Two section air-water heat pump for heating, cooling and DHW production

SPHERA EVO - B COMFORT

SRHME-BC + MDAN-YMi 2.1 - 5.1 RANGE

TECHNICAL BULLETIN

R-32 ErP ICIM CERTIFIED PRODUCT

SIZE	2.1	3.1	4.1	5.1
HEATING CAPACITY KW	4,49	6,32	8,37	10,26
COOLING CAPACITY KW	4,63	6,79	8,53	9,73

Page

Clivet is taking part in the EUROVENT certification programme up to 1.500 kW. The products concerned appear in the certified products list of the EUROVENT www.eurovent-certification.com site.

Features and benefits

SPHERA EVO is a specialised autonomous heat pump system for single- and multi-family homes with medium/low and high power consumption.
Is an air-water heat pump system for cooling and producing/storing domestic hot water.
The SPHERA EVO system is composed of a latest generation high efficiency outdoors moto-condensing unit connected via refrigerant connections to an indoors unit.

SPHERA EVO BOX

- Box Version
- Integrated 3-way valve for DHW
- Compact dimensions
- Class A+++ Low temperature
- Built-in WiFi for connection to the dedicated APP

R-32

SPHERA EVO TOWER

- Tower Version
- Two volumes of DHW 190 and 250 litres
- Class A++ Average temperature
- Class A+ Domestic hot water production
- Built-in WiFi for connection to the dedicated APP

R-32

SPHERA EVO Invisible

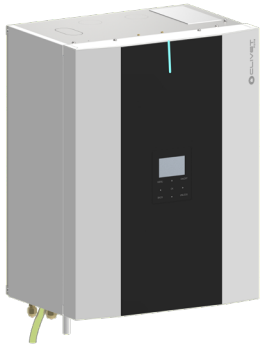
- Uncased version
- 150 litre DHW storage can be expanded up to 300 litres
- Compact dimensions for easy installation in walls
- Also available in the hybrid version with 24 kW boiler
- Built-in WiFi for connection to the dedicated APP

R-32

SPHERA EVO - BC indoor unit

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

Panelling
External panelling in zinc-magnesium sheet, with white paint in RAL 9003 to ensure better resistance to corrosion. Panels that can be easily removed to allow full access to internal components.



Internal exchanger
Direct expansion heat exchanger with INOX AISI 316 stainless steel braze-welded plates. With low refrigerant content and high exchange surface, complete with external anti-condensation thermal insulation 10 mm thick in sintered expanded polypropylene.

Hydronics module
- DC primary circulate pump, vary at variable flow
- Safety flow switch for water flow
- 3-way switching valve of installation or domestic hot water
- Water side safety valve 3bar
- Magnetic dirt separator
- Sustem purge valve
- 8 liter system expansion tank, 1 bar pre-charge
- ABS drain pan

Electrical panel
The electrical panel is located inside the unit and is easily accessible thanks to removable panel. Moreover, a LED on the front panel is connected to check the operating status of the unit.

The capacity section includes:
- main power supply terminals.

The control section includes:
- microprocessor control;
- BMS management;
- daily, weekly temperature set point and start-up/shutdown scheduler;
- anti-legionella function scheduling;
- management busters two zones;
- solar thermal management;
- management for auxiliary heaters;
- antifreeze protection water side;
- no water flow-rate protection with flow switch;
- interface terminal with graphic display.

Inside the electrical panel there are:
- T5 temperature probe for temperature control in DHW storage tanks (length 4.5m and 6mm bulb);
- T1B temperature probe for low temperature area control in the 2 area kit (length 4.5m and 6mm bulb);
- T1 temperature probe for external boiler connection kit (1.6m length and 6mm bulb).

The immersion heater in the DHW storage tanks must not exceed 4 kW.

Standard unit kit:
- Mesh filter for system water
- Copper gas reduction for 4-6 kW external unit connection
- Unit connection fittings
- Key and torx insert for opening and closing unit panels

SPHERA EVO outdoor unit

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

Panelling
Outer panelling made of Zinc-Magnesium sheet metal painted with pantone warm gray 2C to ensure superior corrosion resistance. Each panel can be easily removed to allow full access to internal components.

Rotary DC inverter compressor
Inverter controlled rotary hermetic compressor for constant modulation of the power supplied according to actual needs, ensuring high seasonal efficiency. 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. The compressor is wrapped by a sound-absorbing hood, that reduces its sound emissions. A guard heater with automatic insertion prevents the refrigerant from diluting the oil when the compressor stops.

EC inverter fan
Axial fan with variable speed control and sickle shaped blades in ABS resin. It is directly coupled to the electronically controlled motor (IP23), which, thanks to brushless technology and the particular power supply, increase its lifespan and reduce consumption. The fan is housed in an aerodynamically shaped nozzle to increase efficiency and minimise noise. It is also fitted with anti-intrusion grid.

External exchanger
Direct expansion finned coil exchanger made with copper pipes mechanically expanded to better adhere to the fin collar. It has a large surface area to improve heat exchange and reduce defrosting in the interest of seasonal efficiency. The fins are made of aluminium with hydrophilic treatment which facilitates the elimination of condensate, further improving defrosting.

Refrigerant circuit
The refrigeration circuit includes:
- Electronic expansion valve
- 4-way cycle inversion valve
- Liquid separator in extraction
- Mechanical filters
- Low pressure pressure switch
- High pressure pressure switch

EH2
EH4
EH6
EH9

Integration electric heater

Integration electric heater in STAINLESS STEEL with 2-4 kW single-phase or 6-9 kW three-phase capacities.
The electric heater can operate both for the system and for the production of domestic hot water in two different modes:

- as an integration, when the heat pump capacity is not enough to fulfil the required set point;
- as a safety element if the heat pump fails;

⚠ The additional electric heater is not an accessory supplied separately, but a construction configuration.
⚠ The configuration with additional electric heater excludes the external boiler connection kit.
⚠ Selection of the additional three-phase electric heater changes the voltage of the indoor unit only. The outdoor unit remains with single phase power supply.

1PUM

Single pump with larger available head

Configuration involving a pump with a head higher than the standard one.
The circulator, with a head of 10.5 m and a direct current power supply, has a variable flow rate and adapts perfectly to the internal logic of the unit.

⚠ Single pump with increased head is not an accessory supplied separately, but a construction configuration.

Accessories separately supplied

KIRE2HX - KIRE2HLX

2 zones: external kit, high temperature
2 zones: external kit, high temperature + low temperature

Distribution module for 2-zone heating systems with compact design (402 mm x 250 mm x h525 mm) and ample versatility for different types of installation.
Kit composed of:

- 1 collector / Black painted separator;
- 2 circulator;
- 1 sliding temperature mixing valve (only for the kit KIRE2HL);
- 1 EPP insulation (front and rear);
- 1 threaded disc with hermetic sealing cap,
- 1 lower anti-rotation jig;
- 1 support bracket module.

⚠ For the technical data of the hydraulic head of the pumps, please refer to the dedicated section in the HYDRAULIC DATA chapter.

ACIMPX

System inertial storage tank

Inertial storage to be installed outside the unit. Extremely compact, supplied with air vents and support brackets for wall installation. Suitable for all SPHERA EVO sizes, it facilitates operation and helps to fulfil the heat requirement, guaranteeing optimal modulation.
It can be installed next to or below the unit, as shown in the figure
Kit composed of:

- 1 ST37.1 steel 40 liter tank
- 1 Flexible tube from 2 m

- Extremely compact:
  LENGTH: 440 mm
  DEPTH: 220 mm
  HEIGHT: 887 mm

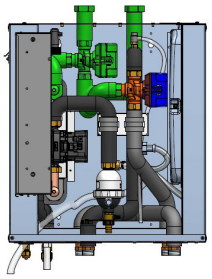
- Max. operation temperature: 100°C
- Max. operation pressure: 6 bar
- Thermally-isolated with EPP 40 g/l
- Insulation thickness 30 mm
- Automatic air vent

KCCEX

External boiler connection kit

Kit offering the option to connect the water circuit to an external boiler.
The latter, to be provided by the customer, must have a clean ON/OFF contact.
The internal logics of SPHERA EVO permit use of the boiler both together with or instead of the heat pump for greater comfort even at the coldest temperatures.
Kit composed of:

- 1 three-way valve with microswitch for ON/OFF activation of the boiler;
- copper pipes for connection;
- plastic seals;
- terminals and cables for electrical connections;
- kit installation manual.

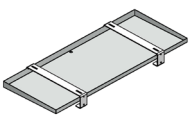


⚠ The external boiler connection kit excludes configuration with additional electric heater.
⚠ Check that the boiler pressure drops are compatible with the head of the unit.

DTX

Auxiliary condensate collection 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.
The tray also includes an antifreeze heater which prevents freezing of the condensate produced when the outside temperature drops below zero.



ACS200X **200-liter domestic hot water storage tank**
ACS2SX **200-liter domestic hot water storage tank with solar coil**
ACS300X **300-liter domestic hot water storage tank**
ACS3SX **300-liter domestic hot water storage tank with solar coil**
ACS500X **500-liter domestic hot water storage tank**
ACS5SX **500-liter domestic hot water storage tank with solar coil**

Carbon steel tanks with internal vitrification treatment according to DIN 4753-3 and UNI 10025. Complete with magnesium anodic protection, inspection flange, electric heater.
All the tanks have an external insulation in 70 mm rigid polyurethane which allows to reduce heat losses to a minimum and increase efficiency.

		ACS200X	ACS2SX	ACS300X	ACS3SX	ACS500X	ACS5SX
Capacity	[l]	196	194	273	267	475	464
Diameter	[mm]	640	640	640	640	790	790
Height	[mm]	1215	1215	1615	1615	1705	1705
Surface of exchanger	[m^2]	1,5	1,5	1,8	1,8	2,2	2,2
Surface of solar exchanger	[m^2]	\	0,5	\	1,1	\	1,3
Max pressure of hot water	[bar]	10	10	10	10	10	10
Tank energy class	[-]	B	B	B	B	B	B
Storage dispersion	[W]	51	51	63	63	80	80
Electric heater	[kW]	2,0	2,0	2,0	2,0	2,0	2,0

AMRX **Rubber antivibration mounts**

The rubber antivibration mounts reduce the vibrations produced by the compressor during its operation and are fixed to the base feet.

General technical data

Performance

SIZE			2.1	3.1	4.1	5.1
HEATING						
Air 7°C - Water 35°C						
Nominal Heating capacity / Max	1	kW	4,49 / 6,92	6,32 / 8,79	8,37 / 11,0	10,26 / 12,3
Total power input	1	kW	0,90	1,32	1,72	2,19
COP	1	-	5,01	4,79	4,87	4,68
Water flow-rate	1	l/s	0,22	0,31	0,41	0,48
Nominal available pressure	1	kPa	38,0	46,0	34,0	20,0
Maximum available pressure	1	kPa	67,0	57,0	38,0	20,0
Air -7°C - Water 35°C						
Nominal Heating capacity / Max	2	kW	4,59 / 4,81	5,55 / 5,70	6,46 / 6,71	8,02 / 8,25
Total power input	2	kW	1,50	1,91	2,13	2,69
COP	2	-	3,07	2,90	3,04	2,98
Water flow-rate	2	l/s	0,23	0,31	0,32	0,40
Nominal available pressure	2	kPa	38,0	46,0	45,0	38,0
Maximum available pressure	2	kPa	66,0	57,0	55,0	39,0
Air 7°C - Water 45°C						
Nominal Heating capacity / Max	3	kW	4,14 / 6,40	6,09 / 8,25	8,02 / 10,6	10,3 / 11,9
Total power input	3	kW	1,12	1,66	2,10	2,81
COP	3	-	3,70	3,66	3,82	3,67
Water flow-rate	3	l/s	0,20	0,29	0,38	0,47
Nominal available pressure	3	kPa	39,0	47,0	37,0	21,0
Maximum available pressure	3	kPa	69,0	59,0	43,0	21,0
COOLING						
Air 35°C - Water 18°C						
Nominal Cooling capacity / Max	4	kW	4,63 / 7,86	6,79 / 9,30	8,53 / 10,3	9,73 / 11,5
Total power input	4	kW	0,89	1,32	1,71	2,00
EER	4	-	5,21	5,14	5,00	4,87
Water flow-rate	4	l/s	0,22	0,32	0,41	0,45
Nominal available pressure	4	kPa	38,0	45,0	34,0	27,0
Maximum available pressure	4	kPa	67,0	55,0	38,0	27,0
Air 35°C - Water 7°C						
Nominal Cooling capacity / Max	5	kW	4,56 / 6,57	6,17 / 7,58	7,39 / 9,09	9,06 / 10,2
Total power input	5	kW	1,31	1,92	2,37	3,01
EER	5	-	3,49	3,21	3,12	3,01
Water flow-rate	5	l/s	0,22	0,30	0,35	0,41
Nominal available pressure	5	kPa	38,0	46,0	37,0	34,0
Maximum available pressure	5	kPa	67,0	58,0	49,0	38,0
ERP						
Clima Average High temperature Heat pumps						
Nominal power	6	kW	5	6	8	9
SCOP	6		3,37	3,37	3,40	3,56
Generator energy class	6		A++	A++	A++	A++
η_s	6	%	132	132	133	140
System energy class	6		A++	A++	A++	A++
η_s	6	%	137	137	138	145
Clima Average Low temperature Heat pumps						
Nominal power	7	kW	5	6	8	10
SCOP	7		4,73	4,89	4,96	5,04
Generator energy class	7		A+++	A+++	A+++	A+++
η_s	7	%	186	192	195	199
System energy class	7		A+++	A+++	A+++	A+++
η_s	7	%	191	197	200	204

1. User side entering/leaving water temperature 30/35°C, source side air 7°C (U.R. = 85% Heat power data, Total power input and COP in accordance with EN 14511:2018.
2. User side entering/leaving water temperature 30/35°C, source side air -7°C Heat power data, Total power input and COP in accordance with EN 14511:2018.
3. User side entering/leaving water temperature 40/45°C, source side air 7°C (U.R. = 85% Heat power data, Total power input and COP in accordance with EN 14511:2018.
4. User side entering/leaving water temperature 18/23°C, source side air 35°C Heat power data, Total power input and COP in accordance with EN 14511:2018.
5. User side entering/leaving water temperature 7/12°C, source side air 35°C Heat power data, Total power input and COP in accordance with EN 14511:2018.
6. The product is conforming with the European ErP Directives, which includes Commission Delegated Regulation (EU) N. 811/2018 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. 811/2018 and Commission Delegated Regulation N. 813/2013, Clima Average, Low Temperature 30/35°C.

* All data calculated with zero elevation gain and equivalent length of 7m.

Construction - Outdoor unit

SIZE			2.1	3.1	4.1	5.1
Characteristics						
Compressor			Rotary	Rotary	Rotary	Rotary
Refrigerant			R-32	R-32	R-32	R-32
Refrigerant charge		kg	1,55	1,55	1,65	1,65
GWP		t_{CO2}	675	675	675	675
Equivalent tons of CO2 (*)		t_t	1,05	1,05	1,11	1,11
Oil charge		l	0,46	0,46	0,46	0,46
Type of fan			Axial	Axial	Axial	Axial
Standard air flow rate		m^3/h	2860	2860	4750	4750
Outdoors unit sound pressure at 1 metre	1	dB(A)	47	48	48	50
Sound power	1	dB(A)	61	62	63	65
Dimensions						
Length of unit		mm	960	960	1075	1075
Depth of unit		mm	380	380	395	395
Height of unit		mm	860	860	965	965
Operation weight		kg	57	57	67	67

1. 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).

(*) It contains fluorinated greenhouse gases.

Construction - Indoor unit

SIZE			A
Characteristics			
Maximum circuit pressure		bar	3
System expansion tank	1	l	8
Dimensions			
Length of unit		mm	547
Depth of unit		mm	386
Height of unit		mm	604
Operation weight		kg	52

1. Sufficient volume up to a maximum of 60 litres of system water content.

Hydronic data - Indoor unit + outdoor unit

SIZE			2.1	3.1	4.1	5.1
Characteristics			**A**	**A**	**A**	**A**
Minimum system water content	1	l	15	22	28	35
Minimum admitted water flow rate		l/s	0,16	0,16	0,16	0,16
Maximum admitted water flow rate		l/s	0,61	0,61	0,61	0,61

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.

Electrical data

Indoor unit - Standard

SIZE			
Power supply 220-240V~ 50Hz			
F.L.A. - TOTAL Full load current at max admissible conditions		A	0,50
F.L.I. - TOTAL Full load power input		kW	0,10
M.I.C. - Maximum inrush current		A	0,50

Power supply 220-240V ~ 50Hz +/-10%
The units are conforming with the prescriptions of European Standards CEI EN 60335 and EN 60335-2-40

Outdoor unit - Standard

SIZE			2.1	3.1	4.1	5.1
Power supply 220-240V ~ 50Hz						
F.L.A. - Full load current at max admissible conditions		A	11,3	11,3	16,7	16,7
F.L.I. - Full load power input at max admissible conditions		kW	2,65	2,65	3,80	3,80
M.I.C - Maximum inrush current		A	11,3	11,3	16,7	16,7

Power supply 220-240V ~ 50Hz +/-10%
The units are conforming with the prescriptions of European Standards CEI EN 60335 and EN 60335-2-40
(*) The electrical consumptions relating to the electric heater refer to that in the DHW storage tank.

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

Unit configured with oversized pump

SIZE			1PUM
Power supply 220-240V ~ 50Hz			
F.L.A. - Current absorbed by the unit with increased head circulator		A	0,90
F.L.I. - Power input of the unit with increased head circulator		kW	0,20
M.I.C. - Unit maximum starting current of the unit with increased head circulator		A	0,90

Power supply 220-240V ~ 50Hz +/-10%
The units are conforming with the prescriptions of European Standards CEI EN 60335 and EN 60335-2-40
Data to be added to the values of the standard indoor unit.

Unit configured with single-phase integration electric heaters

SIZE			EH2	EH4
Power supply 220-240V ~ 50Hz				
F.L.A. - Current absorbed by the unit with increased head circulator		A	8,70	17,4
F.L.I. - Power input of the unit with increased head circulator		kW	2,00	4,00
M.I.C. - Unit maximum starting current of the unit with increased head circulator		A	8,70	17,4

Power supply 220-240V ~ 50Hz +/-10%
The units are conforming with the prescriptions of European Standards CEI EN 60335 and EN 60335-2-40
Data to be added to the values of the standard indoor unit.

Unit configured with three-phase integration heaters

SIZE			EH6	EH9
Power supply 380-415V ~ 50Hz				
F.L.A. - Current absorbed by the unit with increased head circulator		A	8,60	13,0
F.L.I. - Power input of the unit with increased head circulator		kW	6,00	9,00
M.I.C. - Unit maximum starting current of the unit with increased head circulator		A	8,60	13,0

Power supply 380-415V ~ 50Hz +/-6%
The units are conforming with the prescriptions of European Standards CEI EN 60335 and EN 60335-2-40
Data to be added to the values of the standard indoor unit.

External 2 zone kit

SIZE		KI RE2HX - KIRE2HLX
Power supply 220-240V ~50Hz		
F.L.A. - Full load current at max admissible conditions	A	0,45
F.L.I. - Full load power input at max admissible conditions	kW	0,10

Power supply 220-240V ~ 50Hz +/-10%
The units are conforming with the prescriptions of European Standards CEI EN 60335 and EN 60335-2-40
Data to be added to the values of the standard indoor unit.

Storage tanks for domestic hot water

SIZE		ACS200X	ACS2SX	ACS300X	ACS3SX	ACS500X	ACS5SX
Power supply 220-240V ~50Hz							
F.L.A. - Current absorbed by the electric heater	A	8,70	8,70	8,70	8,70	8,70	8,70
F.L.I. - Power input of the electric heater	kW	2,00	2,00	2,00	2,00	2,00	2,00
M.I.C. Unit maximum starting current	A	8,70	8,70	8,70	8,70	8,70	8,70

Power supply 220-240V ~ 50Hz +/-10%
The units are conforming with the prescriptions of European Standards CEI EN 60335 and EN 60335-2-40
Data to be added to the values of the standard indoor unit.
The tanks are supplied with immersed electric heater.

Auxiliary drain pan

SIZE		DTX
Power supply 220-240V ~50Hz		
F.L.A. - Full load current at max admissible conditions	A	0,40
F.L.I. - Full load power input at max admissible conditions	W	80,0

Power supply 220-240V ~ 50Hz +/-10%
The units are conforming with the prescriptions of European Standards CEI EN 60335 and EN 60335-2-40
Data to be added to the values of the standard indoor unit.

Sound levels outdoor unit

Standard mode

SIZE	Sound power level								Sound power level	Sound pressure level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
2.1	67	63	62	57	56	51	44	37	47	61
3.1	68	69	61	58	57	54	47	42	48	62
4.1	74	71	64	59	57	56	52	46	48	63
5.1	79	70	64	62	60	58	54	48	50	65

Sound levels refer to units with full load under nominal test conditions. Data referred to the following conditions:
entering / leaving exchanger water temperature user side 47/55°C source side exchanger air inlet 7°C.
The sound pressure level refers to a distance of 1m from the external surface of the units operating in an open field.
Noise levels are determined using the tensiometric method (UNI EN ISO 9614-2)

Silenced mode

SIZE	Sound power level	Sound pressure level
	dB(A)	dB(A)
2.1	47	61
3.1	47	61
4.1	47	62
5.1	47	62

Sound levels refer to units with full load under nominal test conditions.
For maximum capacity delivered in silent mode use a correction factor of 0.8.
Data referred to the following conditions: entering / leaving exchanger water temperature user side 47/55°C source side exchanger air inlet 7°C.
The sound pressure level refers to a distance of 1m from the external surface of the units operating in an open field.
Noise levels are determined using the tensiometric method (UNI EN ISO 9614-2)

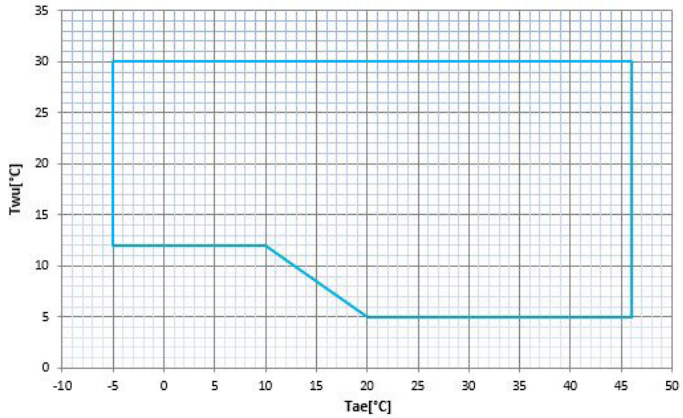
Super-silenced mode

SIZE	Sound power level	Sound pressure level
	dB(A)	dB(A)
2.1	44	58
3.1	45	59
4.1	45	60
5.1	46	61

Sound levels refer to units with full load under nominal test conditions.
For maximum capacity delivered in silent mode use a correction factor of 0,6
Data referred to the following conditions: entering / leaving exchanger water temperature user side 47/55°C source side exchanger air inlet 7°C.
The sound pressure level refers to a distance of 1m from the external surface of the units operating in an open field.
Noise levels are determined using the tensiometric method (UNI EN ISO 9614-2)

Operating limits

Cooling



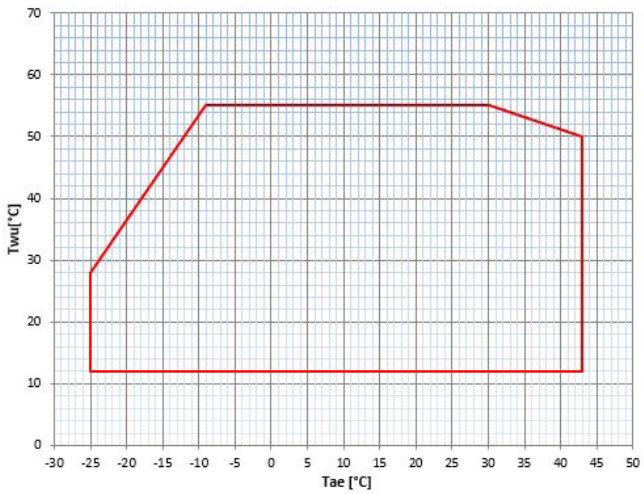
Twu [°C] = Exchanger water outlet temperature
Tae [°C] = Outdoors exchanger air inlet temperature

Heating

Twu [°C] = Temperature domestic hot water
Tae [°C] = Outdoors exchanger air inlet temperature

In the configuration with the integration electric heater, the extension of the limits varies according to the electrical capacity of the electric heater chosen.

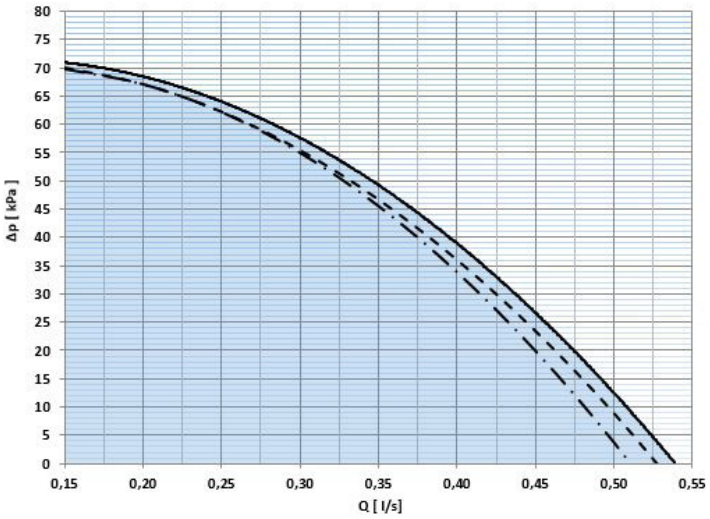
Domestic hot water



Twu [°C] = Exchanger water outlet temperature
Tae [°C] = Outdoors exchanger air inlet temperature

General technical data

Available pressure of the standard circulator at the unit connections



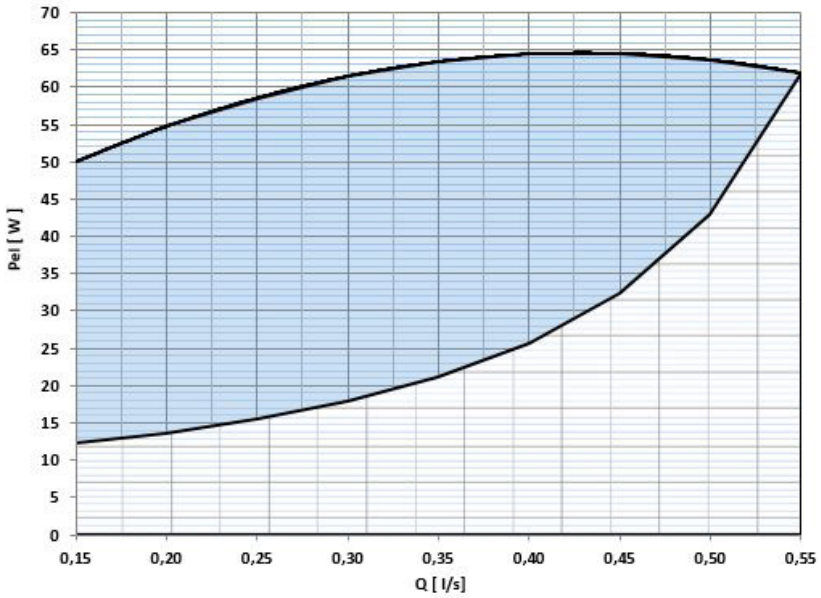
ΔP [kPa] = Available pressure
Q [l/s] = Water flow-rate

-------- Maximum head of the circulator with configuration of integration electric heater

_.-.-._ Maximum head of the circulator with option of external boiler connection kit

Circulator operating field

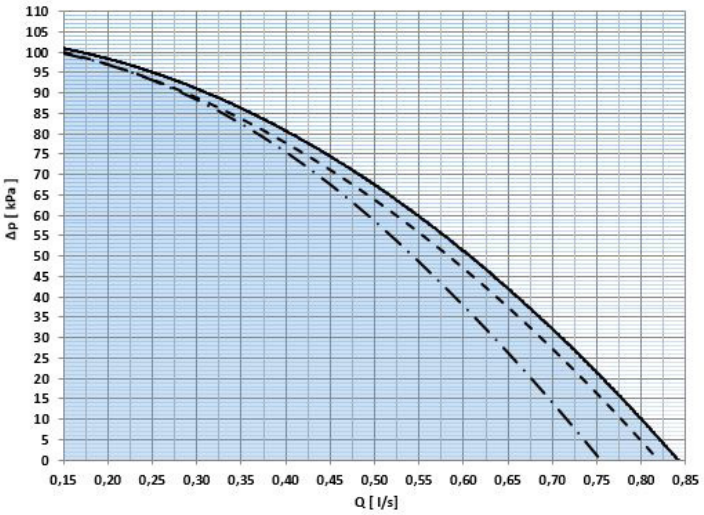
Absorption of the standard circulator



Pel [W] = Electrical power input
Q [l/s] = Water flow-rate

Circulator operating field

Head of the circulator with increased pump at the unit connections



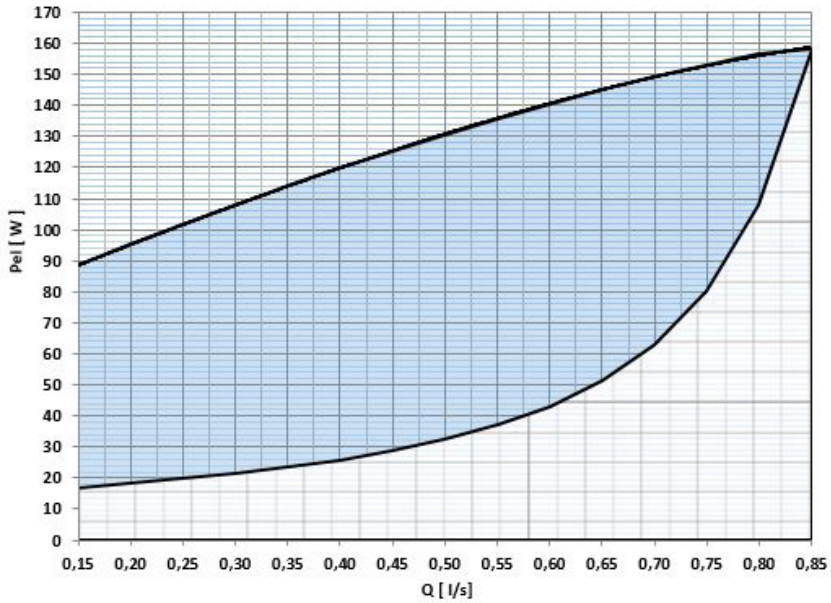
ΔP [kPa] = Available pressure
Q [l/s] = Water flow-rate

-------- Maximum head of the circulator with configuration of integration electric heater

_.-._.-._ Maximum head of the circulator with option of external boiler connection kit

Circulator operating field

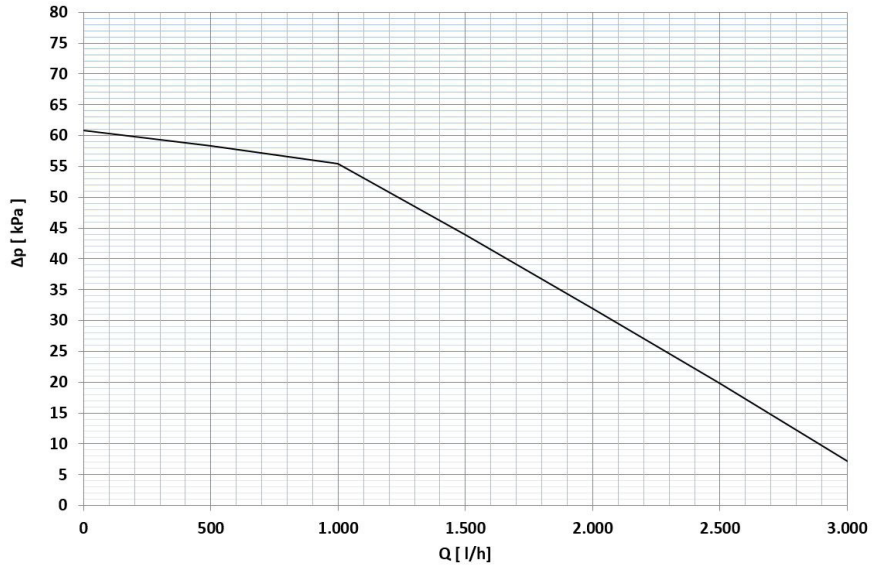
Absorption of the circulator increased



Pel [W] = Electrical power input
Q [l/s] = Water flow-rate

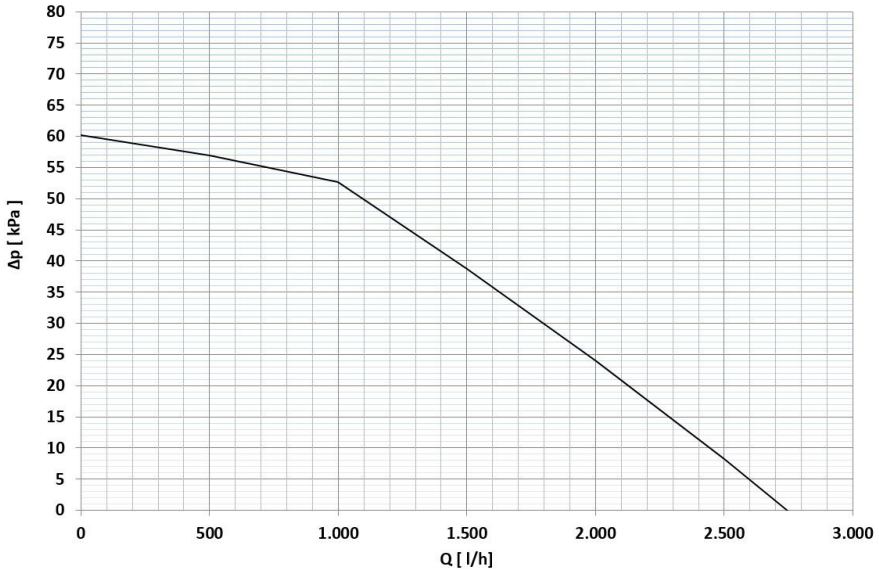
Circulator operating field

Pressure drop for direct booster system circulator



ΔP [kPa] = Available pressure
Q [l/h] = Water flow-rate

Available head for mixed booster system circulator

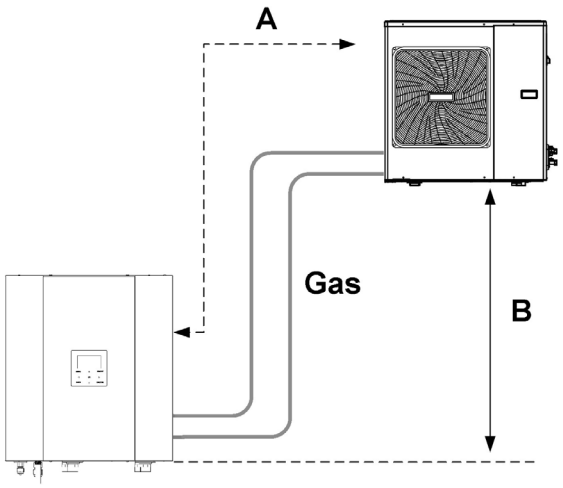


Pel [W] = Electrical power input
Q [l/h] = Water flow-rate

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.

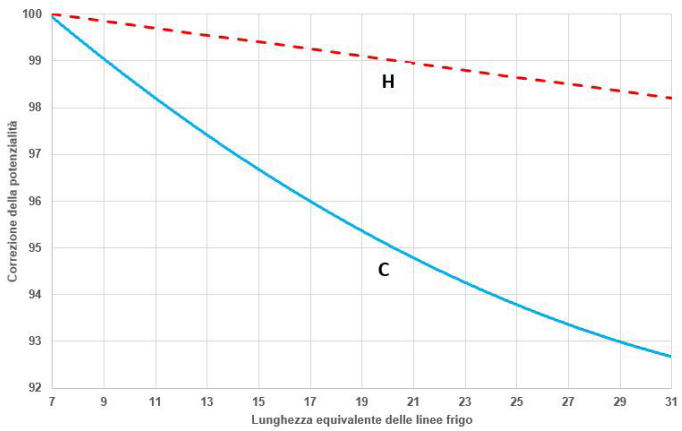
⚠ To correctly install the refrigerant pipes and charge the refrigerant gas, refer to the SPHERA MANUAL



SIZE		2.1	3.1	4.1	5.1
Length and height difference of refrigerant pipes					
A - Refrigerant pipe min/max equivalent length	m	3 - 30	3 - 30	3 - 30	3 - 30
C - Maximum level difference of refrigerant piping with external unit above internal unit	m	25	25	25	25
B - Maximum level difference of refrigerant piping with external unit above internal unit	m	25	25	25	25
Diameters of refrigerant pipes					
Gas pipe diameter	inch	5/8"	5/8"	5/8"	5/8"
Fluid line diameter	inch	1/4"	1/4"	3/8"	3/8"
Power supply 220-240V ~50Hz					
R32 - Standard charge for connections up to 15 m	kg	1,55	1,55	1,65	1,65
Equivalent tons of CO2	$t_{eq\ co2}$	1,05	1,05	1,11	1,11
Additional charge per metre	kg/m	0,020	0,020	0,038	0,038

Determination of cooling and heating power loss

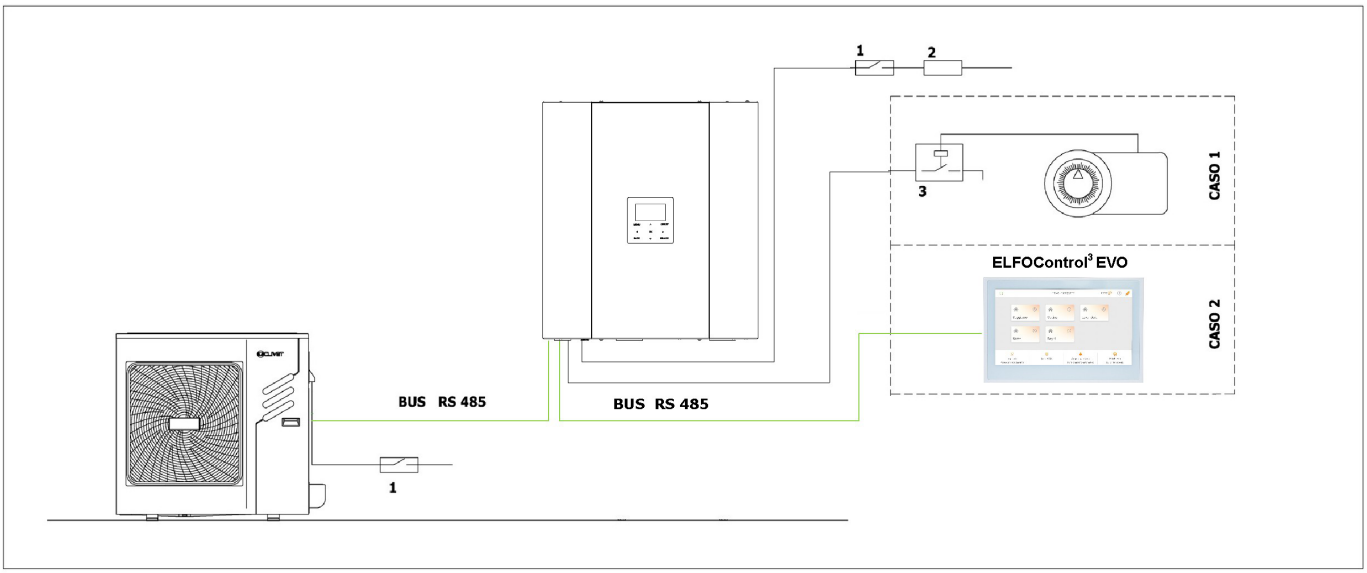
The equivalent length of the cooling lines results in a loss of cooling and heating power supplied to the circuit and DHW system.
The graph shows the amount of this loss of powergh



1. C = Cooling power efficiency curve
2. H = Heating power efficiency curve

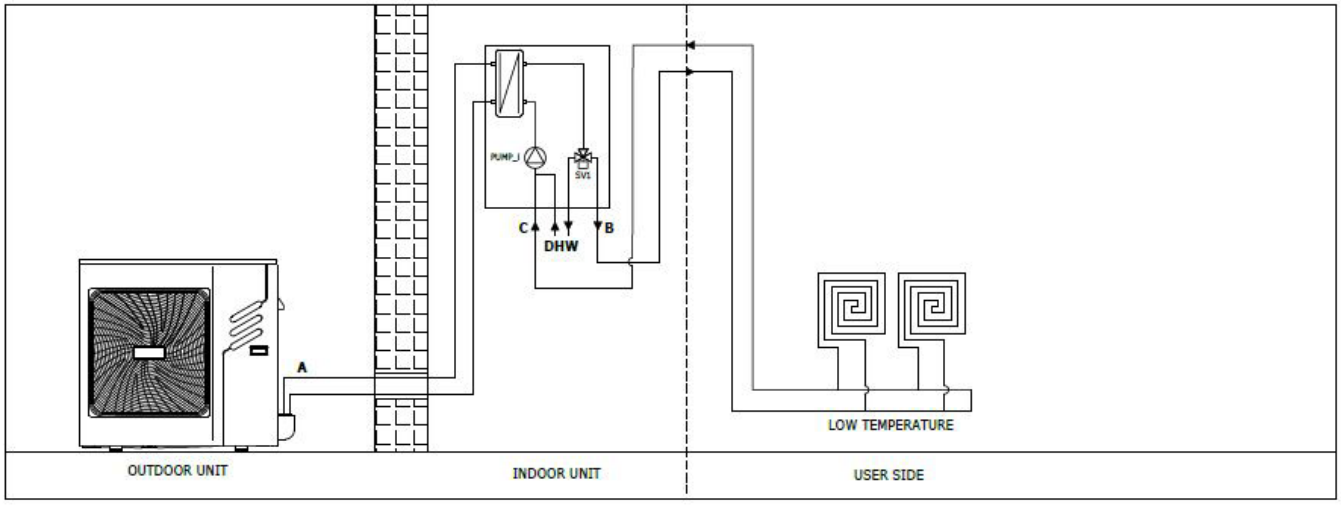
Electrical connections

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.
SPHERA EVO can be controlled with the on-board controller. To operate the unit, you may use: the ELFOControl[3] EVO supervision system or normal electromechanical thermostats.
For more information on connections, consult the installation manual.

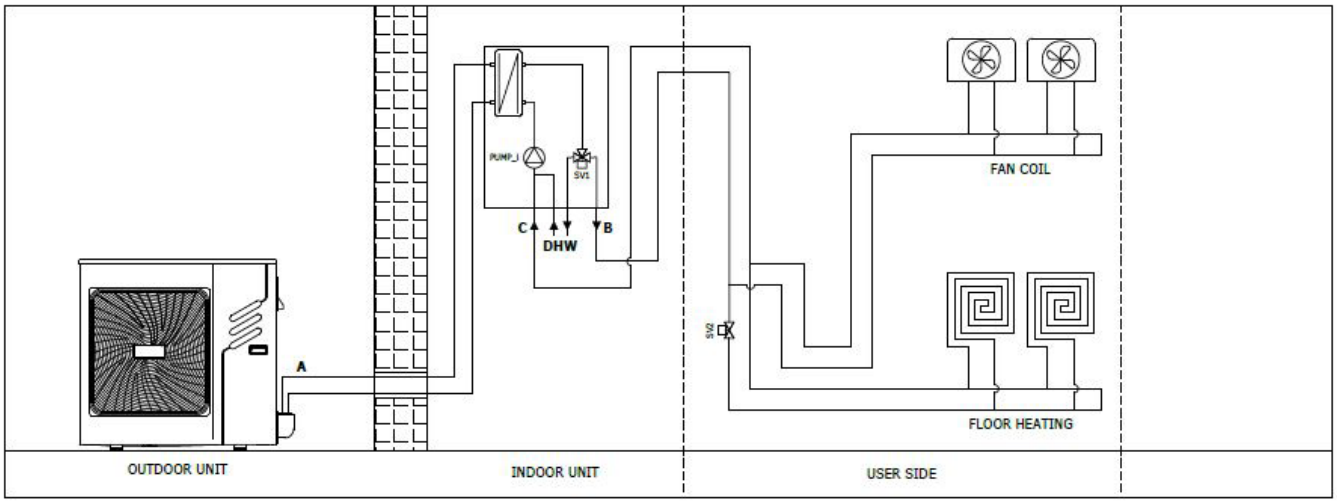


1. Contactor or automatic switch
2. Differential circuit breaker
3. Relè

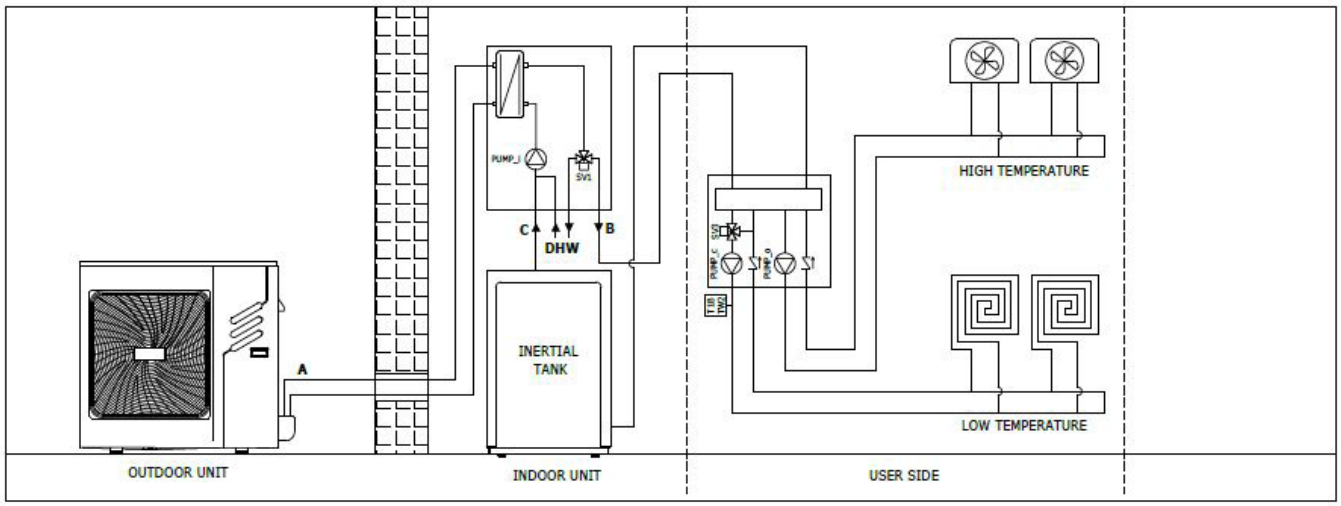
General description of the system and possible connections



Single Zone

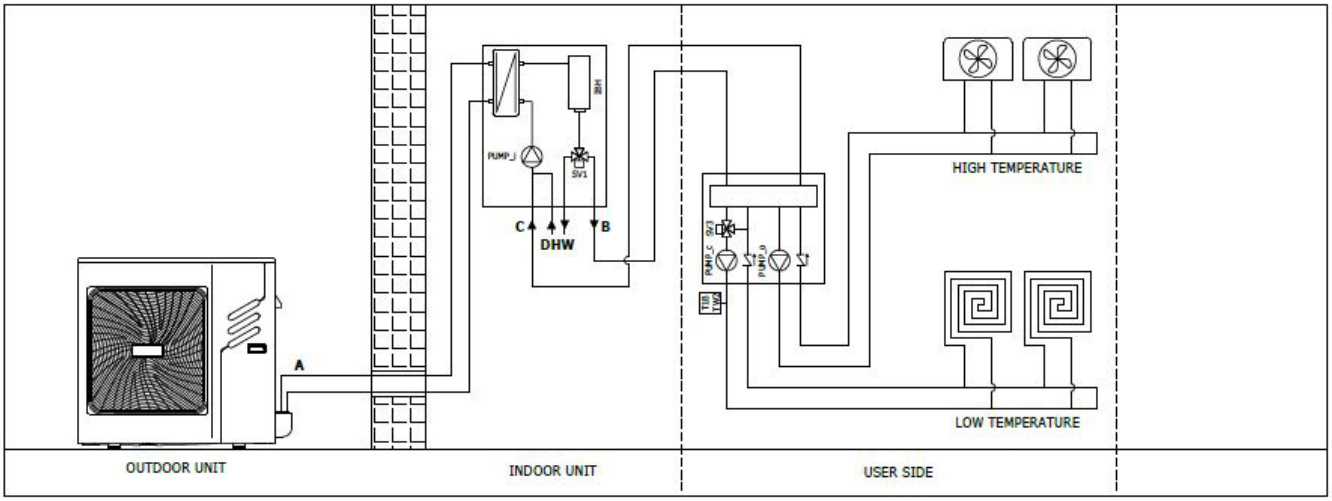


Single Zone (SV2 by the customer)

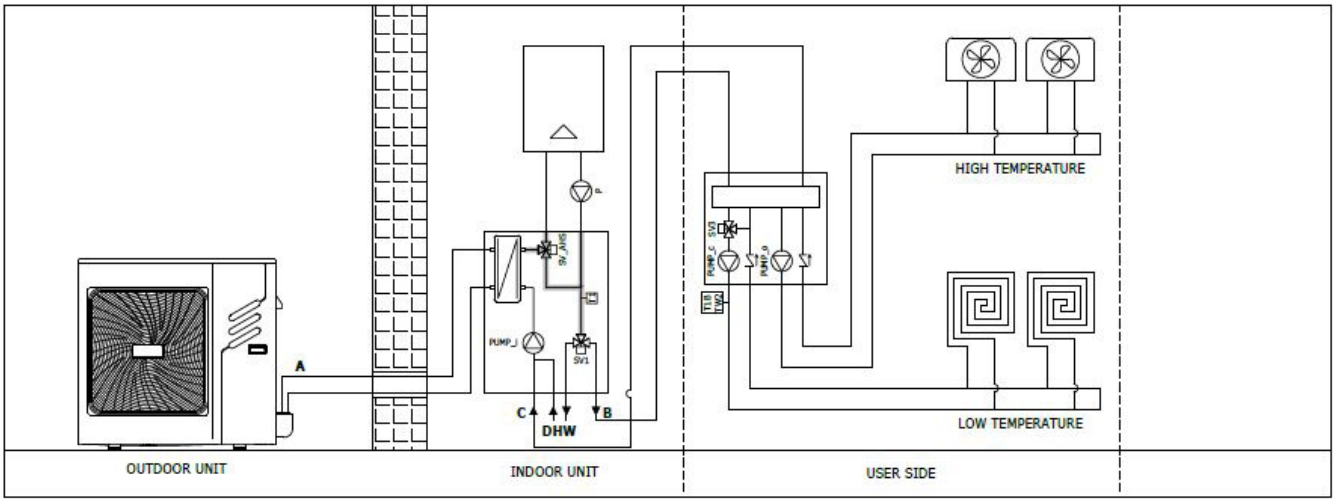


2 zone

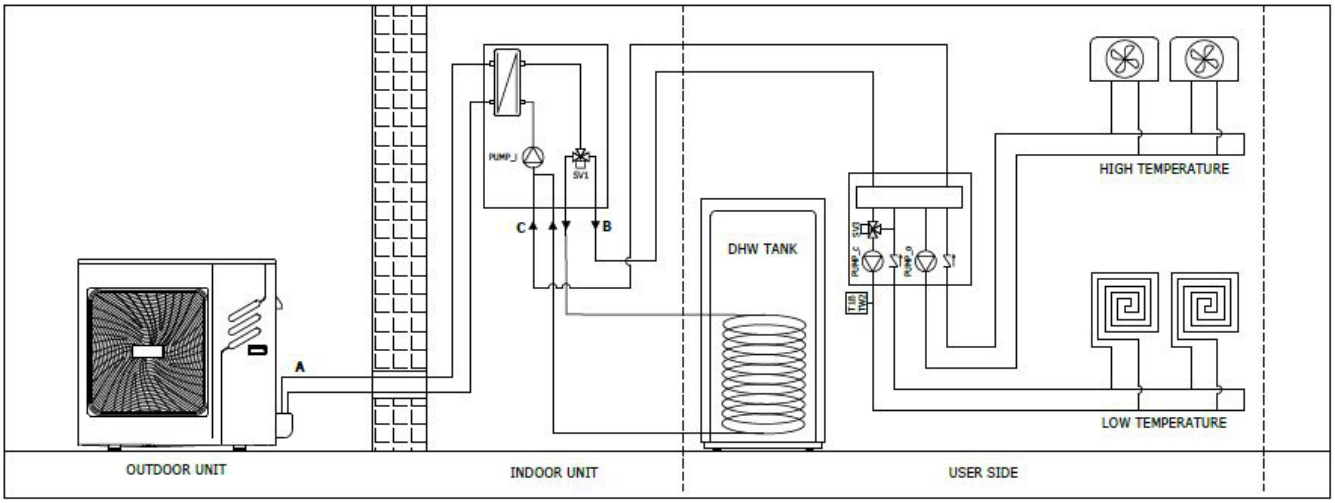
System connections



Additional electric heater



Connection to an external boiler



Additional storage tank

Clivet S.p.A. 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

SPHERA EVO 2.1

Data for determination of COPPL T delivery 20°C		Tdesignh	A	B	C	D
	Te	-10	-7	2	7	12
2.1	PLR	100%	88%	54%	35%	15%
	DC		4,59	4,68	4,49	5,25
	CR		1,00	0,60	0,41	0,15
	P	5,21	4,59	2,94	1,78	1,68
	COP (part load)		3,06	4,32	4,94	3,45
	COP (full load)		3,06	4,09	4,96	5,81
	Fcop		1,00	1,06	1,00	0,59
Data to be provided for power and COP under full load cold source air						
	Te	Tm	-7	2	7	12
2.1	Potenza Termica $\Phi_{H,HP\ out}$ (kW)	35°C	4,59	4,68	4,49	5,25
		45°C	4,29	4,33	4,14	4,84
		55°C	4,38	4,38	4,09	4,77
	COP	35°C	3,06	4,09	4,96	5,81
		45°C	2,35	3,08	3,68	4,24
		55°C	1,88	2,41	2,84	3,23
DHW Power and COP data under full load				Te		
	Te	Tm	7	15	20	35
2.1	Heating capacity $\Phi_{H,HP\ out}$ (kW)	55°C	4,09	5,18	6,05	8,66
	COP	55°C	2,84	3,45	3,96	5,40

SPHERA EVO 3.1

Data for determination of COPPL T delivery 20°C		Tdesignh	A	B	C	D
	Te	-10	-7	2	7	12
3.1	PLR	100%	88%	54%	35%	15%
	DC		5,61	6,02	6,32	7,37
	CR		1,00	0,57	035	0,13
	P	6,38	5,61	3,69	2,22	1,62
	COP (part load)		3,12	4,01	4,93	3,13
	COP (full load)		3,12	3,83	4,79	5,54
	Fcop		1,00	1,05	1,03	0,56
Data to be provided for power and COP under full load cold source air				Te		
	Te	Tm	-7	2	7	12
3.1	Heating capacity $\Phi_{H,HP\ out}$ (kW)	35°C	5,61	6,02	6,32	7,37
		45°C	5,27	6,48	6,09	7,10
		55°C	5,20	5,51	5,76	6,71
	COP	35°C	3,12	3,83	4,79	5,54
		45°C	2,28	2,91	3,64	4,17
		55°C	1,92	2,43	2,98	3,38
DHW Power and COP data under full load				Te		
	Te	Tm	7	15	20	35
3.1	Heating capacity $\Phi_{H,HP\ out}$ (kW)	55°C	5,76	7,27	8,52	12,26
	COP	55°C	2,98	3,61	4,14	5,63

Data for the UNI/TS 11300 calculation

SPHERA EVO 4.1

Data for determination of COPPL T delivery 20°C		Tdesignh	A	B	C	D
	Te	-10	-7	2	7	12
4.1	PLR	100%	88%	54%	35%	15%
	DC		6,46	6,70	8,37	9,06
	CR		1,00	0,59	0,31	0,12
	P	7,34	6,46	4,11	2,54	1,54
	COP (part load)		3,03	4,19	5,52	3,58
	COP (full load)		3,03	3,96	4,87	5,73
	Fcop		1,00	1,06	1,13	0,62
Data to be provided for power and COP under full load cold source air				Te		
	Te	Tm	-7	2	7	12
4.1	Heating capacity $\Phi_{H,HP\ out}$ (kW)	35°C	6,46	6,70	8,37	9,06
		45°C	6,19	6,43	8,02	8,64
		55°C	5,93	6,12	7,60	8,13
	COP	35°C	3,03	3,96	4,87	5,73
		45°C	2,48	3,15	3,82	4,44
		55°C	2,09	2,60	3,11	3,54
DHW Power and COP data under full load				Te		
	Te	Tm	7	15	20	35
4.1	Heating capacity $\Phi_{H,HP\ out}$ (kW)	55°C	7,60	8,44	9,92	14,35
	COP	55°C	3,11	3,83	4,30	5,48

SPHERA EVO 5.1

Data for determination of COPPL T delivery 20°C		Tdesignh	A	B	C	D
	Te	-10	-7	2	7	12
5.1	PLR	100%	88%	54%	35%	15%
	DC		8,23	9,46	10,26	11,85
	CR		1,00	0,53	0,32	0,12
	P	9,35	8,23	5,19	3,56	1,87
	COP (part load)		3,31	4,22	6,36	4,87
	COP (full load)		3,31	3,85	4,68	5,45
	Fcop		1,00	1,10	1,36	0,89
Data to be provided for power and COP under full load cold source air				Te		
	Te	Tm	-7	2	7	12
5.1	Heating capacity $\Phi_{H,HP\ out}$ (kW)	35°C	8,23	9,46	10,26	11,85
		45°C	7,67	9,67	10,30	11,87
		55°C	7,28	8,74	9,43	10,84
	COP	35°C	3,31	3,85	4,68	5,45
		45°C	2,43	3,03	3,66	4,19
		55°C	2,00	2,53	3,00	3,39
DHW Power and COP data under full load				Te		
	Te	Tm	7	15	20	35
5.1	Heating capacity $\Phi_{H,HP\ out}$ (kW)	55°C	9,43	11,68	13,29	18,12
	COP	55°C	3,00	3,62	4,12	5,61

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

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

UNI/TS 11300 Part 3

SIZE	Cooling capacity kW				EER			
Test	1	2	3	4	1	2	3	4
	100%	75%	50%	25%	100%	75%	50%	25%
220-240V N 50Hz								
2.1	4,56	3,42	2,29	1,32	3,48	4,33	5,45	6,95
3.1	6,17	4,63	3,09	1,54	3,21	3,96	5,33	7,70
4.1	7,39	5,54	3,70	1,90	3,12	4,10	5,36	6,55
5.1	9,06	6,79	4,53	2,26	3,00	4,24	5,33	7,53

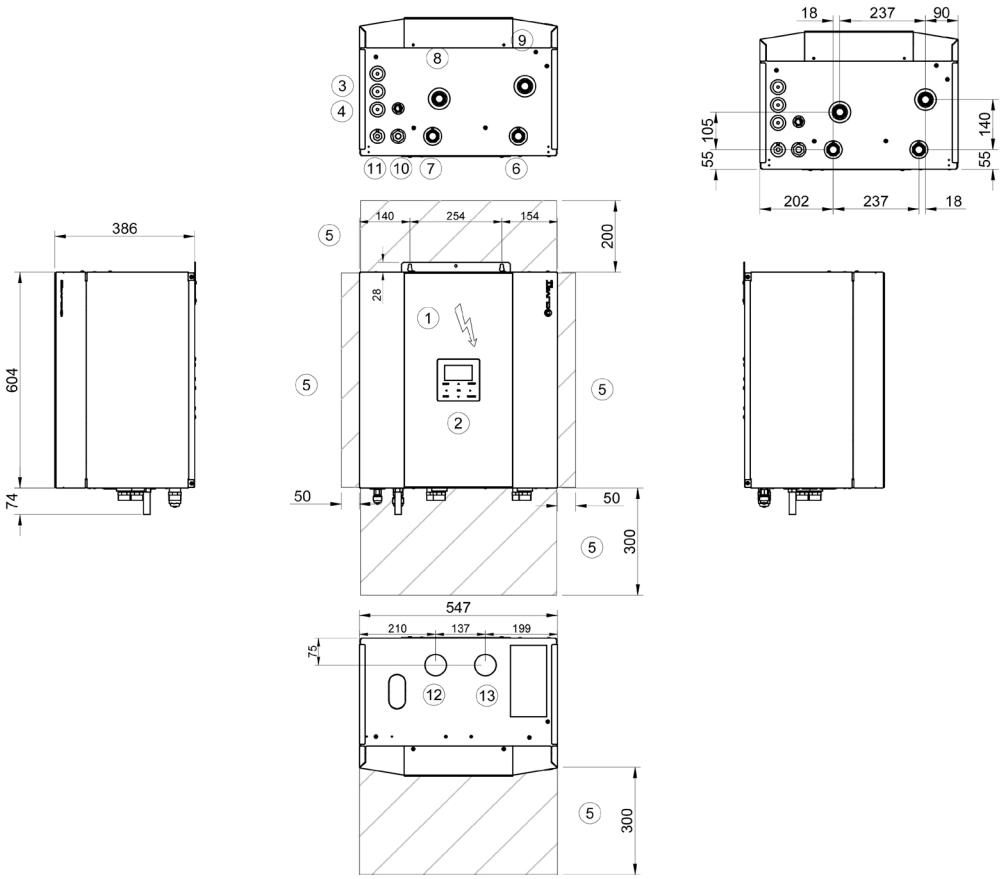
Reference conditions prescribed by UNI/TS 11300-3:

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

Dimensional drawings

SPHERA EVO -B Comfort (indoor unit)

DAAHM0001_00
DATA/DATE 26/05/2020



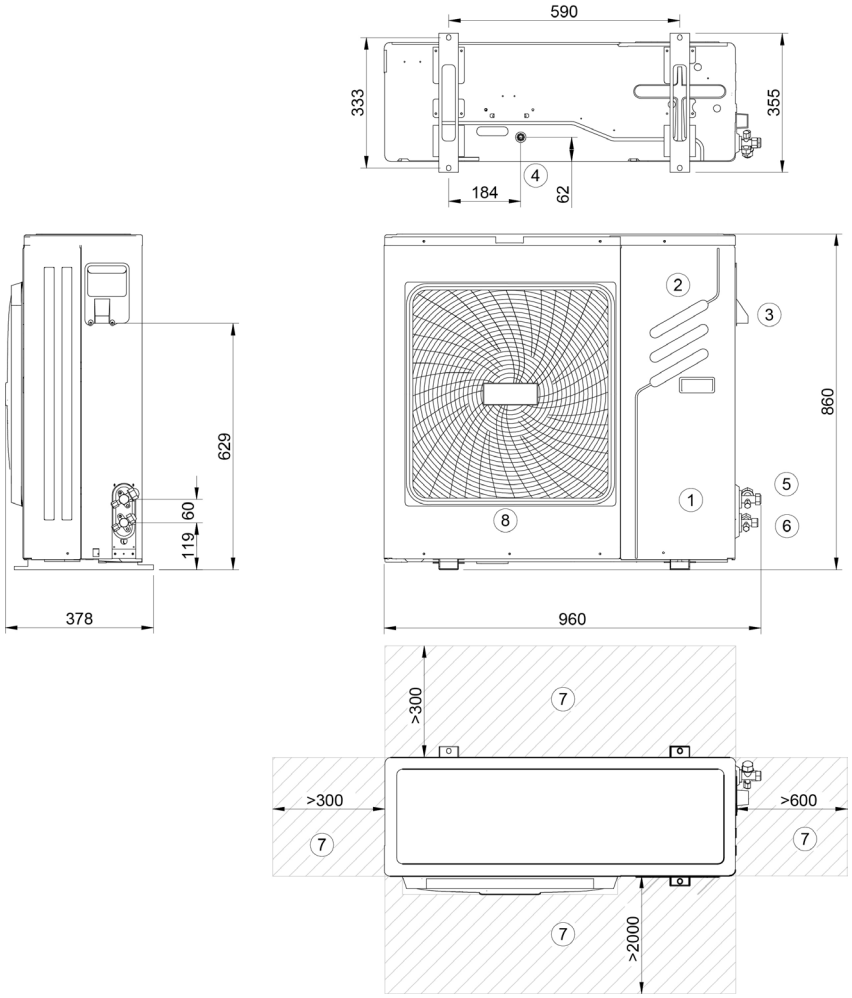
1. Electrical panel
2. Unit control keypad
3. Power input
4. Condensate drain
5. Functional spaces
6. DHW exchanger supply
7. DHW exchanger return
8. System outlet
9. System return
10. 5/8" SAE intake connection
11. 3/8" SAE liquid connection
12. Gas boiler inlet (optional)
13. Gas boiler outlet (optional)

SIZE		
Operation weight	kg	50
Shipping weight	kg	58

The presence of optional accessories may result in a substantial variation of the weights shown in the table.

SPHERA EVO (outdoor unit) - 2.1 - 3.1

DAAP80001_REV00
DATA/DATE 20/09/2019



1. Compressor enclosure
2. Electrical panel
3. Power input
4. Condensate drain
5. Gas connections (5/8")
6. Gas connections (3/8")
7. Functional spaces
8. Electrical fan

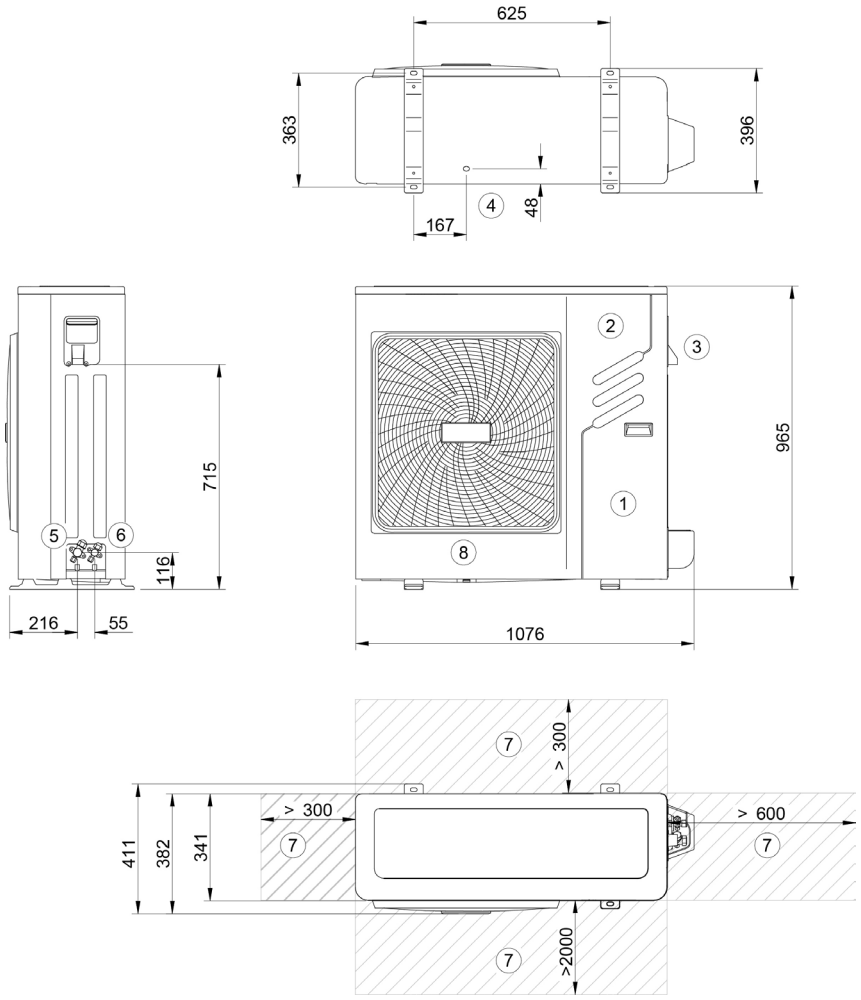
SIZE			2.1	3.1
Operation weight		kg	57	57
Shipping weight		kg	68	68

The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional drawings

SPHERA EVO (outdoor unit) - 4.1 - 5.1

DAAP80002_REV00
DATA/DATE 20/09/2019



1. Compressor enclosure
2. Electrical panel
3. Power input
4. Condensate drain
5. Gas connections (5/8")
6. Gas connections (3/8")
7. Functional spaces
8. Electrical fan

SIZE			4.1	5.1
Operation weight		kg	67	67
Shipping weight		kg	79	79

The presence of optional accessories may result in a substantial variation of the weights shown in the table.

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SPHERA EVO - B COMFORT - BT 20I003GB-01

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