

Airwell

AIR CONDITIONING & HEATING

PAC BT / PAC BT Solar

Air-water heat pump in two sections with integrated DHW storage tank

→ **It simplifies the installation**

It includes in only one unit the most important installation elements.

→ **High seasonal efficiency**

Continuous modulation of the capacity and water flow rate thanks to the compressor and Inverter DC circulator.

→ **Integrated DHW production**

Integrates a 280 l storage tank into the unit capable of fulfilling the highest comfort needs.



PAC BT, four versions to satisfy the different installation requirements

PAC BT **Air-water heat pump**

- Indoor unit with 280L DHW storage tank.
- Outdoor unit equipped with inverter modulating compressor.

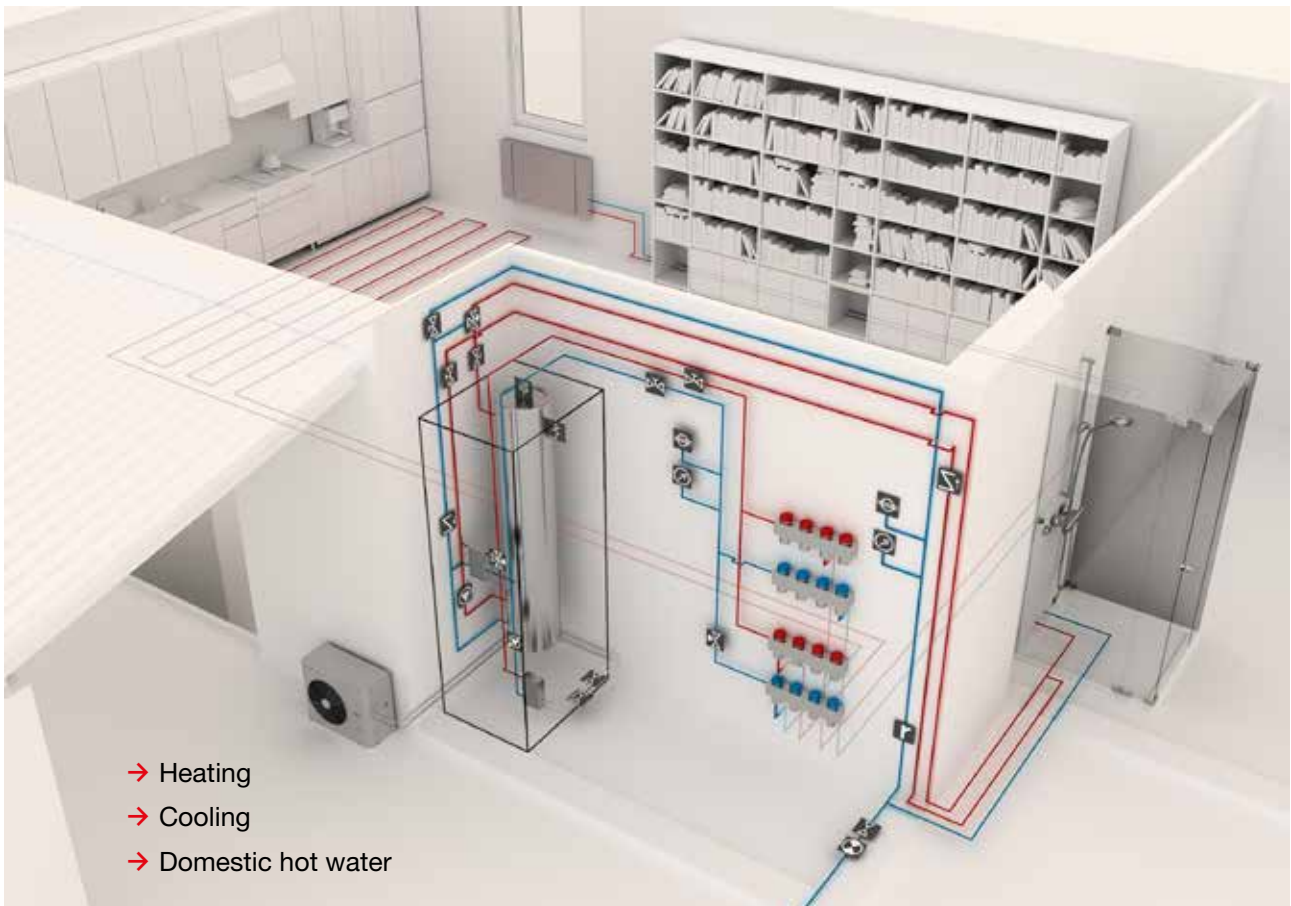


PAC BT SOLAR **Air-water heat pump with thermal solar integration for DHW**

- Indoor unit with 280L DHW storage tank and set up for connection to thermal solar installation.
- Outdoor unit equipped with inverter modulating compressor.



Maximum system flexibility



- Heating
- Cooling
- Domestic hot water

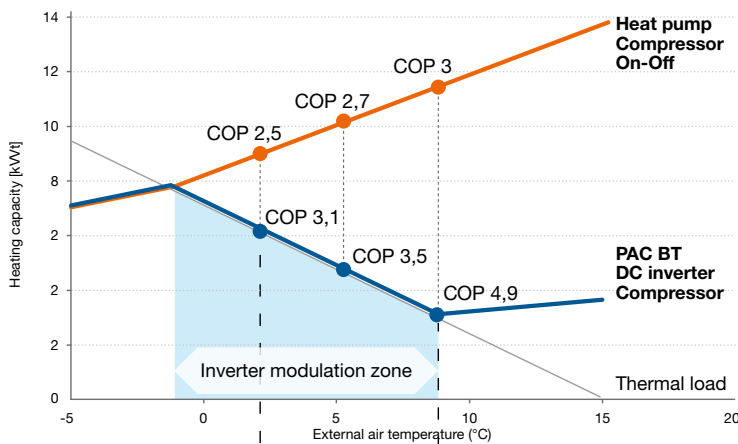
Comfort and seasonal efficiency

Since the maximum power generated by the system is requested only for short periods of time, it is fundamental to dispose of the maximum efficiency in the conditions of part-load.

This is the only way to actually reduce overall yearly consumptions.

Thanks to automatic capacity modulation, the direct current inverter compressor supplies only the thermal energy that is strictly necessary, thereby avoiding useless wasting of energy and increasing the energy efficiency so that the exchange surfaces are larger in relation to the output capacity.

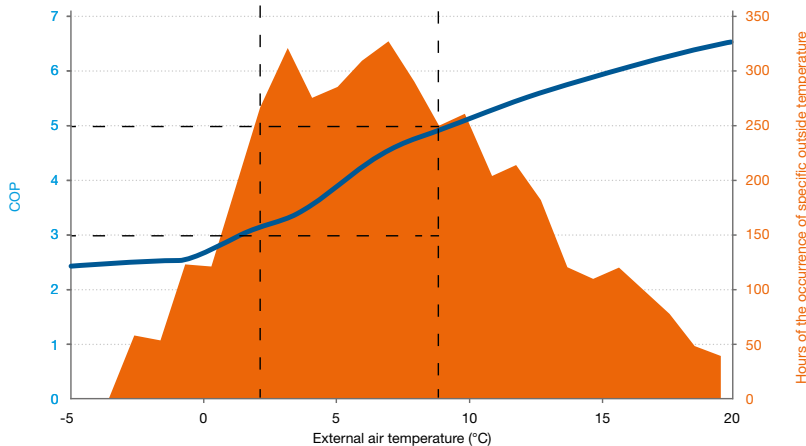
CAPACITY MODULATION



Good to know!

- Optimized running at partial load = Higher COP
- Heating capacity = Heating needs

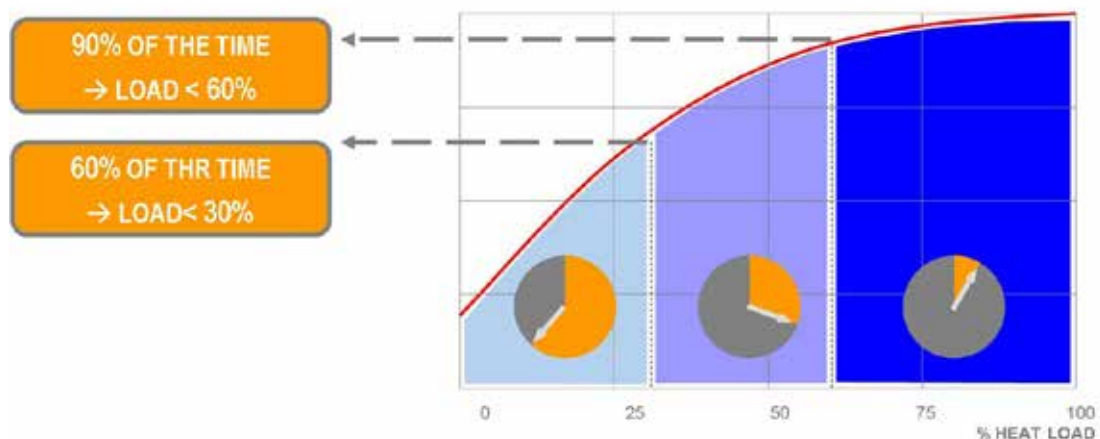
SEASONAL EFFICIENCY



Good to know!

- PAC BT works for most of the time with COP between 3 and 5

% WORKING TIME



Indoor unit

EASY TO INSTALL

The most important components of the system are fitted in the indoor unit and this makes installation steps easier, as they do not need to be inserted externally.

All elements are controlled and optimized by the control system.

The unit is already designed for domestic water recirculation, which can therefore be installed by reducing additional costs to a minimum and can considerably increase comfort levels.



ADAPTABILITY TO THE INSTALLATION

PAC BT is equipped with a DC circulator which provides significant energy savings over a conventional circulator.

The DC circulator can also be adjusted when first started up to compensate the actual pressure drop of the system, thus further reducing energy consumption.



HIGH SANITARY COMFORT

The storage tank has a volume of 280L that can fulfil high demand for domestic hot water.

The thermal energy produced by the heat pump is quickly and efficiently transferred to the storage tank via the plate exchanger, which also makes maintenance work easier.

If there is a considerable demand for domestic hot water, along with the energy stored in the storage tank, all the available capacity of the heat pump can be provided as well.



WIDE ACCESS AND REDUCTION OF OVERALL DIMENSIONS

PAC BT is carefully designed to optimise the layout of components and to give comfortable access to them from the front. This makes support and maintenance work easier, while reducing overall dimensions to a minimum to protect spaces in the property.



INTEGRATED THERMAL SOLAR INSTALLATION

PAC BT SOLAR has a plate exchanger dedicated to the connection with a thermal solar system and can manage the production of domestic hot water with the best possible energy efficiency by favouring (when available) direct solar energy through thermal solar panels or by using indirect energy in the air through the heat pump.



Outdoor unit

MAXIMUM SEASONAL EFFICIENCY

This unit can control, at each instant, the delivered capacity according to the demand on the system.

Very high efficiency values can be achieved thanks to the inverter compressor that can constantly modulate capacity



ICE PROTECTION SYSTEM

The ICE PROTECTION SYSTEM device prevents icing on the base of the external exchanger during winter operation, thanks to a special subcooling circuit.

This prevents damages caused by freezing.



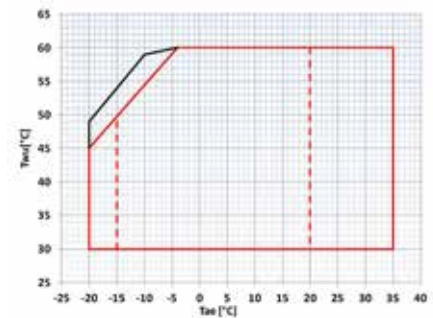
ADAPTABILITY TO THE COLD CLIMATES

The unit's broad operating limits allow PAC BT to fulfil heating demand even in the coldest of climates.

Indeed the unit can ensure the suitable supply temperature to feed a heating system down to an outdoor temperature of -20°C .

T_{w2} [$^{\circ}\text{C}$] = leaving exchanger water temperature

T_a [$^{\circ}\text{C}$] = internal exchanger inlet air temperature



SILENCE

The fans in the PAC BT outdoor unit have been carefully designed to achieve the lowest noise levels in all operating modes.

Moreover, the fan varies its speed in relation to conditions by becoming even quieter.



Super quiet

COMPACT AESTHETIC

The position of outdoor units is always a critical aspect of installing systems to ensure comfort.

This is why the PAC BT outdoor unit has been designed to have a simple, compact design and to fulfil aesthetic needs, thereby allowing you to easily access all its internal components and making it easier to conduct maintenance work.



PAC BT CONFIGURATION

Model	Size					
PAC BT	5 kW	7 kW	9 kW	12 kW	14 kW	17 kW
Indoor unit	PAC BT from 5 to 9 kW			PAC BT from 12 to 17 kW		
						
Power supply	230/1/50			230/1/50		
Outdoor unit	5 kW	7 kW	9 kW	12 kW	14 kW	17 kW
						
Power supply	230/1/50			230/1/50		400/350
				400/3/50		
Heating capacity A7/W35	5.19	6.87	8.54	12.2	14.3	17.0
Cooling capacity A35/W18	4.11	6.56	8.05	10.7	12.2	15.9

ACCESSORIES SEPARATELY SUPPLIED

Part number	Designation
7ACFH0818	Additional heater 2kW / 4kW / 6kW (230/1/50)
PE181101 PE181910	Rubber antivibration mounts for outdoor unit
7HP010003 7HP010004	PAC BT Solar (integration domestic hot water)
7ACEL1731	External boiler connection kit
7ACFH0819	Auxiliary domestic hot water storage

GENERAL TECHNICAL DATA

Size			5 kW	7 kW	9 kW	12 kW	14 kW	17 kW
USE WITH RADIANT PANELS								
Heating								
Heating capacity	1	kW	5.19	6.87	8.54	12.2	14.3	17.0
Total power input	2	kW	1.32	1.76	2.18	3.13	3.67	4.35
COP (EN 14511:2013)	3		3.94	3.91	3.91	3.91	3.91	3.91
ErP Classe energetica Riscaldamento d'ambiente - Clima MEDIO - W55 (1)	13		A++	A++	A++	A++	A++	A++
ErP Domestic Hot Water Energy Class	14		A	A	A	A	A	A
ErP Domestic Hot Water Profile	15		XL	XL	XL	XL	XL	XL
ErP System Energy Class - AVERAGE Climate - W55	16		A++	A++	A++	A++	A++	A++
Cooling								
Cooling capacity	6	kW	4.11	6.56	8.05	10.7	12.2	15.9
Total power input	2	kW	1.07	1.78	2.23	2.76	3.38	4.38
EER (EN 14511:2013)	7		3.85	3.69	3.61	3.86	3.61	3.64
ESEER	8		5.3	6.14	4.87	6.59	6.06	5.56
Water flow-rate	1	l/s	0.25	0.33	0.41	0.58	0.68	0.81
Pump nominal available pressure	1	kPa	51	50	47	53	47	37
Max. available pressure		kPa	71	63	55	78	70	54
USE WITH TERMINAL UNITS								
Heating								
Heating capacity	4	kW	5.01	6.59	8.65	11.6	13.6	16.6
Total power input	2	kW	1.59	2.11	2.89	3.78	4.50	5.52
COP (EN 14511:2013)	3		3.15	3.12	2.99	3.08	3.02	3.01
Cooling								
Cooling capacity	9	kW	4.05	5.37	7.19	8.65	11.1	15.5
Total power input	2	kW	1.46	1.93	2.79	3.12	4.50	5.91
EER (EN 14511:2013)	7		2.77	2.78	2.58	2.77	2.46	2.62
ESEER	10		4.08	4.02	3.89	4.03	4.00	4.06
Water flow-rate	4	l/s	0.23	0.32	0.42	0.56	0.65	0.74
Pump nominal available pressure	4	kPa	51	50	46	55	49	72
Max. available pressure		kPa	72	65	53	82	73	62
USE WITH RADIATORS								
Heating								
Heating capacity	5	kW	4.72	6.30	8.00	10.6	12.5	15.3
Total power input	2	kW	1.96	2.59	3.54	4.65	5.74	6.95
COP (EN 14511:2013)	3		2.41	2.44	2.26	2.29	2.17	2.20
Water flow-rate	5	l/s	0.11	0.15	0.19	0.25	0.30	0.37
Pump nominal available pressure	5	kPa	46	48	50	65	64	62
Max. available pressure		kPa	75	75	73	102	100	96
Water circuit								
Min. installation water contents		l	17	20	25	33	40	50
Solar exchanger capacity (only for PAC BT Solar version)		W/K	2703	2703	2703	3186	3186	3186
DHW storage capacity		l	280	280	280	280	280	280
Compressor								
Type of compressors			ROTARY INVERTER DC			ROTARY INVERTER DC		
Refrigerant			R-410A	R-410A	R-410A	R-410A	R-410A	R-410A
Oil charge			0.35	0.35	0.87	1.70	1.70	1.90
User side exchanger								
Type of internal exchanger	11		PHE	PHE	PHE	PHE	PHE	PHE
Water content		l	0.64	0.64	0.64	1.8	1.8	1.8
External Section Fans								
Type of fans	12		AX	AX	AX	AX	AX	AX
no. of fans		No	1	1	1	1	1	1
Standard airflow		l/s	653	1028	1028	2056	1996	2222
Power supply								
Standard power supply			230/1/50	230/1/50	230/1/50	400/3/50+N	400/3/50+N	400/3/50+N

The Product is compliant with the ErP (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 811/2013 (rated heat output ≤ 70 kW at specified reference conditions) and the Commission delegated Regulation (EU) No 813/2013 (rated heat output ≤ 400 kW at specified reference conditions)

- Entering/leaving water temperature user side 30/35°C, Entering external exchanger air temperature 7 °C (R.H. = 85%).
- The overall power absorbed is calculated by adding the power absorbed by the compressor + the power absorbed by the fans + the power absorbed by the auxiliary electrical circuit + the percentage value of the pump to overcome pressure drops inside the unit.
- COP (EN 14511:2013) performance coefficient in heating mode. Ratio between heating capacity supplied and absorbed power in accordance with EN 14511:2013. The absorbed power is the sum of the power absorbed by the compressor + power absorbed by the fans + the power absorbed by the electric auxiliary circuit + the percentage value of the pump to overcome pressure drops inside the unit.
- Entering/leaving water temperature user side 40/45°C, Entering external exchanger air temperature 7 °C (R.H. = 85%).
- Entering/leaving water temperature user side 45/55°C, Entering external exchanger air temperature 7°C (R.H. = 85%).
- Entering/leaving water temperature user side 23/18°C, Entering external exchanger air temperature 35°C.
- EER (EN 14511:2013) performance coefficient in cooling mode. Ratio between cooling capacity provided and power absorbed in compliance with EN 14511:2013. The absorbed power is the sum of the power absorbed by the compressor + power absorbed by the fans + the power absorbed by the electric auxiliary circuit + the percentage value of the pump to overcome pressure drops inside the unit.
- ESEER calculated by Airwell for radiant systems with water produced at 18°C by taking into account the load conditions and source water temperature as defined by EUROVENT for water at 7°C.
- User side entering/leaving water temperature 12/7 °C, external exchanger entering air 35°C.
- ESEER calculated by EUROVENT, for systems featuring terminal units with water produced at 7°C.
- PHE = plate exchanger.
- AX = axial fan.
- Seasonal Space Heating Energy Efficiency Class according to Commission delegated Regulation (EU) No 811/2013. W = Water outlet temperature (°C).
- Water Heating Energy Efficiency Class according to Commission delegated Regulation (EU) No 811/2013.
- Considered Load profile for the definition of Domestic Hot Water Energy Class according to Commission delegated Regulation (EU) No 811/2013 Class of the package with RCW15 thermostat.
- Seasonal Space Heating Energy Efficiency Class of the package according to Commission delegated Regulation (EU) No 811/2013.

ELECTRICAL DATA

Outdoor unit

SUPPLY VOLTAGE 230/1/50						
Size		5 kW	7 kW	9 kW	12 kW	14 kW
F.L.A. - FULL LOAD CURRENT AT MAX ADMISSIBLE CONDITIONS						
F.L.A. - External fan unit	A	0.51	0.60	0.60	0.60	0.60
F.L.A. - Total	A	11.41	14.55	18.03	23.96	28.24
F.L.I. - FULL LOAD POWER INPUT AT MAX ADMISSIBLE CONDITIONS						
F.L.I. - External fan unit	kW	0.12	0.15	0.15	0.15	0.15
F.L.I. - Total	kW	2.69	3.42	4.22	5.68	6.63
M.I.C. - MAXIMUM INRUSH CURRENT						
M.I.C. - Value	A	11.99	15.13	18.61	25.26	29.54

Power supply 230/1/50 Hz +/-10%

For non standard voltage please contact Airwell technical office

The units are compliant with the provisions of European standards CEI EN 60204 and CEI EN 60335.

SUPPLY VOLTAGE 400/3/50+N				
Size		12 kW	14 kW	17 kW
F.L.A. - FULL LOAD CURRENT AT MAX ADMISSIBLE CONDITIONS				
F.L.A. - External fan unit	A	0.60	0.60	2.10
F.L.A. - Total	A	13.30	13.70	23.90
F.L.I. - FULL LOAD POWER INPUT AT MAX ADMISSIBLE CONDITIONS				
F.L.I. - External fan unit	kW	0.15	0.15	0.48
F.L.I. - Total	kW	3.80	4.50	7.10

Power supply 400/3/50 (+ NEUTRAL) +/- 10%

Maximum Phase Unbalance: 2%

For non standard voltage please contact Airwell technical office

The units are compliant with the provisions of European standards CEI EN 60204 and CEI EN 60335.

Indoor unit

Voltage 230/1/50 ± 10%				
Size		PAC BT from 5 to 9 kW		PAC BT from 12 to 17 kW
F.L.A. - FULL LOAD CURRENT AT MAX ADMISSIBLE CONDITIONS				
F.L.A. - Pump	A	0.90		1.40
F.L.A. - Heating elements	1 A	8.70		8.70
F.L.A. - Total	A	9.60		10.10
F.L.I. - FULL LOAD POWER INPUT AT MAX ADMISSIBLE CONDITIONS				
F.L.I. - Pump	kW	0.21		0.30
F.L.I. - Heating elements	1 kW	2.00		2.00
F.L.I. - Total	1 kW	2.21		2.30

Power supply 230/1/50 Hz +/-10%

The pump is included in the total values calculation for non standard voltage please contact Airwell technical office

The units are compliant with the provisions of European standards CEI EN 60204 and CEI EN 60335.

- The electric heater inserted in the domestic hot water tank is never activated at the same time as the compressor in order to prevent high electrical power levels, which would result in a greater contactor.
- If there is the 7ACFH0818 accessory 5-7-9 kW Integrated electric heater, electrical data must be increased. The power draw of the heater must be considered when rating the power line.

Caution: when defining the size, make sure all absorption values are compliant with current power supply contracts in the country of installation.

SOUND LEVELS

Size	Sound power level								Sound pressure level dB(A)	Sound power level dB(A)
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000		
2.1	73	73	70	65	63	59	51	36	49	64
3.1	76	70	65	60	58	53	46	48	49	64
4.1	76	71	66	61	59	54	47	49	49	64
5.1	76	71	69	66	63	58	50	39	53	68
7.1	77	71	69	67	63	59	50	40	54	69
8.1	83	77	69	61	63	67	60	61	56	72

Sound levels refer to units with full load under nominal test conditions.

The sound pressure level refers to a distance of 1 meter from the outer surface of the unit operating in open field.

Noise levels are determined using the tensiometric method (UNI EN ISO 9614-2).

Data referred to the following conditions: Entering / leaving exchanger water temperature user side 12/7°C.

Entering / leaving exchanger water temperature source side 30/35°C.

ADMISSIBLE WATER FLOW RATES

→ Min. (Qmin) and max. (Qmax) water flow-rates admissibles for the correct unit operation.

Size		5 kW	7 kW	9 kW	12 kW	14 kW	17 kW
Minimum flow	l/s	0.15	0.18	0.18	0.23	0.34	0.32
Maximum flow-rate	l/s	0.90	0.90	0.90	1.10	1.50	1.70

FOULING CORRECTION FACTORS

m ² C/W	Internal exchanger	
	F1	FK1
0.44 x 10 ⁻⁴	1.00	1.00
0.44 x 10 ⁻⁴	0.97	0.99
0.44 x 10 ⁻⁴	0.94	0.88

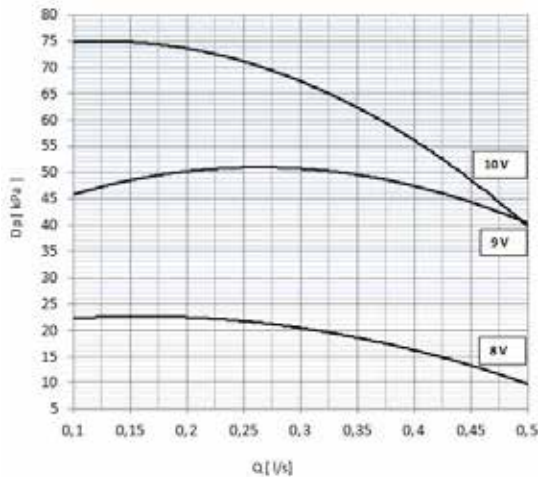
The cooling performance values provided in the tables are based on the external exchanger having clean plates (fouling factor 1). For different fouling factor values, multiply the performance by the coefficients shown in the table.

F1 = Cooling capacity correction factors.

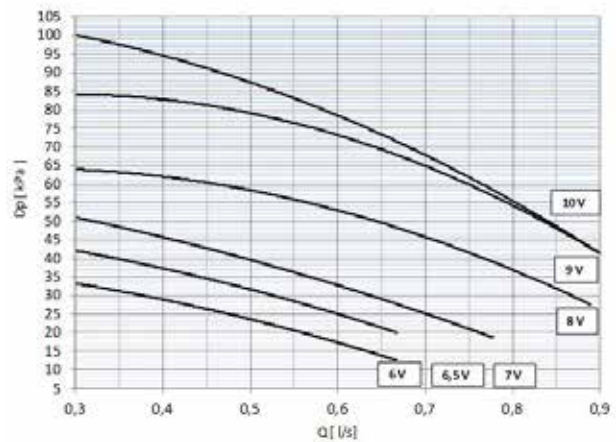
FK1 = Compressor power input correction factor.

PRESSURE CURVES OF THE INSTALLATION CIRCULATOR

■ PAC BT 5-7-9 kW



■ PAC BT 12-14-17 kW



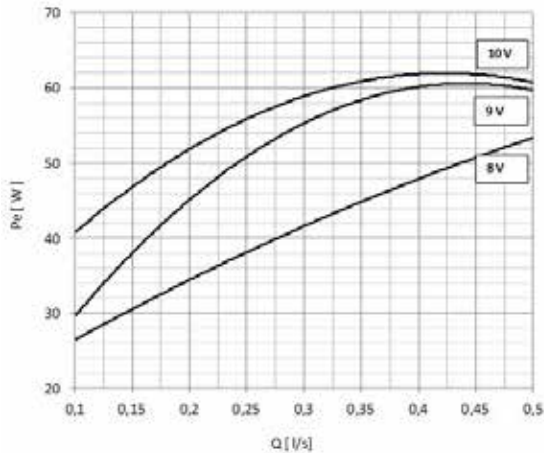
DP [kPa] = Available pressure

Q [l/s] = water flow-rate

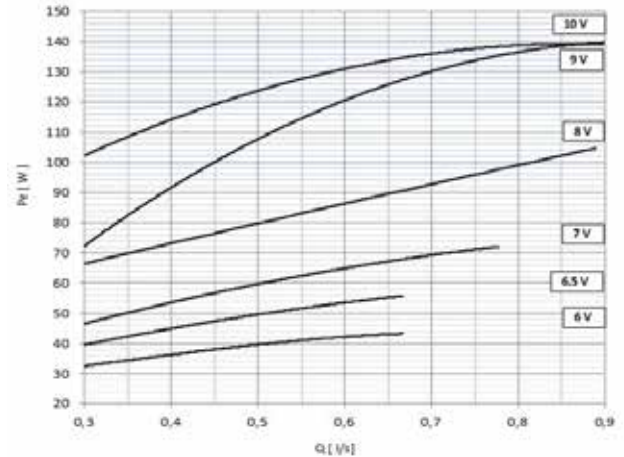
the heads are intended as available at the unit connections

SYSTEM CIRCULATOR ABSORPTION CURVES

■ PAC BT 5-7-9 kW



■ PAC BT 12-14-17 kW

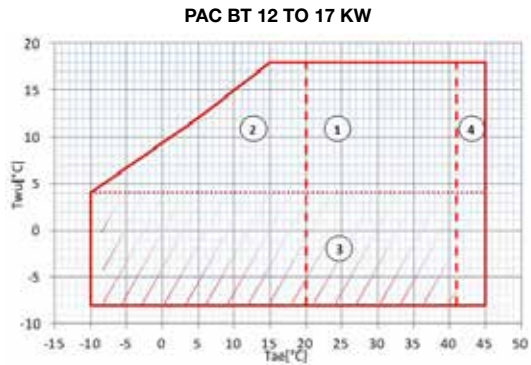
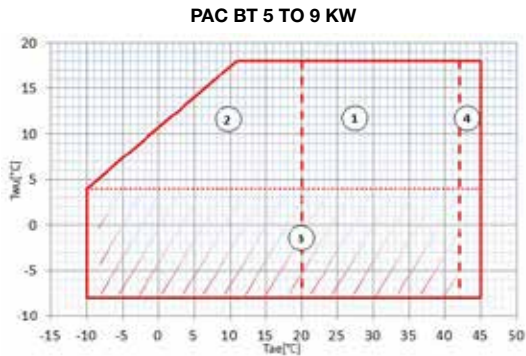


Pe [W] = Electric power consumption

Q [l/s] = water flow-rate

OPERATING RANGE

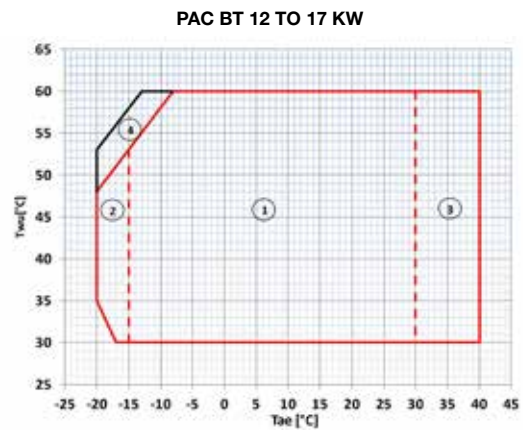
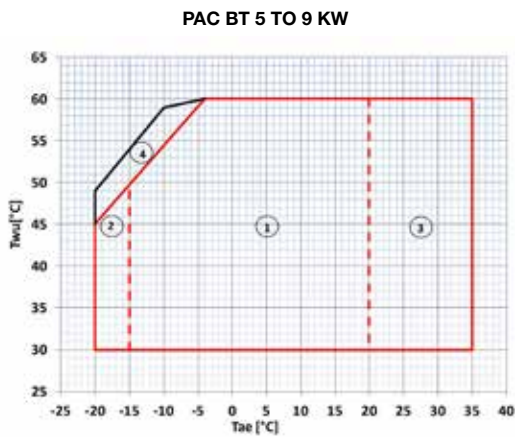
■ COOLING



T_{wu} [°C] = outlet exchanger water temperature. T_{ae} [°C]: External exchanger inlet air temperature.

1. Normal operating range
2. Normal operating range, with modulating fans
3. Operating range where the use of ethylene glycol is mandatory in relation to the temperature of the water at the outlet of the user side exchanger
4. Operating range with modulating compressor

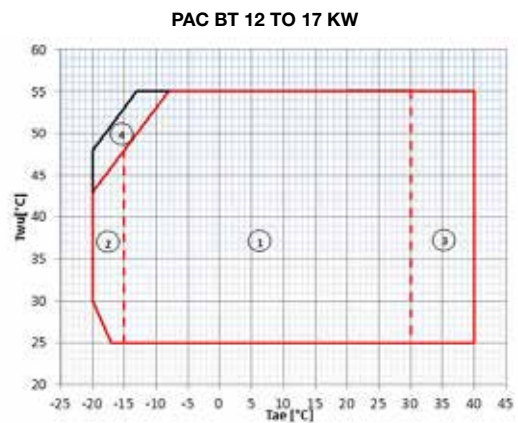
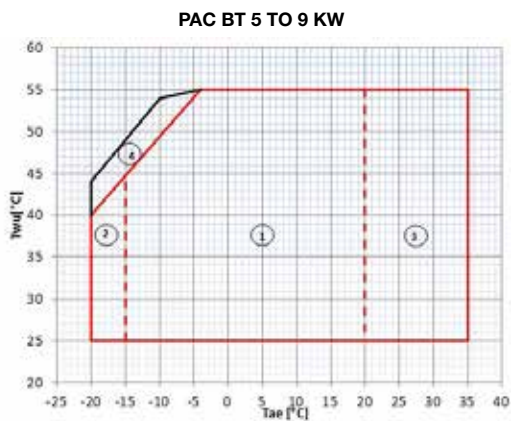
■ HEATING



T_{wu} [°C] = outlet exchanger water temperature. T_{ae} [°C]= External exchanger inlet air temperature.

1. Normal operating range
2. Operating range with modulating compressor
3. Operation with fans and compressors in modulation
4. Operating range with the use of the resistance (optional)

■ DOMESTIC HOT WATER



T_{wu} [°C] = outlet exchanger water temperature. T_{ae} [°C]= External exchanger inlet air temperature

1. Normal operating range
2. Operating range with modulating compressor
3. Operation with fans and compressors in modulation
4. Operating range with the use of the resistance (optional)

Indoor unit: composition and features

■ Structure

Supporting structure made with zinc-magnesium sheet metal that ensures excellent mechanical features and high long-term resistance against corrosion.

■ Panelling

Outer panelling made of painted zinc-magnesium sheet metal RAL 9001. Each panel can be easily removed to give full access to internal components.

■ Internal exchanger

Direct expansion heat exchanger, braze-welded AISI 316 stainless steel plates with large exchange surface and complete with external heat and anti-condensate insulation.

■ Domestic hot water circuit

- ① 280L domestic hot water storage tank with glassified inside and external polyurethane coating (40mm thickness) with PVC finishing
- ② Electronic anode
- ③ 2 kW safety and anti-legionella cycle heating element
- ④ Exchanger with stainless steel braze-welded plates (AISI 316) for the domestic hot water production
- ⑤ Exchanger with stainless steel braze-welded plates (AISI 316) for the domestic hot water production by a thermal solar installation (only for PAC BT Solar version)
- ⑥ DHW recirculation circulator
- ⑦ Domestic hot water system recirculation circulator
- ⑧ Automatic air blow valve, left water side
- ⑨ Domestic hot water side safety valve 6bar
- ⑩ Storage drain bibcock
- ⑪ Probe sump for solar thermal system control
- ⑫ Domestic water expansion vessel connection
- ⑬ Limestone cleaning bibcock

■ Water circuit

- ⑭ Direct-current primary circulator
- ⑮ Differential pressure switch, water side
- ⑯ System drain bibcock
- ⑰ Water side safety valve 3bar
- ⑱ Switching 3-way valve of the DHW or installation water
- ⑲ System expansion vessel connection

■ Refrigeration circuit

- ⑳ Electronic expansion valve

■ ⑳ Electrical panel

The capacity section includes:

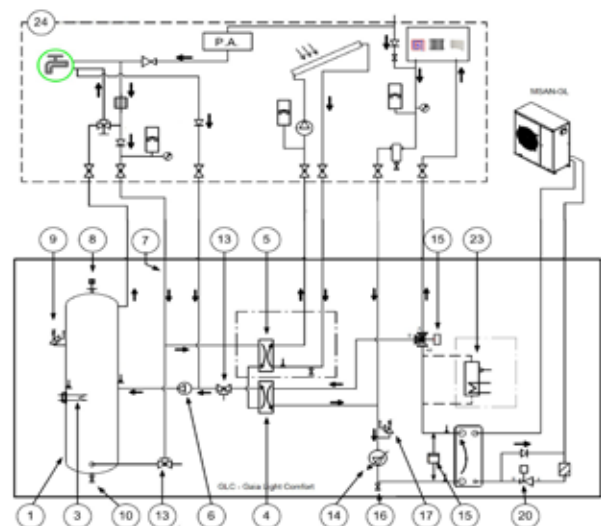
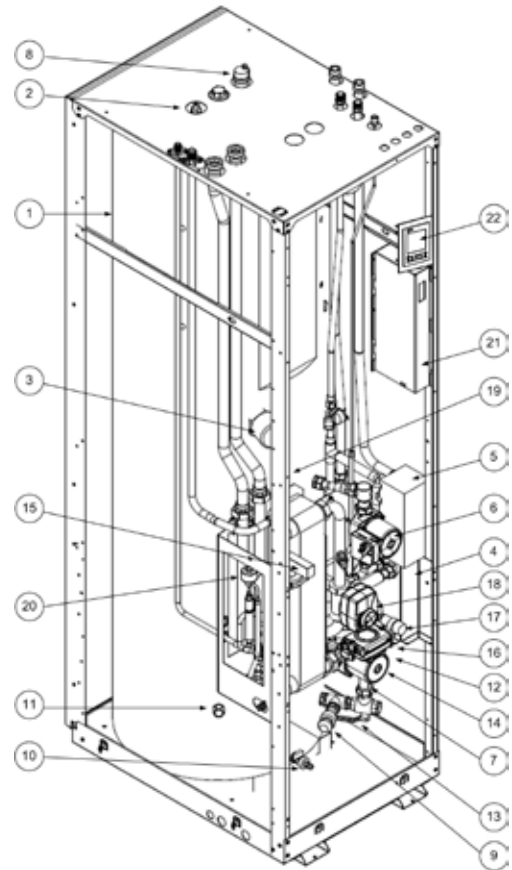
- Anti-legionellosis heater control contactor
- Main isolator switch
- Heaters fuses
- Auxiliary circuit fuse
- Primary circulator fuses

⑳ Control SOFT-TOUCH keypad including:

- Displaying the operating status (setpoint / outside temperature / supply temperature / alarms, etc.)
- Summer/winter season changeover
- Forcing for recharging the domestic water storage
- Hourly domestic water recharge scheduling (+ manual forcing)
- Anti-legionella function scheduling
- Summer/winter climate setting
- Hhourly/weekly domestic water recirculation scheduling

㉑ Supplementary electric heaters of 2kW / 4kW / 6kW (Separately supplied option)

㉒ Components performed by Customer



Outdoor unit: composition and features

■ ① Compressor

Size 5-7-9 kW

Inverter controlled rotary-type hermetic compressor equipped with a motor protection device for overheating, overcurrents and excessive temperatures of the supply gas. It is installed on anti-vibration mounts and it is equipped with oil charge.

An oil heater, which starts automatically, keeps the oil from being diluted by the refrigerant when the compressor stops.

Size 12-14-17 kW

Inverter controlled scroll-type hermetic compressor equipped with a motor protection device for overheating, overcurrents and excessive temperatures of the supply gas. It is installed on anti-vibration mounts and is equipped with oil charge.

An oil heater, which starts automatically, keeps the oil from being diluted by the refrigerant when the compressor stops.

■ ② Structure

Structure made entirely in Zinc-Magnesium plate that guarantees excellent mechanical characteristics and high corrosion strength over time.

Zinc-magnesium base painted with polyester powder RAL 9001

■ ③ Panelling

External RAL 9001 painted zinc-magnesium sheet metal panelling that ensures superior resistance to corrosion for outdoor installation and eliminates the need for periodic painting. Each panel can be easily removed to allow full access to internal components.

■ ④ External exchanger

Direct expansion finned exchanger, made from copper pipes in staggered rows and mechanically expanded to the fin collars. The fins are made from aluminium with a corrugated surface and adequately distanced to ensure the maximum heat exchange efficiency. A correct power supply to the expansion valve is ensured by the subcooling circuit; this circuit also prevents the formation of ice at the base of the heat exchanger during winter operation.

The unit is fitted as standard with coil protection grills.

■ ⑤ Fan

Axial fans with shaped die-cast aluminium blades coupled directly onto the single-phase electric motor with external rotor in compliance with VDE 0530/12.84, with built-in thermal protection, IP 54 rating in accordance with DIN 40 050.

Placed into aerodynamic shaped nozzles, to increase efficiency and minimize the noise level, are equipped of protection grilles to avoid accidents.

■ Refrigeration circuit

⑥ Refrigeration circuit with:

⑦ Electronic expansion valve

- Pressure probes
- Low pressure safety
- High pressure safety
- Liquid and gas shut-off valves with service fitting

④ Way reverse cycle valve

⑧ Filter dryer

⑨ Liquid receiver

⑩ Inlet liquid separator

■ Drain pan

Thermoformed ABS condensate collection tray fitted with drain pipe.

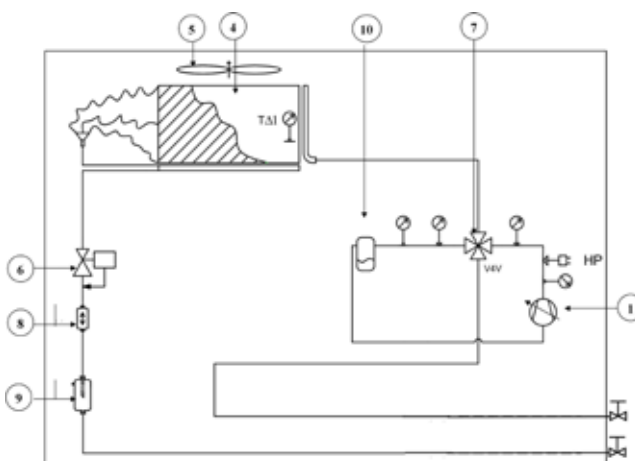
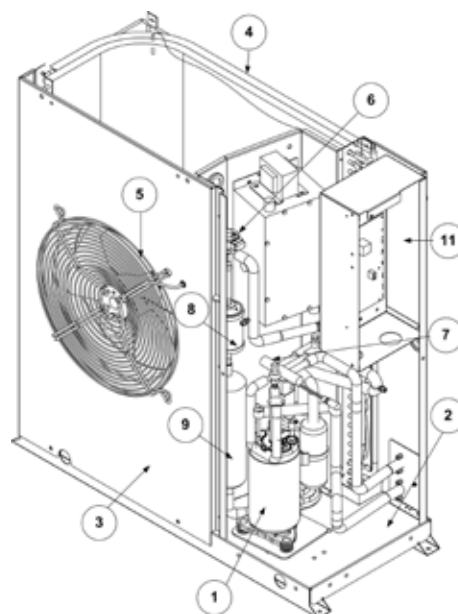
■ ⑪ Electrical panel

The control section includes:

- Relay for remote cumulative fault signal
- Dynamic control system for optimisation of the defrost cycles
- Condenser control
- RS485 serial
- Probe of the outdoor air temperature.

Client connection with 2 digital inputs, configurable as:

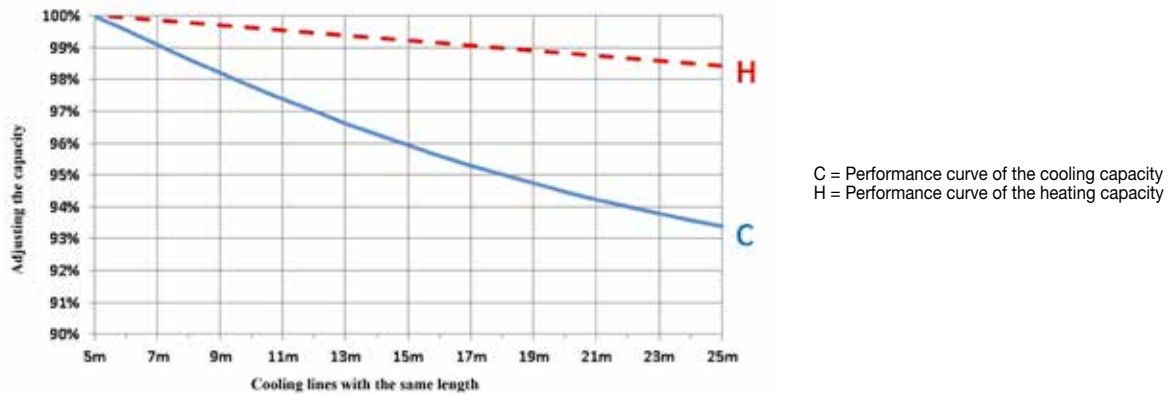
- Remote ON-OFF
- Remote mode change (hot/cold)
- Remote system call
- Second remote system set point



Definition of the cooling and heating capacity leak

The length of the refrigerant lines involves a worsening of the heating and cooling capacity supplied to the system and to the domestic hot water.

In the graph is possible to determine the value of this efficiency reduction



PAC BT connections with outdoor unit

REFRIGERATING LINE CONNECTIONS

- Maximum equivalent length of the refrigerant lines 25m
- Maximum level difference 15m

Size	5 kW	7 kW	9 kW	12 kW	14 kW	17 kW
External diameter gas line	3/8" (9.52 thickness 0.8 mm)	1/2" (12.7 thickness 0.8mm)		5/8" (15.88 thickness 1mm)		3/4" (19.05 thickness 1mm)
External diameter liquid line	3/8" (9.52 thickness 0.8mm)			1/2" (12.7 thickness 0.8mm)		

Equivalent length of the lines (metres) = Effective length (metres) + (Q.ty of curves x K)
Consider K = 0.3 for wide-range elbow bends
Consider K=0.5 m for standard 90° elbow curves.

CAUTION: for the correct realisation of the refrigerant lines, refrigerant gas, refer to the PAC BT MANUAL.

REFRIGERANT CHARGE

The outdoor unit is preloaded with refrigerant gas, while the indoor unit is supplied loaded with nitrogen. The preload is enough to cover a distance of up to 5 m between the two units.

Refrigerant charge (R-410A)							
Size		5 kW	7 kW	9 kW	12 kW	14 kW	17 kW
R410a	kg	2.9	2.9	2.9	4.9	6.6	8.5

ELECTRICAL CONNECTIONS

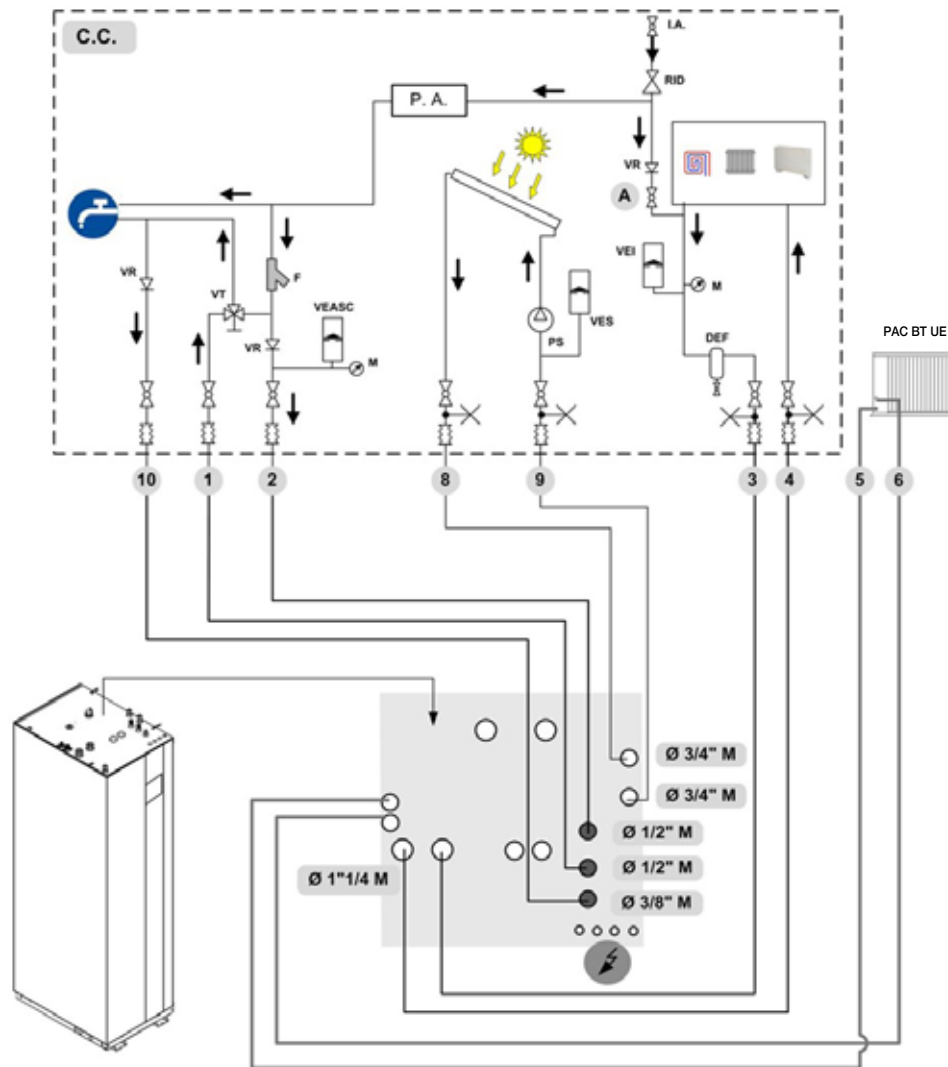
The internal and external PAC BT units must be individually powered. Along with the power supply, it is necessary to connect a communication cable between the outdoor and indoor unit.

Directions for the electric connection between the indoor unit and the external unit:

- Maximum length of the connection cable: 30 meters
- Cat.5 Ethernet cable
- Separate installation in relation to the capacity conductors

Water connection diagrams

Installation is the responsibility of the Client, externally to the unit.



A	System valve
I.A.	Aqueduct inlet
C.C.	Components performed by Customer
DEF	Dirt separator
F	Water filter
M	Pressure gauge
P.A.	Descaler protection

PS	solar pump
RID	Pressure reducing valve
VEASC	Domestic hot water expansion tank
VEI	System expansion tank
VES	Solar expansion tank
VR	check valve
VT	Mixing valve thermostatic

1	Domestic hot water outlet
2	Aqueduct inlet
3	Return from user side system
4	User side system supply
5	Gas line
6	Liquid line
8	Return from solar system
9	Supply to solar system
10	Dhw recirculation circuit inlet
	Antivibration joints
	Cut-off valves
	vent

Dimension criteria in heating

The first stage in selecting the heat pump is based on project heat load requirements, in other words, the maximum temperature lost in the premises during winter project conditions (in alignment with winter project temperatures for examined sites, excluding heat sources).

Design procedure foresees the selection of a heat generator capable of generating, under design conditions, power equal to, or greater than, that lost by the building under the same conditions.

In the case of the PAC BT and PAC BT Solar version, if the design thermal load is greater than the heating capacity supplied by the unit under the same conditions, you can still install the unit, provided there are integration systems with an electric heater.

ELECTRIC HEATER

PAC BT has an optional electric heater that can supply a heating capacity of up to 4 kW and 6 kW. This electric heater is integrated into the unit and can modulate its capacity output to minimise power consumption.

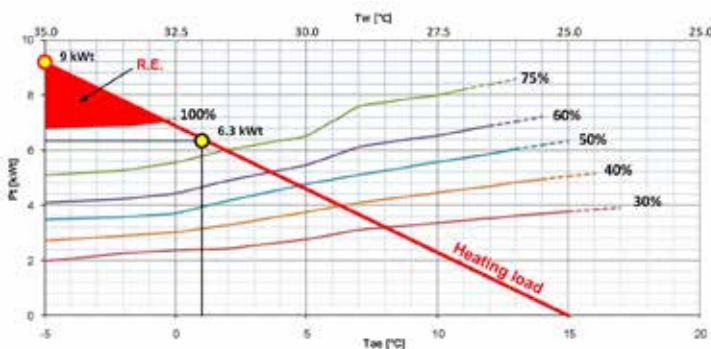
As there is no justified reason in terms of energy to choose the size of the heat pump based on the minimum outdoor air temperature, given that there are very few hours of operation, it is preferable to use an electric heater.

The graph below shows the case of a building with a thermal load under design conditions equal to 9 kW, with an outdoor air temperature of -5°C . Since the heat pump, with water supply at 35°C , can deliver 6.8 kW under the same outdoor air conditions (-5°C), the difference in capacity ($9 - 6.8 = 2.2 \text{ kW}$) is provided by the electric heater. The electric resistor operates until the building's heating capacity demand equals the maximum capacity supplied (at 100%) by the unit which, in this case, happens at a outdoor temperature of 0°C .

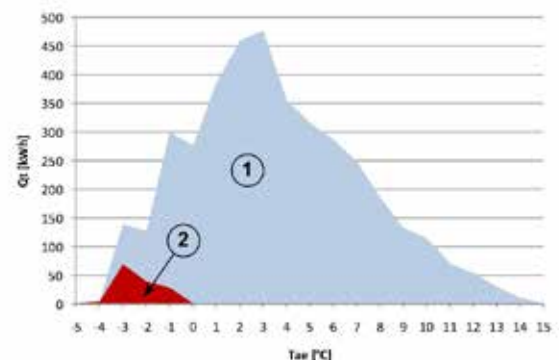
Due to the limited number of hours involving low fresh air temperatures for the premises involved, the power required to the integrated heater is relatively low compared to the power required from the heat pump. As such, seasonal efficiency performance is not compromised. In the example of the load described above, the overall electric energy absorbed by the heat pump + the electric heater is equivalent to 6266 kWh and the value of the only electric resistance is lower than 1%.

Thanks to the control of the indoor temperature in the various areas, during actual operation the capacity demand will be lower and, as a result, the electric heater will be used less as well.

In the above example of load, the overall electrical power absorption of the heat pump + the electric heater is 3966 kWh, so that the contribution of the electric heater is 3%.



P_t = delivered heat capacity
 T_w = supply water temperature
 T_{ae} = outdoor air temperature



Q_t = heating energy requested by the building
 T_{ae} = outdoor air temperature
1. Produced heat energy
2. Heating energy produced by the electric heaters

Data for the UNI/TS 11300 calculation part 4

Airwell declares that the data to use for the calculation, in line with UNI/TS 11300 part 4 of the generation performance of heat pumps it manufactures, are the ones reported in the following tables.

The data contained in this document may be updated by the manufacturer in the event of updates to the range without obligation of prior notice.

If the unit you are interested in is not included in this list, please contact your local agent.

	Te	Tdesignh	A	B	C	D
		-10	-7	2	7	12
5 kW	PLR		0.885	0.538	0.346	0.154
	DC		3.300	2.010	1.220	1.210
	CR		1.0	1.0	1.06	0.47
	P	3.73	3.30	2.01	1.29	0.57
	COP (partial load)		2.70	3.59	5.73	5.97
	COP (full load)		2.70	3.21	3.94	4.40
	fCOP		1.0	1.1	1.5	1.0
7 kW	PLR		0.885	0.538	0.346	0.154
	DC		4.470	2.720	1.750	1.300
	CR		1.0	1.0	1.0	0.60
	P	5.05	4.47	2.72	1.75	0.78
	COP (partial load)		2.71	3.51	4.80	5.65
	COP (full load)		2.71	3.12	3.91	4.41
	fCOP		1.0	1.1	1.2	1.1
9 kW	PLR		0.885	0.538	0.346	0.154
	DC		5.440	3.310	2.240	2.140
	CR		1.0	1.0	0.95	0.44
	P	6.15	5.44	3.31	2.13	0.95
	COP (partial load)		2.72	3.80	6.35	7.83
	COP (full load)		2.72	3.15	3.91	4.16
	fCOP		1.0	1.2	1.6	1.5
12 kW	PLR		0.885	0.538	0.346	0.154
	DC		7.860	5.030	7.150	6.020
	CR		1.0	1.0	0.43	0.23
	P	8.89	7.86	4.78	3.08	1.37
	COP (partial load)		2.71	3.64	4.58	5.52
	COP (full load)		2.71	3.16	3.91	4.34
	fCOP		1.0	1.2	1.0	0.8
14 kW	PLR		0.885	0.538	0.346	0.154
	DC		9.140	5.560	6.950	7.340
	CR		1.0	1.0	0.51	0.22
	P	10.33	9.14	5.56	3.58	1.59
	COP (partial load)		2.72	3.71	4.81	5.41
	COP (full load)		2.72	3.14	3.91	4.16
	fCOP		1.0	1.2	1.1	0.9
17 kW	PLR		0.885	0.538	0.346	0.154
	DC		11.200	6.820	9.260	10.070
	CR		1.0	1.0	0.47	0.19
	P	12.66	11.20	6.82	4.38	1.95
	COP (partial load)		2.71	3.71	4.64	5.28
	COP (full load)		2.71	3.18	3.90	4.27
	fCOP		1.0	1.2	1.0	0.8

Terms and definitions:

Supply T 35°C

Tdesignh = climate A project temperature - Average (defined in the UNI EN 14825)

A, B, C, D = used to identify the four conditions that the various outdoor air temperatures (Te) are associated with

Te = outdoor air temperature

PLR = part load ratio that is climatic load capacity

DC = capacity at full load referred to the indicated temperatures

CR = heat pump load capacity

P = capacity required by the installation

COP (full load) = COP at full load referred to the indicated outdoor air conditions

COP (partial load) = COP at CR load and referred to the indicated outdoor air conditions

fCOP = COP correction factor and defined as: COP¹ (full load) / COP (partial load)

PdC = acronym for Heat Pump

acs = acronym for Domestic Hot Water

Performance

SIZE 5 KW - HEATING

To °C	T _{ae} (°C) DB/WB	Heating capacity					COP				
		100%	90%	70%	50%	40%	100%	90%	70%	50%	40%
25	-20/-20.1	-	-	1.16	0.70	0.48	-	-	1.74	1.82	1.90
	-10/-10.5	2.96	2.70	2.03	1.28	0.91	2.92	2.94	3.00	3.05	3.05
	-7/-8	3.50	3.19	2.44	1.62	1.21	3.44	3.48	3.56	3.64	3.66
	0/-0.6	4.01	3.61	2.88	2.16	1.81	3.87	3.93	4.07	4.23	4.32
	2/1.1	4.26	3.88	3.02	2.12	1.67	4.07	4.13	4.29	4.47	4.57
	7/6	5.35	4.81	3.75	2.69	2.16	5.08	5.18	5.42	5.69	5.83
	12/10.2	6.06	5.50	4.28	3.02	2.39	5.81	5.94	6.25	6.59	6.77
	15/13	6.49	5.89	4.57	3.20	2.52	6.28	6.44	6.79	7.17	7.36
20/16	7.21	6.55	5.07	3.51	2.73	7.08	7.27	7.72	8.20	8.44	
35	-20/-20.1	-	-	0.98	0.59	0.39	-	-	1.31	1.39	1.48
	-10/-10.5	2.78	2.52	2.17	1.17	0.82	2.30	2.32	2.36	2.46	2.51
	-7/-8	3.30	3.01	2.61	1.50	1.10	2.70	2.76	2.80	2.94	3.01
	0/-0.6	3.90	3.49	3.04	2.04	1.69	3.06	3.12	3.19	3.41	3.52
	2/1.1	4.14	3.74	3.25	2.00	1.56	3.20	3.26	3.34	3.60	3.74
	7/6	5.19	4.66	4.05	2.56	2.03	3.94	4.02	4.14	4.50	4.68
	12/10.2	5.83	5.24	5.16	2.82	2.21	4.40	4.50	4.62	5.10	5.33
	15/13	6.3	5.7	4.9	3.0	2.4	4.75	4.88	5.04	5.56	5.82
20/16	7.2	6.4	4.6	3.4	2.6	5.34	5.50	6.08	6.36	6.69	
45	-20/-20.1	-	-	-	0.58	0.37	-	-	-	1.28	1.36
	-10/-10.5	2.65	2.36	1.72	1.04	0.71	1.85	1.87	1.92	1.98	2.03
	-7/-8	3.0	2.65	1.96	1.25	0.90	2.04	2.06	2.13	2.21	2.27
	0/-0.6	3.7	3.23	2.49	1.80	1.46	2.40	2.45	2.55	2.68	2.77
	2/1.1	3.9	3.5	2.63	1.78	1.35	2.54	2.59	2.71	2.87	2.99
	7/6	5.0	4.5	3.4	2.4	1.83	3.15	3.22	3.38	3.59	3.73
	12/10.2	5.61	4.96	3.73	2.54	1.94	3.48	3.56	3.76	4.04	4.23
	15/13	6.0	5.4	4.0	2.7	2.1	3.71	3.80	4.04	4.34	4.57
20/16	6.8	6.0	4.5	3.0	2.3	4.08	4.20	4.48	4.87	5.15	
55	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	-	-	-	-	-	-	-	-	-	-
	-7/-8	2.84	2.54	1.88	1.17	0.82	1.63	1.64	1.69	1.75	1.80
	0/-0.6	3.48	3.08	2.36	1.68	1.34	1.86	1.89	1.97	2.07	2.13
	2/1.1	3.72	3.32	2.49	1.65	1.23	1.96	2.00	2.08	2.20	2.29
	7/6	4.72	4.20	3.17	2.15	1.64	2.41	2.45	2.57	2.73	2.84
	12/10.2	5.31	4.72	3.54	2.36	1.78	2.64	2.69	2.84	3.04	3.18
	15/13	5.8	5.1	3.8	2.5	1.89	2.80	2.87	3.03	3.26	3.42
20/16	6.5	5.8	4.3	2.8	2.1	3.07	3.15	3.35	3.62	3.84	
60	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	-	-	-	-	-	-	-	-	-	-
	-7/-8	-	-	-	-	-	-	-	-	-	-
	0/-0.6	3.3	2.9	2.22	1.57	1.24	1.42	1.44	1.50	1.58	1.64
	2/1.1	3.6	3.2	2.39	1.56	1.15	1.50	1.53	1.59	1.69	1.77
	7/6	4.6	4.1	3.1	2.08	1.57	1.86	1.89	1.99	2.12	2.22
	12/10.2	4.98	4.44	3.32	2.19	1.63	1.94	1.98	2.09	2.24	2.36
	15/13	5.3	4.7	3.5	2.3	1.69	2.01	2.06	2.17	2.34	2.47
20/16	5.8	5.1	3.8	2.5	1.8	2.12	2.17	2.31	2.50	2.66	

To = Leaving internal exchanger water temperature (°C)
 Eat [°C]: external exchanger inlet air temperature
 Performances in function of the inlet/outlet water temperature differential = 5°C
 Heating capacity and COP calculated according to EN 14511:2013
 ATTENTION: The data of the heat capacity and COP include defrostings.
 DB = dry bulb
 WB = wet bulb

SIZE 5 KW - COOLING

To °C	Tae °C	Cooling capacity						EER					
		100%	90%	75%	60%	50%	40%	100%	90%	75%	60%	50%	40%
5	20	4.62	4.13	3.57	2.75	2.27	1.78	4.12	4.18	4.29	4.42	4.54	4.70
	25	4.36	3.91	3.38	2.62	2.17	1.71	3.52	3.57	3.67	3.78	3.89	4.03
	30	4.11	3.69	3.20	2.49	2.07	1.64	3.02	3.07	3.16	3.26	3.35	3.46
	35	3.85	3.46	3.01	2.35	1.96	1.57	2.71	2.76	2.84	2.92	3.00	3.09
	40	3.60	3.24	2.82	2.22	1.86	1.50	2.17	2.21	2.29	2.36	2.43	2.50
	45	-	3.02	2.63	2.08	1.76	1.42	-	1.80	1.88	1.94	1.99	2.06
7	20	4.86	4.35	3.76	2.90	2.39	1.88	4.33	4.41	4.56	4.73	4.88	5.07
	25	4.59	4.12	3.56	2.77	2.29	1.81	3.68	3.75	3.89	4.03	4.16	4.32
	30	4.32	3.88	3.37	2.63	2.19	1.75	3.15	3.21	3.33	3.45	3.56	3.70
	35	4.05	3.65	3.18	2.50	2.09	1.68	2.77	2.83	2.94	3.04	3.12	3.23
	40	3.78	3.41	2.98	2.36	1.99	1.61	2.27	2.32	2.42	2.50	2.57	2.66
	45	-	3.18	2.79	2.22	1.89	1.55	-	1.92	2.01	2.08	2.14	2.21
12	20	5.47	4.90	4.23	3.28	2.70	2.12	4.84	4.99	5.24	5.49	5.71	6.00
	25	5.16	4.64	4.02	3.13	2.60	2.07	4.08	4.21	4.43	4.63	4.82	5.06
	30	4.86	4.37	3.80	2.99	2.50	2.01	3.47	3.58	3.77	3.93	4.09	4.28
	35	4.56	4.12	3.60	2.86	2.41	1.96	2.93	3.02	3.18	3.32	3.44	3.59
	40	4.25	3.85	3.39	2.71	2.31	1.91	2.50	2.58	2.72	2.83	2.93	3.04
	45	-	3.59	3.17	2.57	2.21	1.85	-	2.21	2.34	2.42	2.50	2.58
15	20	5.83	5.22	4.51	3.50	2.88	2.27	5.22	5.41	5.73	6.02	6.29	6.62
	25	5.50	4.94	4.29	3.35	2.78	2.22	4.29	4.44	4.71	4.95	5.18	5.46
	30	5.17	4.66	4.06	3.20	2.68	2.17	3.58	3.71	3.93	4.12	4.31	4.53
	35	4.86	4.39	3.85	3.06	2.60	2.12	3.02	3.13	3.32	3.47	3.62	3.79
	40	4.53	4.11	3.62	2.92	2.50	2.08	2.56	2.65	2.82	2.94	3.05	3.18
	45	-	-	3.40	2.78	2.41	2.03	-	-	2.41	2.50	2.59	2.69
18	20	6.19	5.55	4.79	3.72	3.07	2.42	5.28	5.49	5.87	6.21	6.53	6.94
	25	5.85	5.26	4.57	3.57	2.97	2.37	4.39	4.56	4.87	5.15	5.42	5.76
	30	5.51	4.97	4.34	3.43	2.88	2.33	3.69	3.84	4.10	4.32	4.54	4.80
	35	5.18	4.68	4.11	3.29	2.79	2.30	3.48	3.61	3.85	4.02	4.19	4.38
	40	4.83	4.39	3.88	3.15	2.70	2.26	2.65	2.76	2.95	3.08	3.21	3.36
	45	-	-	3.65	3.01	2.62	2.23	-	-	2.52	2.63	2.73	2.84

To = Leaving internal exchanger water temperature (°C)
 Eat [°C]: external exchanger inlet air temperature
 Performances in function of the inlet/outlet water temperature differential = 5°C
 Cooling capacity and EER calculated according to EN 14511:2013

SIZE 7 KW - HEATING

To °C	Tae (°C) DB/WB	Heating capacity					COP				
		100%	90%	70%	50%	40%	100%	90%	70%	50%	40%
25	-20/-20.1	-	-	1.61	1.04	0.74	-	-	1.83	1.86	1.86
	-10/-10.5	3.87	3.53	2.84	1.88	1.38	2.99	3.02	3.07	3.11	3.10
	-7/-8	4.58	4.17	3.35	2.29	1.74	3.41	3.45	3.53	3.60	3.62
	0/-0.6	5.15	4.64	3.63	2.69	2.23	3.55	3.61	3.74	3.89	3.97
	2/1.1	5.53	5.02	4.01	2.84	2.25	3.69	3.76	3.90	4.08	4.17
	7/6	6.93	6.23	4.85	3.47	2.78	4.67	4.78	5.01	5.26	5.39
	12/10.2	7.88	7.13	5.63	4.00	3.18	5.34	5.47	5.76	6.10	6.27
	15/13	8.64	7.81	6.19	4.37	3.45	5.81	5.99	6.36	6.77	6.97
35	-20/-20.1	-	-	1.49	0.95	0.67	-	-	1.23	1.29	1.35
	-10/-10.5	3.74	3.38	2.68	1.76	1.28	2.29	2.32	2.37	2.45	2.49
	-7/-8	4.47	4.05	3.20	2.16	1.63	2.71	2.74	2.82	2.92	2.97
	0/-0.6	5.05	4.52	3.47	2.55	2.10	3.04	3.09	3.21	3.36	3.44
	2/1.1	5.40	4.87	3.82	2.68	2.10	3.12	3.19	3.32	3.48	3.58
	7/6	6.87	6.17	4.77	3.38	2.69	3.91	4.01	4.21	4.45	4.58
	12/10.2	7.83	7.04	5.47	3.84	3.03	4.41	4.52	4.78	5.09	5.27
	15/13	8.58	7.72	6.00	4.19	3.28	4.74	4.90	5.21	5.58	5.79
45	-20/-20.1	-	-	-	0.86	0.59	-	-	-	1.25	1.27
	-10/-10.5	3.50	3.12	2.38	1.52	1.08	1.87	1.89	1.93	1.97	1.98
	-7/-8	3.9	3.51	2.67	1.76	1.30	2.06	2.08	2.13	2.19	2.22
	0/-0.6	4.8	4.29	3.17	2.26	1.83	2.41	2.45	2.55	2.66	2.72
	2/1.1	5.2	4.6	3.49	2.38	1.83	2.54	2.59	2.70	2.83	2.90
	7/6	6.6	5.9	4.5	3.1	2.44	3.12	3.20	3.35	3.53	3.64
	12/10.2	7.47	6.63	4.96	3.40	2.62	3.46	3.55	3.74	3.98	4.12
	15/13	8.1	7.2	5.4	3.7	2.8	3.68	3.79	4.02	4.30	4.46
55	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	-	-	-	-	-	-	-	-	-	-
	-7/-8	3.76	3.37	2.59	1.69	1.23	1.65	1.67	1.71	1.76	1.78
	0/-0.6	4.6	4.1	3.04	2.15	1.71	1.88	1.92	1.98	2.07	2.12
	2/1.1	4.9	4.4	3.36	2.27	1.72	1.99	2.02	2.10	2.20	2.26
	7/6	6.3	5.6	4.3	2.92	2.25	2.44	2.49	2.60	2.74	2.83
	12/10.2	7.09	6.32	4.77	3.23	2.46	2.66	2.73	2.87	3.04	3.15
	15/13	7.7	6.9	5.2	3.5	2.65	2.82	2.90	3.07	3.27	3.40
60	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	-	-	-	-	-	-	-	-	-	-
	-7/-8	-	-	-	-	-	-	-	-	-	-
	0/-0.6	4.6	4.1	3.05	2.14	1.69	1.72	1.75	1.81	1.88	1.93
	2/1.1	4.9	4.4	3.35	2.25	1.69	1.81	1.84	1.91	2.00	2.04
	7/6	6.2	5.5	4.2	2.83	2.16	2.20	2.25	2.35	2.47	2.54
	12/10.2	6.97	6.22	4.72	3.18	2.40	2.40	2.46	2.58	2.73	2.82
	15/13	7.5	6.7	5.1	3.4	2.57	2.53	2.60	2.74	2.91	3.01
20/16	8.4	7.5	5.8	3.8	2.9	2.75	2.83	3.00	3.21	3.34	

To = Leaving internal exchanger water temperature (°C)
 Eat [°C]: external exchanger inlet air temperature
 Performances in function of the inlet/outlet water temperature differential = 5°C
 Heating capacity and COP calculated according to EN 14511:2013
 ATTENTION: The data of the heat capacity and COP include defrostings.
 DB = dry bulb
 WB = wet bulb

SIZE 7 KW - COOLING

To	Tae	Cooling capacity						EER					
°C	°C	100%	90%	75%	60%	50%	40%	100%	90%	75%	60%	50%	40%
5	20	6.08	5.21	4.42	3.53	2.91	2.29	4.18	4.27	4.35	4.47	4.56	4.67
	25	5.74	4.92	4.18	3.36	2.78	2.20	3.52	3.60	3.68	3.78	3.87	3.98
	30	5.40	4.64	3.95	3.18	2.64	2.10	2.99	3.06	3.13	3.23	3.31	3.40
	35	5.08	4.37	3.73	3.01	2.51	2.01	2.72	2.79	2.85	2.94	3.01	3.09
	40	4.75	4.10	3.50	2.84	2.38	1.92	2.16	2.22	2.28	2.36	2.43	2.50
	45	-	3.82	3.28	2.67	2.25	1.82	-	1.90	1.96	2.03	2.09	2.15
7	20	6.41	5.49	4.65	3.73	3.07	2.42	4.35	4.48	4.60	4.76	4.89	5.03
	25	6.06	5.19	4.42	3.55	2.94	2.33	3.67	3.78	3.89	4.03	4.14	4.28
	30	5.70	4.90	4.18	3.37	2.81	2.24	3.12	3.22	3.31	3.43	3.53	3.65
	35	5.37	4.63	3.96	3.21	2.68	2.16	2.78	2.87	2.95	3.06	3.15	3.24
	40	5.03	4.34	3.73	3.04	2.55	2.07	2.25	2.33	2.41	2.51	2.58	2.67
	45	-	4.06	3.49	2.87	2.43	1.98	-	1.99	2.07	2.16	2.23	2.29
12	20	7.21	6.18	5.25	4.21	3.48	2.74	4.79	5.02	5.24	5.51	5.71	5.94
	25	6.84	5.87	5.00	4.03	3.35	2.67	4.03	4.23	4.41	4.64	4.82	5.03
	30	6.46	5.57	4.76	3.86	3.23	2.60	3.43	3.60	3.76	3.95	4.10	4.27
	35	6.09	5.27	4.52	3.69	3.11	2.53	2.92	3.07	3.20	3.37	3.50	3.64
	40	5.71	4.95	4.28	3.52	2.99	2.46	2.48	2.61	2.73	2.87	2.98	3.09
	45	-	4.64	4.03	3.35	2.87	2.39	-	2.23	2.34	2.47	2.56	2.65
15	20	7.65	6.56	5.57	4.47	3.69	2.92	5.03	5.32	5.60	5.93	6.17	6.45
	25	7.26	6.25	5.33	4.30	3.58	2.85	4.18	4.42	4.65	4.93	5.15	5.40
	30	6.87	5.93	5.08	4.13	3.46	2.79	3.52	3.73	3.92	4.15	4.34	4.54
	35	6.48	5.62	4.83	3.96	3.35	2.73	2.98	3.16	3.32	3.52	3.67	3.84
	40	6.08	5.29	4.58	3.79	3.23	2.67	2.53	2.68	2.83	2.99	3.12	3.25
	45	-	-	4.33	3.62	3.12	2.62	-	-	2.42	2.57	2.67	2.78
18	20	8.92	7.66	6.52	5.23	4.33	3.42	5.88	6.33	6.73	7.19	7.54	7.91
	25	8.48	7.30	6.23	5.04	4.19	3.35	5.00	5.35	5.68	6.06	6.36	6.68
	30	8.02	6.93	5.94	4.84	4.07	3.29	4.27	4.56	4.84	5.16	5.40	5.67
	35	7.56	6.56	5.66	4.65	3.94	3.23	3.45	3.69	3.91	4.17	4.37	4.59
	40	7.10	6.19	5.38	4.47	3.83	3.18	3.10	3.31	3.51	3.74	3.90	4.07
	45	-	-	5.10	4.28	3.71	3.14	-	-	3.02	3.22	3.35	3.49

To = Leaving internal exchanger water temperature (°C)
 Eat [°C]: external exchanger inlet air temperature
 Performances in function of the inlet/outlet water temperature differential = 5°C
 Cooling capacity and EER calculated according to EN 14511:2013

SIZE 9 KW - HEATING

To	Tae (°C) DB/WB	Heating capacity					COP				
		100%	90%	70%	50%	40%	100%	90%	70%	50%	40%
°C	°C										
25	-20/-20.1	-	-	1.89	1.12	0.74	-	-	1.55	1.87	2.45
	-10/-10.5	4.88	4.44	3.22	2.00	1.39	2.41	2.45	2.60	2.89	3.26
	-7/-8	5.56	5.07	3.77	2.48	1.84	2.82	2.87	3.05	3.37	3.70
	0/-0.6	6.42	5.80	4.65	3.51	2.94	3.18	3.26	3.47	3.79	4.02
	2/1.1	6.83	6.21	4.77	3.34	2.63	3.39	3.47	3.73	4.14	4.51
	7/6	8.59	7.72	6.00	4.3	3.46	4.23	4.37	4.72	5.26	5.71
	12/10.2	9.99	9.05	6.89	4.9	3.85	4.73	4.85	5.55	6.24	6.83
	15/13	10.9	9.9	7.5	5.3	4.1	5.22	5.36	6.16	6.97	7.65
35	-20/-20.1	-	-	1.84	1.08	0.70	-	-	1.60	1.88	2.41
	-10/-10.5	4.78	4.32	3.11	1.91	1.31	2.36	2.40	2.54	2.80	3.13
	-7/-8	5.44	4.92	3.64	2.36	1.72	2.72	2.77	2.93	3.22	3.53
	0/-0.6	6.26	5.61	4.47	3.33	2.77	2.96	3.04	3.23	3.52	3.74
	2/1.1	6.70	6.05	4.62	3.19	2.49	3.15	3.23	3.46	3.84	4.19
	7/6	8.54	7.66	5.92	4.2	3.33	3.91	4.03	4.35	4.84	5.25
	12/10.2	9.62	8.65	6.54	4.55	3.56	4.16	4.27	4.84	5.44	5.97
	15/13	10.4	9.3	7.0	4.8	3.8	4.46	4.58	5.22	5.90	6.50
45	-20/-20.1	-	-	-	1.04	0.64	-	-	-	1.65	2.17
	-10/-10.5	4.77	4.24	3.01	1.78	1.18	1.88	1.92	2.03	2.26	2.58
	-7/-8	5.30	4.71	3.43	2.16	1.52	2.04	2.08	2.21	2.45	2.72
	0/-0.6	6.43	5.66	4.43	3.21	2.61	2.35	2.41	2.57	2.81	3.01
	2/1.1	6.85	6.08	4.57	3.07	2.32	2.47	2.53	2.72	3.04	3.36
	7/6	8.65	7.72	5.86	4.0	3.12	2.99	3.08	3.31	3.69	4.03
	12/10.2	9.79	8.46	6.44	4.35	3.31	3.18	3.45	3.66	4.14	4.61
	15/13	10.6	9.3	6.9	4.7	3.5	3.38	3.57	3.91	4.45	4.99
55	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	-	-	-	-	-	-	-	-	-	-
	-7/-8	4.91	4.38	3.16	1.94	1.34	1.58	1.61	1.69	1.85	2.04
	0/-0.6	5.90	5.22	4.04	2.87	2.29	1.77	1.81	1.92	2.08	2.22
	2/1.1	6.30	5.62	4.18	2.74	2.03	1.86	1.90	2.03	2.24	2.45
	7/6	8.00	7.11	5.35	3.6	2.73	2.26	2.32	2.48	2.73	2.97
	12/10.2	8.99	7.87	5.87	3.88	2.89	2.40	2.51	2.70	3.01	3.32
	15/13	9.65	8.47	6.28	4.1	3.04	2.53	2.65	2.86	3.21	3.56
60	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	-	-	-	-	-	-	-	-	-	-
	-7/-8	-	-	-	-	-	-	-	-	-	-
	0/-0.6	6.11	5.41	4.17	2.93	2.31	1.60	1.63	1.72	1.86	1.98
	2/1.1	6.53	5.83	4.31	2.80	2.04	1.69	1.73	1.83	2.01	2.19
	7/6	8.31	7.37	5.51	3.66	2.74	2.08	2.13	2.27	2.49	2.70
	12/10.2	9.29	8.16	6.04	3.95	2.91	2.22	2.32	2.48	2.75	3.01
	15/13	10.0	8.8	6.5	4.2	3.06	2.36	2.46	2.64	2.94	3.24
20/16	11.2	9.9	7.2	4.6	3.3	2.57	2.68	2.91	3.27	3.64	

To = Leaving internal exchanger water temperature (°C)
 Eat [°C]: external exchanger inlet air temperature
 Performances in function of the inlet/outlet water temperature differential = 5°C
 Heating capacity and COP calculated according to EN 14511:2013
 ATTENTION: The data of the heat capacity and COP include defrostings.
 DB = dry bulb
 WB = wet bulb

SIZE 9 KW - COOLING

To	Tae	Cooling capacity						EER					
		100%	90%	75%	60%	50%	40%	100%	90%	75%	60%	50%	40%
5	20	8.07	7.33	6.08	4.83	3.93	3.03	3.76	3.78	4.02	4.38	4.82	5.64
	25	7.64	6.97	5.81	4.63	3.79	2.94	3.16	3.25	3.44	3.73	4.06	4.66
	30	7.24	6.62	5.53	4.43	3.65	2.86	2.74	2.81	2.97	3.19	3.44	3.88
	35	6.84	6.26	5.25	4.23	3.50	2.77	2.52	2.58	2.72	2.91	3.10	3.42
	40	6.44	5.90	4.97	4.03	3.36	2.68	2.02	2.07	2.17	2.31	2.46	2.67
	45	6.04	5.55	4.69	3.82	3.21	2.59	-	1.78	1.87	1.98	2.09	2.24
7	20	8.41	7.68	6.38	5.07	4.13	3.18	3.83	3.97	4.25	4.67	5.17	6.10
	25	8.01	7.32	6.10	4.88	4.00	3.12	3.30	3.40	3.63	3.96	4.33	5.00
	30	7.60	6.95	5.82	4.68	3.87	3.05	2.86	2.94	3.12	3.38	3.65	4.12
	35	7.19	6.59	5.54	4.49	3.74	2.98	2.58	2.65	2.80	3.00	3.21	3.54
	40	6.77	6.22	5.26	4.29	3.60	2.91	2.11	2.17	2.28	2.44	2.59	2.81
	45	6.36	5.86	4.98	4.10	3.47	2.83	-	1.87	1.96	2.08	2.19	2.35
12	20	-	8.54	7.11	5.66	4.62	3.57	4.03	4.43	4.83	5.39	6.04	7.26
	25	8.92	8.17	6.83	5.49	4.52	3.55	3.64	3.79	4.10	4.53	5.00	5.83
	30	8.50	7.80	6.56	5.31	4.42	3.52	3.15	3.27	3.51	3.83	4.18	4.73
	35	8.06	7.41	6.28	5.14	4.32	3.50	2.72	2.81	3.00	3.24	3.49	3.85
	40	7.61	7.02	5.99	4.96	4.22	3.47	2.34	2.41	2.56	2.74	2.91	3.15
	45	7.15	6.63	5.71	4.78	4.11	3.45	-	2.08	2.20	2.34	2.46	2.61
15	20	-	9.11	7.59	6.05	4.94	3.83	4.65	5.12	5.64	6.34	7.11	8.53
	25	-	8.73	7.32	5.89	4.86	3.83	3.93	4.32	4.70	5.22	5.78	6.73
	30	9.08	8.35	7.04	5.72	4.78	3.83	3.53	3.68	3.97	4.36	4.75	5.38
	35	8.63	7.95	6.76	5.56	4.69	3.83	3.03	3.14	3.37	3.65	3.93	4.33
	40	8.15	7.54	6.47	5.38	4.61	3.83	2.60	2.69	2.86	3.07	3.27	3.52
	45	7.68	7.13	6.17	5.21	4.52	3.83	-	-	2.45	2.61	2.75	2.91
18	20	-	-	7.71	6.15	5.02	3.90	5.39	5.58	6.61	7.42	8.30	9.84
	25	-	8.85	7.42	5.98	4.94	3.90	4.52	5.00	5.46	6.06	6.69	7.73
	30	9.18	8.45	7.14	5.82	4.87	3.92	4.04	4.23	4.58	5.02	5.47	6.14
	35	8.72	8.05	6.86	5.66	4.80	3.94	3.47	3.61	3.87	4.19	4.50	4.94
	40	8.25	7.64	6.58	5.50	4.73	3.96	2.98	3.09	3.29	3.53	3.74	4.02
	45	7.77	7.24	6.30	5.35	4.68	4.00	-	-	2.82	3.01	3.15	3.33

To = Leaving internal exchanger water temperature (°C)
 Eat [°C]: external exchanger inlet air temperature
 Performances in function of the inlet/outlet water temperature differential = 5°C
 Cooling capacity and EER calculated according to EN 14511:2013

SIZE 12 KW - HEATING

To °C	Tae (°C) DB/WB	Heating capacity					COP				
		100%	90%	70%	50%	40%	100%	90%	70%	50%	40%
25	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	7.03	6.37	4.92	3.48	2.76	2.95	2.99	3.11	3.27	3.43
	-7/-8	7.90	7.22	5.74	4.26	3.52	3.29	3.34	3.46	3.64	3.79
	0/-0.6	8.92	8.20	6.63	5.06	4.28	3.57	3.56	3.50	3.38	3.29
	2/1.1	9.46	8.70	7.03	5.37	4.54	3.72	3.78	3.94	4.15	4.32
	7/6	11.9	11.1	9.3	7.4	6.50	4.59	4.67	4.88	5.15	5.36
	12/10.2	13.3	12.3	10.2	8.0	6.96	5.10	5.20	5.45	5.78	6.04
	15/13	14.5	13.4	11.0	8.6	7.4	5.52	5.64	5.93	6.30	6.59
35	-20/-20.1	-	-	-	2.02	1.55	-	-	-	1.82	2.01
	-10/-10.5	6.94	6.29	4.86	3.43	2.72	2.42	2.46	2.58	2.73	2.87
	-7/-8	7.86	7.19	5.71	4.24	3.50	2.71	2.77	2.89	3.06	3.20
	0/-0.6	9.12	8.39	6.78	5.18	4.38	3.02	3.02	3.00	2.92	2.85
	2/1.1	9.68	8.90	7.20	5.49	4.65	3.16	3.22	3.38	3.58	3.75
	7/6	12.2	11.4	9.5	7.6	6.66	3.91	4.00	4.21	4.47	4.67
	12/10.2	13.66	12.66	10.45	8.25	7.16	4.34	4.44	4.68	4.99	5.23
	15/13	14.9	13.8	11.3	8.9	7.6	4.67	4.79	5.07	5.41	5.68
45	-20/-20.1	-	-	-	1.98	1.52	-	-	-	1.45	1.62
	-10/-10.5	6.59	5.97	4.61	3.26	2.58	1.81	1.85	1.96	2.10	2.23
	-7/-8	7.28	6.66	5.29	3.93	3.25	2.00	2.05	2.16	2.31	2.44
	0/-0.6	8.74	8.03	6.49	4.96	4.19	2.40	2.42	2.42	2.36	2.32
	2/1.1	9.28	8.53	6.90	5.27	4.45	2.53	2.59	2.74	2.92	3.08
	7/6	11.6	10.8	9.0	7.2	6.33	3.08	3.15	3.34	3.57	3.75
	12/10.2	13.06	12.10	9.99	7.89	6.84	3.41	3.50	3.72	3.99	4.21
	15/13	14.1	13.0	10.7	8.4	7.2	3.65	3.74	3.98	4.28	4.52
55	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	6.02	5.45	4.21	2.98	2.36	1.35	1.38	1.44	1.51	1.59
	-7/-8	6.65	6.08	4.83	3.59	2.96	1.48	1.51	1.57	1.66	1.73
	0/-0.6	7.97	7.33	5.93	4.53	3.83	1.75	1.75	1.73	1.67	1.62
	2/1.1	8.48	7.80	6.30	4.81	4.07	1.85	1.88	1.97	2.07	2.16
	7/6	10.6	9.9	8.2	6.61	5.79	2.29	2.33	2.44	2.57	2.66
	12/10.2	11.86	10.99	9.07	7.17	6.22	2.52	2.57	2.69	2.84	2.96
	15/13	12.8	11.9	9.7	7.6	6.59	2.70	2.75	2.89	3.05	3.18
60	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	-	-	-	-	-	-	-	-	-	-
	-7/-8	6.22	5.69	4.52	3.36	2.78	1.25	1.27	1.31	1.37	1.41
	0/-0.6	7.65	7.04	5.69	4.35	3.67	1.52	1.51	1.48	1.42	1.37
	2/1.1	8.18	7.53	6.09	4.65	3.93	1.62	1.64	1.70	1.77	1.83
	7/6	10.4	9.7	8.1	6.46	5.66	2.03	2.06	2.14	2.23	2.29
	12/10.2	11.67	10.79	8.87	6.95	6.00	2.25	2.28	2.36	2.45	2.51
	15/13	12.5	11.6	9.5	7.5	6.44	2.40	2.44	2.53	2.65	2.73
20/16	14.0	12.9	10.6	8.3	7.2	2.64	2.69	2.82	2.98	3.12	

To = Leaving internal exchanger water temperature (°C)
 Eat [°C]: external exchanger inlet air temperature
 Performances in function of the inlet/outlet water temperature differential = 5°C
 Heating capacity and COP calculated according to EN 14511:2013
 ATTENTION: The data of the heat capacity and COP include defrostings.
 DB = dry bulb
 WB = wet bulb

SIZE 12 KW - COOLING

To °C	Tae °C	Cooling capacity						EER					
		100%	85%	75%	60%	50%	40%	100%	85%	75%	60%	50%	40%
5	20	9.53	8.32	7.46	6.24	5.44	4.63	3.87	4.20	4.46	4.89	5.36	6.11
	25	9.10	7.91	7.07	5.88	5.09	4.29	3.38	3.61	3.80	4.11	4.43	4.94
	30	8.64	7.51	6.69	5.55	4.79	4.03	2.96	3.13	3.26	3.47	3.69	4.03
	35	8.14	7.08	6.32	5.25	4.54	3.82	2.75	2.87	2.96	3.11	3.26	3.48
	40	7.58	6.61	5.92	4.96	4.31	3.67	2.21	2.30	2.36	2.47	2.57	2.72
	45	-	6.15	5.55	4.71	4.15	3.59	-	1.97	2.02	2.11	2.19	2.30
7	20	10.1	8.80	7.85	6.51	5.62	4.73	3.99	4.35	4.64	5.13	5.68	6.66
	25	9.66	8.36	7.43	6.13	5.26	4.39	3.48	3.73	3.94	4.29	4.68	5.34
	30	9.18	7.93	7.04	5.79	4.95	4.11	3.05	3.23	3.38	3.62	3.88	4.31
	35	8.65	7.48	6.64	5.47	4.69	3.90	2.77	2.90	3.01	3.18	3.35	3.63
	40	8.06	7.00	6.24	5.18	4.47	3.75	2.28	2.37	2.44	2.56	2.69	2.87
	45	-	6.51	5.85	4.92	4.30	3.68	-	2.03	2.09	2.19	2.28	2.42
12	20	11.6	10.0	8.82	7.19	6.09	5.00	4.30	4.72	5.08	5.73	6.51	8.05
	25	11.1	9.49	8.35	6.75	5.69	4.62	3.74	4.04	4.30	4.76	5.30	6.32
	30	10.5	9.00	7.90	6.37	5.35	4.32	3.26	3.48	3.67	3.99	4.35	5.02
	35	9.9	8.49	7.46	6.03	5.07	4.11	2.83	2.99	3.12	3.34	3.59	4.01
	40	9.26	7.96	7.03	5.72	4.84	3.97	2.44	2.55	2.65	2.81	2.97	3.25
	45	-	7.43	6.61	5.46	4.69	3.92	-	2.19	2.27	2.39	2.52	2.72
15	20	12.4	10.8	9.63	7.98	6.88	5.77	4.70	5.17	5.56	6.24	7.02	8.45
	25	11.9	10.3	9.12	7.50	6.43	5.35	4.04	4.38	4.66	5.14	5.68	6.64
	30	11.3	9.73	8.62	7.08	6.04	5.01	3.50	3.74	3.94	4.27	4.64	5.27
	35	10.6	9.18	8.14	6.69	5.73	4.76	3.02	3.19	3.33	3.56	3.81	4.22
	40	9.9	8.62	7.67	6.35	5.47	4.59	2.58	2.71	2.81	2.98	3.15	3.42
	45	-	-	7.23	6.07	5.30	4.53	-	-	2.40	2.53	2.67	2.87
18	20	16.8	14.8	13.3	11.1	9.70	8.26	7.99	9.63	10.42	11.64	12.89	14.93
	25	15.0	13.1	11.7	9.72	8.41	7.09	5.77	6.33	6.78	7.51	8.29	9.62
	30	13.0	11.3	10.09	8.37	7.22	6.07	4.02	4.35	4.61	5.04	5.51	6.29
	35	12.3	10.7	9.53	7.92	6.84	5.76	3.62	3.86	4.06	4.37	4.69	5.22
	40	11.5	10.05	9.00	7.53	6.55	5.57	3.01	3.18	3.32	3.55	3.78	4.13
	45	-	-	8.50	7.21	6.35	5.49	-	-	2.85	3.03	3.20	3.47

To = Leaving internal exchanger water temperature (°C)
 Eat [°C]: external exchanger inlet air temperature
 Performances in function of the inlet/outlet water temperature differential = 5°C
 Cooling capacity and EER calculated according to EN 14511:2013

SIZE 14 KW - HEATING

To	Tae (°C) DB/WB	Heating capacity					COP				
°C	°C	100%	90%	70%	50%	40%	100%	90%	70%	50%	40%
25	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	8.53	7.87	6.17	4.37	3.40	2.83	2.93	3.08	3.24	3.38
	-7/-8	9.51	8.73	6.95	5.13	4.15	3.15	3.26	3.43	3.61	3.75
	0/-0.6	10.7	10.0	8.14	6.16	5.10	3.36	3.55	3.66	3.57	3.47
	2/1.1	11.4	10.6	8.63	6.53	5.40	3.52	3.62	3.81	4.04	4.21
	7/6	14.5	13.1	10.5	8.3	7.16	4.34	4.52	4.80	5.08	5.28
	12/10.2	16.5	14.7	12.0	9.3	7.93	4.69	5.28	5.48	5.83	6.08
	15/13	17.9	16.1	13.0	10.0	8.5	5.05	5.48	5.93	6.33	6.61
35	-20/-20.1	-	-	-	2.56	1.93	-	-	-	1.92	2.09
	-10/-10.5	8.15	7.50	5.88	4.16	3.23	2.43	2.50	2.64	2.79	2.92
	-7/-8	9.14	8.38	6.67	4.92	3.98	2.72	2.81	2.96	3.13	3.26
	0/-0.6	10.6	9.8	7.99	6.05	5.01	2.98	3.13	3.24	3.17	3.08
	2/1.1	11.2	10.4	8.48	6.42	5.31	3.14	3.21	3.38	3.60	3.75
	7/6	14.3	12.9	10.5	8.3	7.12	3.91	4.06	4.33	4.59	4.78
	12/10.2	16.16	14.34	11.68	9.11	7.74	4.16	4.64	4.82	5.14	5.37
	15/13	17.5	15.8	12.7	9.8	8.3	4.48	4.83	5.20	5.57	5.83
45	-20/-20.1	-	-	-	2.88	2.17	-	-	-	1.80	1.94
	-10/-10.5	8.04	7.38	5.77	4.08	3.17	1.96	2.00	2.11	2.26	2.36
	-7/-8	8.65	7.91	6.27	4.63	3.75	2.09	2.14	2.26	2.41	2.51
	0/-0.6	9.90	9.18	7.44	5.63	4.66	2.34	2.43	2.52	2.49	2.44
	2/1.1	10.6	9.8	7.97	6.04	4.99	2.47	2.50	2.64	2.83	2.96
	7/6	13.6	12.4	10.1	8.0	6.87	3.02	3.14	3.37	3.62	3.78
	12/10.2	14.80	13.46	10.84	8.46	7.18	3.45	3.50	3.74	4.03	4.21
	15/13	16.2	14.6	11.7	9.1	7.7	3.61	3.75	4.03	4.33	4.54
55	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	8.16	7.43	5.77	4.08	3.18	1.49	1.52	1.59	1.68	1.75
	-7/-8	8.59	7.80	6.15	4.54	3.67	1.56	1.59	1.66	1.76	1.82
	0/-0.6	9.44	8.69	7.00	5.30	4.39	1.68	1.74	1.79	1.74	1.69
	2/1.1	10.0	9.2	7.42	5.62	4.65	1.77	1.79	1.87	1.97	2.05
	7/6	12.5	11.2	9.0	7.15	6.14	2.17	2.24	2.36	2.49	2.58
	12/10.2	13.97	12.52	10.03	7.83	6.65	2.40	2.47	2.61	2.76	2.87
	15/13	15.1	13.5	10.8	8.4	7.07	2.55	2.64	2.79	2.96	3.07
60	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	-	-	-	-	-	-	-	-	-	-
	-7/-8	7.6	6.9	5.42	4.00	3.24	1.25	1.27	1.32	1.37	1.41
	0/-0.6	9.4	8.6	6.90	5.22	4.32	1.51	1.56	1.59	1.53	1.48
	2/1.1	10.0	9.2	7.38	5.59	4.62	1.60	1.62	1.67	1.75	1.80
	7/6	12.7	11.3	9.1	7.19	6.17	2.01	2.05	2.14	2.24	2.30
	12/10.2	14.24	12.71	10.14	7.92	6.72	2.22	2.28	2.38	2.50	2.57
	15/13	15.4	13.7	10.9	8.5	7.16	2.36	2.44	2.56	2.68	2.76
20/16	17.3	15.5	12.3	9.4	7.9	2.60	2.69	2.84	2.98	3.08	

To = Leaving internal exchanger water temperature (°C)
 Eat [°C]: external exchanger inlet air temperature
 Performances in function of the inlet/outlet water temperature differential = 5°C
 Heating capacity and COP calculated according to EN 14511:2013
 ATTENTION: The data of the heat capacity and COP include defrostings.
 DB = dry bulb
 WB = wet bulb

SIZE 14 KW - COOLING

To °C	Tae °C	Cooling capacity						EER					
		100%	80%	75%	60%	50%	40%	100%	80%	75%	60%	50%	40%
5	20	12.3	10.1	9.6	8.04	6.82	5.60	3.28	3.66	3.78	4.18	4.57	5.24
	25	11.6	9.6	9.11	7.58	6.40	5.21	2.86	3.15	3.24	3.52	3.79	4.25
	30	11.0	9.09	8.61	7.16	6.02	4.89	2.50	2.73	2.79	2.99	3.18	3.49
	35	10.3	8.55	8.10	6.74	5.68	4.62	2.33	2.50	2.54	2.69	2.82	3.03
	40	9.6	7.99	7.58	6.34	5.38	4.41	1.84	1.98	2.01	2.11	2.21	2.35
	45	-	7.42	7.06	5.97	5.13	4.28	-	1.69	1.71	1.80	1.88	1.99
7	20	13.2	10.9	10.3	8.59	7.23	5.87	3.55	4.01	4.15	4.62	5.07	5.89
	25	12.5	10.3	9.8	8.09	6.77	5.45	3.09	3.45	3.55	3.89	4.20	4.76
	30	11.8	9.8	9.25	7.64	6.38	5.11	2.71	2.99	3.06	3.29	3.51	3.89
	35	11.1	9.22	8.71	7.20	6.02	4.83	2.46	2.67	2.73	2.89	3.05	3.30
	40	10.3	8.62	8.16	6.78	5.70	4.62	2.00	2.17	2.21	2.33	2.44	2.61
	45	-	8.02	7.61	6.40	5.45	4.50	-	1.85	1.89	1.99	2.08	2.21
12	20	15.5	12.8	12.1	9.9	8.24	6.52	4.23	4.90	5.09	5.73	6.34	7.51
	25	14.7	12.2	11.5	9.37	7.72	6.06	3.68	4.21	4.34	4.80	5.23	6.03
	30	13.8	11.5	10.9	8.84	7.26	5.68	3.22	3.63	3.73	4.05	4.35	4.89
	35	13.0	10.9	10.2	8.34	6.86	5.38	2.78	3.11	3.18	3.40	3.61	3.98
	40	12.2	10.2	9.61	7.87	6.52	5.16	2.39	2.65	2.70	2.87	3.02	3.27
	45	-	9.51	9.00	7.45	6.24	5.04	-	2.27	2.31	2.45	2.57	2.77
15	20	16.6	13.9	13.1	10.9	9.18	7.44	4.49	5.28	5.49	6.20	6.87	8.08
	25	15.7	13.2	12.5	10.3	8.60	6.91	3.87	4.48	4.63	5.13	5.59	6.43
	30	14.8	12.5	11.8	9.71	8.10	6.48	3.35	3.83	3.93	4.28	4.61	5.17
	35	14.0	11.8	11.1	9.17	7.65	6.14	2.89	3.27	3.34	3.59	3.81	4.20
	40	13.1	11.0	10.4	8.66	7.28	5.89	2.47	2.78	2.83	3.01	3.18	3.45
	45	-	-	9.78	8.21	6.98	5.75	-	-	2.42	2.57	2.70	2.92
18	20	17.1	14.4	13.7	11.5	9.7	7.97	4.38	5.40	5.64	6.43	7.17	8.51
	25	16.3	13.7	13.0	10.8	9.11	7.41	3.96	4.61	4.79	5.36	5.88	6.82
	30	15.4	12.9	12.3	10.2	8.57	6.95	3.45	3.97	4.09	4.50	4.88	5.52
	35	14.5	12.2	11.6	9.6	8.10	6.58	3.12	3.61	3.66	3.96	4.23	4.68
	40	13.6	11.5	10.9	9.11	7.72	6.33	2.58	2.91	2.98	3.20	3.39	3.71
	45	-	-	10.2	8.66	7.43	6.19	-	-	2.55	2.74	2.90	3.15

To = Leaving internal exchanger water temperature (°C)
 Eat [°C]: external exchanger inlet air temperature
 Performances in function of the inlet/outlet water temperature differential = 5°C
 Cooling capacity and EER calculated according to EN 14511:2013

SIZE 17 KW - HEATING

To	Tae (°C) DB/WB	Heating capacity					COP				
		100%	90%	70%	50%	40%	100%	90%	70%	50%	40%
°C	°C										
25	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	10.4	9.34	7.19	5.04	3.97	2.63	2.68	2.81	3.02	3.24
	-7/-8	11.5	10.46	8.30	6.15	5.08	2.89	2.94	3.07	3.28	3.46
	0/-0.6	13.0	11.8	9.57	7.32	6.19	3.22	3.29	3.44	3.65	3.83
	2/1.1	13.9	12.7	10.24	7.83	6.63	3.45	3.52	3.69	3.92	4.12
	7/6	17.7	16.2	13.5	10.9	9.57	4.19	4.39	4.63	4.92	5.13
	12/10.2	19.8	18.2	14.8	11.8	10.30	4.69	4.77	5.37	5.56	5.84
	15/13	21.6	19.9	16.2	12.7	11.0	5.10	5.19	5.61	6.06	6.37
	20/16	24.6	22.6	18.6	14.2	12.2	5.79	5.89	5.97	6.92	7.33
35	-20/-20.1	-	-	-	3.14	2.37	-	-	-	2.11	2.38
	-10/-10.5	10.09	9.04	6.96	4.88	3.85	2.48	2.53	2.64	2.80	2.96
	-7/-8	11.2	10.16	8.06	5.98	4.94	2.71	2.76	2.89	3.05	3.19
	0/-0.6	12.7	11.6	9.40	7.19	6.08	3.00	3.07	3.21	3.39	3.54
	2/1.1	13.5	12.3	9.98	7.63	6.46	3.18	3.25	3.40	3.60	3.76
	7/6	17.0	15.7	13.1	10.5	9.26	3.90	4.00	4.21	4.46	4.64
	12/10.2	19.37	17.84	14.49	11.58	10.07	4.27	4.35	4.90	5.05	5.28
	15/13	21.1	19.4	15.8	12.4	10.7	4.62	4.71	5.10	5.47	5.74
	20/16	24.0	22.0	18.1	13.8	11.9	5.19	5.29	5.39	6.19	6.52
45	-20/-20.1	-	-	-	3.17	2.39	-	-	-	1.79	2.04
	-10/-10.5	9.82	8.80	6.77	4.75	3.74	1.91	1.96	2.07	2.22	2.37
	-7/-8	10.6	9.64	7.65	5.68	4.69	2.05	2.10	2.21	2.36	2.50
	0/-0.6	12.3	11.25	9.10	6.96	5.89	2.31	2.37	2.50	2.67	2.82
	2/1.1	13.2	12.0	9.70	7.42	6.28	2.45	2.51	2.66	2.84	2.99
	7/6	16.7	15.4	12.8	10.3	9.08	3.02	3.11	3.29	3.52	3.69
	12/10.2	18.70	17.23	14.10	11.17	9.71	3.27	3.35	3.64	3.91	4.11
	15/13	20.1	18.5	15.1	11.9	10.2	3.49	3.58	3.88	4.18	4.41
	20/16	22.5	20.7	16.8	13.0	11.1	3.86	3.95	4.27	4.65	4.93
55	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	9.2	8.2	6.32	4.43	3.49	1.40	1.42	1.49	1.57	1.66
	-7/-8	9.9	9.0	7.14	5.30	4.38	1.50	1.53	1.59	1.68	1.75
	0/-0.6	11.5	10.5	8.49	6.49	5.50	1.69	1.73	1.80	1.90	1.98
	2/1.1	12.2	11.1	9.00	6.89	5.83	1.79	1.82	1.90	2.01	2.09
	7/6	15.3	14.1	11.8	9.5	8.34	2.20	2.24	2.34	2.47	2.56
	12/10.2	17.19	15.83	12.95	10.26	8.92	2.39	2.43	2.59	2.74	2.85
	15/13	18.5	17.0	13.9	10.9	9.41	2.55	2.60	2.76	2.93	3.05
	20/16	20.7	19.0	15.4	11.9	10.2	2.81	2.87	3.05	3.25	3.40
60	-20/-20.1	-	-	-	-	-	-	-	-	-	-
	-10/-10.5	-	-	-	-	-	-	-	-	-	-
	-7/-8	10.0	9.0	7.18	5.32	4.40	1.40	1.42	1.46	1.53	1.58
	0/-0.6	11.4	10.4	8.43	6.44	5.46	1.57	1.59	1.65	1.72	1.77
	2/1.1	12.1	11.0	8.92	6.82	5.78	1.65	1.68	1.74	1.81	1.87
	7/6	15.1	13.9	11.6	9.37	8.24	2.03	2.07	2.14	2.23	2.29
	12/10.2	16.98	15.46	12.85	10.18	8.86	2.24	2.30	2.38	2.48	2.56
	15/13	18.3	16.7	13.7	10.8	9.33	2.38	2.43	2.53	2.65	2.74
	20/16	20.5	18.9	15.2	11.8	10.1	2.61	2.64	2.80	2.94	3.05

To = Leaving internal exchanger water temperature (°C)
 Eat [°C]: external exchanger inlet air temperature
 Performances in function of the inlet/outlet water temperature differential = 5°C
 Heating capacity and COP calculated according to EN 14511:2013
 ATTENTION: The data of the heat capacity and COP include defrostings.
 DB = dry bulb
 WB = wet bulb

SIZE 17 KW - COOLING

To °C	Tae °C	Cooling capacity						EER					
		100%	80%	75%	60%	50%	40%	100%	80%	75%	60%	50%	40%
5	20	17.7	16.3	13.9	11.79	10.32	8.84	4.13	4.33	4.64	5.11	5.48	6.05
	25	16.8	15.6	13.17	11.06	9.63	8.19	3.54	3.64	3.93	4.26	4.52	4.91
	30	16.1	14.77	12.44	10.42	9.05	7.68	3.01	3.12	3.35	3.58	3.76	4.02
	35	15.0	13.67	11.52	9.66	8.40	7.14	2.58	2.64	2.80	2.95	3.07	3.24
	40	13.6	12.50	10.58	8.93	7.81	6.68	2.16	2.22	2.33	2.44	2.52	2.64
	45	-	11.24	9.62	8.21	7.26	6.31	-	1.84	1.93	2.01	2.08	2.16
7	20	18.4	16.9	14.4	12.06	10.49	8.91	4.13	4.33	4.77	5.29	5.71	6.36
	25	17.5	16.1	13.6	11.31	9.78	8.25	3.55	3.67	4.04	4.40	4.70	5.15
	30	16.7	15.3	12.80	10.65	9.19	7.72	3.04	3.19	3.44	3.70	3.90	4.20
	35	15.5	14.15	11.87	9.88	8.54	7.19	2.62	2.71	2.89	3.06	3.19	3.39
	40	14.1	12.92	10.88	9.11	7.92	6.72	2.21	2.27	2.39	2.51	2.61	2.74
	45	-	11.74	9.99	8.47	7.44	6.41	-	1.90	2.00	2.09	2.17	2.27
12	20	20.2	18.4	15.4	12.8	10.93	9.09	4.12	4.35	5.09	5.73	6.26	7.14
	25	19.1	17.4	14.5	11.94	10.17	8.39	3.58	3.75	4.32	4.77	5.14	5.75
	30	18.1	16.5	13.7	11.21	9.52	7.83	3.13	3.36	3.68	3.99	4.25	4.66
	35	16.7	15.4	12.7	10.43	8.87	7.31	2.70	2.90	3.11	3.33	3.50	3.77
	40	15.3	14.0	11.61	9.58	8.20	6.81	2.33	2.41	2.56	2.70	2.82	3.00
	45	-	12.99	10.91	9.11	7.89	6.66	-	2.06	2.18	2.30	2.39	2.53
15	20	22.0	20.2	16.9	14.3	12.46	10.57	4.29	4.54	5.01	5.96	6.53	7.43
	25	20.8	19.0	16.0	13.4	11.56	9.73	3.72	3.90	4.47	4.96	5.36	5.98
	30	19.6	17.9	15.1	12.53	10.80	9.06	3.24	3.37	3.81	4.15	4.42	4.84
	35	18.2	16.8	14.1	11.71	10.11	8.49	2.78	2.96	3.21	3.45	3.63	3.91
	40	16.7	15.4	12.9	10.83	9.40	7.96	2.42	2.52	2.69	2.85	2.98	3.17
	45	-	-	12.33	10.45	9.17	7.89	-	-	2.33	2.47	2.57	2.72
18	20	25.2	23.1	19.6	16.7	14.6	12.56	4.88	5.19	5.77	6.76	7.53	8.64
	25	23.7	21.7	18.3	15.5	13.50	11.50	4.22	4.45	4.88	5.69	6.20	6.96
	30	22.1	20.2	17.0	14.4	12.53	10.64	3.65	3.82	4.14	4.76	5.11	5.63
	35	20.5	18.8	15.9	13.4	11.67	9.93	3.13	3.26	3.64	3.96	4.20	4.54
	40	18.8	17.3	14.8	12.49	10.93	9.37	2.67	2.77	3.08	3.30	3.47	3.71
	45	-	-	14.4	12.35	10.93	9.50	-	-	2.74	2.93	3.07	3.27

To = Leaving internal exchanger water temperature (°C)
 Eat [°C]: external exchanger inlet air temperature
 Performances in function of the inlet/outlet water temperature differential = 5°C
 Cooling capacity and EER calculated according to EN 14511:2013

Recharge time of the PAC BT domestic hot water storage tank

Model	T _{ae} [°C]	Recharge time			Charge time		
		T1 [min]	T2 [min]	T3 [min]	T4 [min]	T5 [min]	T6 [min]
PAC BT 5 kW	-5	39	68	100	193	226	265
	7	28	49	71	139	163	187
	30	24	40	61	106	123	155
PAC BT 7 kW	-5	29	51	73	146	171	194
	7	21	37	53	105	123	141
	30	19	31	43	80	93	108
PAC BT 9 kW	-5	22	40	55	111	132	145
	7	16	29	40	82	97	105
	30	16	26	34	65	78	84
PAC BT 12 kW	-5	17	29	44	87	98	116
	7	13	22	32	65	73	84
	30	15	16	24	54	54	62
PAC BT 14 kW	-5	14	23	36	71	78	95
	7	11	19	26	56	63	69
	30	13	18	23	47	50	55
PAC BT 17 kW	-5	12	20	28	59	67	74
	7	9	15	22	46	51	58
	30	11	15	20	39	42	47

T_{ae}[°C]: external temperature

T1 [min]: recharge time with storage temperature at 38°C. Entering aqueduct water temperature 10°C - DHW set 45°C

T2 [min]: recharge time with storage temperature at 38°C. Entering aqueduct water temperature 10°C - DHW set 50°C

T3 [min]: recharge time with storage temperature at 38°C. Entering aqueduct water temperature 10°C - DHW set 55°C

T4 [min]: recharge time with storage completely discharged. Entering aqueduct water temperature 10°C - DHW set 45°C

T5 [min]: recharge time with storage completely discharged. Entering aqueduct water temperature 10°C - DHW set 50°C

T6 [min]: recharge time with storage completely discharged. Entering aqueduct water temperature 10°C - DHW set 55°C

Accessories separately supplied

Every accessory is marked with a configuration code, for instance CMMBX.

When the letter X is placed at the end, this means that the accessory is supplied separately. If there is no X in the code, the accessory is mounted in the factory.

7ACFH0818 - ADDITIONAL HEATER 2-4-6 KW

These are modulating electric heaters and can provide an additional capacity of 2-4-6 kW depending on the electrical connection performed.

Caution: When requesting them, you need to take into account the absorption of the additional 2-4-6 kW electric heater in relation to the absorption of the unit under nominal conditions to determine the dimensions of the mains and the metering device.

CONTROL

The electric heater has two different operating modes depending on the setting of a specific parameter:

- ① The electric heater starts only when the capacity supplied by the heat pump is not enough to maintain the supply temperature requested by the climatic curve.

There is a minimum outdoor Temperature value (default value 2°C) above which the electric heater does not start.

- ② Operation of the electric heater as a safety device, which is automatically activated if a fault occurs in the cooling circuit.

AMRX - RUBBER ANTIVIBRATION MOUNTS

Outdoor unit

The rubber antivibration mounts reduce the vibrations of compressor during its operation and they are installed at the base toe.

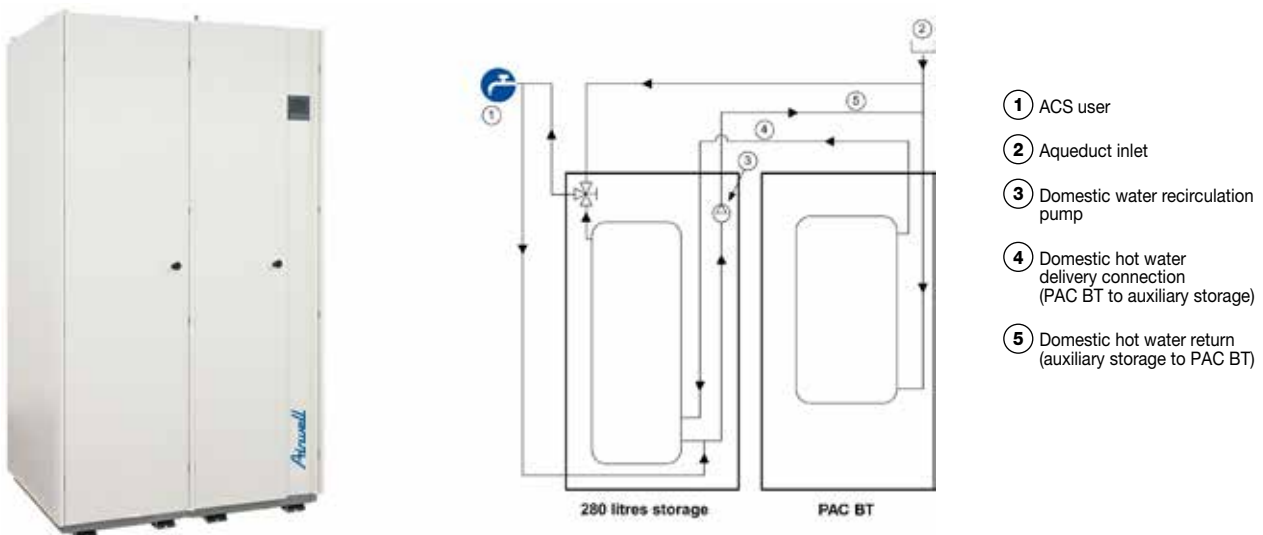
A280X - AUXILIARY ACS STORAGE

If there is a higher demand for Domestic Hot Water, an additional 280L storage tank can be fitted into the design of PAC BT itself and with all the preset hydraulic connections.

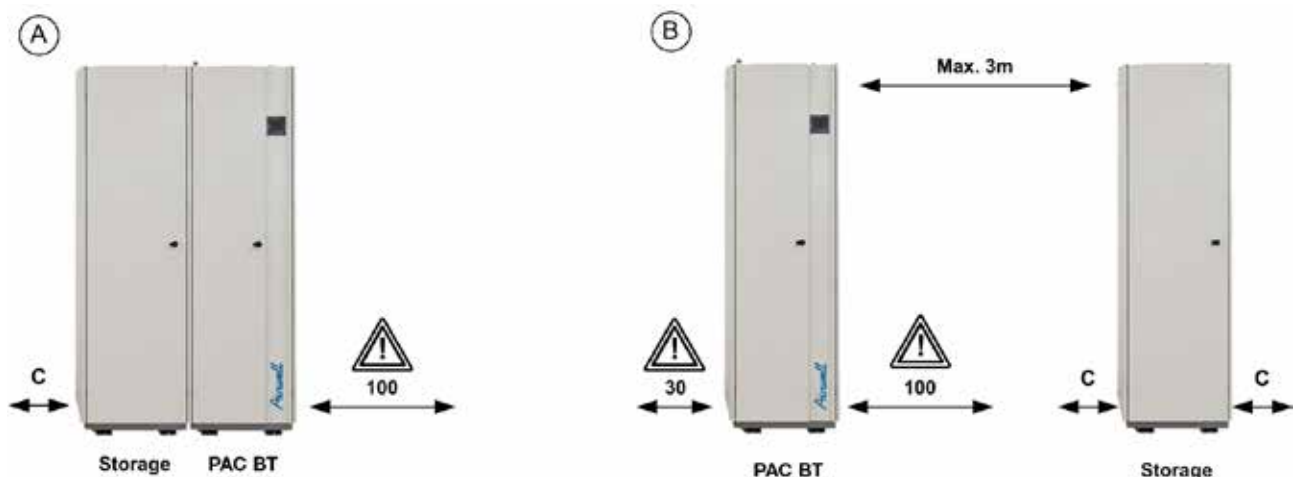
The connection piping is set up according to the hydraulic diagram shown below, by placing the built-in storage tank in series with PAC BT's storage tank.

The energy transfer between the two storage tanks is done via recirculation pump (5).

Dimensions: 280L domestic hot water auxiliary storage cabinet: 600x2030x800



Distances to respected

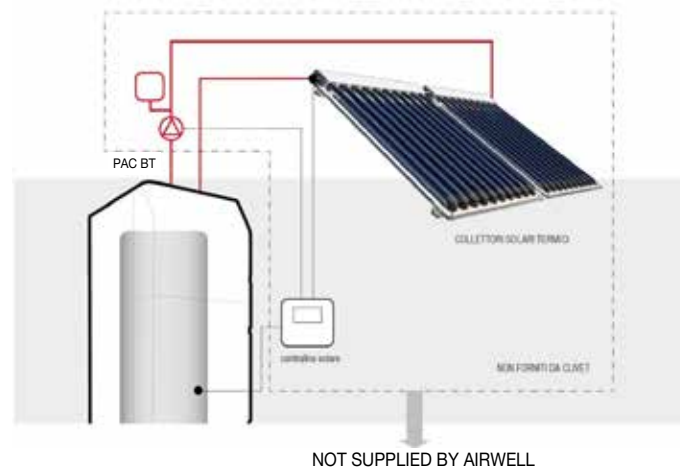


- Ⓐ Joint storage tank
- Ⓑ Separate storage tank
- Ⓒ The spaces can be occupied by furniture or other objects; it has to be possible to move them easily in case of maintenance interventions.

Caution: Respect the unit functional clearances for maintenance

PAC BT SOLAR (INTEGRATION DOMESTIC HOT WATER)

■ PAC BT is set for the connection with the solar collectors



The dimensioning of the drain thermal solar manifolds surface for the production of domestic hot water, must happen following the technical standard of sector.

General sizing rules, which should not replace the project, provide a surface of flat solar collectors per person equivalent to:

1.2 m²/person in areas with reduced solar radiation (eg Northern Italy)

1 m²/person in areas with average solar radiation (eg Central Italy)

0.8 m²/person in areas with high solar radiation (eg Southern Italy)

The tank must have a volume around 50 liters per m² of installed solar collector.

These rules a first approximation may enable a cover of about 50% of the annual requirement of primary energy requested for the domestic hot water production.

PAC BT with its 280L tank and a surface of solar panels of about 4 m² is able to cover the needs of domestic hot water of a family of 4 persons with a per capita daily consumption of about 50L/(day*person).

Keeping the PAC BT storage tank, if a bigger solar collector surface is installed, you will not get a benefit directly proportional to the increase of the surface, because the tank is not able to accumulate all the energy collected by panels.

It will be also necessary to install an additional storage tank, such as the A280X accessory

If the number of persons, or the needs of domestic hot water, increases is however necessary to provide an additional storage tank, independently from the presence of solar thermal collectors.

PAC BT guarantees the priority in the production of domestic hot water to solar panels; if the solar contribution is not sufficient to heat the domestic hot water, it is directly produced by the heat pump.

The capacity of the solar heat exchanger installed in PAC BT is 2703 W/K for PAC BT 5-7-9 kW and 3186 W/K for PAC BT 12-14-17 kW.

The max. entering water temperature of PAC BT is 120°C.

The DHW max temperature inside the tank is 80°C (Controlled by a safety thermostat).

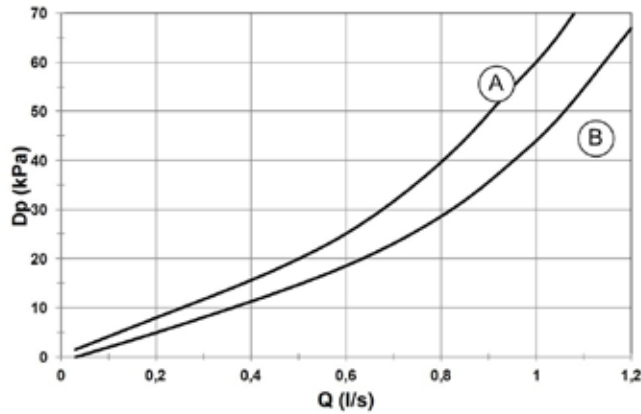
The max DHW temperature that can be reached by the heat pump is 55°C (See operating range)

In the storage tank is present a 2kW resistance to intervene in case of refrigerant circuit failure or to complete the antilegionella cycle in place of the compressor.

The solar panel systems are activated when the storage tank temperature is lower than the temperature of the water produced by the panels.

The temperature probe of the solar panel controller must be placed in the proper well of the PAC BT storage tank.

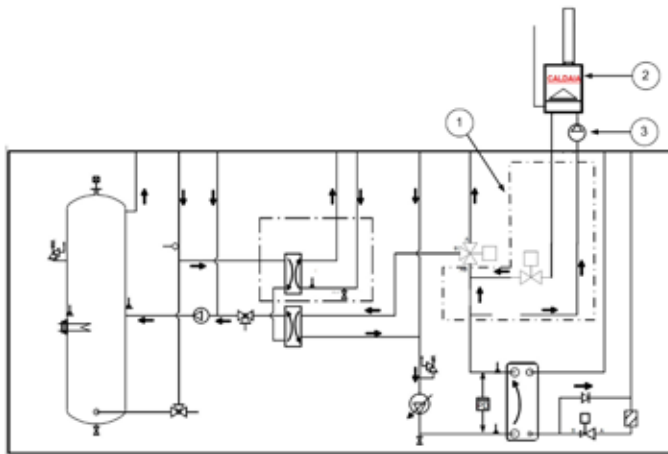
■ Solar exchanger pressure drops



DP = water side pressure drops (kPa)
Q [l/s] = water flow-rate

- Ⓐ PAC BT size 5-7-9 kW
- Ⓑ PAC BT size 12-14-17 kW

■ KCCEX - External boiler connection kit



- ① External boiler connection kit
- ② Customer boiler
- ③ Pump to be provided by the Customer (required to compensate the boiler's pressure drop)

The PAC BT control can manage an external boiler (provided by the Customer) with the following features:

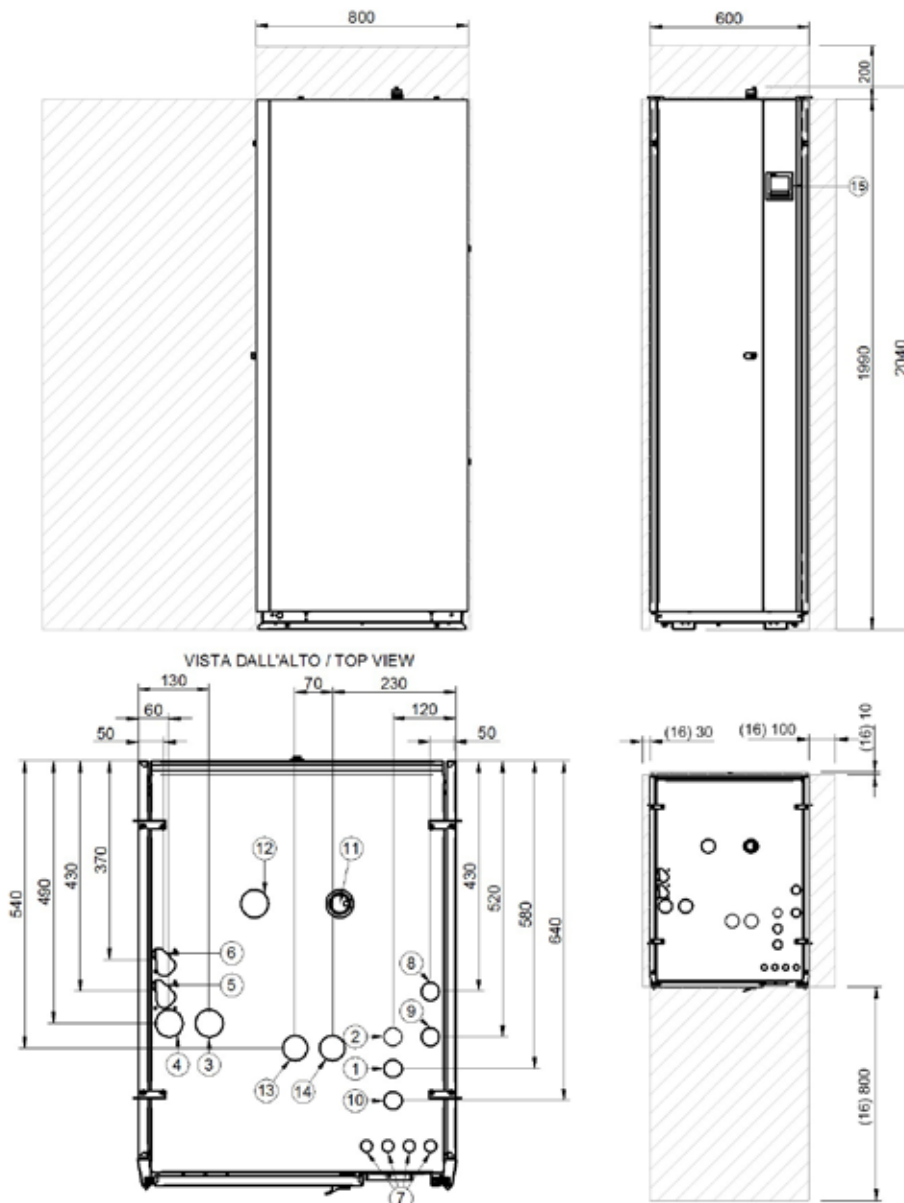
- on/off with potential-free contact,
- or with management of the supply temperature setpoint with signal 0-10V and on/off potential-free contact.

PAC BT's control logic enables it to use the external boiler either as a supplementary unit or as a substitute

Caution: For further details, refer to the PAC BT Hybrid bulletin.

Dimensional drawings

INDOOR UNIT



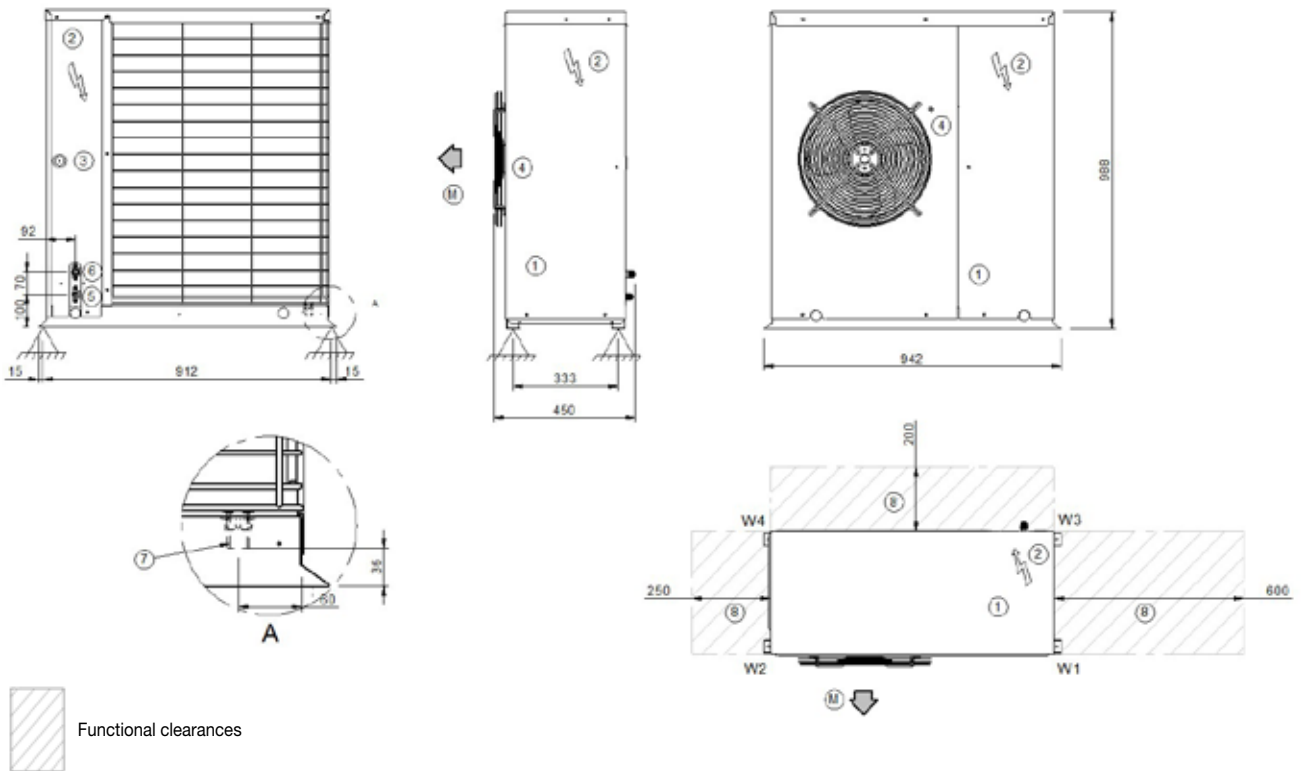
- | | |
|--|--|
| <ul style="list-style-type: none"> ① Domestic hot water outlet 1/2" GAS M ② Aqueduct inlet 1/2" GAS M ③ Return from user side system 1"1/4 GAS M flat seat ④ User side system supply 1"1/4 GAS M flat seat ⑤ Gas line ⑥ Liquid line ⑦ Power input ⑧ Return from the 3/4" GAS M solar system (optional) | <ul style="list-style-type: none"> ⑨ Supply to the 3/4" GAS M solar system (optional) ⑩ Dhw recirculation circuit inlet 3/8" GAS M ⑪ Automatic vent valve ⑫ Electronic anode ⑬ Boiler supply, gas M1"1/4 flat seat (optional) ⑭ Boiler return, gas M1"1/4 flat seat (optional) ⑮ Unit control keypad ⑯ Functional spaces |
|--|--|

Size		PAC BT from 5 to 9 kW	PAC BT from 12 to 17 kW
Shipping height	mm	2130	2130
Operating weight	kg	450	470
Shipping weight	kg	170	190

Important: For the refrigeration line diameters, refer to "Refrigerating line connections".

OUTDOOR UNIT

■ Size 5-7-9 kW

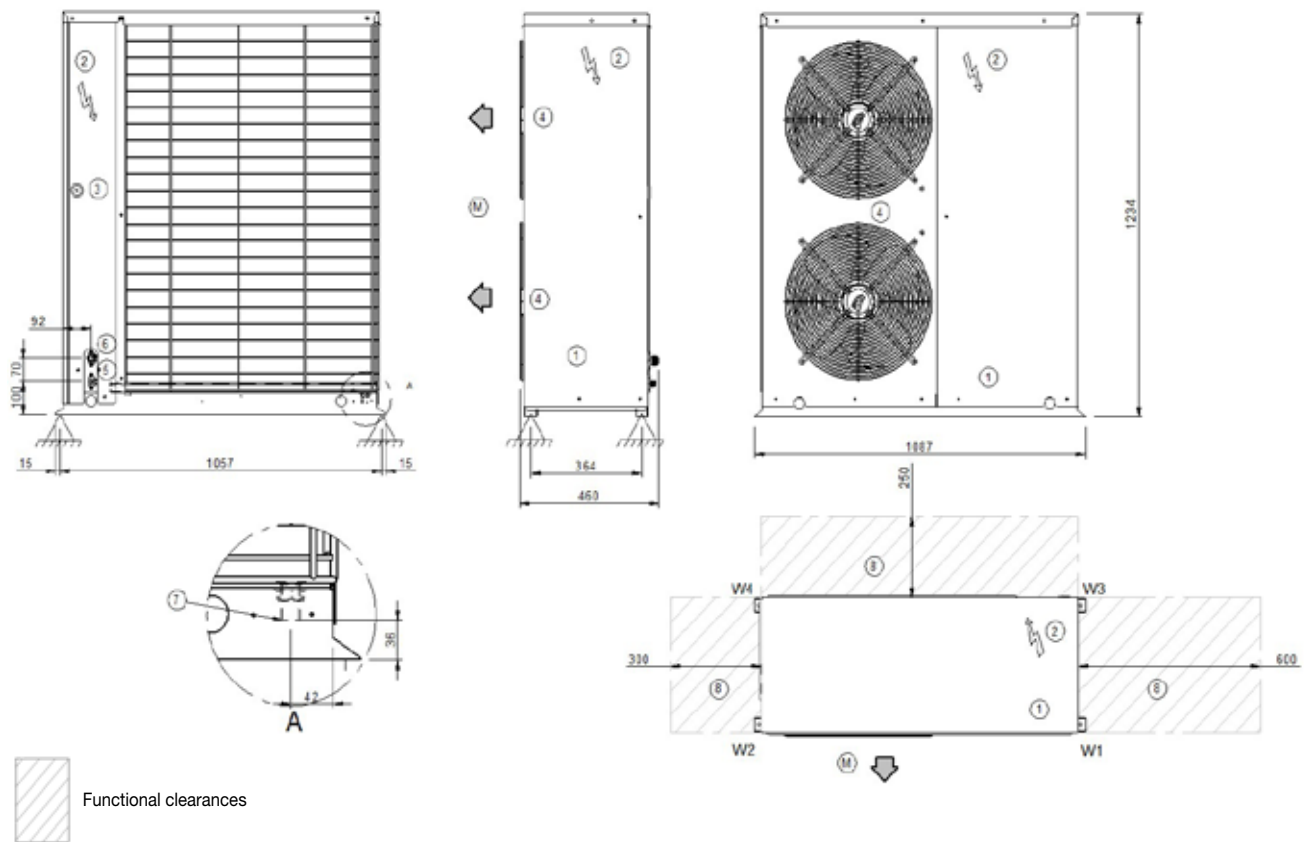


- ① Compressor compartment
- ② Electrical panel
- ③ Power input
- ④ Electric fan
- ⑤ Liquid line fittings
- ⑥ Gas fittings
- ⑦ Condensate discharge connection Ø 13
- ⑧ Functional spaces
- Ⓜ Air supply

Size		5 kW	7 kW	9 kW
W1 supporting point	kg	33	34	36
W2 Supporting point	kg	16	17	19
W3 Supporting point	kg	35	36	38
W4 Supporting point	kg	18	18	20
Shipping height	mm	1122	1122	1122
Operating weight	kg	102	105	113
Shipping weight	kg	104	107	115

Important: for the refrigeration line diameters, refer to “Refrigerating line connections”.

■ Size 12-14 kW

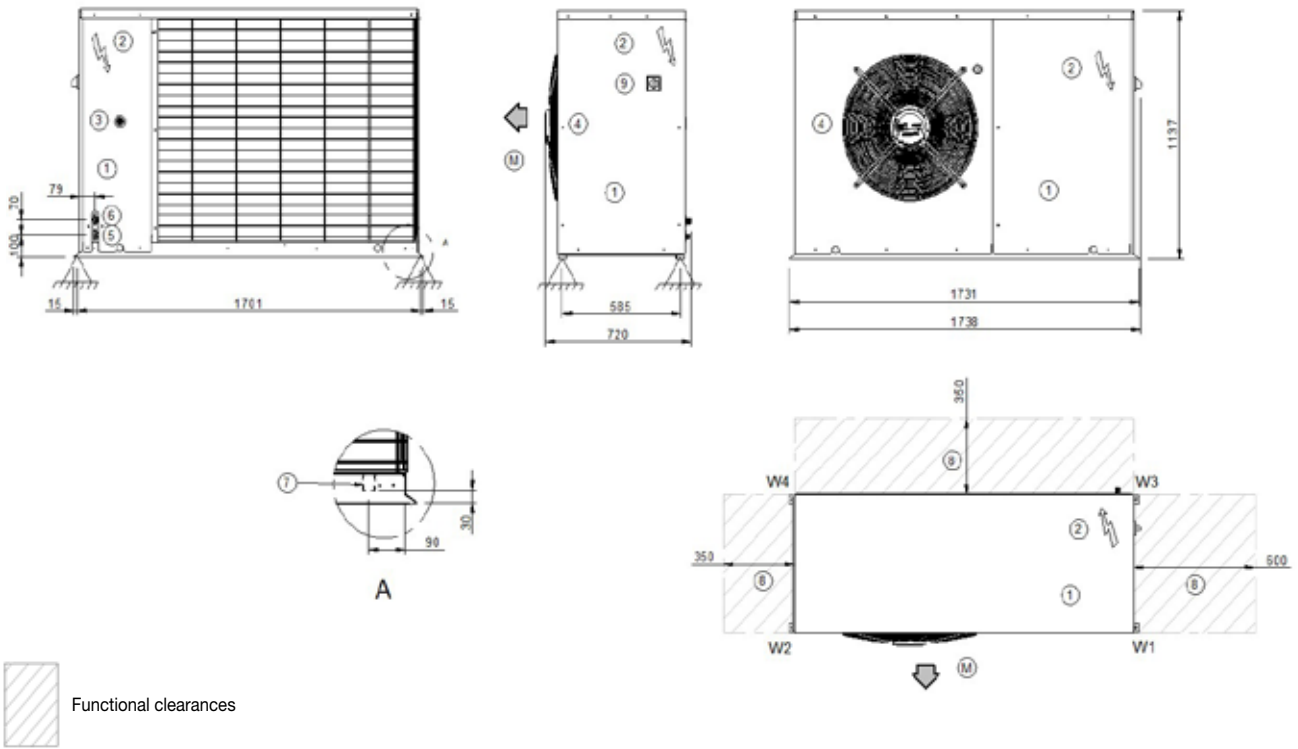


- ① Compressor compartment
- ② Electrical panel
- ③ Power input
- ④ Electric fan
- ⑤ Liquid line fittings
- ⑥ Gas fittings
- ⑦ Condensate discharge connection Ø 13
- ⑧ Functional spaces
- Ⓜ Air supply

Size		12 kW	14 kW
W1 supporting point	kg	45	47
W2 Supporting point	kg	31	32
W3 Supporting point	kg	50	49
W4 Supporting point	kg	33	33
Shipping height	mm	1364	1364
Operating weight	kg	157	161
Shipping weight	kg	160	164

Important: for the refrigeration line diameters, refer to “Refrigerating line connections”.

■ Size 17 kW



- ① Compressor compartment
- ② Electrical panel
- ③ Power input
- ④ Electric fan
- ⑤ Liquid line fittings
- ⑥ Gas fittings
- ⑦ Condensate discharge connection Ø 13
- ⑧ Functional spaces
- ⑨ Isolating switch
- Ⓜ Air supply

Size		17 kW
W1 supporting point	kg	59
W2 Supporting point	kg	34
W3 Supporting point	kg	79
W4 Supporting point	kg	53
Shipping height	mm	1397
Operating weight	kg	225
Shipping weight	kg	235

Important: for the refrigeration line diameters, refer to “Refrigerating line connections”.