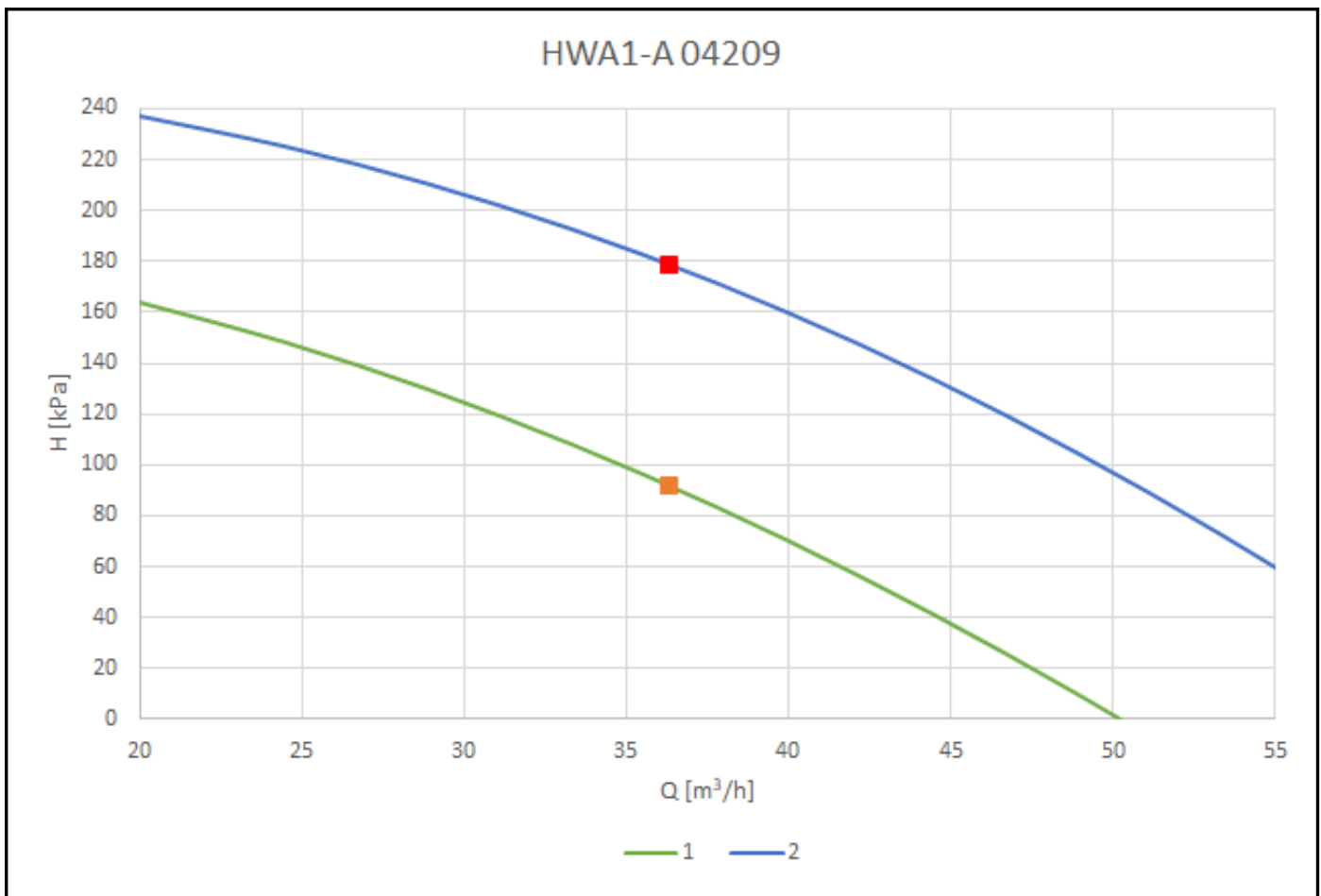
HWA1-A 04177			
Standard available head pressure pump		High available head pressure pump	
Water flow [m <sup>3</sup> /h]	Available pressure [kPa]	Water flow [m <sup>3</sup> /h]	Available pressure [kPa]
15,0	208,2	15,0	270,4
18,9	192,0	18,9	252,9
22,8	173,4	22,8	233,0
26,7	152,3	26,7	210,9
30,6	128,8	30,6	186,8
34,4	102,9	34,4	160,3
38,3	74,3	38,3	131,2
42,2	42,7	42,2	98,9
46,1	7,8	46,1	62,5



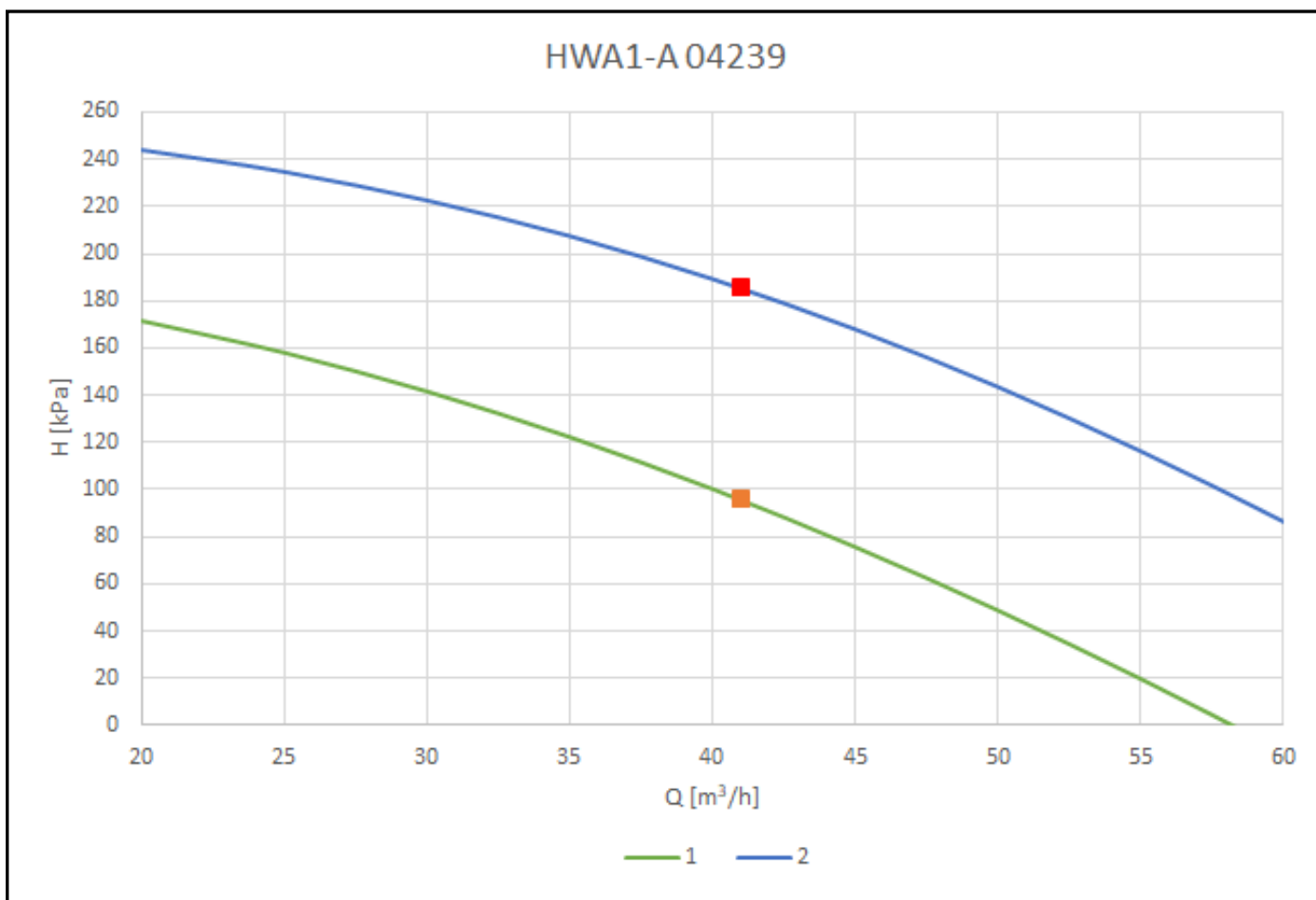
HWA1-A 04184			
Standard available head pressure pump		High available head pressure pump	
Water flow [m <sup>3</sup> /h]	Available pressure [kPa]	Water flow [m <sup>3</sup> /h]	Available pressure [kPa]
15,0	208,2	15,0	270,4
18,9	192,0	18,9	252,9
22,8	173,4	22,8	233,0
26,7	152,3	26,7	210,9
30,6	128,8	30,6	186,8
34,4	102,9	34,4	160,3
38,3	74,3	38,3	131,2
42,2	42,7	42,2	98,9
46,1	7,8	46,1	62,5



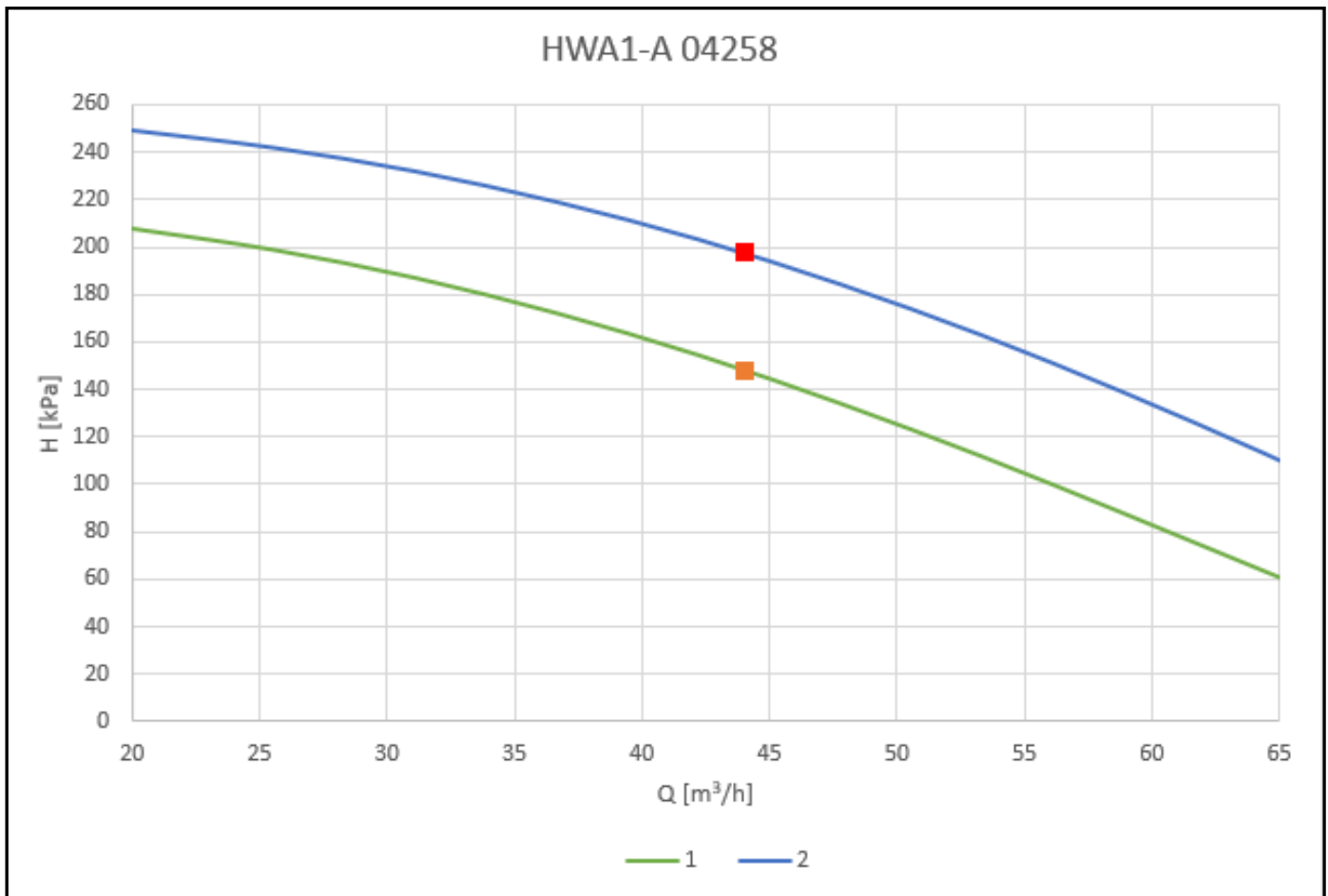
HWA1-A 04209			
Standard available head pressure pump		High available head pressure pump	
Water flow [m <sup>3</sup> /h]	Available pressure [kPa]	Water flow [m <sup>3</sup> /h]	Available pressure [kPa]
20,0	163,8	20,0	236,8
24,4	148,3	24,4	225,0
28,9	129,7	28,9	210,2
33,3	108,0	33,3	192,4
37,8	83,4	37,8	171,3
42,2	56,1	42,2	147,0
46,7	26,0	46,7	119,5



HWA1-A 04239			
Standard available head pressure pump		High available head pressure pump	
Water flow [m <sup>3</sup> /h]	Available pressure [kPa]	Water flow [m <sup>3</sup> /h]	Available pressure [kPa]
20,0	171,3	20,0	244,3
25,0	157,8	25,0	235,0
30,0	141,4	30,0	222,9
35,0	122,0	35,0	207,8
40,0	100,0	40,0	189,5
45,0	75,5	45,0	168,1
50,0	48,6	50,0	143,7
55,0	19,6	55,0	116,4

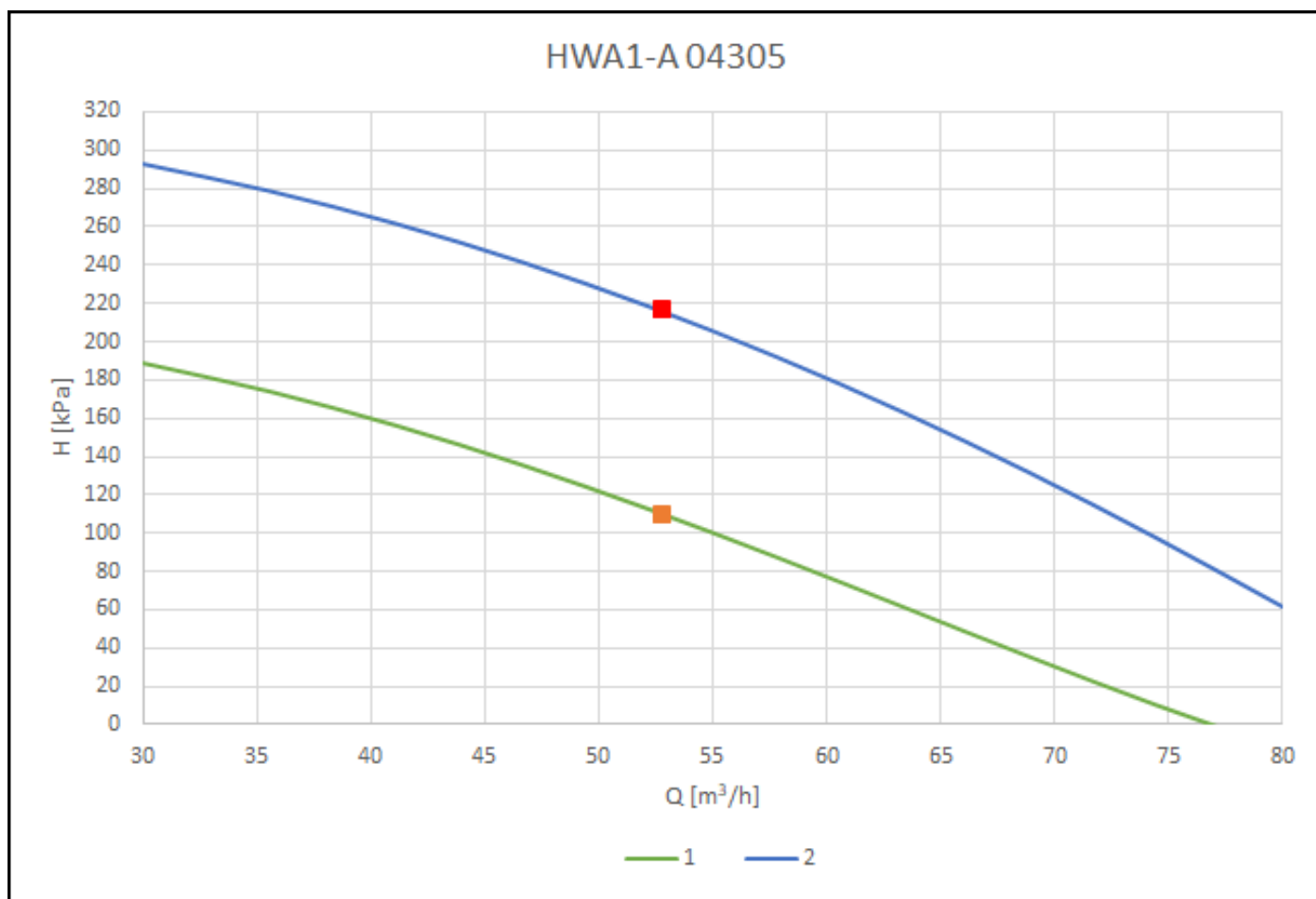


HWA1-A 04258			
Standard available head pressure pump		High available head pressure pump	
Water flow [m <sup>3</sup> /h]	Available pressure [kPa]	Water flow [m <sup>3</sup> /h]	Available pressure [kPa]
20,0	208,1	20,0	249,1
25,6	199,1	25,6	241,7
31,1	187,3	31,1	231,8
36,7	172,3	36,7	218,9
42,2	154,6	42,2	203,2
47,8	134,2	47,8	184,3
53,3	111,8	53,3	162,9
58,9	87,7	58,9	138,9
64,4	63,1	64,4	113,0

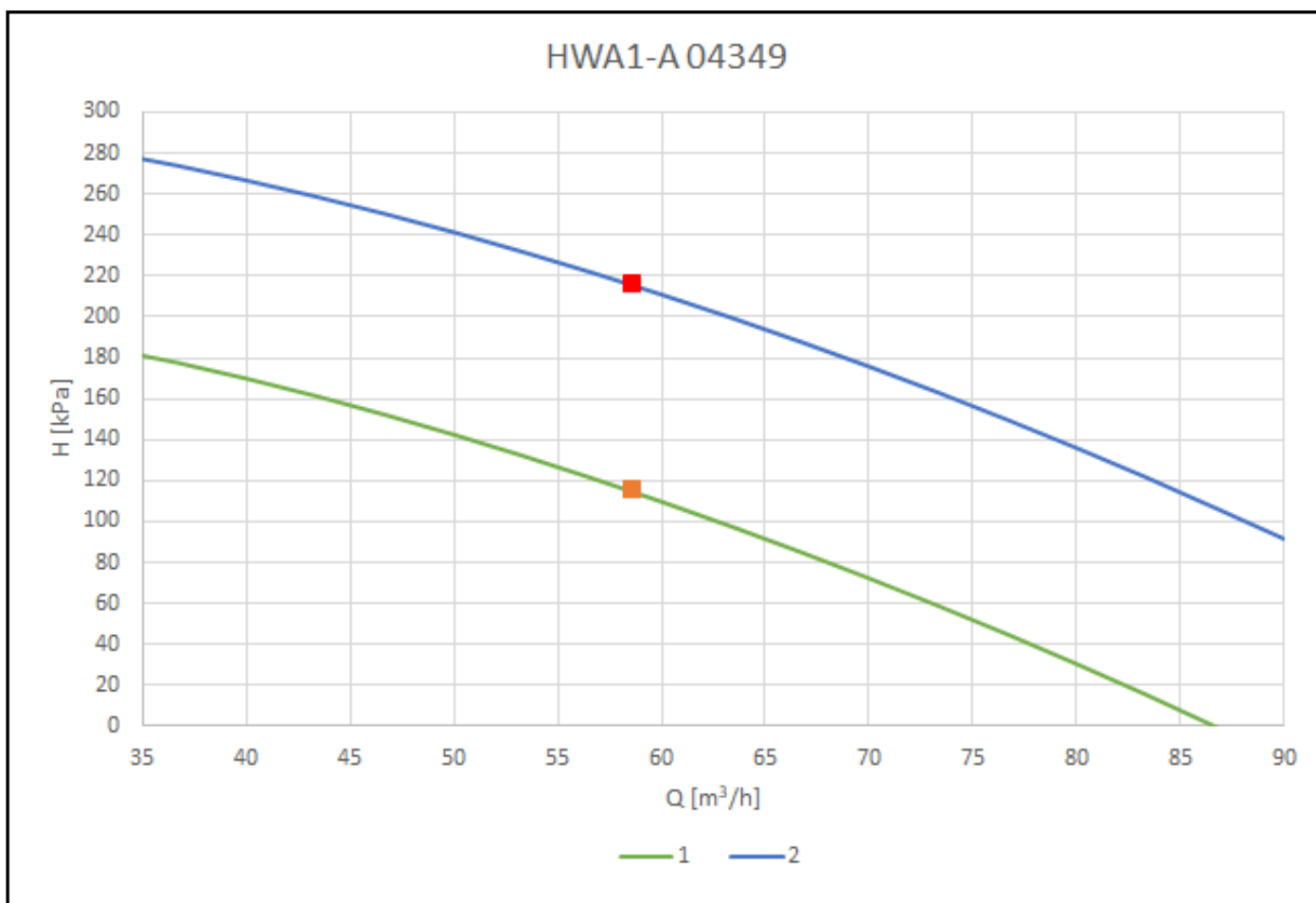




HWA1-A 04305			
Standard available head pressure pump		High available head pressure pump	
Water flow [m <sup>3</sup> /h]	Available pressure [kPa]	Water flow [m <sup>3</sup> /h]	Available pressure [kPa]
30,0	189,2	30,0	293,4
35,6	174,4	35,6	279,2
41,1	156,5	41,1	262,1
46,7	135,8	46,7	241,9
52,2	112,6	52,2	218,6
57,8	87,7	57,8	192,4
63,3	61,6	63,3	163,4
68,9	35,4	68,9	131,7
74,4	10,1	74,4	97,6



HWA1-A 04349			
Standard available head pressure pump		High available head pressure pump	
Water flow [m <sup>3</sup> /h]	Available pressure [kPa]	Water flow [m <sup>3</sup> /h]	Available pressure [kPa]
30,0	191,2	30,0	286,4
36,7	178,0	36,7	274,0
43,3	161,7	43,3	258,9
50,0	142,7	50,0	241,4
56,7	121,3	56,7	221,7
63,3	97,8	63,3	199,8
70,0	72,3	70,0	175,8
76,7	44,9	76,7	149,8
83,3	15,4	83,3	121,7



## 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 UNI EN ISO 9614-2 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			
<b>02106</b>	57,6	74,2	78,1	79,8	82,4	76,2	66,2	86,0	67,6	54,0
<b>02120</b>	57,6	75,1	78,0	79,7	82,3	76,1	66,4	86,0	67,6	54,0
<b>02128</b>	58,3	76,8	78,8	80,6	83,2	76,9	67,3	87,0	68,6	55,0
<b>02140</b>	58,0	75,3	80,5	82,0	82,0	76,6	67,4	87,0	68,0	54,9
<b>04155</b>	59,7	75,9	81,7	82,0	79,6	76,7	69,7	87,0	68,0	54,9
<b>04177</b>	59,0	75,8	81,1	81,8	83,8	78,1	68,9	88,0	69,0	55,9
<b>04184</b>	58,9	75,7	81,0	81,8	83,9	78,2	69,1	88,0	69,0	55,9
<b>04209</b>	59,6	76,5	80,3	81,8	84,4	78,2	68,3	88,0	68,9	55,9
<b>04239</b>	59,6	77,4	80,2	81,7	84,3	78,1	68,5	88,0	68,9	55,9
<b>04258</b>	59,5	78,2	80,1	81,7	84,2	78,1	68,7	88,0	68,9	55,9
<b>04305</b>	59,2	77,9	81,6	82,9	83,0	77,7	69,2	88,0	68,3	55,8
<b>04349</b>	60,0	79,0	84,0	85,5	84,1	79,4	70,9	90,0	70,3	57,8

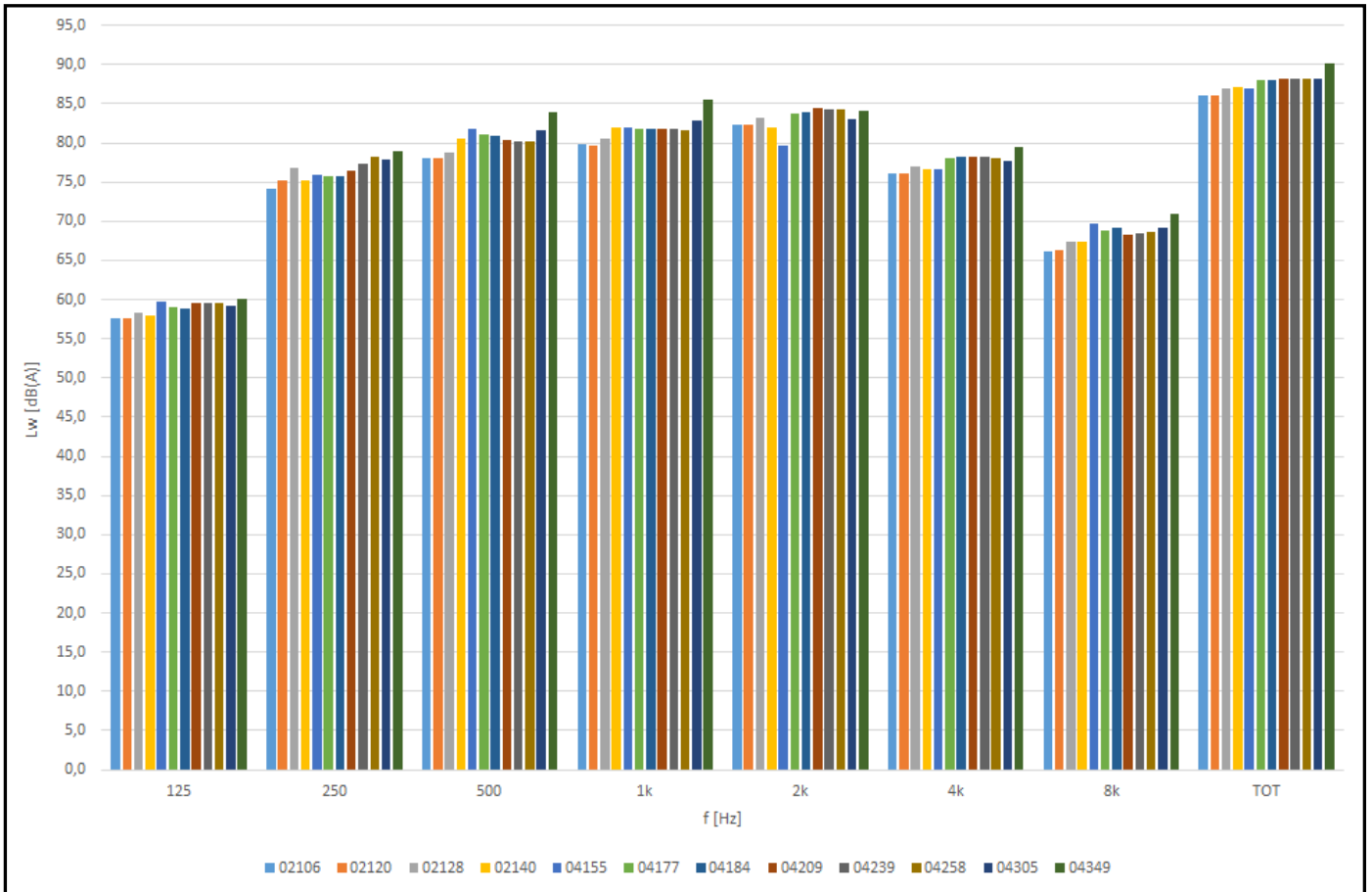
## 7.2 Noise power and pressure of SL version

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

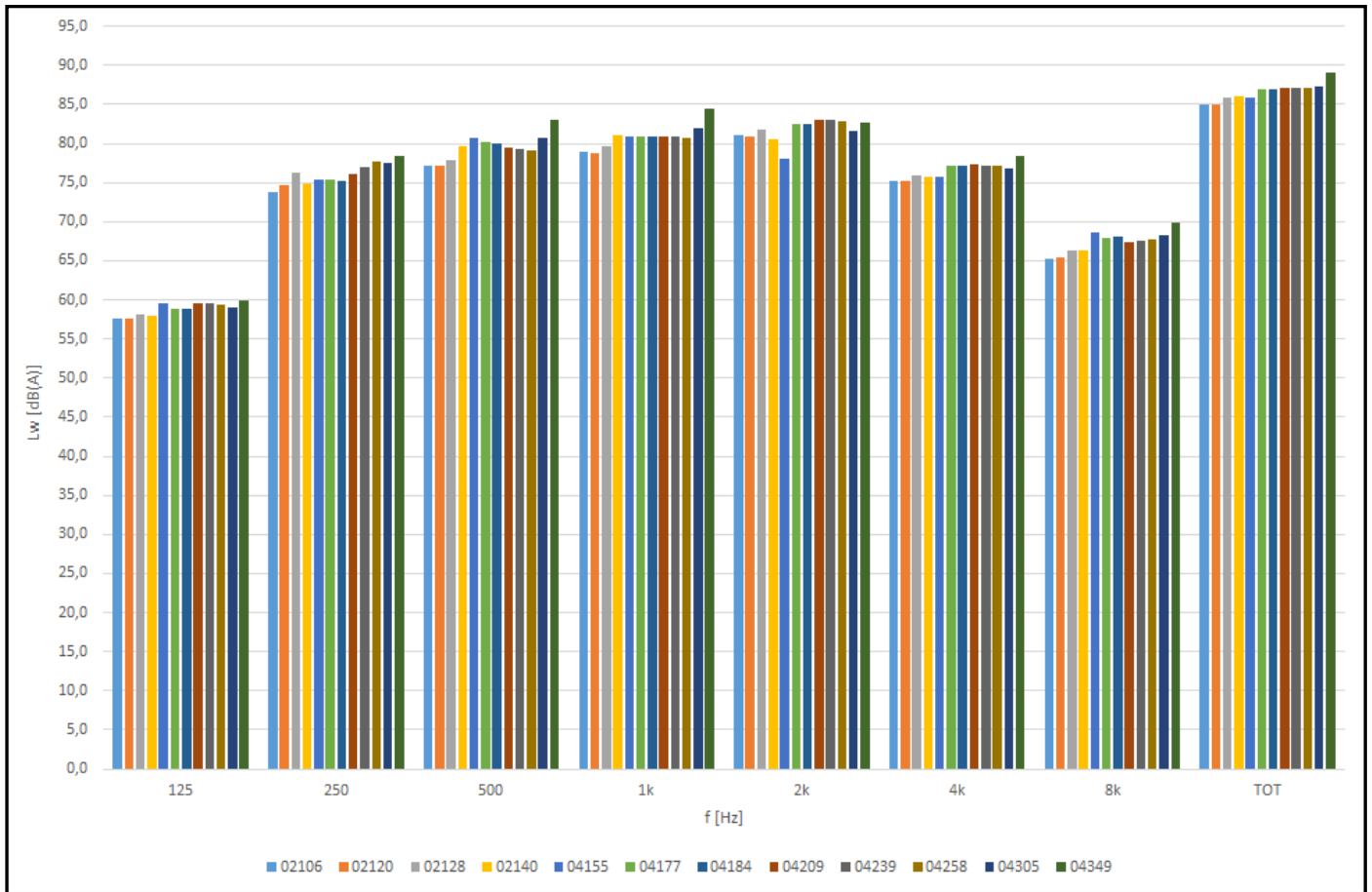
## 7.3 Noise power and pressure SSL version

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

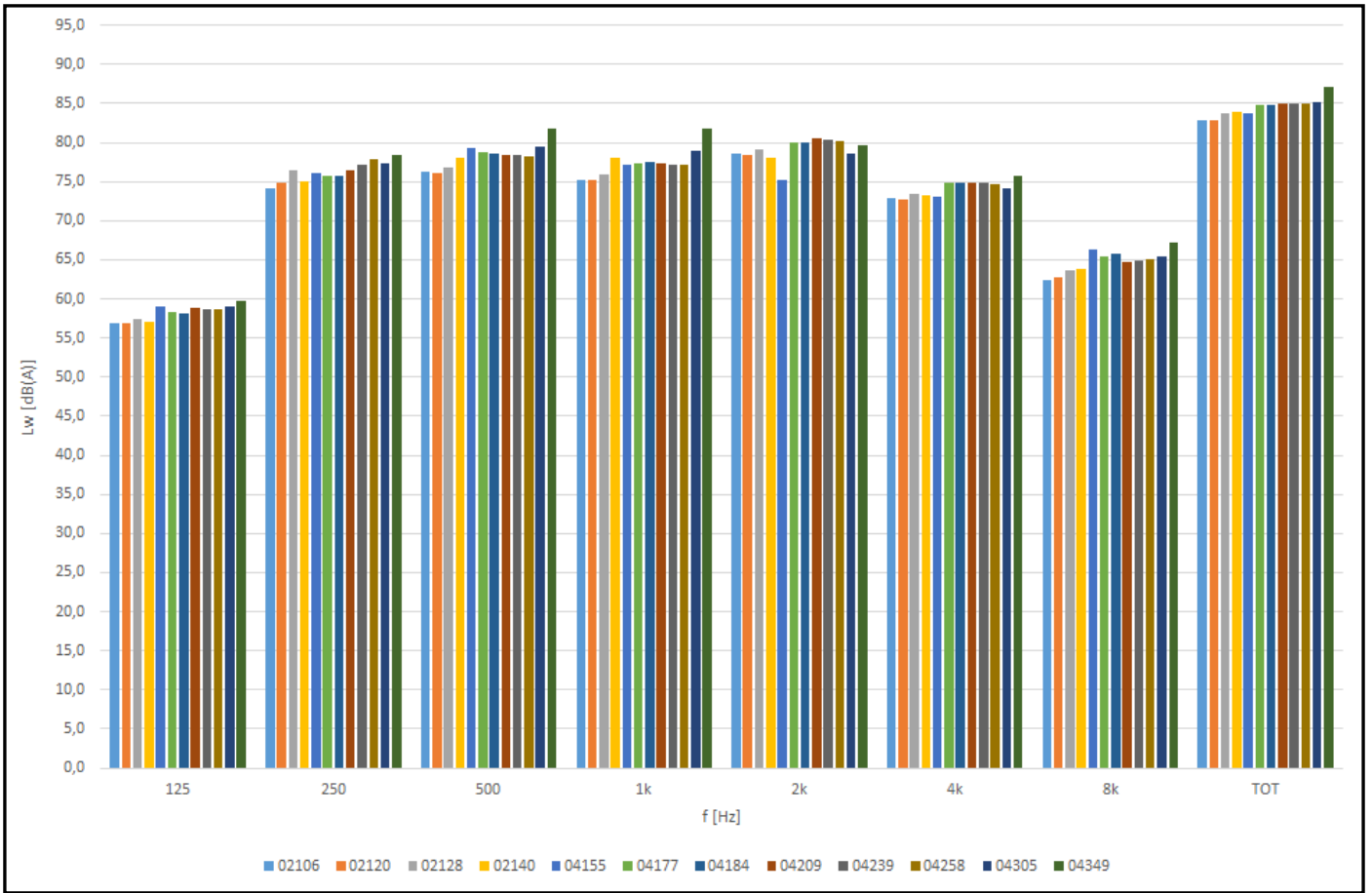
HWA1-A standard version



HWA1-A silenced version (SL)



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. Higher values can cause pressure drops too high. The minimum permitted water flow is that with a temperature drop of 8 ° C. Insufficient water flows can cause, depending on the operating status, evaporation temperatures that are too low, implying the intervention of the safety devices and the stopping of the unit and, in some extreme cases, the formation of ice in the evaporator and consequent serious breakdowns in the refrigeration circuit, or increase in the condensing pressure with the risk of stopping the unit and probable damage to the compressor.

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

The minimum flow rates have been calculated in the conditions (1) of the technical data tables.

<b>Model HWA1-A</b>	<b>02106</b>	<b>02120</b>	<b>02128</b>	<b>02140</b>	<b>04155</b>	<b>04177</b>
Cooling capacity of reference [kW]	105,0	118,7	129,5	139,3	155,0	175,9
Minimum water flow to be guaranteed [L/s]	3,1	3,6	3,8	4,2	4,6	5,3

<b>Model HWA1-A</b>	<b>04184</b>	<b>04209</b>	<b>04239</b>	<b>04258</b>	<b>04305</b>	<b>04349</b>
Cooling capacity of reference [kW]	182,4	207,9	238,1	256,6	304,8	347,7
Minimum water flow to be guaranteed [L/s]	5,5	6,2	7,1	7,7	9,1	10,4



### 8.2 Chilled water production

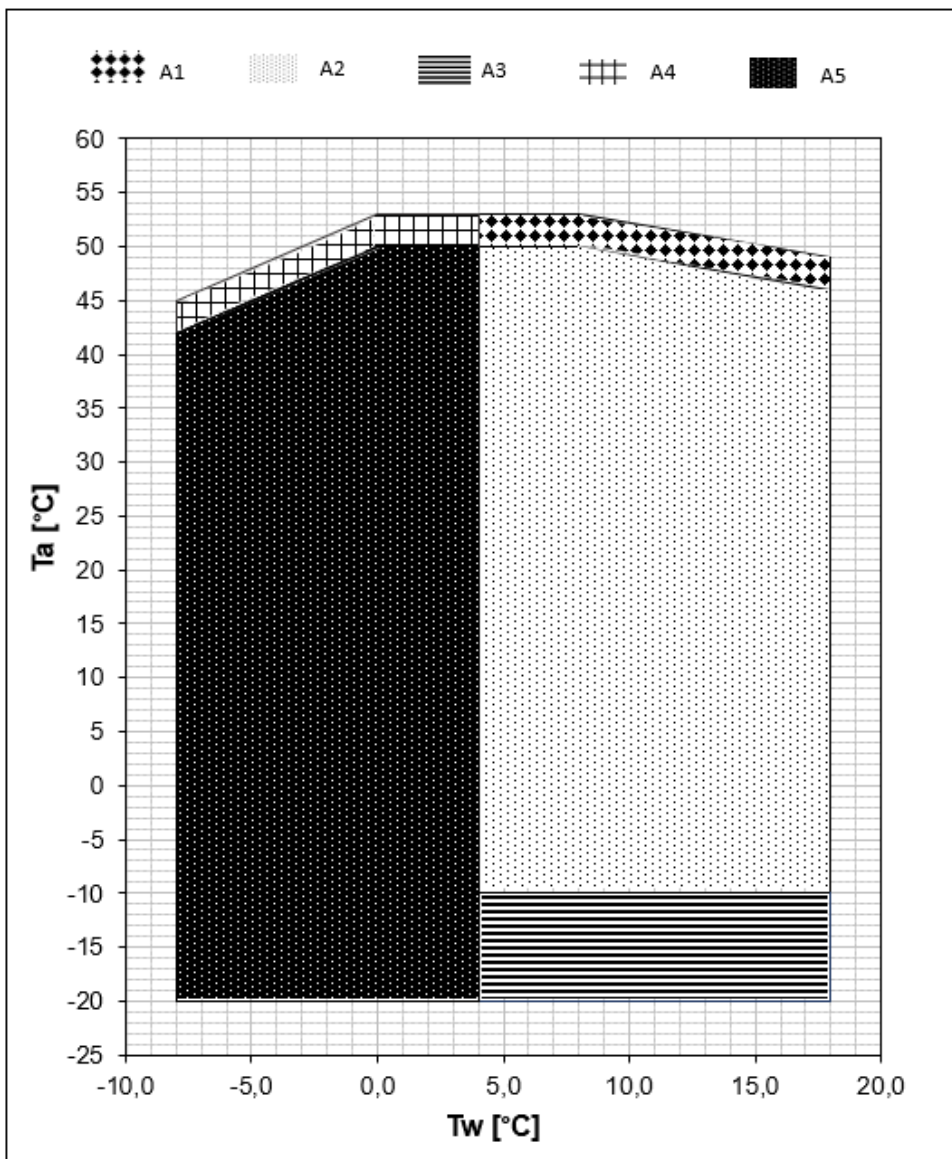
The minimum temperature allowed at the evaporator outlet is + 4 ° C: for lower temperatures there is the BT version - low temperature, which guarantees operation for external temperatures down to -8 ° C. In the case of lower water temperatures, contact our technical office for feasibility study and evaluation 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 temperaturee	Minimum -10°C (-20°C if CC fitted )	Maximum +50°C
Standard version outlet water temperature	Minimum +4°C	Maximum +18°C
Ambient temperature (with CC—Condensation Control)	Minumum -10°C (-20°C if CC fitted)	Maximum +50°C
BT version outlet temperature	Minimum -8°C	Maximum +18°C

### 8.4 Envelope



- A1 = HWA1-A partial load
- A2 = HWA1-A
- A3 = HWA1-A with CC condensation control down to -20°C
- A4 = HWA1-A BT partial load
- A5 = HWA1-A BT

## 9. PERFORMANCE TABLE

The tables show the values of cooling power, absorbed power and EER for various outdoor air temperature conditions. The data are always referred to the instantaneous power and are calculated for an input / output temperature difference of 5°C. The following is indicative and may be subject to change

COOLING																			
Model HWA1-A	T air outdoor [°C]	T <sub>out</sub> [°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	110,5	25,9	4,26	117,4	26,4	4,45	128,3	27,1	4,74	134,4	27,3	4,92	143,6	27,7	5,18	156,0	28,6	5,46
	25	107,2	27,8	3,86	114,0	28,3	4,03	124,5	29,0	4,29	130,4	29,3	4,46	139,3	29,6	4,70	151,4	30,6	4,96
	30	103,4	30,2	3,43	109,9	30,7	3,58	120,2	31,4	3,82	126,0	31,7	3,98	134,6	32,1	4,20	146,3	33,0	4,43
	35	99,1	33,1	3,00	105,0	33,5	3,13	115,2	34,4	3,35	120,6	34,6	3,49	128,8	34,9	3,69	138,8	35,73	3,88
	40	93,7	36,3	2,58	99,5	36,8	2,71	108,6	37,5	2,90	113,6	37,6	3,02	121,2	37,9	3,20	131,3	38,7	3,39
45	87,6	39,6	2,21	92,9	40,0	2,32	101,6	40,7	2,50	106,4	40,8	2,61	113,6	41,0	2,77	123,4	41,9	2,94	
02120	20	125,3	30,0	4,17	132,9	30,5	4,35	144,8	31,3	4,62	151,5	31,6	4,79	161,5	32,1	5,04	174,9	33,0	5,31
	25	121,5	32,1	3,79	128,9	32,6	3,95	140,4	33,5	4,20	146,9	33,8	4,35	156,6	34,2	4,58	169,8	35,2	4,83
	30	117,1	34,6	3,38	124,3	35,2	3,53	135,5	36,1	3,76	141,7	36,4	3,90	151,1	36,8	4,10	164,0	37,8	4,34
	35	112,0	37,7	2,97	118,7	38,3	3,10	130,1	39,2	3,32	135,8	39,5	3,44	144,3	39,9	3,62	154,9	40,82	3,79
	40	106,0	41,2	2,57	112,4	41,8	2,69	122,4	42,6	2,87	128,0	42,9	2,98	135,9	43,2	3,15	147,1	44,2	3,33
45	99,0	44,8	2,21	105,1	45,4	2,32	114,5	46,3	2,48	120,1	46,5	2,58	127,6	46,8	2,73	138,2	47,8	2,89	
02128	20	134,7	34,7	3,88	142,6	35,3	4,04	155,3	36,3	4,29	161,7	36,5	4,43	171,4	37,0	4,64	185,8	38,0	4,89
	25	130,4	37,1	3,52	138,3	37,7	3,67	150,6	38,6	3,90	157,0	38,9	4,03	166,5	39,4	4,23	180,4	40,5	4,46
	30	125,9	39,9	3,16	133,5	40,5	3,29	145,3	41,6	3,50	151,5	41,9	3,62	160,8	42,3	3,80	174,1	43,4	4,01
	35	120,5	43,3	2,78	129,5	44,2	2,93	138,8	45,0	3,09	144,4	45,3	3,19	152,7	45,7	3,34	163,7	46,8	3,50
	40	113,3	47,1	2,41	120,1	47,8	2,51	130,6	48,8	2,68	136,0	49,1	2,77	144,0	49,4	2,91	155,4	50,6	3,07
45	105,9	51,2	2,07	112,2	51,9	2,16	122,2	52,9	2,31	127,3	53,1	2,40	135,0	53,5	2,53	146,3	54,8	2,67	
02140	20	146,4	34,1	4,30	155,5	34,7	4,48	170,0	35,7	4,76	177,7	36,1	4,92	189,3	36,6	5,17	205,8	37,9	5,43
	25	142,1	36,5	3,89	150,9	37,2	4,06	165,0	38,3	4,31	172,5	38,6	4,47	183,8	39,2	4,69	199,7	40,4	4,94
	30	137,0	39,7	3,45	145,5	40,3	3,61	159,1	41,5	3,84	166,3	41,8	3,98	177,2	42,3	4,19	192,8	43,6	4,42
	35	131,1	43,6	3,01	139,3	44,3	3,15	152,4	45,4	3,36	159,4	45,7	3,49	169,9	46,2	3,68	184,9	47,5	3,89
	40	124,5	48,2	2,58	132,3	48,8	2,71	144,2	49,8	2,90	150,6	49,9	3,02	160,2	50,2	3,20	173,7	51,3	3,39
45	115,9	52,7	2,20	123,2	53,2	2,32	134,7	54,1	2,49	140,8	54,2	2,60	150,0	54,3	2,76	163,0	55,5	2,94	
04155	20	164,5	38,4	4,28	174,6	39,0	4,48	190,6	39,9	4,78	199,8	40,2	4,97	213,6	40,7	5,26	231,9	41,7	5,56
	25	159,2	41,3	3,86	169,0	41,9	4,04	184,4	42,8	4,31	193,3	43,1	4,48	206,6	43,6	4,74	224,1	44,7	5,01
	30	152,9	44,8	3,41	162,4	45,4	3,57	177,3	46,4	3,82	185,9	46,7	3,98	198,8	47,2	4,21	215,1	48,4	4,44
	35	145,9	49,2	2,96	155,0	49,9	3,11	168,9	50,9	3,32	176,9	51,2	3,45	188,8	51,7	3,65	204,4	52,9	3,87
	40	137,4	54,5	2,52	145,9	55,1	2,65	159,3	56,2	2,84	166,7	56,4	2,96	177,8	56,7	3,14	192,7	57,8	3,33
45	127,8	60,0	2,13	135,8	60,5	2,24	148,3	61,5	2,41	155,4	61,6	2,52	166,1	61,8	2,69	180,3	62,9	2,86	
04177	20	186,5	44,1	4,23	198,1	44,8	4,42	216,4	46,0	4,71	225,9	46,5	4,86	240,1	47,3	5,07	260,7	48,9	5,33
	25	180,6	47,3	3,82	191,9	48,0	4,00	209,6	49,2	4,26	218,8	49,8	4,40	232,6	50,6	4,60	252,5	52,1	4,85
	30	173,8	51,2	3,40	184,7	52,0	3,55	201,9	53,3	3,79	210,8	53,8	3,92	224,1	54,5	4,11	242,7	56,1	4,33
	35	166,0	56,0	2,97	175,9	56,7	3,10	192,7	58,1	3,32	200,9	58,6	3,43	213,4	59,4	3,60	229,7	60,85	3,77
	40	156,9	61,5	2,55	166,3	62,4	2,67	181,3	63,6	2,85	188,9	64,0	2,95	200,5	64,5	3,11	217,1	66,1	3,29
45	146,0	67,3	2,17	155,1	68,1	2,28	169,4	69,3	2,44	176,7	69,7	2,54	187,7	70,2	2,68	203,7	71,7	2,84	
04184	20	194,7	49,1	3,97	206,7	49,9	4,14	225,5	51,3	4,40	236,5	51,8	4,57	253,1	52,6	4,81	274,5	54,1	5,07
	25	188,5	52,6	3,59	200,0	53,4	3,74	218,0	54,9	3,97	228,8	55,4	4,13	244,9	56,2	4,36	265,2	57,9	4,58
	30	181,4	56,8	3,20	192,5	57,7	3,34	209,9	59,2	3,55	219,6	59,8	3,67	234,3	60,7	3,86	253,2	62,6	4,05
	35	172,8	61,9	2,79	182,4	62,9	2,90	199,3	64,5	3,09	208,6	65,2	3,20	222,6	66,1	3,37	238,8	67,76	3,52
	40	162,4	67,9	2,39	172,2	68,8	2,50	187,5	70,3	2,67	196,1	70,9	2,77	209,0	71,7	2,92	225,9	73,5	3,07
45	151,1	73,9	2,05	160,5	74,9	2,14	174,9	76,5	2,29	183,2	76,8	2,38	195,9	77,3	2,54	212,3	78,0	2,72	
04209	20	218,5	52,0	4,20	232,3	52,9	4,39	253,6	54,3	4,67	266,6	54,9	4,86	286,2	55,7	5,14	310,7	57,4	5,41
	25	212,2	55,8	3,80	225,5	56,7	3,98	245,9	58,2	4,23	258,7	58,7	4,41	277,8	59,5	4,67	301,5	61,3	4,92
	30	204,5	60,4	3,39	217,4	61,4	3,54	237,5	62,9	3,78	249,7	63,4	3,94	267,9	64,2	4,17	290,9	66,0	4,41
	35	196,2	66,1	2,97	207,9	67,1	3,10	227,8	68,7	3,32	239,6	69,2	3,46	257,3	69,9	3,68	277,3	71,58	3,87
	40	186,0	72,7	2,56	197,4	73,6	2,68	215,4	75,0	2,87	226,0	75,4	3,00	242,0	75,9	3,19	262,1	77,6	3,38
45	173,8	79,1	2,20	184,6	80,0	2,31	201,5	81,5	2,47	211,6	81,8	2,59	227,0	82,2	2,76	246,1	83,9	2,93	
04239	20	250,5	60,3	4,15	265,5	61,3	4,33	289,2	62,9	4,60	303,5	63,5	4,78	325,0	64,5	5,04	351,3	66,3	5,30
	25	243,0	64,5	3,77	257,6	65,5	3,93	280,5	67,1	4,18	294,5	67,7	4,35	315,4	68,7	4,59	341,5	70,7	4,83
	30	234,3	69,5	3,37	248,4	70,6	3,52	270,6	72,3	3,74	284,2	72,9	3,90	304,5	73,8	4,13	329,8	75,9	4,35
	35	224,4	75,7	2,97	238,1	76,8	3,10	259,6	78,5	3,31	272,3	79,1	3,44	291,3	79,9	3,65	314,3	81,9	3,84
	40	212,5	82,5	2,58	225,2	83,6	2,70	244,7	85,4	2,87	256,5	85,8	2,99	274,6	86,3	3,18	296,7	88,3	3,36
45	198,2	89,9	2,21	210,2	90,9	2,31	229,1	92,6	2,47	240,3	93,0	2,58	257,4	93,5	2,75	278,7	95,5	2,92	
04258	20	271,5	70,1	3,87	287,4	71,3	4,03	311,8	73,1	4,26	327,2	73,9	4,43	350,3	75,0	4,67	377,9	77,2	4,89
	25	263,0	74,8	3,52	278,2	76,0	3,66	302,6	78,0	3,88	317,5	78,7	4,03	339,9	79,9	4,26	367,1	82,2	4,47
	30	253,4	80,5	3,15	268,4	81,7	3,28	291,9	83,8	3,49	306,3	84,5	3,62	327,9	85,6	3,83	354,0	88,0	4,02
	35	242,7	87,3	2,78	256,6	88,5	2,90	278,5	90,6	3,07	291,5	91,4	3,19	311,1	92,4	3,37	332,8	94,63	3,52
	40	228,2	95,0	2,40	241,4	96,3	2,51	261,9	98,2	2,67	274,3	98,9	2,77	293,1	99,8	2,94	315,9	102,2	3,09
45	213,0	103,1	2,07	225,6	104,5	2,16	245,2	106,5	2,30	257,0	107,1	2,40	275,0	107,9	2,55	297,3	110,4	2,69	

COOLING																				
Model	HWA1-A	T air outdoor [°C]	T <sub>out</sub> [°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]
04305	20	321,2	76,5	4,20	340,2	77,8	4,37	370,7	80,0	4,63	389,3	80,9	4,81	417,1	82,3	5,07	451,5	85,0	5,31	
	25	311,5	81,9	3,81	330,2	83,2	3,97	359,7	85,5	4,21	377,7	86,4	4,37	404,7	87,7	4,61	438,1	90,5	4,84	
	30	300,1	88,6	3,39	318,3	90,0	3,54	346,6	92,2	3,76	364,0	93,1	3,91	390,1	94,4	4,14	422,6	97,1	4,35	
	35	287,2	96,9	2,97	304,8	98,3	3,10	332,2	100,6	3,30	349,1	101,4	3,44	374,6	102,6	3,65	405,3	105,2	3,85	
	40	272,8	106,6	2,56	288,8	108,0	2,68	314,3	109,9	2,86	329,7	110,5	2,98	352,8	111,2	3,17	381,5	113,6	3,36	
	45	253,8	116,4	2,18	269,4	117,6	2,29	293,6	119,5	2,46	308,5	119,8	2,57	330,7	120,3	2,75	358,1	122,8	2,92	
04349	20	369,3	87,7	4,21	391,8	89,4	4,38	427,0	92,2	4,63	447,8	93,5	4,79	478,9	95,6	5,01	519,1	99,1	5,24	
	25	357,5	93,6	3,82	379,4	95,5	3,98	413,4	98,2	4,21	433,4	99,6	4,35	463,4	101,6	4,56	502,5	105,2	4,78	
	30	343,9	101,2	3,40	364,9	102,9	3,55	397,9	105,8	3,76	417,1	107,0	3,90	445,8	108,8	4,10	484,1	112,5	4,30	
	35	328,7	110,4	2,98	347,7	112,2	3,10	380,7	115,0	3,31	399,0	116,1	3,44	426,5	117,8	3,62	458,3	121,1	3,78	
	40	311,0	121,0	2,57	329,2	122,8	2,68	358,1	125,3	2,86	374,9	126,2	2,97	400,2	127,5	3,14	433,0	130,6	3,32	
	45	288,9	132,4	2,18	306,6	133,9	2,29	334,3	136,3	2,45	350,2	137,1	2,55	374,3	138,1	2,71	405,6	141,3	2,87	

### 9.1 EER values for calculating the building electrical consumption as UNI/TS 11300-3

The partial load reference conditions specified by UNI / TS 11300-3 are illustrated below.

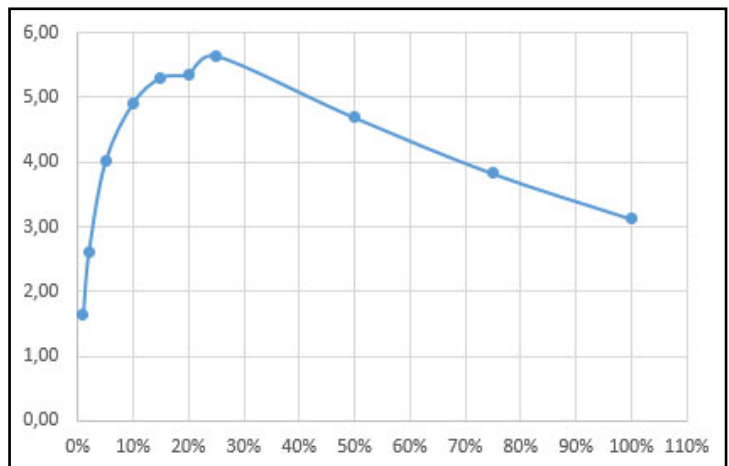
The values of the EER coefficients under partial load conditions for the HWA1-A chillers are then shown.

EERs are also supplied for load factors below 25%.

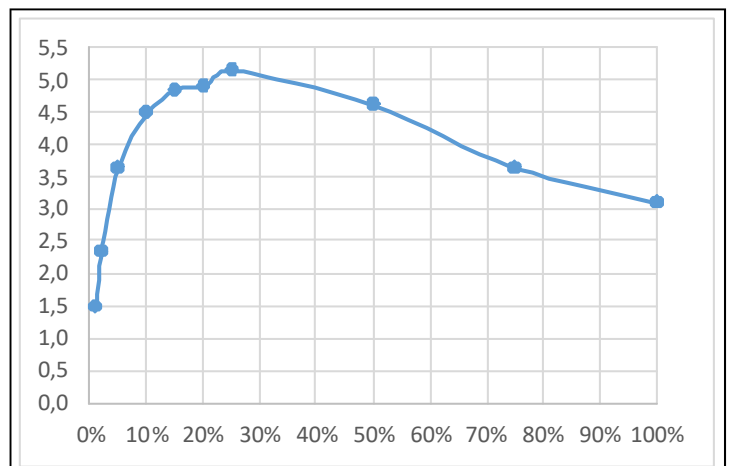
Test	Load factor	Outdoor air dry bulb temperature	Chilled water inlet / outlet temperature of fan coils
1	100%	35	12/7
2	75%	30	*)/7
3	50%	25	*)/7
4	25%	20	*)/7

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

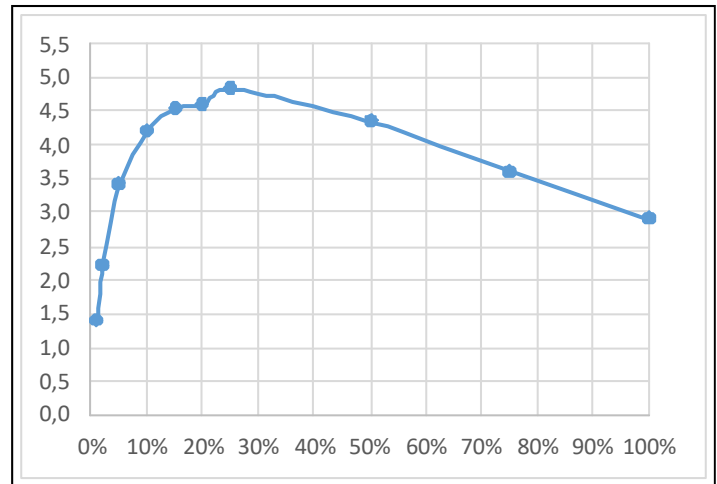
HWA1-A 02106		
Outdoor air dry bulb temperature [°C]	Load factor	EER
35	100%	3,13
30	75%	3,83
25	50%	4,69
20	25%	5,64
C	Load factor	EER @20°C
0,95	20%	5,36
0,94	15%	5,31
0,87	10%	4,91
0,71	5%	4,01
0,46	2%	2,60
0,29	1%	1,64



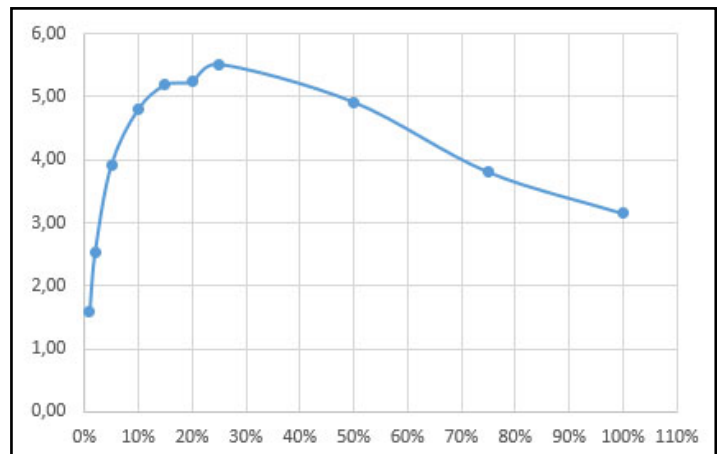
HWA1-A 02120		
Outdoor air dry bulb temperature [°C]	Load facotr	EER
35	100%	3,10
30	75%	3,61
25	50%	4,67
20	25%	5,62
C	Load factor	EER @20°C
0,95	20%	5,34
0,94	15%	5,28
0,87	10%	4,89
0,71	5%	3,99
0,46	2%	2,59
0,29	1%	1,63



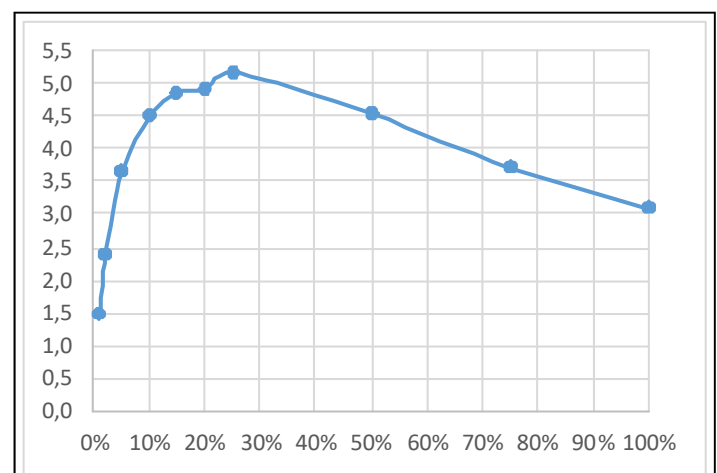
HWA1-A 02128		
Outdoor air dry bulb temperature [°C]	Load factor	EER
35	100%	2,93
30	75%	3,62
25	50%	4,45
20	25%	5,35
C	Load factor	EER @20°C
0,95	20%	5,08
0,94	15%	5,03
0,87	10%	4,65
0,71	5%	3,80
0,46	2%	2,46
0,29	1%	1,55



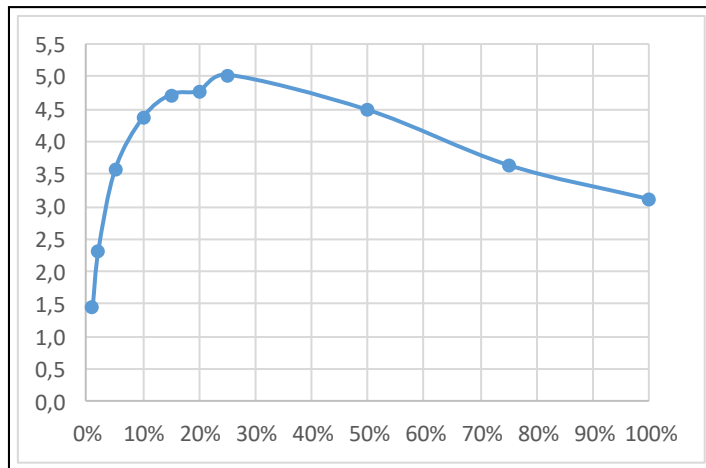
HWA1-A 02140		
Outdoor air dry bulb temperature [°C]	Load factor	EER
35	100%	3,15
30	75%	3,80
25	50%	4,92
20	25%	5,52
C	Load factor	EER @20°C x C
0,95	20%	5,24
0,94	15%	5,18
0,87	10%	4,80
0,71	5%	3,92
0,46	2%	2,54
0,29	1%	1,60



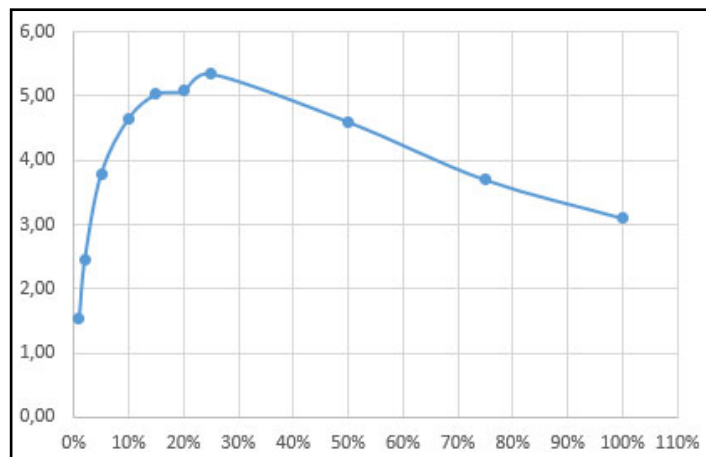
HWA1-A 04155		
Outdoor air dry bulb temperature [°C]	Load factor	EER
35	100%	3,11
30	75%	3,72
25	50%	4,54
20	25%	5,18
C	Load factor	EER @20°C x C
0,95	20%	4,92
0,94	15%	4,86
0,87	10%	4,50
0,71	5%	3,67
0,46	2%	2,38
0,29	1%	1,50



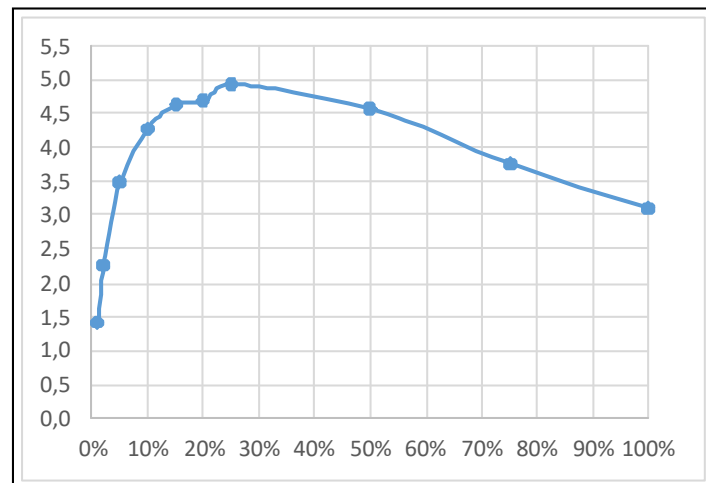
HWA1-A 04177		
Outdoor air dry bulb temperature [°C]	Load factor	EER
35	100%	3,10
30	75%	3,62
25	50%	4,58
20	25%	5,52
C	Load factor	EER @20°C
0,95	20%	5,24
0,94	15%	5,19
0,87	10%	4,80
0,71	5%	3,92
0,46	2%	2,54
0,29	1%	1,60



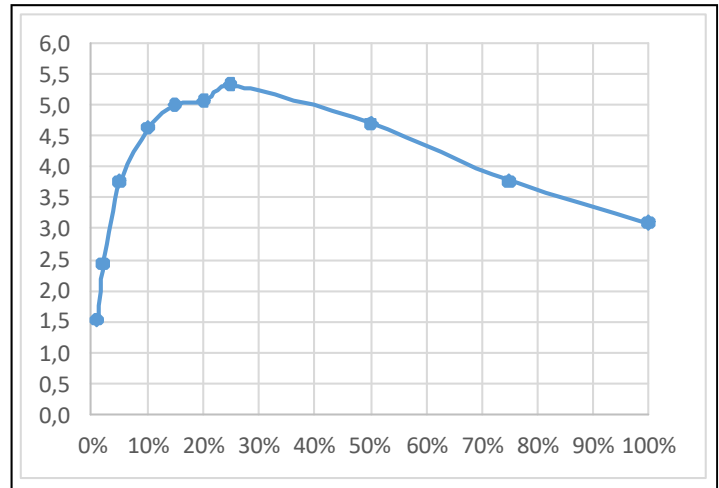
HWA1-A 04184		
Outdoor air dry bulb temperature [°C]	Load factor	EER
35	100%	2,90
30	75%	3,71
25	50%	4,51
20	25%	5,53
C	Load factor	EER @20°C
0,95	20%	5,25
0,94	15%	5,20
0,87	10%	4,81
0,71	5%	3,93
0,46	2%	2,54
0,29	1%	1,60



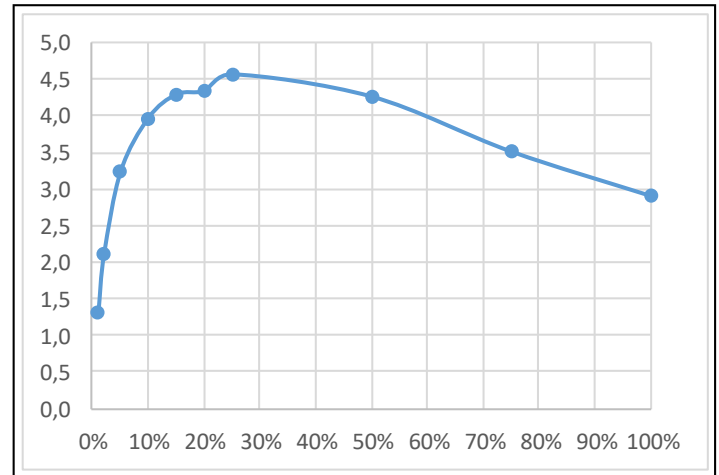
HWA1-A 04209		
Outdoor air dry bulb temperature [°C]	Load factor	EER
35	100%	3,10
30	75%	3,70
25	50%	4,60
20	25%	5,35
C	Load factor	EER @20°C
0,95	20%	5,08
0,94	15%	5,02
0,87	10%	4,65
0,71	5%	3,80
0,46	2%	2,46
0,29	1%	1,55



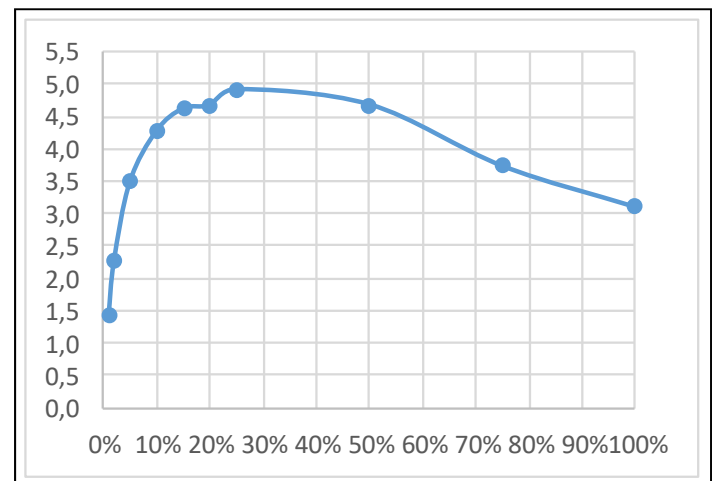
HWA1-A 04239		
Outdoor air dry bulb temperature [°C]	Load factor	EER
35	100%	3,10
30	75%	3,77
25	50%	4,72
20	25%	5,33
C	Load factor	EER @20°C x C
0,95	20%	5,07
0,94	15%	5,01
0,87	10%	4,64
0,71	5%	3,79
0,46	2%	2,45
0,29	1%	1,55



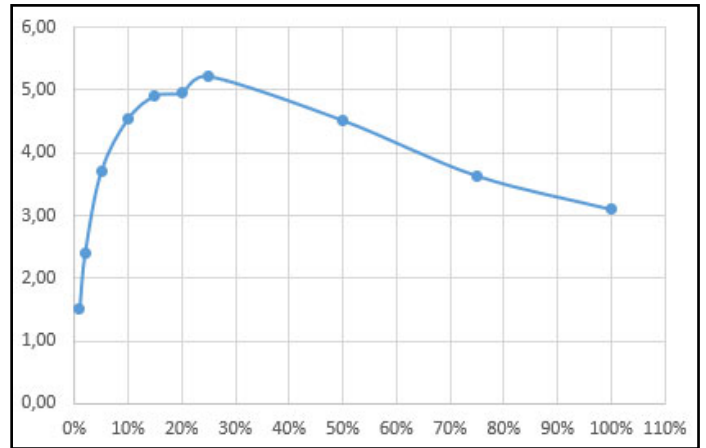
HWA1-A 04258		
Outdoor air dry bulb temperature [°C]	Load factor	EER
35	100%	2,90
30	75%	3,61
25	50%	4,50
20	25%	5,20
C	Load factor	EER @20°C x C
0,95	20%	4,94
0,94	15%	4,89
0,87	10%	4,52
0,71	5%	3,69
0,46	2%	2,39
0,29	1%	1,51



HWA1-A 04305		
Outdoor air dry bulb temperature [°C]	Load factor	EER
35	100%	3,10
30	75%	3,73
25	50%	4,68
20	25%	4,91
C	Load factor	EER @20°C x C
0,95	20%	4,66
0,94	15%	4,62
0,87	10%	4,27
0,71	5%	3,49
0,46	2%	2,26
0,29	1%	1,42



HWA1-A 04349		
Outdoor air dry bulb temperature [°C]	Load factor	EER
35	100%	3,10
30	75%	3,63
25	50%	4,51
20	25%	5,21
C	Load factor	EER @20°C
0,95	20%	4,95
0,94	15%	4,90
0,87	10%	4,53
0,71	5%	3,70
0,46	2%	2,40
0,29	1%	1,51





## 10. SAFETY DATA SHEET OF THE REFRIGERANT

Denomination:	R410A (50% Difluoromethane (R32); 50% Pentafluoroethane (R125)).
<b>INDICATION OF DANGERS</b>	
Major dangers:	Asphyxia.
Specific hazards:	Rapid evaporation can cause freezing.
<b>FIRST AID MEASURES</b>	
General information:	Do not give anything to passed out people.
Inhalation:	Transport in the open air. Use oxygen or artificial respiration if necessary. Do not administer adrenaline or similar substances.
Eye contact:	Rinse thoroughly with plenty of water for at least 15 minutes and seek medical attention.
Skin contact:	Wash immediately with plenty of water. Take off contaminated clothing immediately.
<b>FIRE-FIGHTING MEASURES</b>	
Extinguishing media:	Any.
Specific hazards:	Increased pressure.
Specific methods:	Cool the containers with water spray.
<b>ACCIDENTAL RELEASE MEASURES</b>	
Individual precautions:	Evacuate personnel to safe areas. Provide adequate ventilation. Use personal protective equipment.
Environmental precautions:	Evaporates.
Cleaning methods:	Evaporates.
<b>HANDLING AND STORAGE</b>	
Handling	
technical measures / precautions:	Ensure sufficient air exchange and / or aspiration in the workplace.
tips for safe use:	Do not breathe vapor or aerosol.
Storage:	Close carefully and store in a cool, dry and well-ventilated place. Store in original containers. Incompatible products: explosive, flammable materials, Organic peroxide
<b>EXPOSURE CONTROLS / PERSONAL PROTECTION</b>	
Control parameters:	AEL (8-h and 12-h TWA) = 1000 ml / m3 for each of the two components.
Respiratory protection:	For rescue and maintenance work in tanks use an autonomous respiratory system. The vapors are heavier than air and can cause suffocation by reducing the oxygen available for breathing.
Eye protection:	Safety glasses.
Hand protection:	Rubber gloves.
Hygiene measures:	Do not smoke.
<b>PHYSICAL AND CHEMICAL PROPERTIES</b>	
Color:	Colorless.
Odor:	Slight.
Boiling point	-52.8 ° C at press. ATM.
Ignition point:	Does not ignite.
Density:	1.08 kg/l a 25°C.
Solubility in water:	Negligible
<b>STABILITY AND REACTIVITY</b>	
Stability:	No reactivity when used with the specific instructions.
Materials to avoid:	Highly oxidizing materials. Incompatible with magnesium, zinc, sodium, potassium and aluminum. The incompatibility is made more serious if the metal it is present in the form of powders or if the surfaces have recently been unprotected.
Hazardous decomposition products:	These products are halogenated compounds, hydrofluoric acid, carbon oxides (CO, CO <sub>2</sub> ), carbonyl halides.
<b>TOXICOLOGICAL INFORMATION</b>	
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 can cause narcotic effects. Inhalation of high concentration decomposition products can cause respiratory failure (pulmonary edema).
Long-term toxicity:	Did not show carcinogenic, teratogenic or mutagenic effects in animal experiments.
<b>ECOLOGICAL INFORMATION</b>	
Global warming potential GWP	2088
Depletion potential	0
ozone ODP (R11 = 1):	
Disposal considerations:	usable with reconditioning.

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