CLIMATISATION ET CHAUFFAGE

Engineering Data Manuel

PAC BT SPLIT HEAT PUMP

R410A - Version 1 *English Manual*

PAC-BT-SPLIT2-20181129-Rev1

List of contents

System description

Introduction

Performance certified under the Eurovent Certification programme

Product description

PAC BT SPLIT is a specialised autonomous heat pump system for single- and multi-family homes with medium/low and high power consumption.

PAC BT SPLIT is an air-water heat pump system for heating, cooling and producing/storing domestic hot water.

The PAC BT SPLIT system is composed of a latest generation high efficiency outdoors moto-condensing unit connected via refrigerant connections to an indoors unit in five different versions:

Each version has been carefully designed to satisfy the requirements of different types of building, whether single- or multi-family, with decentralised systems. The PAC BT SPLIT version offer outstanding domestic water production with 280 l of hot water at up to 70°C. The PAC BT SPLIT version, with its reduced footprint, is ideal for replacing existing boilers, whether wall-mounted or in kitchen cupboards.

Such units are especially suited to colder climates, with their higher heating power demand. The heat pump operates without difficulty down to -20°C outdoors air temperature, but in some conditions it may require the support of a combustion generator to avoid the need to over-rate the heat pump.

All PAC BT SPLIT versions have been designed to speed up installation, since the indoors unit integrates the main components required for a heating/hot water system. In addition, PAC BT SPLIT has a vast range of accessories which allow it to be customised for a variety of installation types and requirements for occupant comfort. For example, PAC BT SPLIT can be equipped with a equalisation device with two pumps, to separate the primary circuit of the system to enable full operation under any conditions. It is also possible to control two zones both with a single temperature level or with different temperatures (e.g.: 1 high temperature zone to power fan coil units or radiators, and 1 low temperature zone for floor heating). There are also accessories to enable PAC BT SPLIT to be integrated with other forms of power in addition to the heat pump. PAC BT SPLIT can easily be connected to solar thermal panels to increase the use of renewable sources, or use a backup electric heater to enable the heat pump itself to be rated to optimum effect.

PAC BT SPLIT has been designed to achieve the highest energy efficiency currently available in the market. The use of inverter technology combined with the best commercial componentry enables the system to achieve a COP in excess of 5.2, while its advanced control logic enable it to achieve exceptionally high seasonal efficiency.

Operating Logic

PAC BT SPLIT's electronic controller automatically controls all internal heating and cooling for the heating system and hot water production. With its optimised logic, PAC BT SPLIT autonomously selects the best power source to satisfy the need for heating and occupier comfort.

Domestic hot water production

Domestic hot water production in standard operation depends on the selected configuration: heat pump, solar thermal power plus heat pump, heat pump with supplementary or backup boiler.

DHW production always takes priority over the heating system (standard configuration), to ensure best hot water comfort, with the necessary resources always available to top up the storage tank.
PAC BT SPLIT's DHW production always gives priority to the lowest cost source among those available, unless this results in a loss of user comfort.
PAC BT SPLIT versions, which enable integration with solar thermal panels, always give priority to the solar source since it is renewable and free; this source is always used first when the temperature and sunlight conditions are right. If no solar contribution is available, PAC BT SPLIT uses the heat pump as the primary generator for DHW.
PAC BT SPLIT allows the end user to set a weekly schedule for DHW production. This means that the storage tank can always be at the right temperature when needed, while reducing energy costs by reducing the DHW setpoint when hot water is not required.

Heating operation

The demand for heating can be done with the remote keypad , zone thermostats or simple thermostats, depending on the regulation system.
The option of configuring a climatic curve increases the efficiency of the system's operation in heat pump mode and hence provides better overall efficiency.
The heating demand is identified autonomously by PAC BT SPLIT in relation to the water's return temperature.
The inverter controlled compressor modulates the power delivery in relation to actual system demand, this preventing frequent on/off cycling and protecting the service life of all components.

Cooling operation

The cooling demand can be satisfied by the heat pump alone.
Just as for heat, the demand for cooling can be done with the remote keypad , zone thermostats (or simple thermostats, depending on the regulation system.
In particular, when using the remote keypad or temperature/humidity sensors , it is possible to activate the anti-dew function to prevent condensate forming, using the floor heating terminals.

Managing two zones

All versions of PAC BT SPLIT have the option of controlling two zones, even at different temperatures.
The regulation automatically modulates the flow of each circuit in relation to the temperature differential (configurable) and hence the heating demand, and one can also define the operating state for each circuit separately, for instance: circuit 1 heating only, circuit 2 heating and cooling.

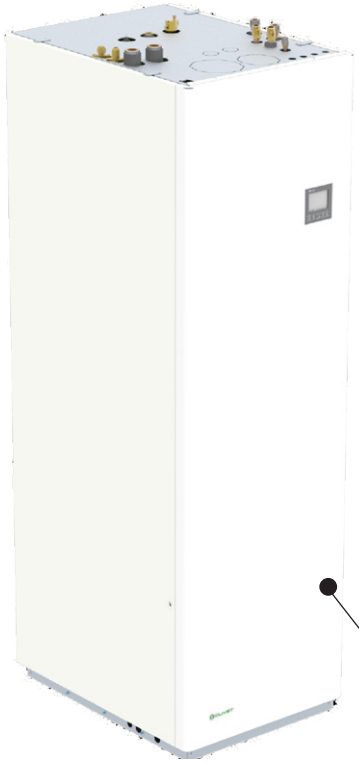
Versions

PAC BT SPLIT DHW

FRAME
Supporting frame in Zinc-Magnesium panelling, excellent mechanical characteristics and high resistance to corrosion over time.

DOMESTIC HOT WATER
- 280l DHW storage tank, vitrified interior and polyurethane cladding (thickness 40 mm).
- electronic anode
- 2 kW safety and anti-legionella heating element
- braised plate exchanger in stainless steel (AISI 316) for DHW production.
- DHW pump
- DHW recirculation circuit
- automatic air purge valve, DHW side
- DHW side pressure relief valve, 6 bar
- storage tank drain tap
- probe sump for solar thermal system regulation
- fitting for DHW expansion vessel connection
- limescale washing tap

HYDRONICS MODULE
- Direct expansion exchanger, braised plate type, INOX 316 with large exchange surface, complete with external cladding to prevent condensate forming.
- DC primary circulate pump
- water side differential pressure switch
- system drain tap
- water side pressure relief valve, 3 bar
- circuit water/DHW three-way diverter valve
- system expansion vessel connection
- electrical panel with keypad



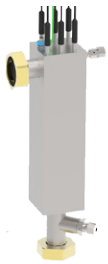
PANELLING
External panelling in Zinc-Magnesium, coated RAL 9001. The panels are easy to remove when access to the internal components is required.

ACCESSORIES

2 zones: high temperature + low temperature
or
2 zones: high temperature

8l expansion vessel kit

Supplementary electric heater, 2-4 and 6 kW



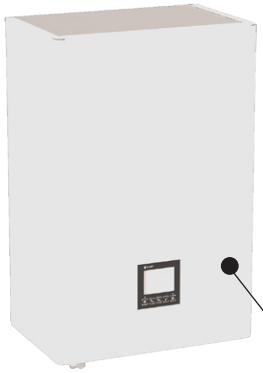
Solar heating kit for DHW

External boiler connection kit

PAC BT SPLIT

FRAME
Supporting frame in Zinc-Magnesium panelling, excellent mechanical characteristics and high resistance to corrosion over time.

HYDRONICS MODULE
- Direct expansion exchanger, braised plate type, INOX 316 with large exchange surface, complete with external cladding to prevent condensate forming.
- DC primary circulate pump
- water side differential pressure switch
- system drain tap
- water side pressure relief valve, 3 bar
- circuit water/DHW three-way diverter valve
- system expansion vessel connection
- electrical panel with keypad



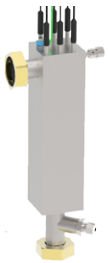
PANELLING
External panelling in Zinc-Magnesium, coated RAL 9001. The panels are easy to remove when access to the internal components is required.

ACCESSORIES

*

2 zones: high temperature + low temperature
or
2 zones: high temperature, external installation

Supplementary electric heater, 2-4 and 6 kW



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PAC BT SPLIT outdoors unit

Zinc-Magnesium frame
High strength frame for outstanding durability and excellent mechanical characteristics.

DC inverter compressor
Constantly modulates the power delivery in relation to actual demand, to ensure excellent seasonal efficiency.

Fan
Helical fan with plastic profile blades.
Housed in aerodynamic ports to increase efficiency and reduce noise.

Large surface area coil
Improves heat exchange and reduces defrost cycles for better seasonal efficiency.
The hydrophilic surface treatment facilitates the elimination of condensate and further improves defrosting.

Ice protection system
Prevents ice forming at the base of the coil, thanks to the special under-cooling circuit, as well as reducing defrost cycles.

Technical data

GENERAL TECHNICAL DATA

Quantities			4KW	6KW	8KW	10KW	12KW	14KW	16KW
Heating									
Air 7°C Water 35°C (1)	Heat output	kW	4.23	6.33	8.09	9.69	12.16	14.16	15.77
	Total power draw	kW	0.81	1.31	1.77	2.11	2.54	2.91	3.28
	COP	-	5.21	4.83	4.57	4.59	4.79	4.87	4.81
	Water flow rate	l/s	0.20	0.30	0.39	0.47	0.56	0.66	0.74
	Nominal available pressure	kPa	50.0	50.0	47.0	42.0	54.0	49.0	42.0
	Maximum available pressure	kPa	71.0	63.0	55.0	80.0	78.0	70.0	54.0
Air -7°C Water 35°C (2)	Heat output	kW	4.78	5.68	6.09	7.69	9.76	11.32	12.06
	Total power draw	kW	1.56	1.95	2.18	2.80	3.32	3.90	4.14
	COP	-	3.06	2.91	2.79	2.75	2.94	2.90	2.91
	Water flow rate	l/s	0.23	0.27	0.29	0.38	0.45	0.53	0.56
	Maximum available pressure	kPa	71.0	63.0	55.0	80.0	78.0	70.0	54.0
Air 7°C Water 45°C (3)	Heat output	kW	4.06	6.00	7.29	9.77	12.22	14.64	16.44
	Total power draw	kW	1.10	1.65	2.15	2.70	3.35	3.86	4.42
	COP	-	3.69	3.64	3.39	3.62	3.65	3.79	3.72
	Water flow rate	l/s	0.19	0.29	0.35	0.48	0.57	0.69	0.77
	Maximum available pressure	kPa	72.0	65.0	53.0	84.0	82.0	73.0	62.0
Cooling									
Air 35°C Water 18°C (4)	Cooling capacity	kW	4.47	6.19	8.01	10.16	11.39	14.34	15.40
	Total power draw	kW	0.80	1.29	1.81	2.03	2.59	3.10	3.56
	EER	-	5.58	4.80	4.43	5.00	4.40	4.63	4.33
	Water flow rate	l/s	0.21	0.30	0.38	0.49	0.54	0.69	0.74
	Nominal available pressure		50.0	50.0	48.0	59.0	56.0	47.0	43.0
	Maximum available pressure	kPa	71.0	63.0	55.0	80.0	78.0	70.0	54.0
Air 35°C Water 7°C (5)	Cooling capacity	kW	4.34	6.24	7.57	9.52	11.34	14.15	15.53
	Total power draw	kW	1.27	2.05	2.73	3.20	4.25	5.14	5.71
	EER	-	3.42	3.05	2.77	2.97	2.67	2.75	2.72
	ESEER		4.82	4.58	3.85	3.57	4.32	4.07	4.02
	Water flow rate	l/s	0.21	0.30	0.36	0.45	0.54	0.68	0.74
	Nominal available pressure	kPa	50.0	50.0	48.0	60.0	56.0	48.0	45.0
	Maximum available pressure	kPa	71.0	63.0	55.0	80.0	78.0	70.0	54.0
ErP									
Clima Average High temperature Heat pumps (6)	Nominal power	kW	4	6	7	10	12	14	15
	Generator energy class		A++	A++	A++	A++	A++	A++	A++
	η_s	%	130	127	127	128	129	131	132
	System energy class		A++	A++	A++	A++	A++	A++	A++
	η_s	%	135	132	132	133	134	136	138
	DHW energy class SRHM-T	XL	A	A	A	A	A	A	A
	DHW energy class SRHM-i	L	A	A	A	A	A	A	A
Clima Average Low temperature Heat pumps (7)	Nominal power	kW	4	6	7	10	12	14	15
	Generator energy class		A++	A+++	A++	A++	A+++	A++	A++
	η_s	%	174	175	171	174	176	166	164
	System energy class		A+++	A+++	A+++	A+++	A+++	A+++	A+++
	η_s	%	179	180	176	179	181	171	169

1. Service side water inlet/outlet temperature 30/35 °C, source side air 7°C (R.H. = 85% heat output, total power draw and COP data pursuant to EN 14511:2013
2. Service side water inlet/outlet temperature 30/35 °C, source side air -7°C heat output, total power draw and COP data pursuant to EN 14511:2013
3. Service side water inlet/outlet temperature 40/45 °C, source side air 7°C (R.H. = 85% heat output, total power draw and COP data pursuant to EN 14511:2013
4. Service side water inlet/outlet temperature 18/23 °C, source side air 35°C heat output, total power draw and COP data pursuant to EN 14511:2013
5. Service side water inlet/outlet temperature 7/12 °C, source side air 35°C heat output, total power draw and COP data pursuant to EN 14511:2013
6. The product is conforming with the European ErP Directives, which includes Commission Delegated Regulation (EU) N. 811/2013 and Commission Delegated Regulation N. 813/2013, Clima Average, High Temperature 47/55°C
7. The product is conforming with the European ErP Directives, which includes Commission Delegated Regulation (EU) N. 811/2013 and Commission Delegated Regulation N. 813/2013, Clima Average, Low Temperature 30/35°C

Outdoors unit

Size			4KW	6KW	8KW	10KW	12KW	14KW	16KW
Characteristics									
Compressor			Rotary	Rotary	Rotary	Rotary	Rotary	Rotary	Rotary
Refrigerant			R-410a	R-410a	R-410a	R-410a	R-410a	R-410a	R-410a
Refrigerant charge		kg	2.5	2.5	2.8	3.9	3.9	3.9	3.9
GWP		t_{CO2}	2088	2088	2088	2088	2088	2088	2088
Equivalent tons of CO2		t_t	5.22	5.22	5.85	8.14	8.14	8.14	8.14
Oil charge		l	0.4	0.4	0.67	1.4	1.4	1.4	1.4
Type of fan	(1)		AX	AX	AX	2 x AX	2 x AX	2 x AX	2 x AX
Standard air flow rate		m^3/h	3180	3180	5120	6500	6500	6500	6500
Outdoors unit sound pressure at 1 metre	(2)	dB(A)	46	48	50	52	54	55	55
Sound power	(2)	dB(A)	60	62	65	67	69	70	70
Dimensions									
Length of unit		mm	960	960	1075	900	900	900	900
Depth of unit		mm	380	380	395	400	400	400	400
Height of unit		mm	860	860	965	1327	1327	1327	1327
Weight during operation		kg	60	60	76	109	109	109	109

1. AX axial fan
2. 2 The sound levels are referred to a unit at full load, under nominal test conditions. Data referred to the following conditions: service side exchanger inlet/outlet water 47/55 °C source side exchanger inlet air 7°C.
The sound pressure level refers to a distance of 1 m from the external surface of the unit operating in the free field. Sound pressure level determined using the intense metric method (UNI EN ISO 9614-2)

Indoors unit

Series			WITH DHW			WITHOUT DHW	
Size			4-8KW	10-16KW		4-8KW	10-16KW
System characteristics							
Maximum circuit pressure		Bar	3	3		3	3
Installation expansion vessel		l	8 (optional)	8 (optional)		8	8
DHW characteristics							
Volume of DHW tank		l	280	280		-	-
DHW safety heating element		W	2.00	2.00		-	-
Maximum DHW circuit pressure		Bar	6	6		-	-
DHW expansion vessel		l	-	-		-	-
Safety thermostat setting		°C	-	-		-	-
Dimensions							
Length of unit		mm	600	600		462	462
Depth of unit		mm	800	800		316	316
Height of unit		mm	2040	2040		700	700
Weight during operation		kg	450 (1)	470 (1)		48	50

1. For the Sphera T Hybrid (SRHM -T Hybrid) version, the operating weight is Gr A 480 kg - Gr B 500 kg

Hydronic data

Indoors unit + outdoors unit

Size			4KW	6KW	8KW	10KW	12KW	14KW	16KW
Characteristics									
Minimum system water content	(1)	l	15	22	28	35	42	50	55
Minimum admitted water flow rate		l/s	0.17	0.17	0.17	0.25	0.25	0.25	0.25
Maximum admitted water flow rate		l/s	0.90	0.90	0.90	1.10	1.30	1.50	1.70
Minimum exchanger surface for storage tank serpentine (SRHM B only)		m^2	4	4	4	6	6	6	6

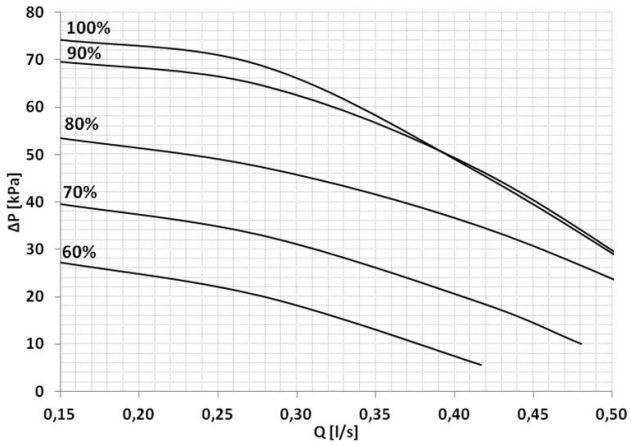
1. The minimum system water charge is the water contained in the system and in the unit when the zone with the smaller water content is demanding service.

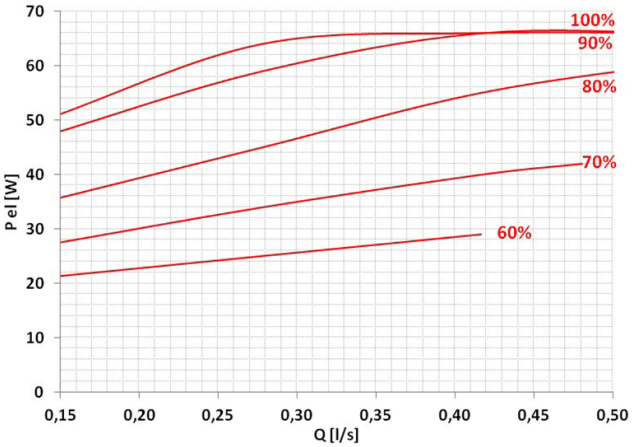
Circulator available pressure

ΔP [kPa] = Available pressure Q [l/s] = Water flow rate P el [W] = Electrical power draw

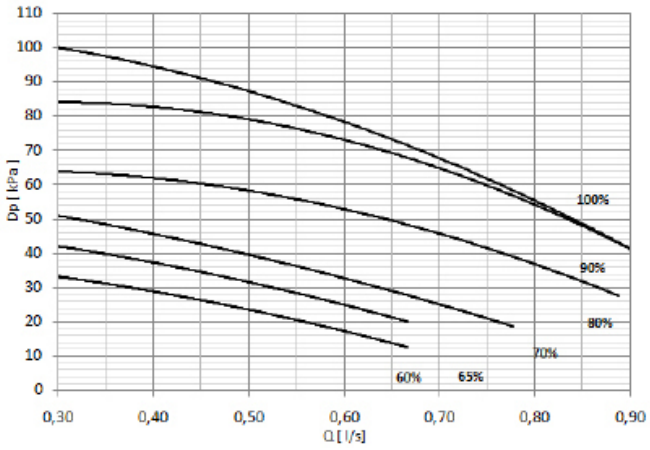
System circulator available pressure for unit in PAC BT SPLIT DHW configuration

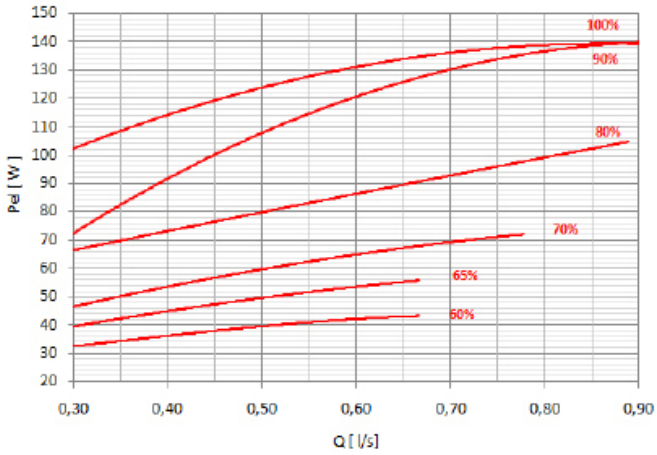
4KW - 6KW - 8KW



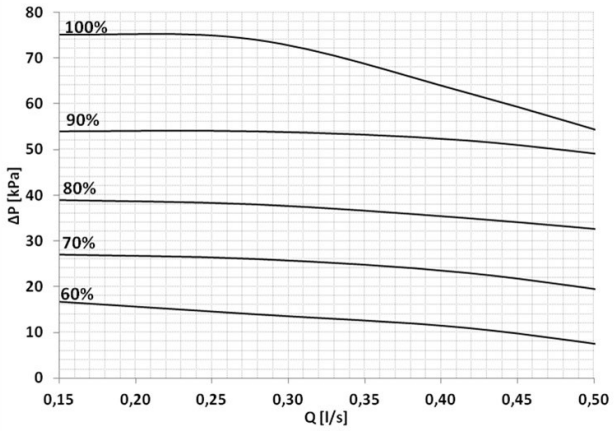


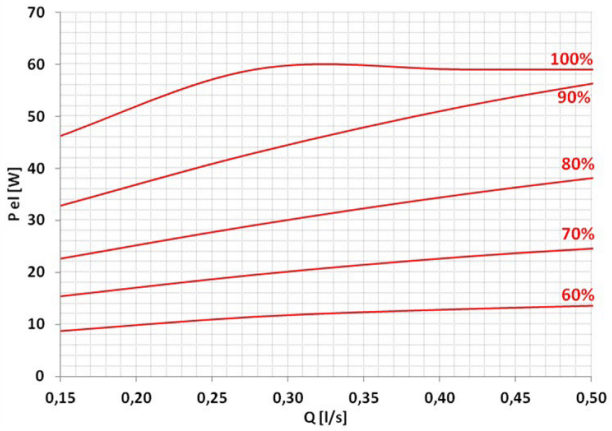
10KW - 12KW - 14KW - 16KW (230/1/50 ; 400/3/50)



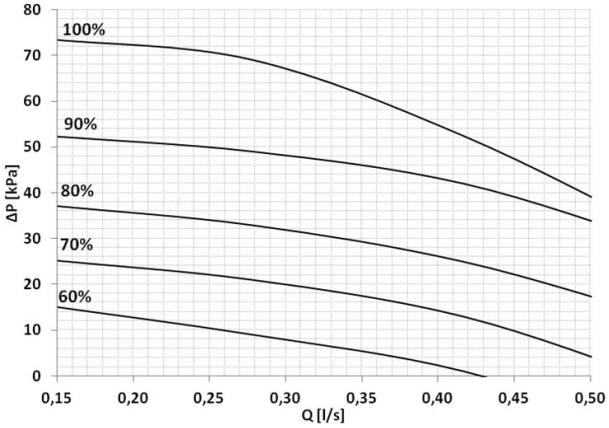


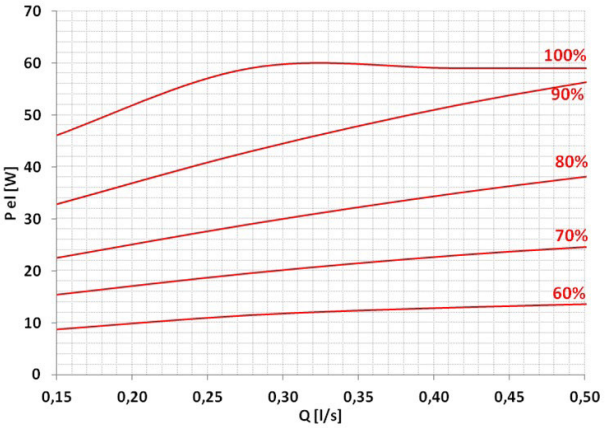
System circulator available pressure, direct relaunch (present in KIT BI-ZONES)





System circulator available pressure, mixed relaunch (present in KIT BI-ZONES)





Electrical data

Outdoors unit

Size			4KW	6KW	8KW	10KW	12KW	14KW	16KW
Outdoors unit 230/1/50									
Power supply	(1)		230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
F.L.A. - Current draw under maximum conditions		A	12.10	12.40	22.00	30.00	33.00	34.00	35.00
F.L.I. - Power draw under full load (maximum conditions)		kW	2.8	2.8	3.4	4.6	4.7	5.1	5.2
M.I.C - Maximum inrush current of unit		A	12.10	12.40	22.00	30.00	33.00	34.00	35.00
Outdoors unit 400/3/50									
Power supply	(1)		n/a	n/a	n/a	n/a	400/3/50	400/3/50	400/3/50
F.L.A. - Current draw under maximum conditions		A	n/a	n/a	n/a	n/a	7.0	8.9	9.4
F.L.I. - Power draw under full load (maximum conditions)		kW	n/a	n/a	n/a	n/a	4.2	5.5	5.8
M.I.C - Maximum inrush current of unit		A	n/a	n/a	n/a	n/a	7.0	8.9	9.4

Indoors unit

Version			PAC BT SPLIT DHW		PAC BT SPLIT	
Size			4-8KW	10-16KW	4-8KW	10-16KW
Power supply	(1)		230/1/50	230/1/50	230/1/50	230/1/50
F.L.A. - Current draw without DHW heating element		A	0.90	1.40	0.60	1.10
F.L.A. - Current draw of DHW heating element		A	8.70	8.70	-	-
F.L.A. - TOTAL current draw under maximum conditions		A	9.60	10.1	0.60	1.10
F.L.I. - Power draw without DHW heating element		kW	0.14	0.20	0.06	0.14
F.L.I. - Power draw of DHW heating element		kW	2.00	2.00	-	-
F.L.I. - Total power draw under full load		kW	2.14	2.20	0.06	0.14
M.I.C - Maximum inrush current of unit		A	9.60	10.1	9.30	9.80

(1) Power supply 230/1/50 Hz +/-10% Power supply 400/3/50 (+ NEUTRAL) +/- 10% Max. voltage imbalance between phases
2%For power voltages other than the standard, contact the AIRWELL technical department
The units are conforming with the prescriptions of European Standards CEI EN 60204 and CEI EN 60335

Important: when rating the unit, check that the absorptions are conforming to the utility contract in the country of installation

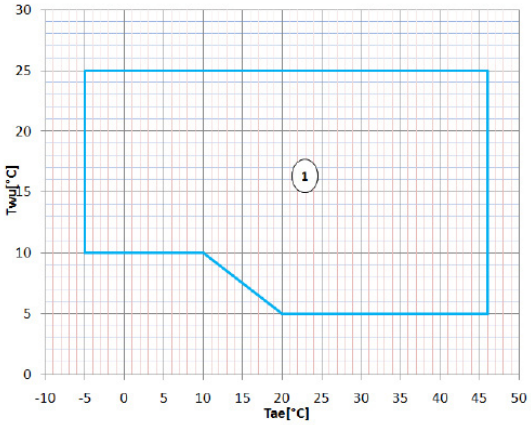
Operational limits

Twu [°C] = exchanger water outlet temperature

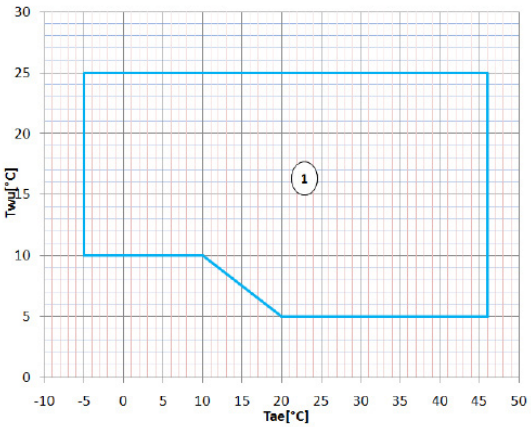
Tae [°C]: outdoors exchanger air inlet temperature

Cooling

4KW-6KW



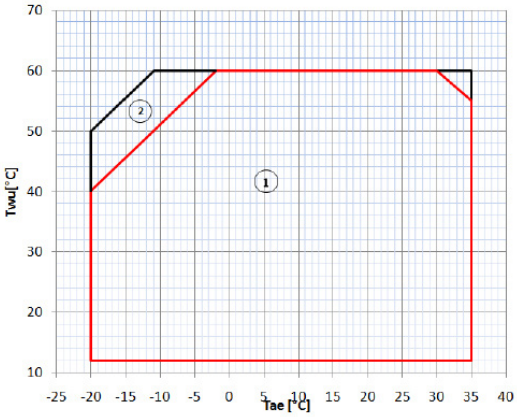
8KW-16KW



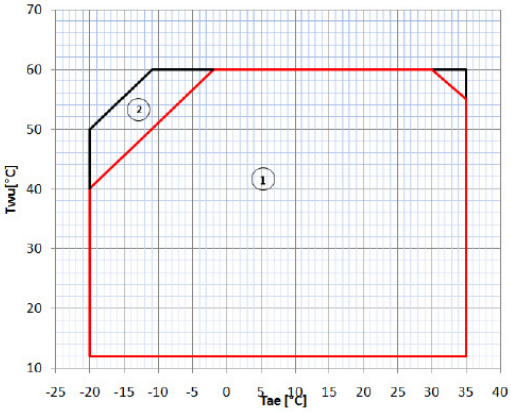
1. Normal operating range

Heating

4KW-6KW



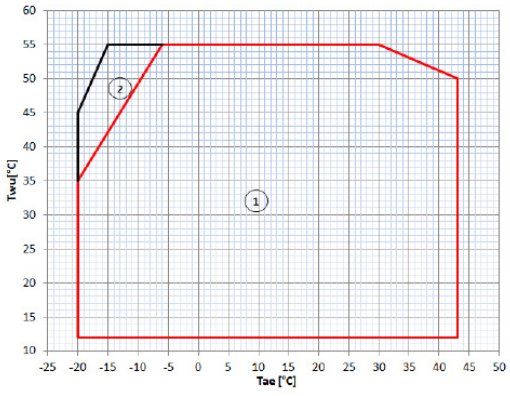
8KW-16KW



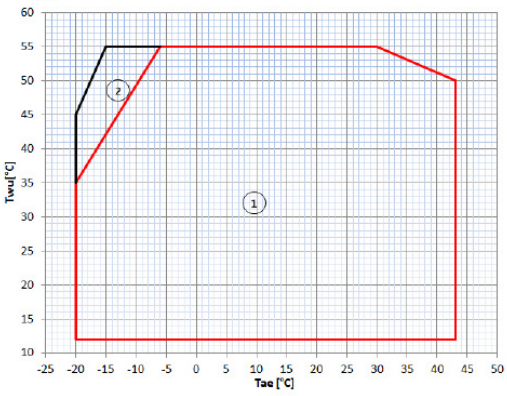
1. Normal operating range
2. Operating range with heating element (optional)

Domestic hot water

4KW-6KW

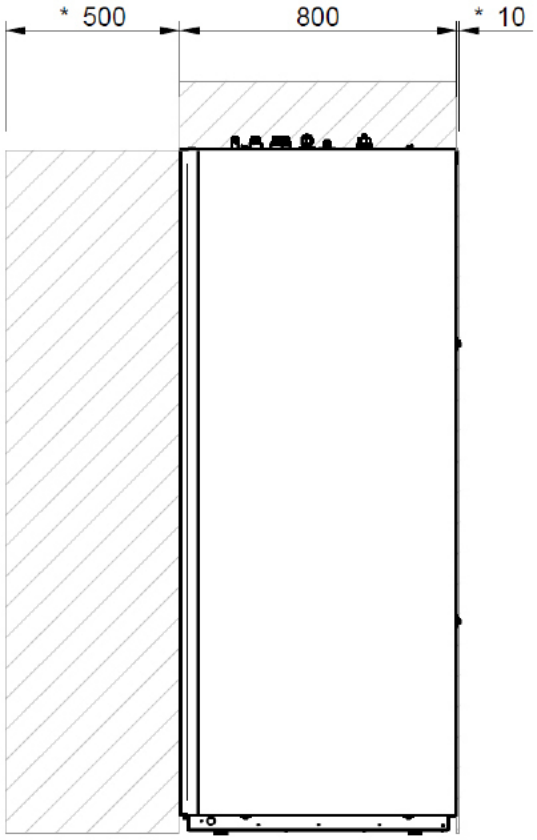


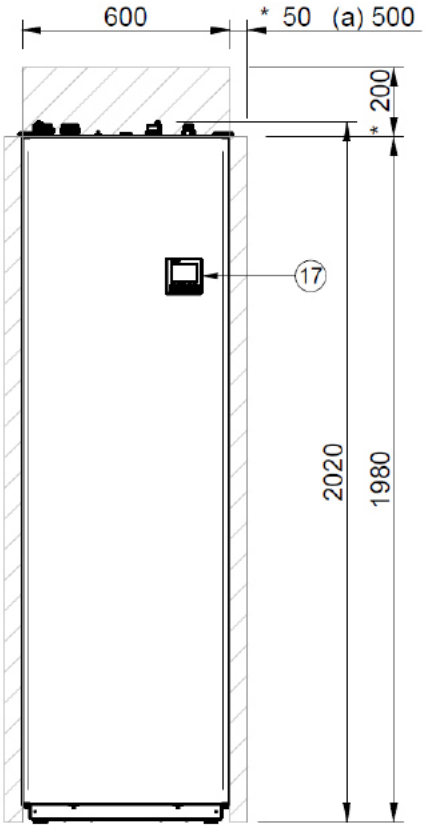
8KW-16KW

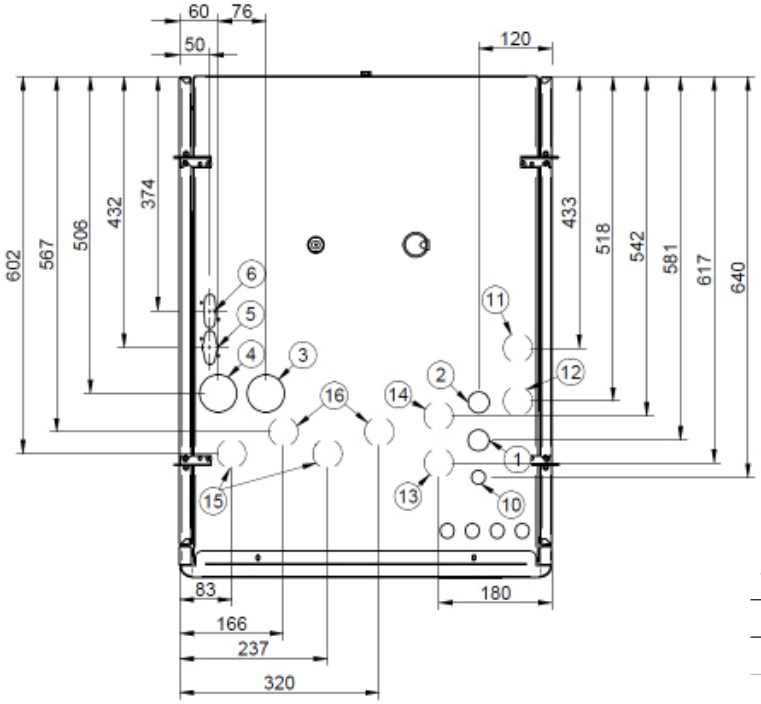


1. Normal operating range
2. Operating range with heating element (optional)

Dimensional and installation data







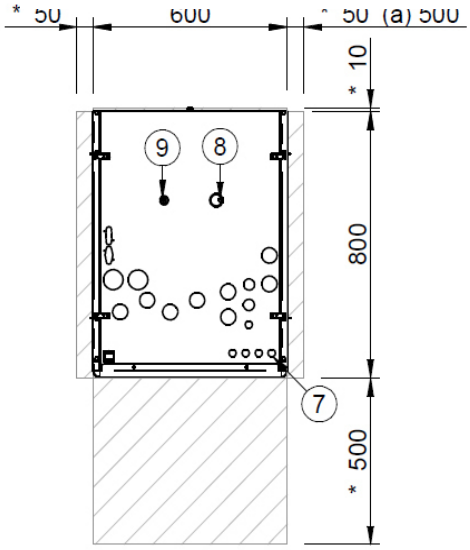


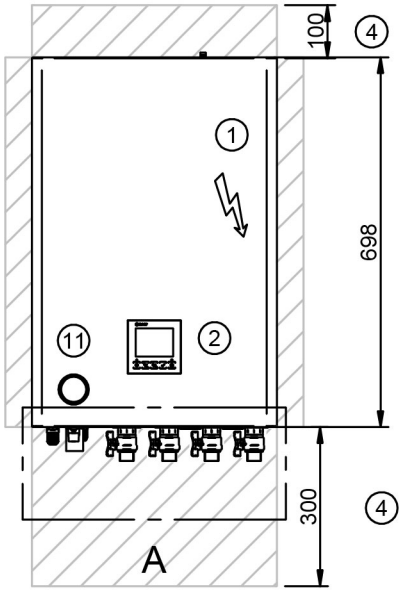
Table of weights

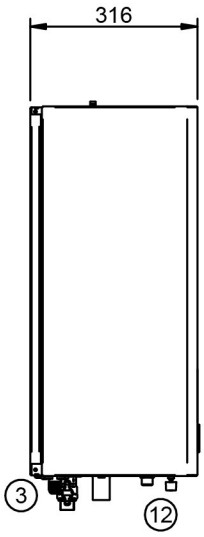
Size		A	B
Weight during operation	kg	450	470
Shipping weight	kg	170	190

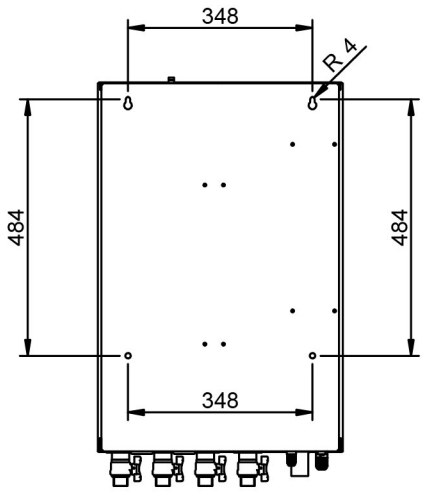
Legend

1	DHW water outlet M G 1/2"	8	Automatic purge valve	15	Service circuit return 1st and 2nd relaunch M G 1"
2	Water mains inlet M G 1/2"	9	Electronic anode	16	Service circuit delivery 1st and 2nd relaunch M G 1"
3	Return from service circuit M G 1" 1/4 flat seating	10	DHW recirculation circuit inlet M G 3/8" Gas flat seating	17	Controller keypad
4	Service circuit delivery M G 1" 1/4 flat seating	11	Solar system return M G 3/4" flat seating	*	Standard unit functional spaces
5	Intake fitting 5/8"	12	Solar system delivery M G 3/4" flat seating	A	Functional spaces with solar heating kit
6	Fluid fitting 3/8"	13	Boiler delivery M G 1" 1/4 flat seating		
7	Electrical line intake	14	Boiler return M G 1" 1/4 flat seating		

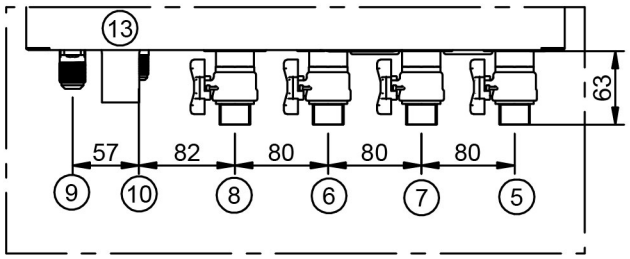
WITHOUT DHW







Wall mounting points



DETAIL A

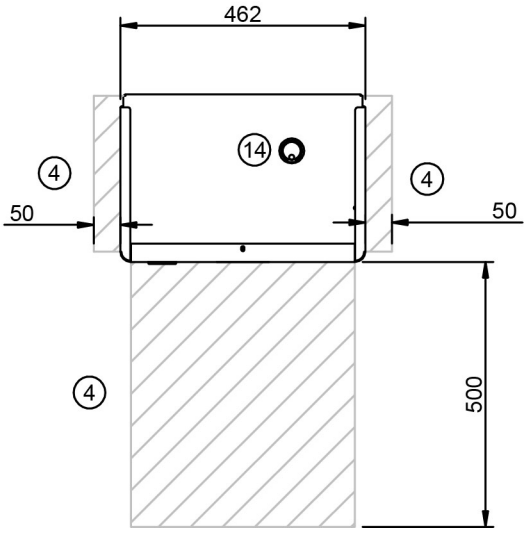


Table of weights

Size		A	B
Weight during operation	kg	48	50
Shipping weight	kg	49	51

Legend

1	Electrical panel	8	Service circuit return 3/4" (with shut off valve)	SV	Shut off valve
2	Controller keypad	9	Intake fitting 5/8"		
3	Electrical line intake	10	Fluid fitting 3/8"		
4	Standard unit functional spaces	11	Pressure gauge		
5	DHW exchanger delivery 3/4" (with shut off valve)	12	System load valve		
6	DHW exchanger return 3/4" (with shut off valve)	13	Condensate drain 1"		
7	Service circuit delivery 3/4" (with shut off valve)	14	System purge valve		

PAC BT SPLIT 4KW – 6KW

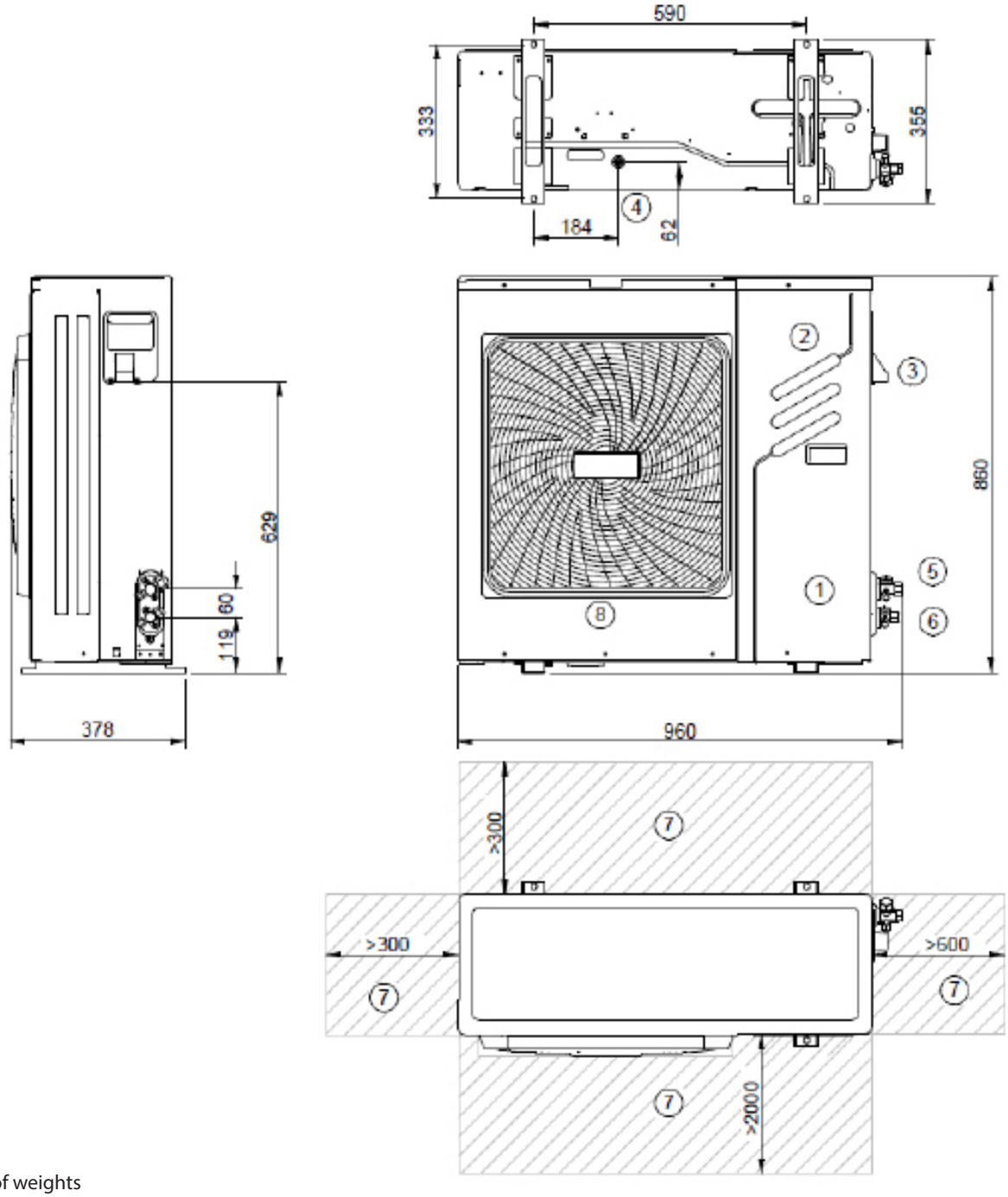


Table of weights

Size		4KW	6KW
Weight during operation	kg	60	60
Shipping weight	kg	72	72

Legend

1	Compressor compartment	8	Electric fan		
2	Electrical panel				
3	Electrical line intake				
4	Condensate drain				
5	Intake fitting 5/8"				
6	Fluid fitting 3/8"				
7	Functional spaces				

PAC BT SPLIT 8KW

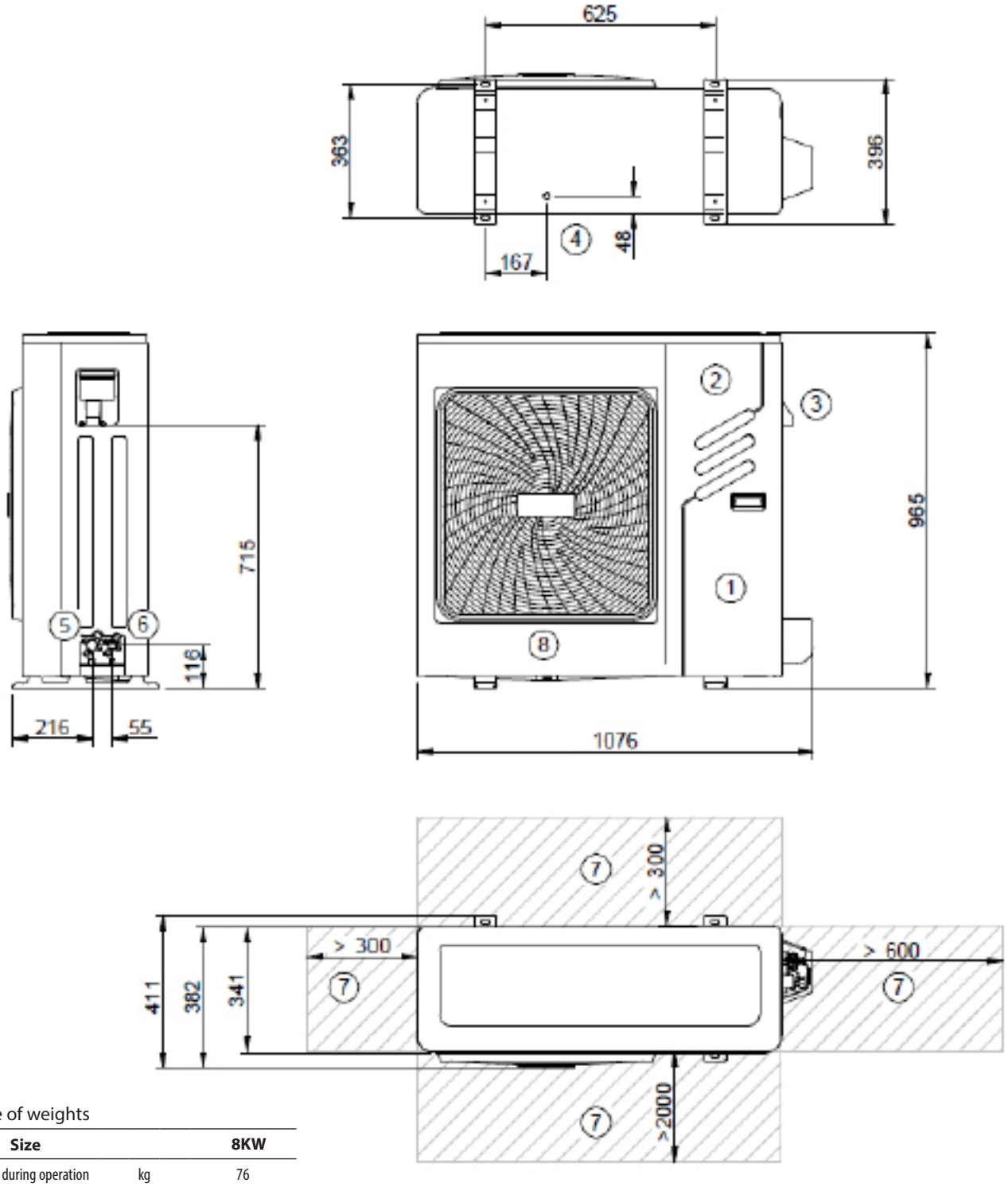


Table of weights

Size		8KW
Weight during operation	kg	76
Shipping weight	kg	88

Legend

1	Compressor compartment	8	Electric fan		
2	Electrical panel				
3	Electrical line intake				
4	Condensate drain				
5	Intake fitting 5/8"				
6	Fluid fitting 3/8"				
7	Functional spaces				

PAC BT SPLIT 10KW – 12KW - 14KW - 16KW

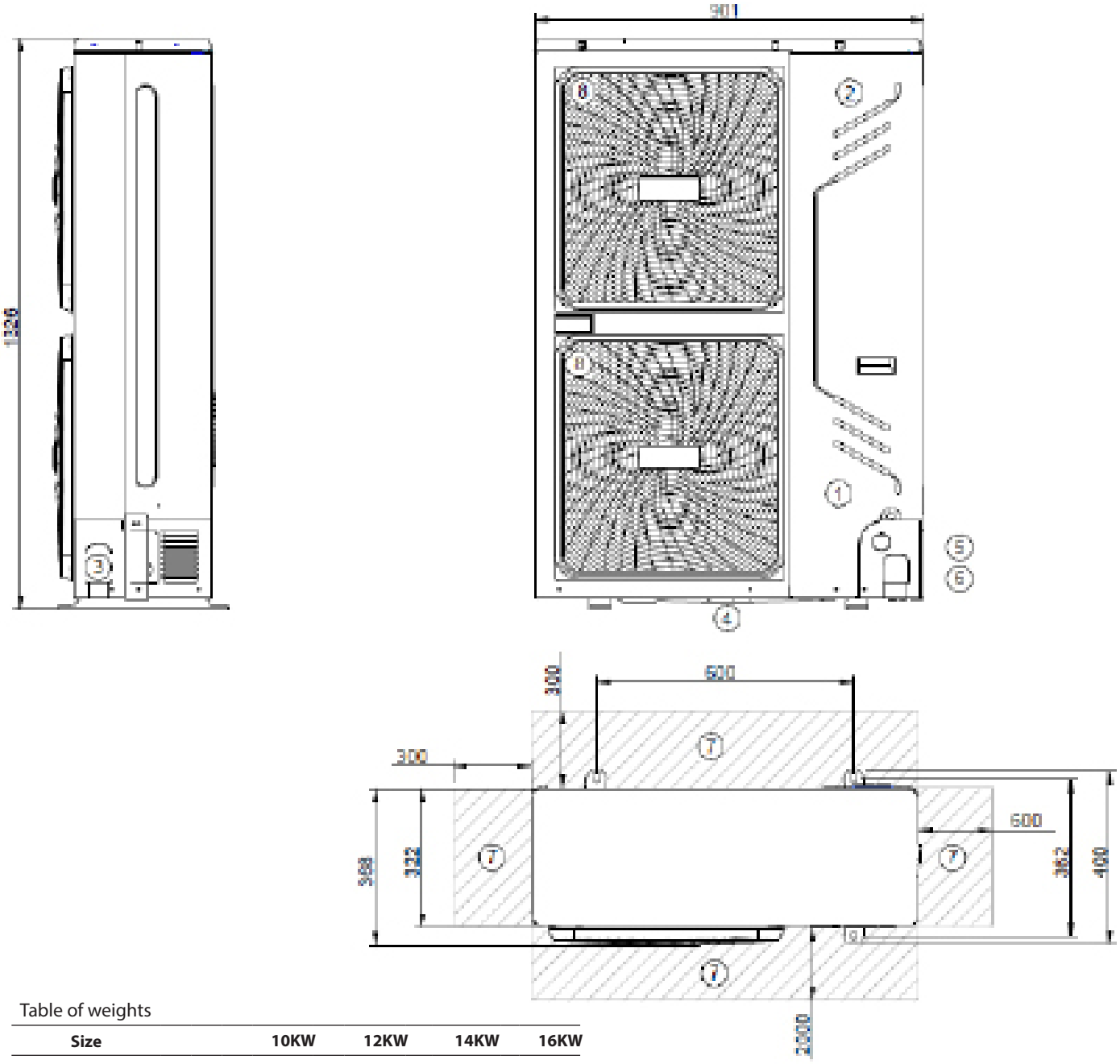


Table of weights

Size		10KW	12KW	14KW	16KW
Weight during operation	kg	115	115	115	115
Shipping weight	kg	128	128	128	128

Legend

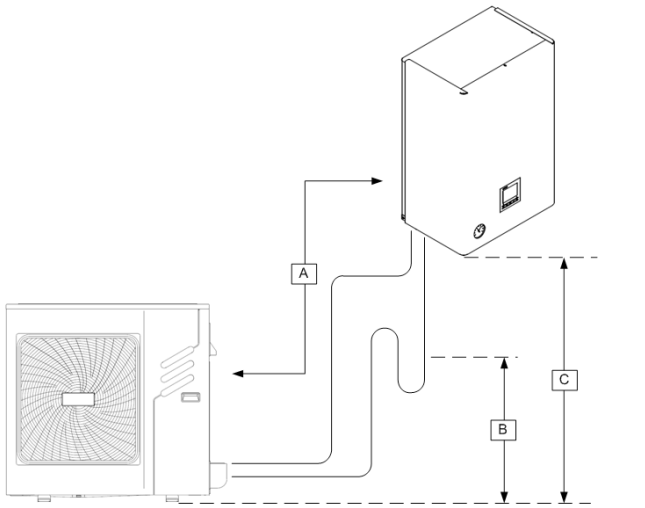
1	Compressor compartment	8	Electric fan		
2	Electrical panel				
3	Electrical line intake				
4	Condensate drain				
5	Intake fitting 5/8"				
6	Fluid fitting 3/8"				
7	Functional spaces				

Cooling connections

Sizing the refrigerant pipes

Equivalent length of pipes (metres) = Effective length (metres) + Number of bends x K
Consider K= 0.3 m per wide radius elbow bend.
Consider K= 0.5 m per standard 90° elbow bend.

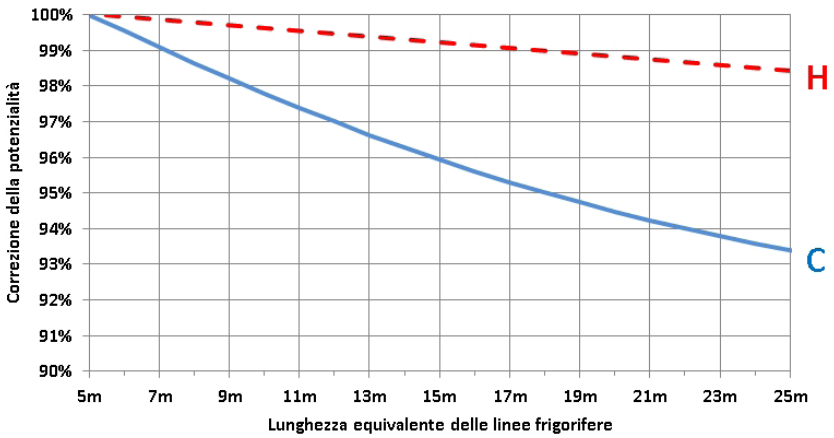
CAUTION: to correctly install the refrigerant pipes and charge the refrigerant gas, refer to the PAC BT SPLIT MANUAL



Size		4KW	6KW	8KW	10KW	12KW	14KW	16KW
Length and height difference of refrigerant pipes								
A - Refrigerant pipe min/max equivalent length	m	2 -20	2 -20	2 -30	2 – 50	2 – 50	2 – 50	2 – 50
B - Height difference due to the presence of the siphon	m	6	6	6	6	6	6	6
C - Maximum refrigerant pipe height difference with outdoors unit higher than indoors unit	m	15	15	15	25	25	25	25
C - Maximum refrigerant pipe height difference with outdoors unit lower than indoors unit	m	20	20	20	30	30	30	30
Diameters of refrigerant pipes								
Gas pipe diameter	inch - mm	5/8" - 15.9	5/8" - 15.9	5/8" - 15.9	5/8" - 15.9	5/8" - 15.9	5/8" - 15.9	5/8" - 15.9
Fluid line diameter	Inch - mm	3/8" - 9.5	3/8" - 9.5	3/8" - 9.5	3/8" - 9.5	3/8" - 9.5	3/8" - 9.5	3/8" - 9.5
Single-phase 230/1/50								
R410A - Standard charge for connections up to 5 m	kg	2.5	2.5	2.8	3.9	3.9	3.9	3.9
Equivalent tons of CO2	$t_{eq\ co2}$	5.22	5.22	5.85	8.14	8.14	8.14	8.14
Additional charge per metre	kg/m	0.054	0.054	0.054	0.054	0.054	0.054	0.054
Three-phase 400/3/50								
R410A - Standard charge for connections up to 5 m	kg	-	-	-	4.2	4.2	4.2	4.2
Equivalent tons of CO2	$t_{eq\ co2}$	-	-	-	8.77	8.77	8.77	8.77
Additional charge per metre	kg/m				0.054	0.054	0.054	0.054

Determination of cooling and heating power loss

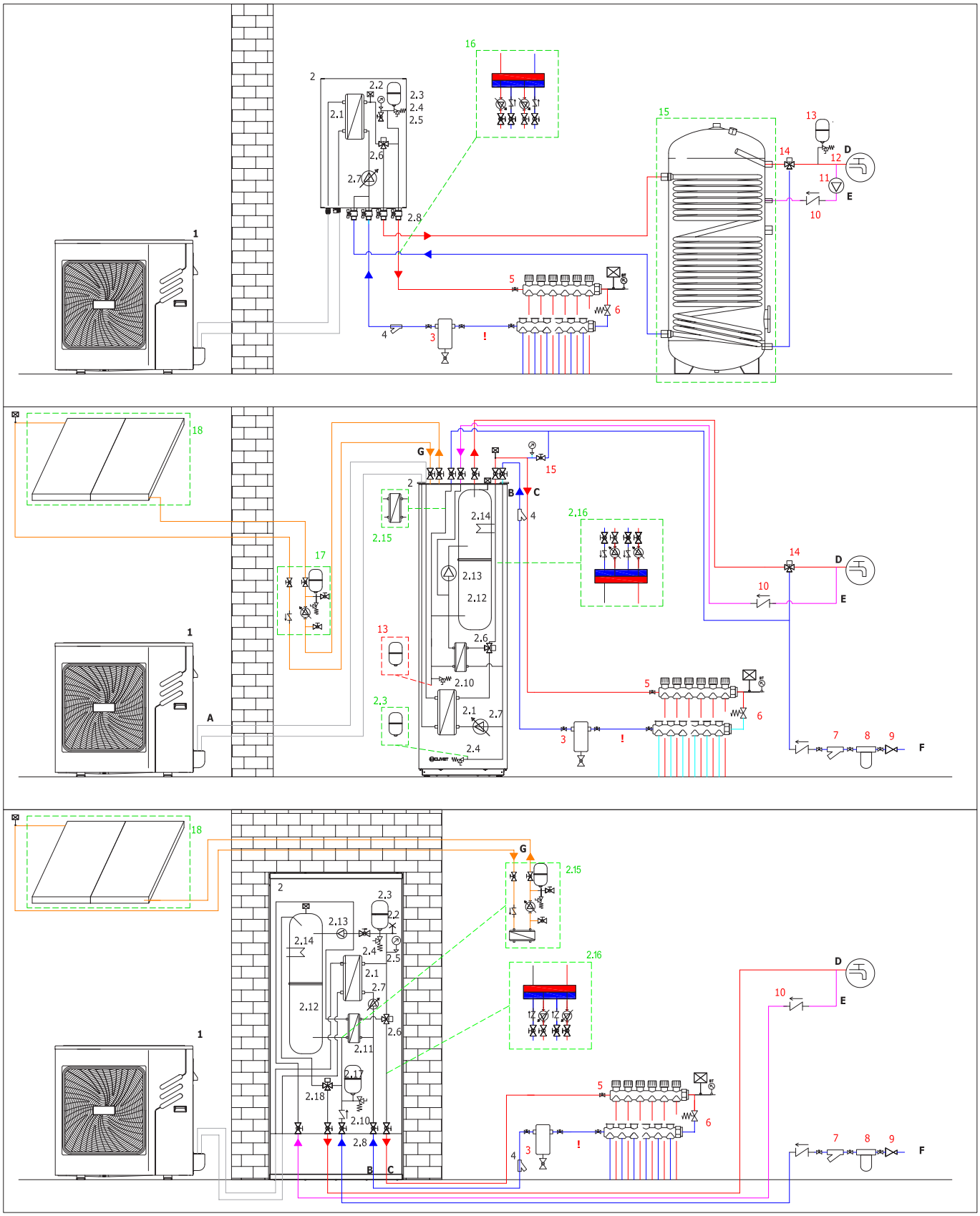
The equivalent length of the cooling lines results in a loss of cooling and heating power supplied to the circuit and DHW system.
The graph shows the amount of this loss of power



C = Cooling power efficiency curve
H = Heating power efficiency curve

Hydronic connections

We give below some sample hydronic connection diagrams for the three versions of PAC BT SPLIT. The connection and design of the system must be conforming with the local regulations.
The numbers 2.XX refer to components which are/may be installed inside the unit.

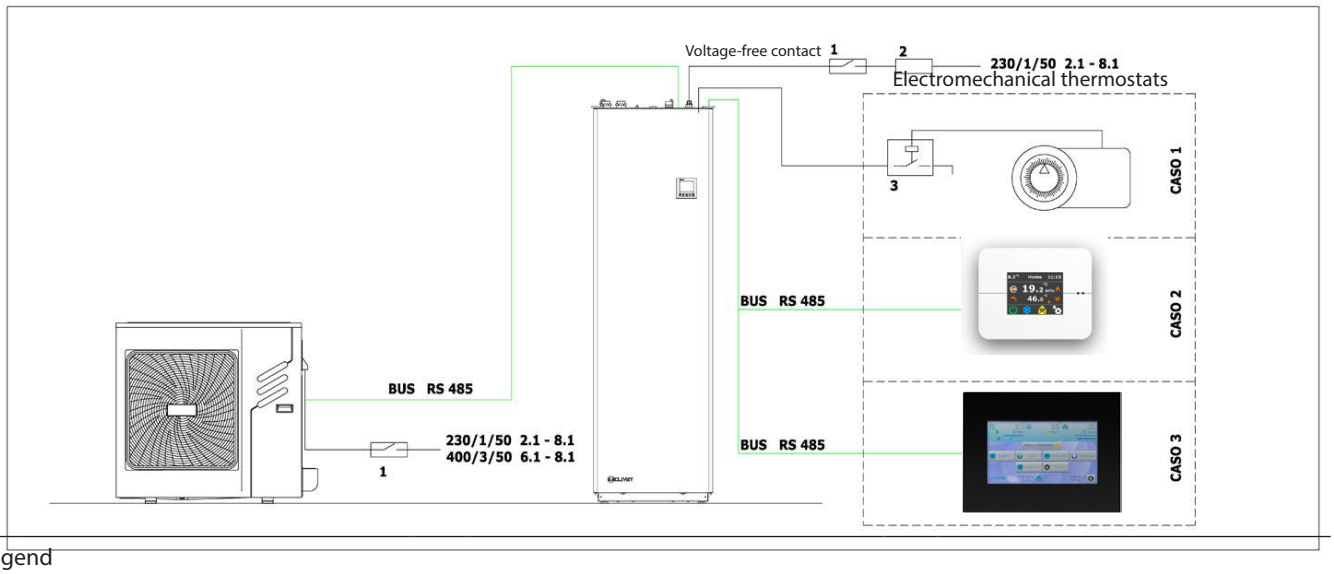


Legend					
1	Outdoors unit				
2	Indoors unit				
2.1	Refrigerant/water exchanger	2.2	Manual purge valve	2.3	System expansion vessel
2.4	System pressure relief valve	2.5	Filling unit with pressure gauge	2.6	3-way valve on DHW circuit
2.7	System primary circulator pump	2.8	Shut off cocks	2.9	
2.10	DHW pressure relief valve	2.11	DHW plate exchanger	2.12	DHW storage tank
2.13	DHW circulator pump (recirculation)	2.14	DHW backup heating element	2.15	Solar heating option
2.16	Equalisation device with relaunches, internal installation	2.17	DHW expansion vessel	2.18	Thermostatic mixing valve
3	Dirt separator (recommended)	4	Y-shaped filter	5	Manifolds
6	Manifold bypass valve	7	DHW filter	8	Water treatment unit (softener, etc.)
9	Pressure reducer	10	Recirculation non-return valve	11	Recirculation circulate pump
12	DHW pressure relief valve	13	DHW expansion vessel	14	Thermostatic mixing valve
15	System filling unit	16	Equalisation device with relaunches, external installation	17	Solar system circulation unit
18-	SOLAR KIT	!	The feasibility of an inertial tank or expansion vessel must be verified in relation to the operating conditions		
---	Accessory	---	Accessory to be provided by the client		
X	Component present in the standard unit	X	Accessory	X	Component to be provided by the client
A	Refrigerant pipes	B	Return from system	C	Supply to installation
D	Domestic hot water	E	DHW recirculation	F	Water network input

Electrical connections

The electrical hookup must be conforming with the local regulations. The hookup must be done by a specialised technician, qualified to work on live equipment.
All PAC BT SPLIT versions can be controlled with the on-board controller. To operate the unit, you may use: the supervision system, the remote keypad, temperature/humidity thermostat, normal electromechanical thermostats.
On the unit are present 2 digital inputs set as:

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



Legend					
1	Contactor or automatic switch	2	Differential circuit breaker	3	Relay

Data for the UNI/TS 11300 calculation

AIRWELL declares that the data to be used for the calculation pursuant to UNI/TS 11300 part 4 of the efficiency of their heat pump are given in the following tables.

The data given in this document may be updated without advance notice by the manufacturer when upgrading his product range.

UNI/TS 11300 Part 4

PAC BT SPLIT 4KW

Data for determination of COP_{PL} T delivery 35°C		Tdesignh	A	B	C	D
	Te	**-10**	**-7**	**2**	**7**	**12**
4KW	**PLR**		0.885	0.538	0.346	0.154
	DC		4.91	5.87	7.89	9.90
	CR		1.00	0.51	0.25	0.08
	P	5.58	4.91	3.02	1.95	0.84
	COP (partial load)		3.03	3.52	4.74	6.09
	COP (full load)		3.03	3.58	4.99	6.48
	Fcop		1.00	0.98	0.95	0.94

Data to be provided for power and COP under full load cold source air			Te			
	Te	**Tm**	**-7**	**2**	**7**	**12**
4KW	**Heat output $\Phi_{H,HP\,out}$ (kW)**	35°C	4.91	5.87	7.89	9.90
		45°C	4.29	5.15	6.42	7.66
		55°C	3.41	4.29	5.41	6.54
	COP	35°C	3.03	3.58	4.99	6.48
		45°C	2.44	3.00	3.55	4.10
		55°C	1.91	2.37	2.86	3.30

DHW Power and COP data under full load			Te			
	Te	**Tm**	**7**	**15**	**20**	**35**
4KW	**Heat output $\Phi_{H,HP\,out}$ (kW)**	55°C	5.41	7.22	8.33	8.50
	COP	55°C	2.86	3.54	3.93	3.69

PAC BT SPLIT 6KW

Data for determination of COP_{PL} T delivery 35°C		Tdesignh	A	B	C	D
	Te	**-10**	**-7**	**2**	**7**	**12**
6KW	**PLR**		0.885	0.538	0.346	0.154
	DC		5.82	7.27	9.33	10.55
	CR		1.00	0.49	0.25	0.09
	P	6.61	5.82	3.57	2.31	0.99
	COP (partial load)		2.85	3.45	4.34	6.71
	COP (full load)		2.85	3.58	4.33	4.78
	Fcop		1.00	0.96	1.00	1.40

Data to be provided for power and COP under full load cold source air			Te			
	Te	**Tm**	**-7**	**2**	**7**	**12**
6KW	**Heat output $\Phi_{H,HP\,out}$ (kW)**	35°C	5.82	7.27	9.33	10.55
		45°C	5.25	6.83	8.08	8.85
		55°C	4.75	6.25	8.09	8.65
	COP	35°C	2.85	3.58	4.33	4.78
		45°C	2.42	3.03	3.53	3.74
		55°C	1.91	2.37	2.91	3.15

DHW Power and COP data under full load			Te			
	Te	**Tm**	**7**	**15**	**20**	**35**
6KW	**Heat output $\Phi_{H,HP\,out}$ (kW)**	55°C	8.09	9.00	9.57	9.76
	COP	55°C	2.91	3.30	3.56	3.60

PAC BT SPLIT 8KW

Data for determination of COP_{PL} T delivery 35°C		Tdesignh	A	B	C	D
	Te	-10	-7	2	7	12
8KW	PLR		0.885	0.538	0.346	0.154
	DC		6.24	8.26	10.53	12.78
	CR		1.00	0.46	0.24	0.08
	P	7.09	6.24	3.83	2.48	1.06
	COP (partial load)		2.75	4.38	4.29	5.12
	COP (full load)		2.75	3.56	4.43	5.28
	Fcop		1.00	1.23	0.97	0.97

Data to be provided for power and COP under full load cold source air			Te			
	Te	Tm	-7	2	7	12
8KW	Heat output $\Phi_{H,HP\,out}$ (kW)	35°C	6.24	8.26	10.53	12.78
		45°C	5.78	7.51	9.61	11.66
		55°C	5.32	7.36	9.06	10.75
	COP	35°C	2.75	3.56	4.43	5.28
		45°C	2.28	2.82	3.36	3.87
		55°C	1.85	2.35	2.71	3.05

DHW Power and COP data under full load			Te			
	Te	Tm	7	15	20	35
8KW	Heat output $\Phi_{H,HP\,out}$ (kW)	55°C	9.06	11.75	13.43	13.69
	COP	55°C	2.71	3.23	3.51	3.54

PAC BT SPLIT 10KW

Data for determination of COP_{PL} T delivery 35°C		Tdesignh	A	B	C	D
	Te	-10	-7	2	7	12
10KW	PLR		0.885	0.538	0.346	0.154
	DC		7.86	10.12	12.70	15.26
	CR		1.00	0.48	0.25	0.09
	P	8.93	7.86	4.82	3.13	1.34
	COP (partial load)		2.69	3.53	4.36	5.29
	COP (full load)		2.69	3.53	4.45	5.38
	Fcop		1.00	1.00	0.98	0.98

Data to be provided for power and COP under full load cold source air			Te			
	Te	Tm	-7	2	7	12
10KW	Heat output $\Phi_{H,HP\,out}$ (kW)	35°C	7.86	10.12	12.70	15.26
		45°C	8.85	11.04	14.18	17.27
		55°C	9.50	12.23	15.32	18.40
	COP	35°C	2.69	3.53	4.45	5.38
		45°C	2.30	2.85	3.53	4.19
		55°C	2.68	3.52	4.44	5.41

DHW Power and COP data under full load			Te			
	Te	Tm	7	15	20	35
10KW	Heat output $\Phi_{H,HP\,out}$ (kW)	55°C	15.32	18.21	21.09	21.51
	COP	55°C	4.44	3.50	3.94	3.97

PAC BT SPLIT 12KW

Data for determination of COP_{PL} T delivery 35°C		Tdesignh	A	B	C	D
	Te	-10	-7	2	7	12
12KW	PLR		0.885	0.538	0.346	0.154
	DC		9.99	12.34	16.36	20.34
	CR		1.00	0.50	0.24	0.08
	P	11.35	9.99	6.13	3.97	1.70
	COP (partial load)		2.87	3.57	4.50	5.51
	COP (full load)		2.87	3.62	4.63	5.60
	Fcop		1.00	0.99	0.97	0.98

Data to be provided for power and COP under full load cold source air			Te			
	Te	Tm	-7	2	7	12
12KW	Heat output $\Phi_{H,HP\,out}$ (kW)	35°C	9.99	12.34	16.36	20.34
		45°C	7.42	9.52	11.87	14.17
		55°C	9.59	12.21	15.36	18.48
	COP	35°C	2.87	3.62	4.63	5.60
		45°C	2.35	2.90	3.51	4.13
		55°C	1.88	2.28	2.79	3.27

DHW Power and COP data under full load			Te			
	Te	Tm	7	15	20	35
12KW	Heat output $\Phi_{H,HP\,out}$ (kW)	55°C	15.36	20.34	23.39	23.86
	COP	55°C	2.79	3.56	4.05	4.09

PAC BT SPLIT 14KW

Data for determination of COP_{PL} T delivery 35°C		Tdesignh	A	B	C	D
	Te	-10	-7	2	7	12
14KW	PLR		0.885	0.538	0.346	0.154
	DC		11.56	14.60	19.81	24.99
	CR		1.00	0.49	0.23	0.08
	P	13.14	11.56	7.10	4.60	1.97
	COP (partial load)		2.85	3.35	4.62	6.26
	COP (full load)		2.85	3.37	4.75	6.28
	Fcop		1.00	0.99	0.97	1.00

Data to be provided for power and COP under full load cold source air			Te			
	Te	Tm	-7	2	7	12
14KW	Heat output $\Phi_{H,HP\,out}$ (kW)	35°C	11.56	14.60	19.81	24.99
		45°C	11.66	14.79	19.75	24.62
		55°C	11.43	14.85	19.66	24.41
	COP	35°C	2.85	3.37	4.75	6.28
		45°C	2.37	2.97	3.72	4.44
		55°C	1.97	2.50	3.13	3.71

DHW Power and COP data under full load			Te			
	Te	Tm	7	15	20	35
14KW	Heat output $\Phi_{H,HP\,out}$ (kW)	55°C	19.66	27.33	32.18	32.83
	COP	55°C	3.13	4.01	4.46	4.51

PAC BT SPLIT 16KW

Data for determination of COP_{PL} T delivery 35°C		Tdesignh	A	B	C	D
	Te	**-10**	**-7**	**2**	**7**	**12**
16KW	**PLR**		0.885	0.538	0.346	0.154
	DC		12.30	15.52	21.11	26.69
	CR		1.00	0.49	0.23	0.08
	P	13.98	12.30	7.55	4.89	2.10
	COP (partial load)		2.86	3.33	4.69	6.18
	COP (full load)		2.86	3.37	4.72	6.18
	Fcop		1.00	0.99	0.99	1.00

Data to be provided for power and COP under full load cold source air			Te			
	Te	**Tm**	**-7**	**2**	**7**	**12**
16KW	**Heat output $\Phi_{H,HP\ ou}$t (kW)**	35°C	12.30	15.52	21.11	26.69
		45°C	12.61	15.99	21.33	26.65
		55°C	12.29	15.94	21.06	26.16
	COP	35°C	2.86	3.37	4.72	6.18
		45°C	2.37	2.97	3.74	4.44
		55°C	2.20	2.55	3.16	3.70

DHW Power and COP data under full load			Te			
	Te	**Tm**	**7**	**15**	**20**	**35**
16KW	**Heat output $\Phi_{H,HP\ out}$ (kW)**	55°C	21.06	29.27	34.44	35.13
	COP	55°C	3.16	3.99	4.41	4.45

Terms and definitions
Tm = Delivery temperature
Tdesignh = A - Average design climate temperature (pursuant to UNI EN 14825)
A, B, C, D = names of the four conditions with which different outdoors air temperatures are associated (Te)
Te = Outdoors air temperature
PLR = part load ratio
DC = power under full load referred to the specified temperatures
CR = heat pump load factor
P = system power demand
COP' (full load) = COP under full load referred to the indicated outdoors air temperatures
COP' (partial load) = COP under partial load referred to the indicated outdoors air temperatures
fCOP = COP correction factor, as follows: COP' (full load) / COP (partial load)
HP= heat pump
DHW = domestic hot water

UNI/TS 11300 Part 3

The specified data refer to the nominal power values under the declared conditions.

Size	**Thermal power kW**					**EER**		
Test	1	2	3	4	1	2	3	4
	100%	75%	50%	25%	100%	75%	50%	25%
230/1/50								
4KW	4.34	3.26	2.82	3.09	3.41	4.04	5.24	6.74
6KW	6.22	4.68	3.14	3.13	3.00	3.78	4.77	6.17
8KW	7.57	5.71	3.84	4.30	2.78	3.31	3.97	5.14
10KW	9.52	7.18	4.84	5.31	2.97	3.13	3.70	5.25
12KW	11.3	8.54	5.75	6.10	2.66	3.38	4.40	6.43
14KW	14.1	10.7	7.16	5.37	2.74	3.48	3.91	5.66
16KW	15.5	11.7	7.83	5.38	2.72	3.21	3.94	5.74
400/3/50								
12KW	11.3	8.54	5.75	6.10	2.66	3.38	4.40	6.43
14KW	14.1	10.7	7.16	5.37	2.74	3.48	3.91	5.66
16KW	15.5	11.7	7.83	5.38	2.72	3.21	3.94	5.74

Reference conditions prescribed by UNI/TS 11300-3:
1. External air temperature B.S. 35°C Refrigerated water temperature at the fancoil inlet/outlet 12/7 °C
2. External air temperature B.S. 30°C Refrigerated water temperature at the fancoil outlet /7 °C
3. External air temperature B.S. 25°C Refrigerated water temperature at the fancoil outlet /7 °C
4. External air temperature B.S. 20°C Refrigerated water temperature at the fancoil outlet /7 °C

Separately supplied accessories

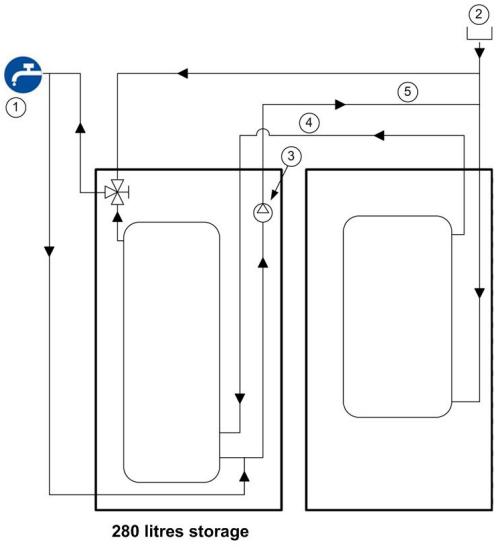
Auxiliary DHW storage tank

If more DHW is required, a supplementary 280L storage tank can be installed with the same styling and all hydronic connections installed. The pipes are configured for the connection scheme shown below, with the supplementary tank in series with theBtank.

The energy transfer between the two tanks is handled by the circulate pump (5).

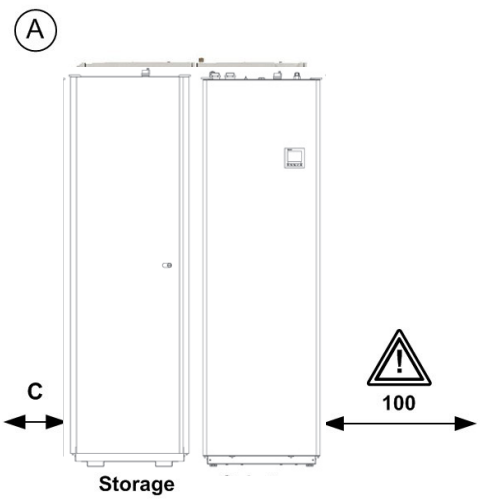
Dimensions:

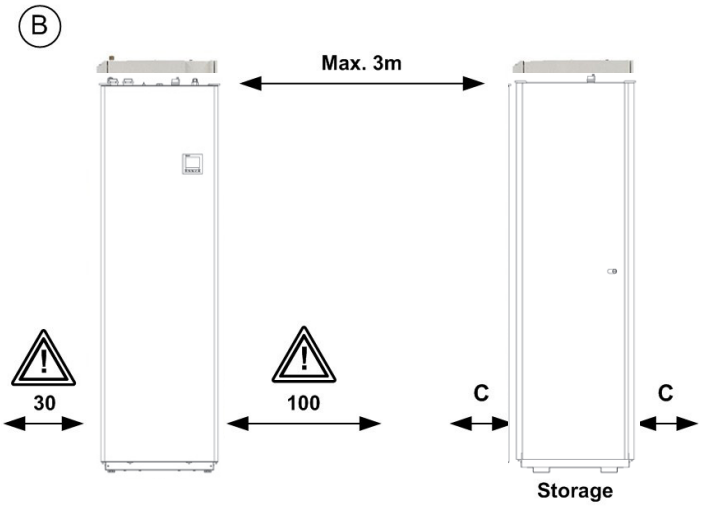
Auxiliary 280L DHW tank enclosure: 600x2030x800.



1. DHW service
2. Water mains inlet
3. DHW recirculate pump
4. DHW delivery connection from pac bt split to auxiliary tank
5. DHW return from auxiliary storage to pac bt split

Clearances





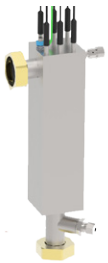
A. United tank

B. Separate tank

C. The clearances may be occupied by furniture or other objects; they must be easy to move in case of service.

Observe the unit functional spaces for maintenance

2-4-6 kW supplementary heating element



The heating element is modular and provides additional power of 2-4-6 kW depending on hookup.

WARNING: when ordering this unit, note that you must include its 2-4-6 kW of power draw in addition to the draw of the unit in nominal conditions when rating the power line and meter.

Adjustment

The heating element can be set to operate in two different modes:

(1) The heating element only operates when the power supplied by the heat pump is inadequate to maintain the delivery temperature indicated in the climate curve.
A minimum outdoors temperature is specified (default 2°C) above which the heating element will not operate.

(2) The heating element acts as a safety device; it operates automatically when the refrigeration system is malfunctioning.

Electrical data

The power draw of the accessory depends on how it is hooked up and on its configuration (unit parameters).

Connection			2kW	4kW	6kW
Indoors unit 230/1/50					
Power supply	(1)		230/1/50	230/1/50	230/1/50
F.L.A. - Current draw under maximum conditions		A	8.69	17.39	26.09
F.L.I. - Power draw under full load (maximum conditions)		kW	2.0	4.0	6.0

Power 230/1/50 Hz +/-10%
For power voltages other than the standard, contact the AIRWELL technical department
The units are conforming with the prescriptions of European Standards CEI EN 60204 and CEI EN 60335.

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external 2 zone kit

Kit composed of:

- 1 hydronic equalisation unit
- 2 circulate pumps
- 1 three point mixer valve
- 1 controller with connectors and cables for hookup to the unit (max. 10 m)
- 1 wall mounting bracket

For the technical data on the pump pressure, refer to HYDRONIC DATA.

Indoors unit 230/1/50				
Power supply	(1)		230/1/50	230/1/50
F.L.A. - Current draw under maximum conditions		A	0.52	0.54
F.L.I. - Power draw under full load (maximum conditions)		kW	0.12	0.12

Power 230/1/50 Hz +/-10%
For power voltages other than the standard, contact the AIRWELL technical department
The units are conforming with the prescriptions of European Standards CEI EN 60204 and CEI EN 60335.

internal 2 zone kit

The kit is composed of:

- 1 hydronic equalisation unit
- 2 circulate pumps
- 1 three point mixer valve
- 1 controller with connectors and cables for hookup to the unit
- 1 mounting bracket

For the technical data on the pump pressure, refer to HYDRONIC DATA.

Indoors unit 230/1/50				
Power supply	(1)		230/1/50	230/1/50
F.L.A. - Current draw under maximum conditions		A	0.52	0.54
F.L.I. - Power draw under full load (maximum conditions)		kW	0.12	0.12

Power 230/1/50 Hz +/-10%
For power voltages other than the standard, contact the AIRWELL technical department
The units are conforming with the prescriptions of European Standards CEI EN 60204 and CEI EN 60335.

8 litre expansion vessel kit

8L expansion vessel kit.

Power supply for thermostats / remote keypad

Power supply input 230V AC output 12V DC

Dimensions: 77x90x57mm (4 DIN modules)

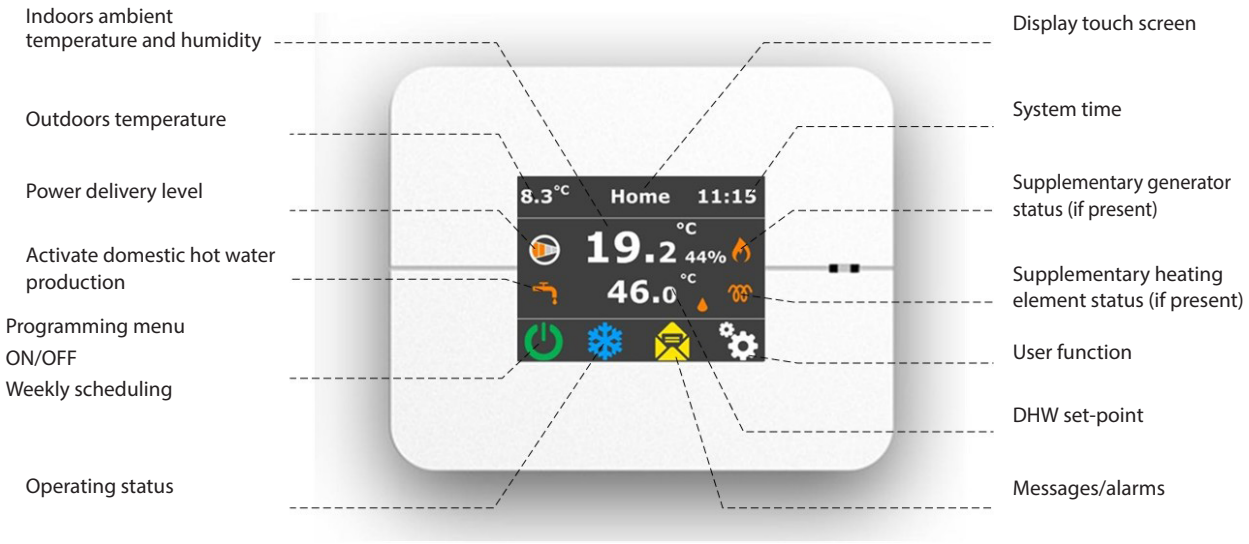
emperature and humidity thermostat / Remote keyboard with touch display for recessed (box 503) or wall mounting. White

The digital controller is equipped with a 2.8" TFT colour touch screen.

The controller can be mounted recessed into the wall using a 503 box, or wall-mounted for perfect integration even without pre-arranged connection systems.

It features an incorporated temperature and humidity sensor.

Remote keypad



Front dimensions: 120 mm (W) x 92 mm (H)

Thickness: 12.5 mm if recessed with box 503 or 20.5 mm when wall mounted

Power supply: 12 V DC

Basic rubber anti-vibration mounts

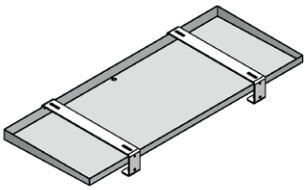
Outdoor unit

The basic rubber anti-vibration mounts reduce the vibrations generated while the compressor is running, and mount to the feet of the base.

Auxiliary condensate tray

Outdoor unit

The outdoors unit's base is equipped with a discharge for the condensate produced in the winter during defrost cycles, which helps (but does not guarantee) proper discharge of the condensate into the drain. .
To guarantee proper condensate flow off, in all conditions, use the condensate tray with discharge for connection to the drain sump, following established regulations.



CLIMATISATION ET CHAUFFAGE

WARNING :
The design and specifications are subject to change without prior notice for product improvement. Consult with the sales agency or manufacturer for details.

ATTENTION :
Le design et les données techniques sont donnés à titre indicatif et peuvent être modifiés sans préavis.

AIRWELL RESIDENTIAL SAS
3 Avenue du Centre - Les Quadrants - Bâtiment A
78280 Guyancourt - France
www.airwell-pro.com

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