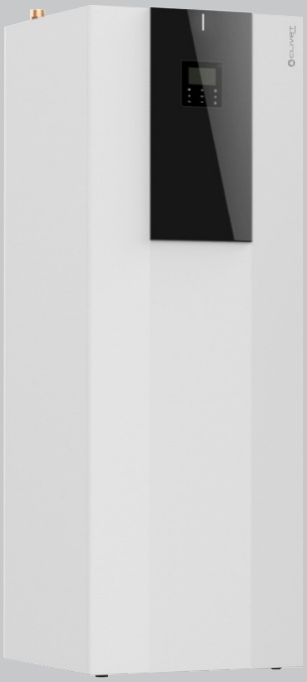
Two section air-water heat pump for heating, cooling and DHW production

SPHERA EVO - T COMFORT

SRHME + MDAN-YMi 2.1 - 5.1 RANGE

TECHNICAL BULLETIN



SIZE	2.1	3.1	4.1	5.1	ACCUMULO ACS
HEATING CAPACITY KW	4,49	6,32	8,37	10,26	190 L
COOLING CAPACITY KW	4,63	6,79	8,53	9,73	250 L

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 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 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 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

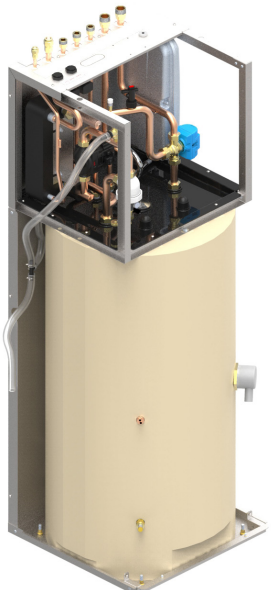
SPHERA EVO - T Comfort indoor unit

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.

Domestic hot water
- 190-litre or 250-litre DHW storage tank with vitrified internal surface and external polyurethane insulation (50mm thick). Magnesium anode
- 2 kW safety and anti-legionella heating element
- Internal exchanger in vitrified steel with an exchange surface of 2 m^2
- Set-up for domestic hot water recirculation circuitStorage discharge stop valve
- Probe sump for solar thermal system control



Hydronics module
- Variable flow direct current primary circulator
- Safety flow switch for water flow
- 3-way switching valve for system or domestic hot water
- 3 bar system water side pressure relief valve
- Magnetic dirt separator
- System vent valve
- 8 litre system expansion tank, 1 bar pre-charge
- Drain pan in ABS

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:
- power input 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

Standard unit kit:
- Mesh filter for system water
- Copper gas reduction for 4-6 kW outdoor unit connection
- Fittings for unit connection
- Ball shut-off valve for system isolation
- Torx key and insert for opening and closing the unit's panels
- Adjustable feet that can be screwed on the base of the unit

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.
⚠ 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.

Accessories separately supplied

KIRE2HX -
KIRE2HLX

2 zones: external kit, both at high temperature
2 zones: external kit, high temperature + low temperature (mixed)

Distribution module for 2-zone heating systems with compact design (402mm x 250mm x h525mm) and ample versatility for different types of installation.
Kit composed of:

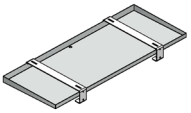
- 1 collector / Black painted separator
- 2 circulator
- 1 sliding temperature mixing valve (only for the kit KIRE2HL)
- 1 EPP insulation (front and rear)
- 1 threaded disc with hermetic sealing cap
- 1 lower anti-rotation jig
- 1 support bracket module

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

DTX

Auxiliary condensate collection tray

Outdoor unit



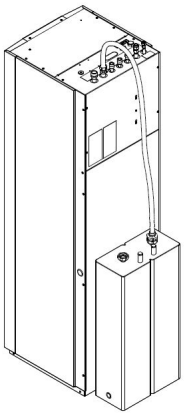
The outdoors unit's base is equipped with a discharge for the condensate produced in the winter during defrost cycles, which helps (but does not guarantee) proper discharge of the condensate into the drain.
To guarantee proper condensate flow off, in all conditions, use the condensate tray with discharge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

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 behind the unit, as shown in the figure
Kit composed of:

- 1 Accumulo da 40 litri in acciaio ST37.1
- 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

AMRX

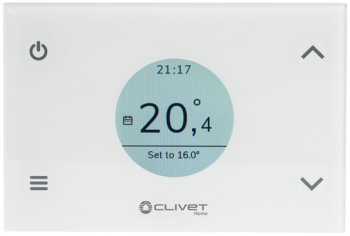
Rubber antivibration mounts

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

HID-TCXB **White soft touch chronothermostat, with temperature control and management via App / Voice control**
HID-TCXN **Black soft touch chronothermostat, with temperature control and management via App / Voice control**

For semi-uncased installation

Main functions available from the thermostat:
- ON/OFF
- keypad lock
- set-point control and limitation
- room temperature display
- setting change (manual / scheduled)
- antifreeze function (prevents temperatures that are too low)



Additional functions available on the Clivet Home Connect App
- weekly schedule
- boost (forced system switch-on)
- temperature and consumptions log

Technical specifications:
- display: colour soft-touch
- combinable SwitchConnect receivers: max 2
- installation: semi-uncased
- power supply: 100÷253V / 50÷60Hz
- settable temperature: 5÷40°C
- antifreeze temperature: 2÷25°C
- temperature offset: ±5°C (std 0°C)
- protection rating: IP30
- Wi-Fi: 802.11 b/g/n
- self-adjusting clock via web with back-up battery
- dimensions: 122x82x15mm

SWCX **SwitchConnect radio receiver**

Radio receiver for HID-TConnect, for managing the request of terminal units or radiant systems, the heat pump mode change or the double set-point.

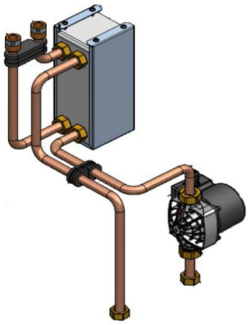
Technical specifications:
- functions: radio receiver for use with HID-TConnect
- combinable thermostats: max 6
- frequency: 2.4GHz
- transmission distance: max 30m (in buildings) / max 100m (in open range)
- contacts: 2 relays (voltage-free)
- power supply: 95÷290V / 47÷440Hz
- operation temperature: 0÷40°C
- operation humidity: 20÷80% RH
- dimensions: 125x78x30.5mm

Accessories separately supplied

SOLX **Drain-back solar integration for domestic hot water**

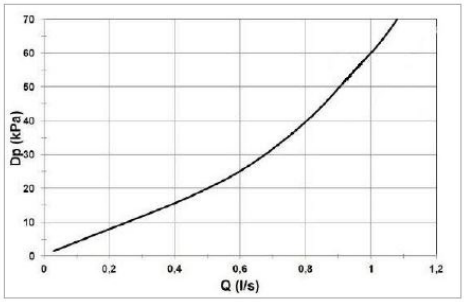
The kit, which can be installed inside the unit, consists of:

- 1 Brazed plate heat exchanger in stainless steel (AISI 316) for domestic hot water production
- 1 Circulator
- 1 Exchanger support
- Copper connection pipes
- 2 plastic supports



In this case, a solar system circulation unit must be hooked up; this can be installed outside the unit.
For the components and sizing of the system of solar collectors, refer to the ELFOSun technical documentation.
A 2kW heating element is submerged in the tank which operates when the refrigeration system fails or to complete the anti-legionella cycle as a backup for the compressor.
For proper operation, the solar panel controller's temperature sensor must be installed in the SPHERA storage tank sump.

Solar heat exchanger pressure drop



DP = Water side pressure drop (kPa)
Q [l/s] = Water flow rate

SOLAR THERMAL SYSTEM

The ELFOSun2 solar thermal system, which can be combined with Clivet residential heat pumps, is available on request. It consists of various kits used to control solutions with a single collector up to solutions with 5 new generation collectors.
The kits can be chosen in relation to the ELFOSystem in which they are used and the specific type of installation required.

For further details, please refer to the documentation available on Clivet's website

Performance

SIZE			2.1		3.1		4.1		5.1	
HEATING			190 L	250 L	190 L	250 L	190 L	250 L	190 L	250 L
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	39	41	48	50	37	40	28	50
Maximum available pressure	1	kPa	68	98	60	92	43	82	28	72
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	40	47	49	47	48	38	40
Maximum available pressure	2	kPa	67	97	61	93	58	90	44	83
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	42	50	51	39	40	28	50
Maximum available pressure	3	kPa	70	100	62	93	45	85	28	73
COOLING										
Air 35°C - Water 18°C										
Nominal cooling capacity	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	40	45	48	36	38	35	54
Maximum available pressure	4	kPa	70	100	58	91	37	80	35	77
Air 35°C - Water 7°C										
Nominal cooling capacity	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	37	40	49	50	43	45	36	37
Maximum available pressure	5	kPa	70	100	61	93	50	87	38	81
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	
Declared load profile	6	-	L	XL	L	XL	L	XL	L	XL
ηwh	6	%	115	93	115	93	115	108	115	108
Domestic Hot Water Energy Class	6		A+	A	A+	A	A+	A	A+	A
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.

* Tutti i dati calcolati con dislivello zero e lunghezza equivalente di 7m.

General technical data

Construction - Outdoor unit

SIZE			2.1	3.1	4.1	5.1
Characteristics						
Compressor			Rotary	Rotary	Rotary	Rotary
Refrigerant			R32	R32	R32	R32
Refrigerant charge		kg	1,55	1,55	1,65	1,65
GWP		t_{co2}	675	675	675	675
Equivalent tons of CO_2 (*)		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 - 190 L	A - 250 L
System characteristics				
Maximum circuit pressure		bar	3	3
System expansion tank	3	l	8	8
DHW characteristics				
Type Storage tank			Glassified steel	Glassified steel
Volume of DHW tank		l	190	250
Internal pipe coil exchange surface		m^2	2	2
Storage dipersion		W/K (kWh/24h)	1,81 (1,95)	2,04 (2,20)
DHW safety heating element		kW	2	2
Maximum DHW circuit pressure	1	bar	10	10
Recommended sanitary expansion tank	2	l	12	16
Dimensions				
Length of unit		mm	600	600
Depth of unit		mm	615	615
Height of unit		mm	1774	2084
Operation weight		kg	357	417

1. The installation of the sanitary side safety valve is mandatory and left to the installer.
2. The installation of the fixture's expansion tank is mandatory and is to be completed by the installer. The indicated volumes are for reference purposes only.
3. Sufficient volume up to a maximum of 70 litres of system water content.

Hydronic data - Indoor unit + outdoor unit

SIZE			2.1		3.1		4.1		5.1	
Characteristics			190 L	250 L	190 L	250 L	190 L	250 L	190 L	250 L
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	0,84	0,61	0,84	0,61	0,84	0,61	0,84
Net boiler capacity		l	180	240	180	240	180	240	180	240
Water mixed at 40°C (V40)		l	200	328	200	328	210	325	210	325
Warm-up time		h:min	02:47	03:52	02:47	03:52	02:16	03:14	02:16	03:14

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

Outdoor unit

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

Indoor unit

SIZE		A - 190 L	A - 250 L
Power supply 220-240V ~ 50Hz			
F.L.A. - Current draw without DHW heating element	A	0,50	0,90
F.L.A. - Current draw of DHW heating element	A	8,70	8,70
F.L.A. - TOTAL current draw under maximum conditions	A	9,20	9,60
F.L.I. - Power draw without DHW heating element	kW	0,10	0,20
F.L.I. - Power draw of DHW heating element	kW	2,00	2,00
F.L.I. - Total power draw under full load	kW	2,10	2,20
M.I.C. - Maximum inrush current of unit	A	9,20	9,60

Power supply 220-240V ~ 50Hz +/-10%
The units are conforming with the prescriptions of European Standards CEI EN 60335
(*) All data calculated with zero height difference and a length of 7m.

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

2 zones external kit

INDOOR UNIT 220-240V ~ 50HZ		
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.

Auxiliary condensate collection tray

INDOOR UNIT 220-240V ~ 50HZ		
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.

Additional electric heater - EH2/EH4/EH6

SIZE		2 KW	4 KW
Power supply 220-240V ~50Hz			
F.L.A. - Full load current at max admissible conditions	A	8,70	17,4
F.L.I. - Full load power input at max admissible conditions	kW	2,00	4,00

SIZE		6 KW	9 KW
Power supply 380-415V 3N ~50Hz			
F.L.A. - Full load current at max admissible conditions	A	8,60	13,0
F.L.I. - Full load power input at max admissible conditions	kW	6,00	9,00

Power supply 380-415V 3N ~50Hz +/- 6%.
Data to be added to the values of the standard unit without DHW electric heater.

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).

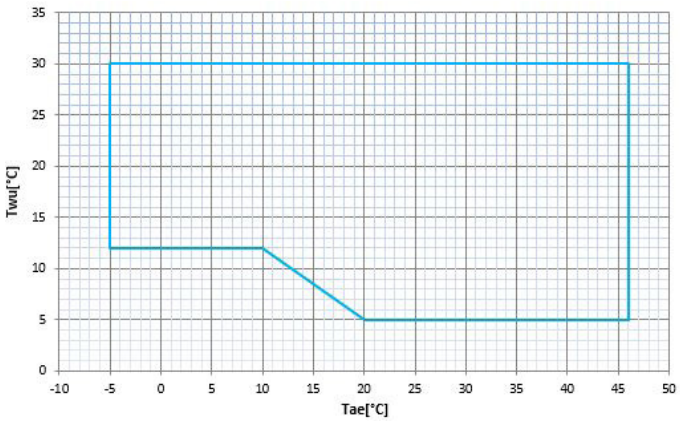
Super-silenced mode

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 limit

Cooling



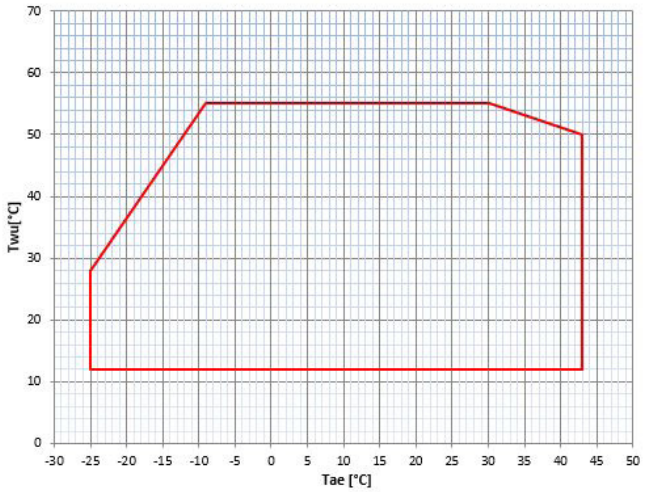
Twu [°C] = Exchanger water outlet temperature
Tae [°C] = Outdoors exchanger air inlet temperature

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.

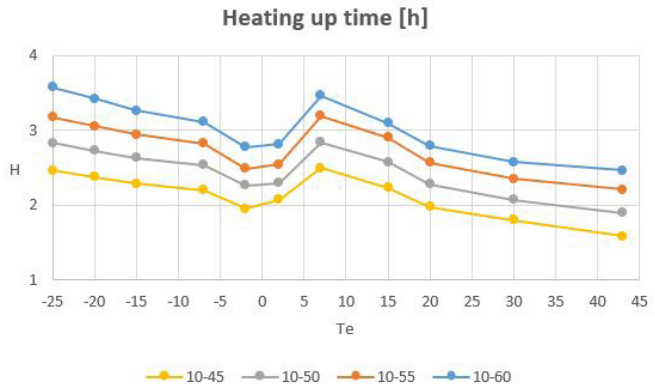
Domestic hot water



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

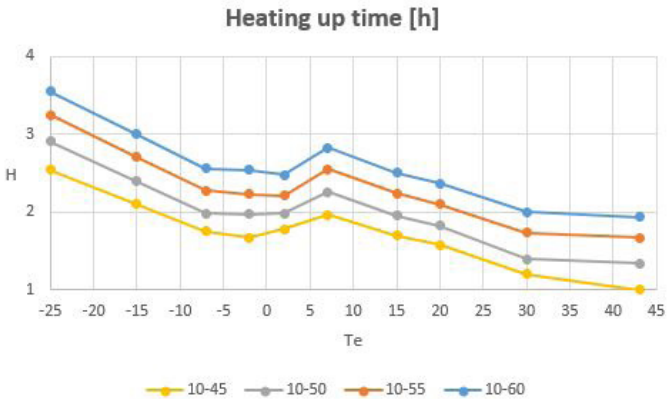
Performance curves in domestic hot water production 190 L

Heat UP - Size 2.1-3.1

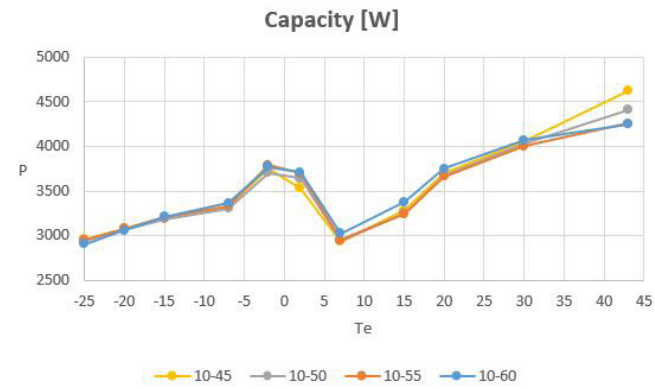


Te = Air temperature °C
H = Heat Up Temp (h)

Heat UP - Size 4.1-5.1

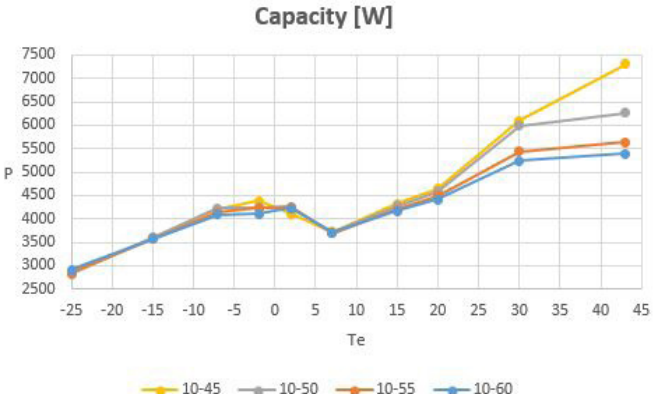


Heating Capacity - Size 2.1-3.1

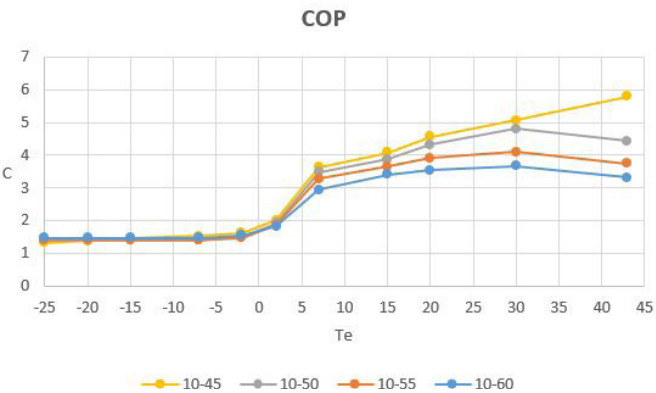


Te = Air temperature °C
P = Heating capacity

Heating Capacity - Size4.1-5.1

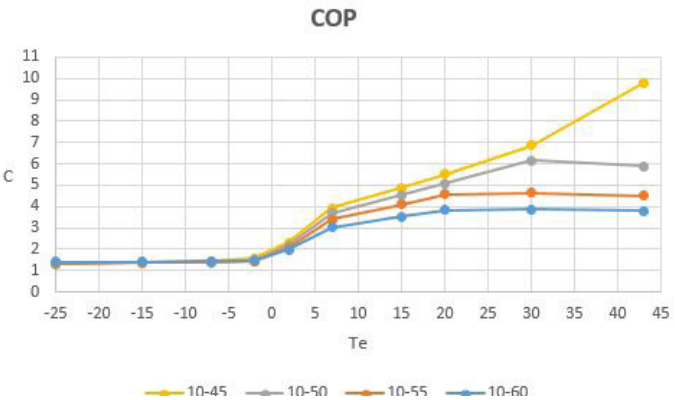


COP - Size 2.1-3.1



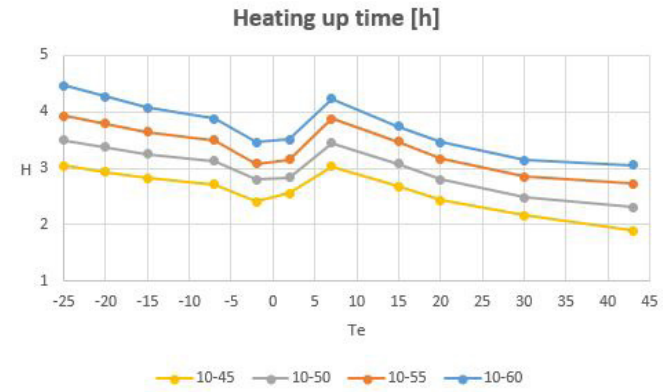
Te = Air temperature °C
C = COP

COP - Size 4.1-5.1



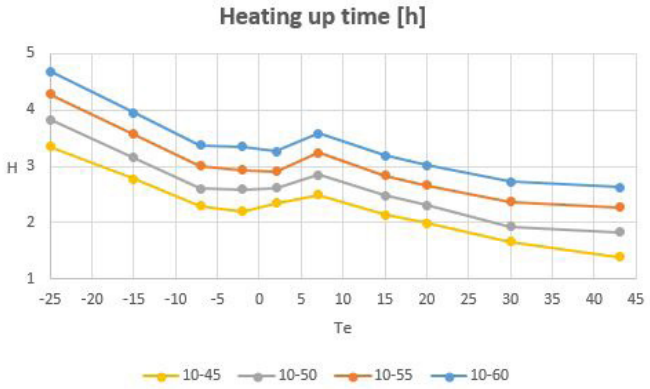
Performance curves in domestic hot water production 250 L

Heat UP - Size 2.1-3.1

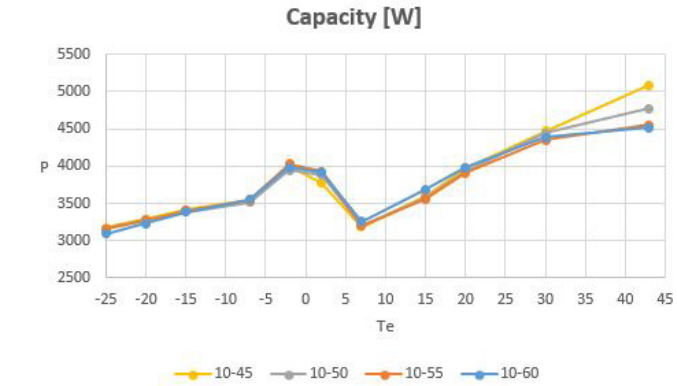


Te = Air temperature °C
H = Heat Up Temp (h)

Heat UP - Size 4.1-5.1

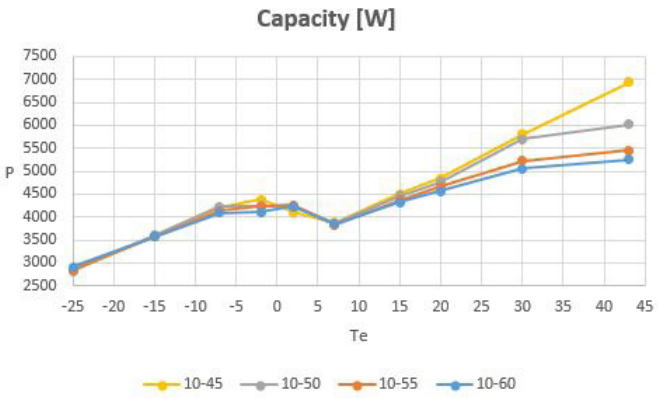


Heating Capacity - Size 2.1-3.1

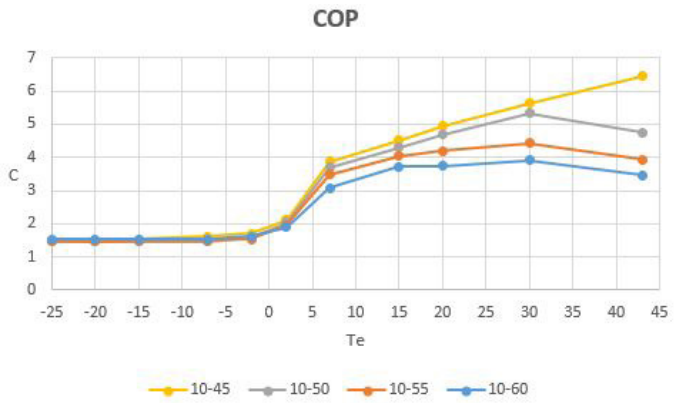


Te = Air temperature °C
P = Heating capacity

Heating Capacity - Size4.1-5.1

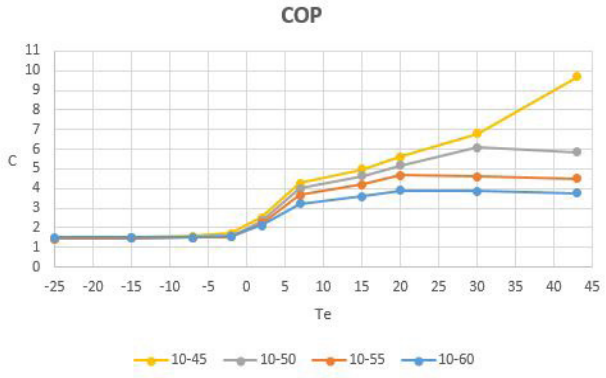


COP - Size 2.1-3.1

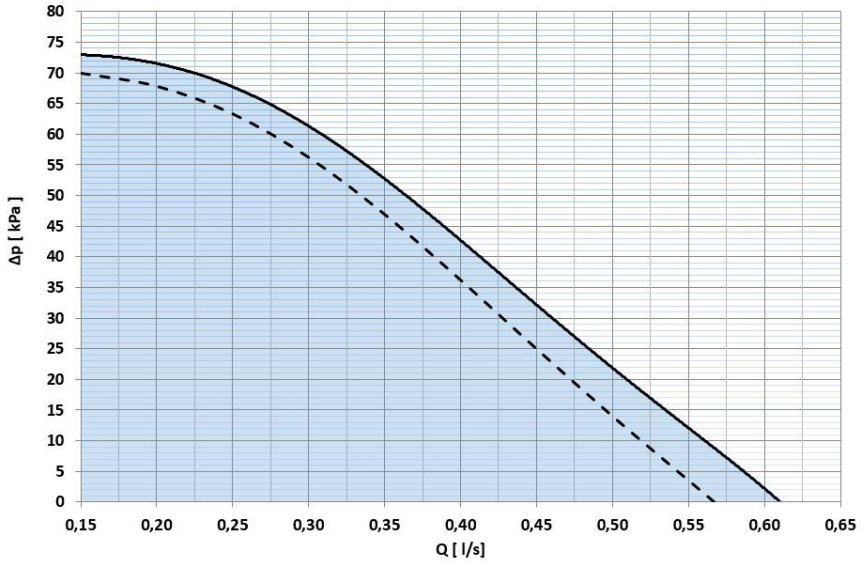


Te = Air temperature °C
C = COP

COP - Size 4.1-5.1



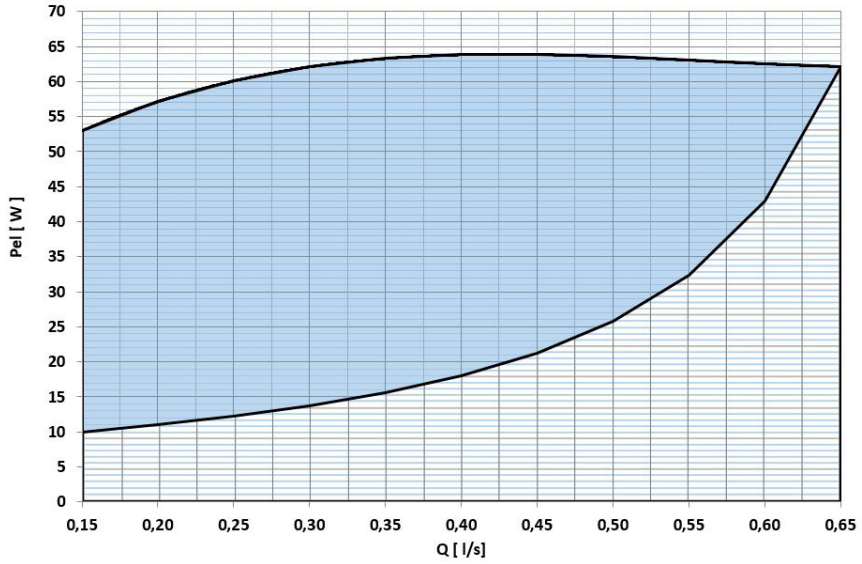
Circulator available pressure 190 L



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

-------- Operating field of the configuration with the integration electric heater.
Circulator operating field

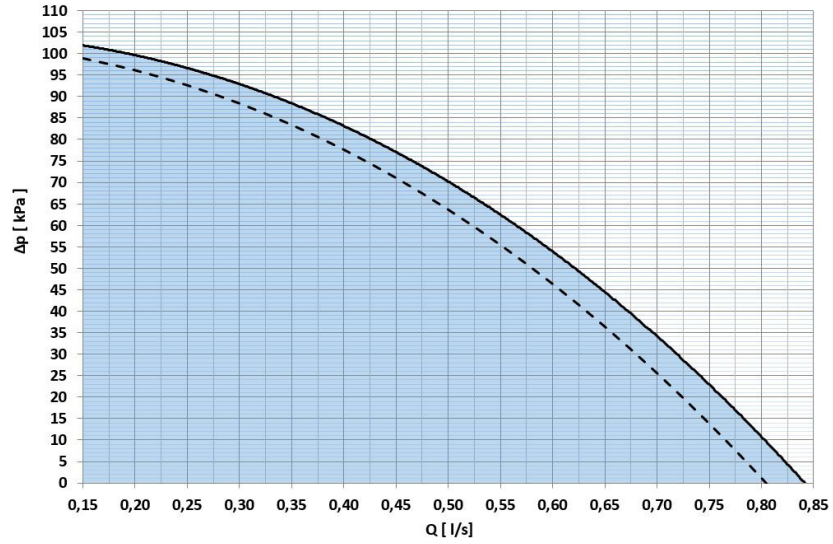
Circulator absorption at the 190L



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

Circulator operating field

Circulator available pressure 250 L

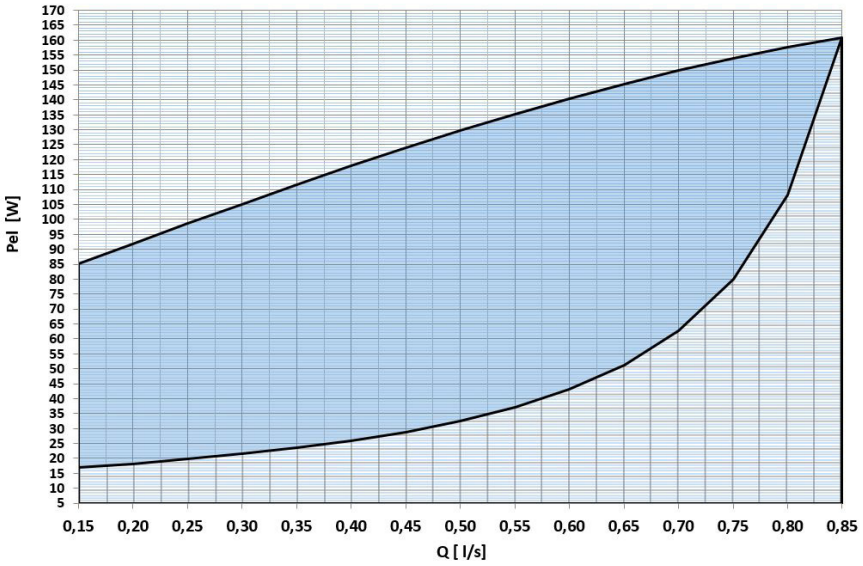


ΔP [kPa] = Available pressure
Q [l/s] = Water flow-rate

-------- Operating field of the configuration with the integration electric heater.

Circulator operating field

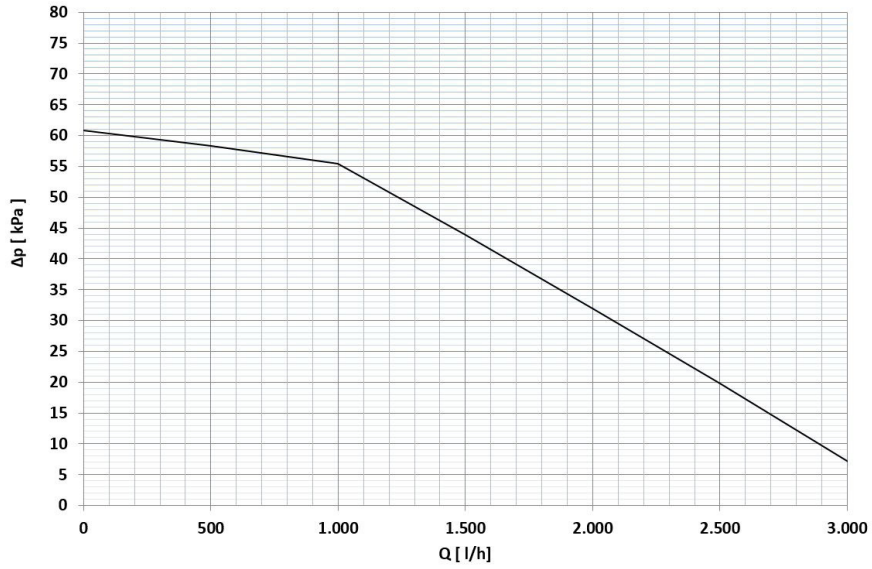
Circulator absorption at the 250L



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

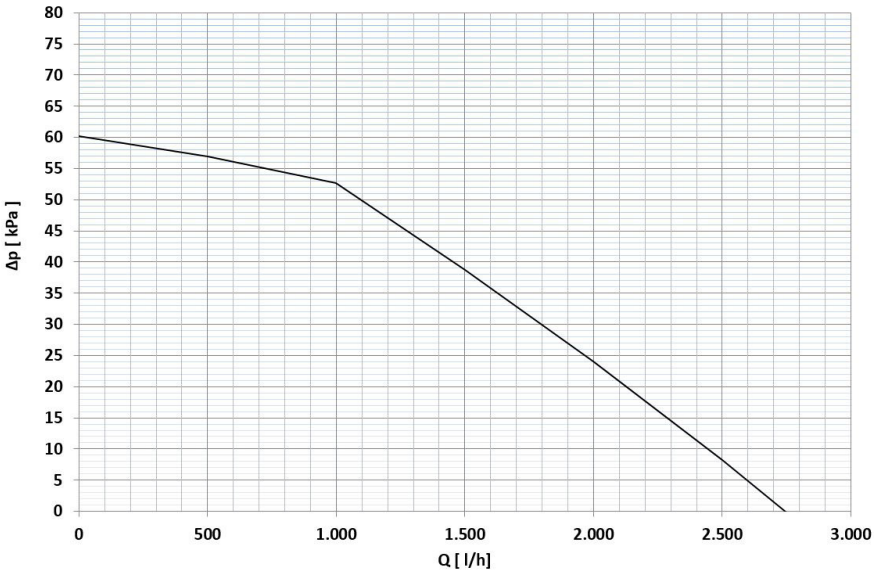
Circulator operating field

Pressure drop for direct booster system circulator



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

Available head for mixed booster system circulator

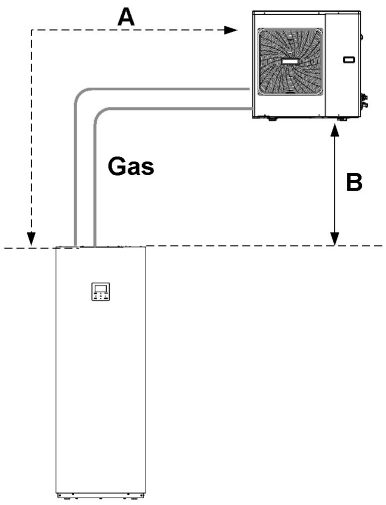


ΔP [kPa] = Available pressure
Q [l/s] = Water flow-rate

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.

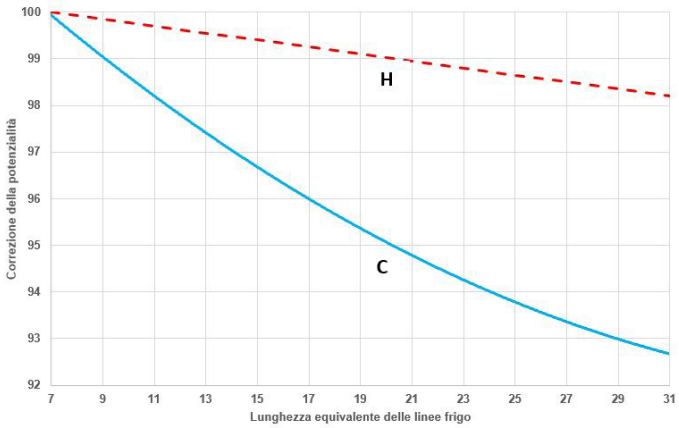
⚠ to correctly install the refrigerant pipes and charge the refrigerant gas, refer to the SPHERA MANUAL



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
B - Maximum refrigerant pipe height difference with outdoors unit higher than indoors unit		25	25	25	25
B - Maximum refrigerant pipe height difference with outdoors unit higher than indoors 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"
Monofase 220-240V N 50Hz					
R32 - Standard charge for connections up to 15 m	kg	1,55	1,55	1,65	1,65
Equivalent tons of CO_2	$t_{eq\ co2}$	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

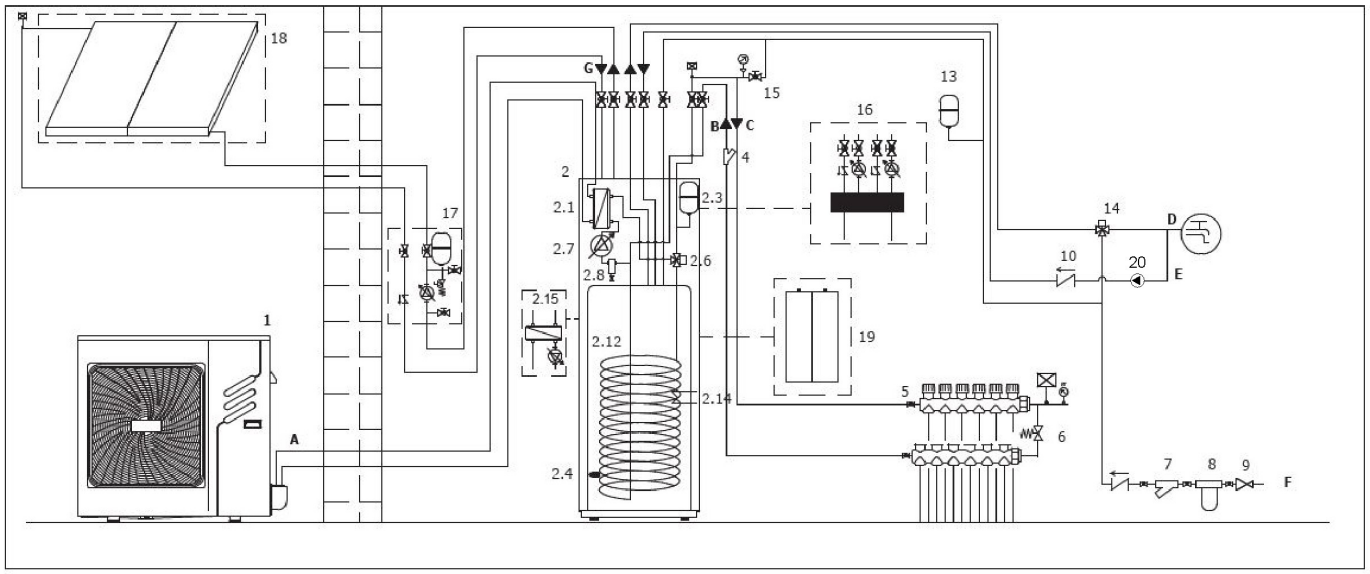
The equivalent length of the cooling lines results in a loss of cooling and heating power supplied to the circuit and DHW system.
The graph shows the amount of this loss of powergh



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

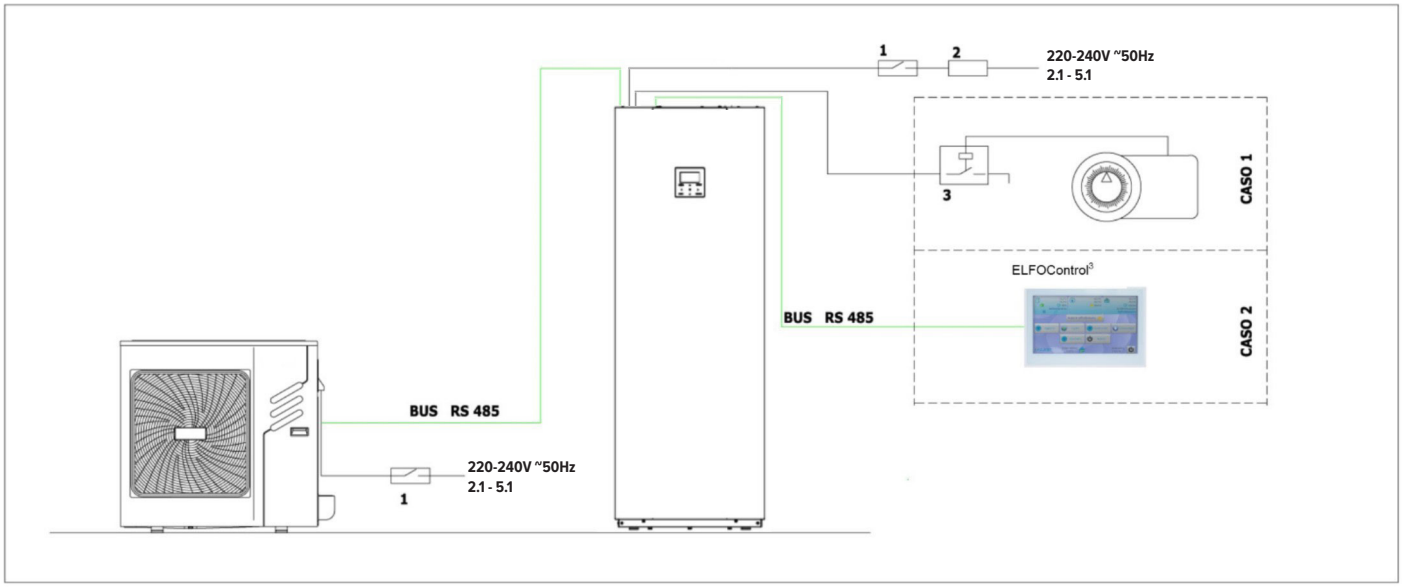
Hydronic connections

We give below some sample hydronic connection diagrams. 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.



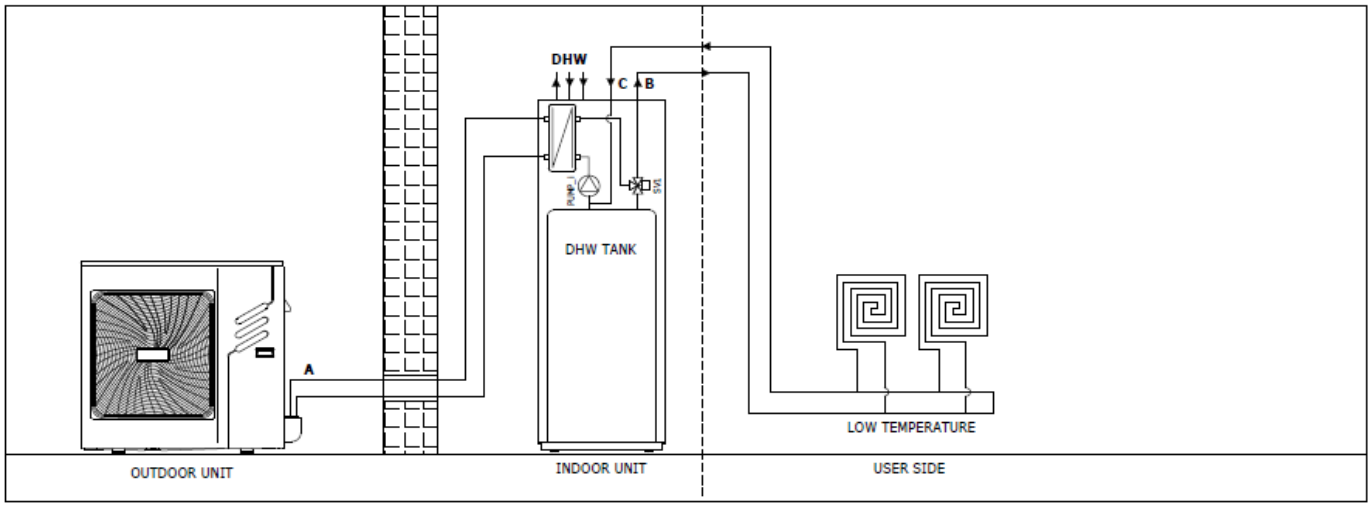
1. Outdoor unit
2. Indoor unit
2.1 Refrigerant exchanger - water
2.3 System expansion tank
2.4 System safety valve
2.6 3-way valve for sanitary
2.7 System primary circulator
2.8 Dirt separator
2.12 DHW storage tank
2.14 DHW backup heating element
2.15 Solar option
4. Y-shaped filter
5. Manifolds
6. Manifold bypass valve
7. DHW filter
8. Water treatment unit (softener, etc.)
9. Pressure reducer
10. Recirculation non-return valve
13. DHW expansion vessel
14. Thermostatic mixing valve
16 Equalisation device with relaunches, internal installation (KIR2H(L)X)
17. Solar system circulation unit (KCVEX)
18. ELFOSun
19. Inertial storage
20. Recirculation pump
A - Refrigerant pipes
B - Return from system
C - Supply to installation
D - Domestic hot water
E - DHW recirculation
F - Water network input
G - Gas 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 ELFOControl3 supervision system or normal electromechanical thermostats.
For more information on connections, consult the installation manual.

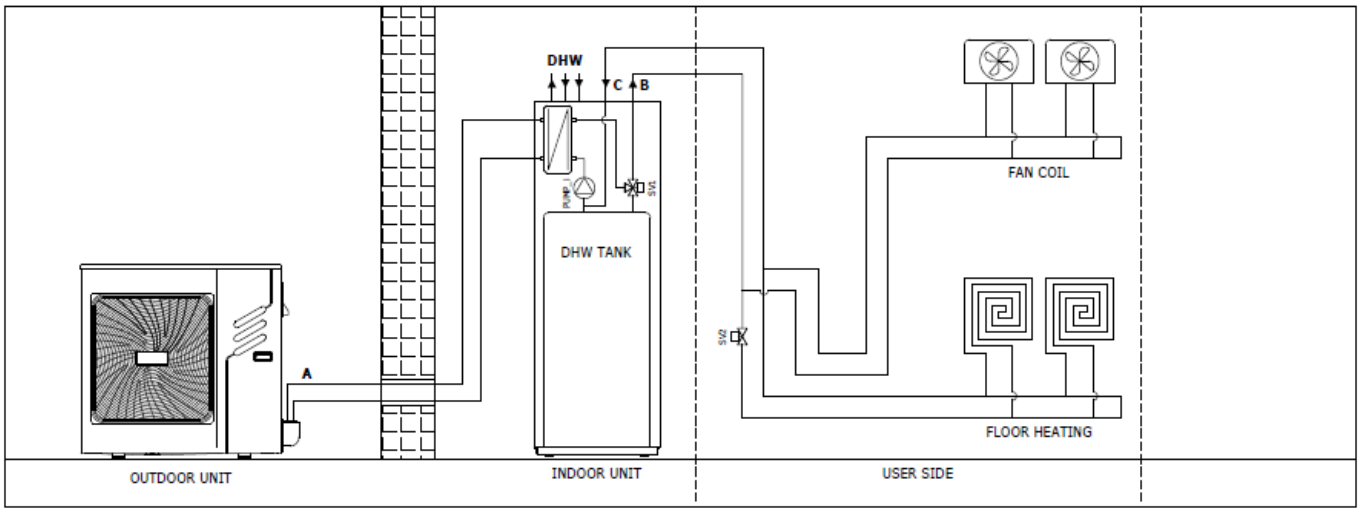


1. Contactor or automatic switch
2. Differential circuit breaker
3. Relè

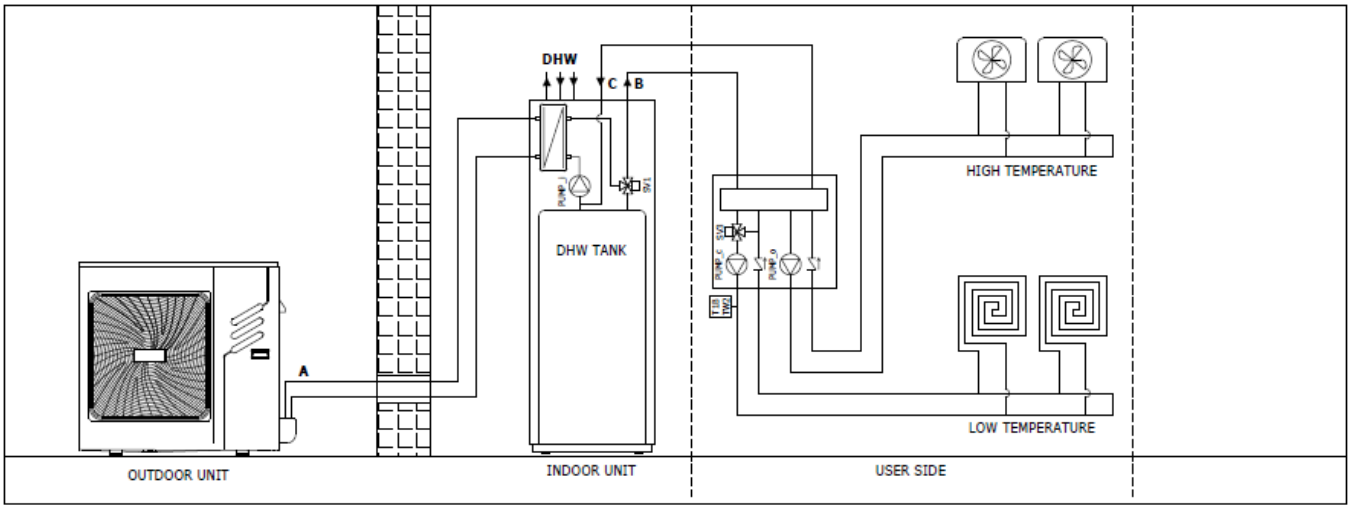
General description of the system and possible connections



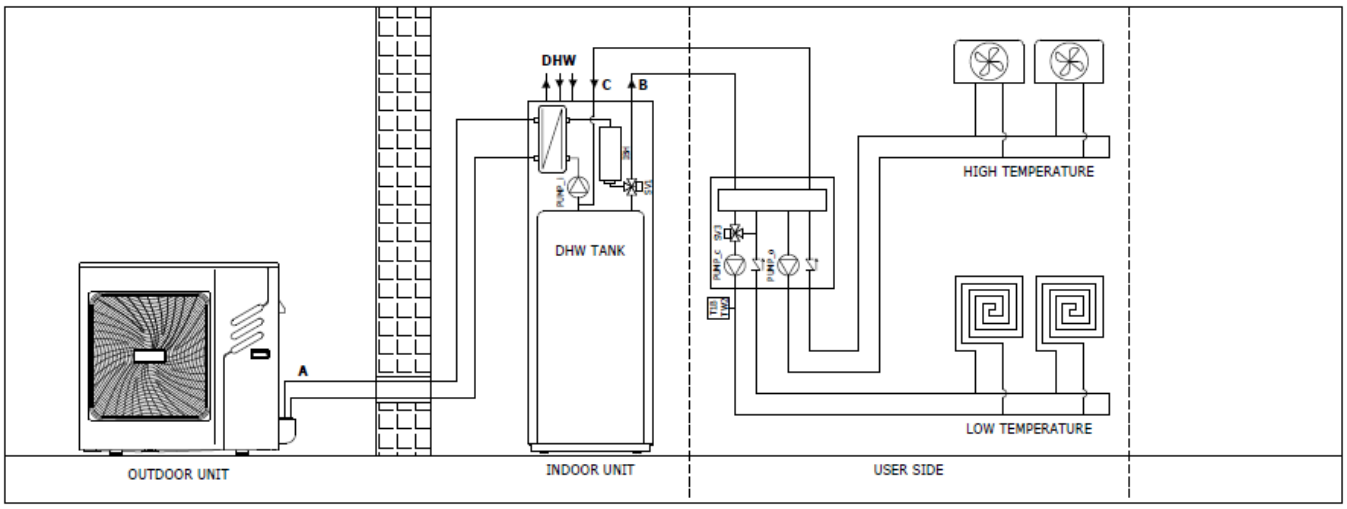
Single Zone



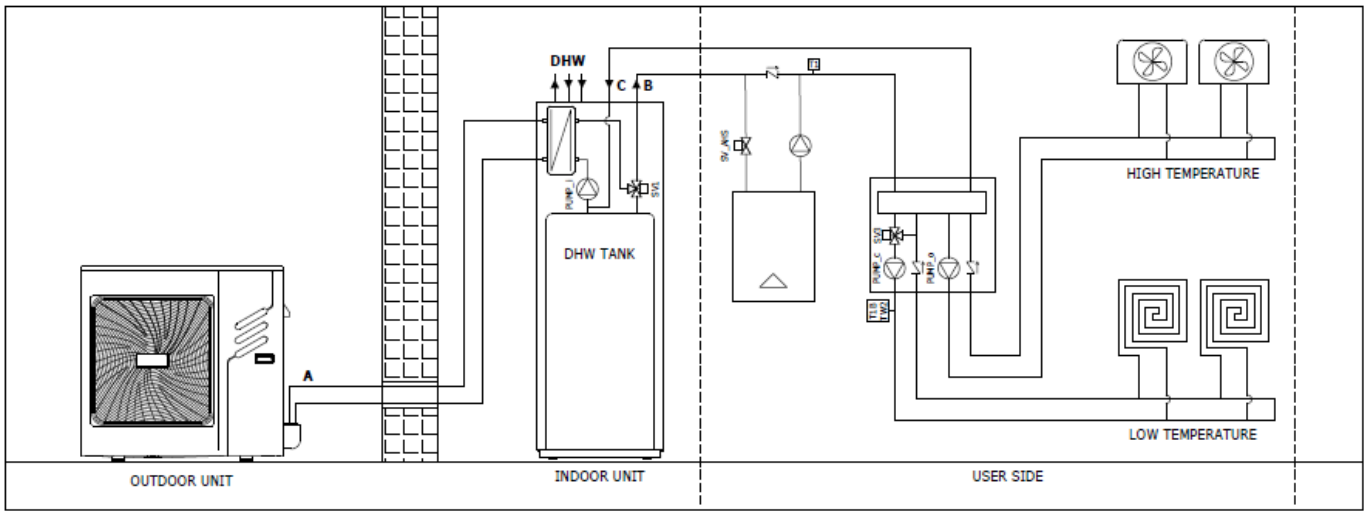
Single Zone (SV2 by the customer) Shut-off valve to exclude the radiant floors in summer mode.



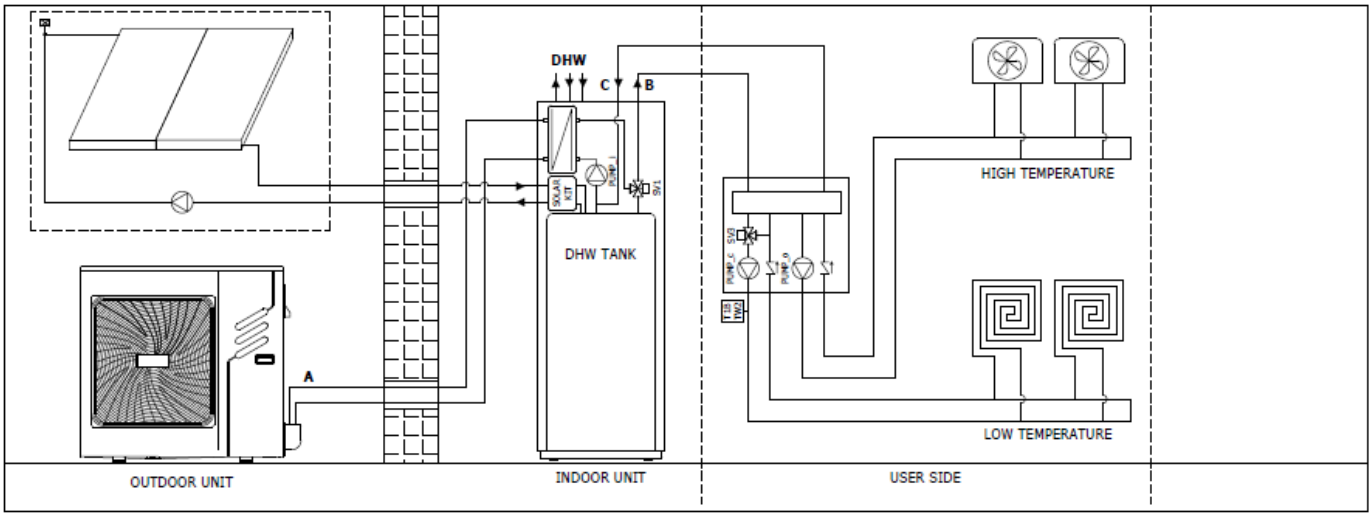
Double zone



Additional electric heater



Auxiliary heater (SV_AHS charged to customer)



Solar kit

Data for the UNI/TS 11300 calculation

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	Heating capacity $\Phi_{H,HP\ out}$ (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

Dati per determinazione COPPL T mandata 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				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

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

Data for the UNI/TS 11300 calculation

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

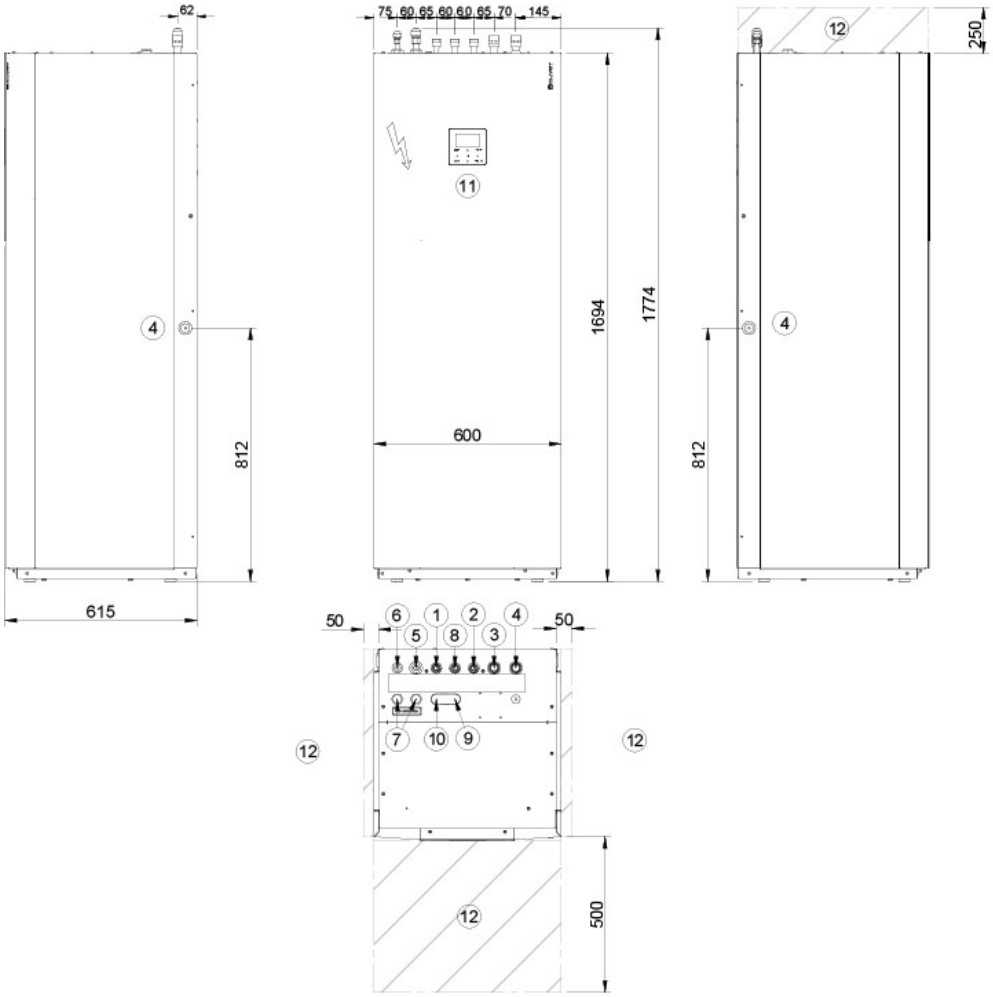
UNI/TS 11300 Part 3

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

SPHERA EVO-T Comfort (indoor unit) 190 L

DAAHL0001 REV01
DATA/DATE 14/01/2020



1. Domestic hot water outlet M 3/4"
2. Mains inlet M 3/4"
3. Return for the utility installation M 1"
4. Supply for the utility installation M 1"
5. Return connection 5/8" SAE (*)
6. Liquid connection 3/8" SAE (*)
7. Electrical line inlet
8. DWH recirculation circuit inlet M 3/4"
9. Solar system inlet M 3/4" (separately supplied accessory)
10. Solar system outlet M 3/4" (separately supplied accessory)
11. Control keypad
12. Functional spaces for standard unit

(*) see instructions in kit RGHL00001

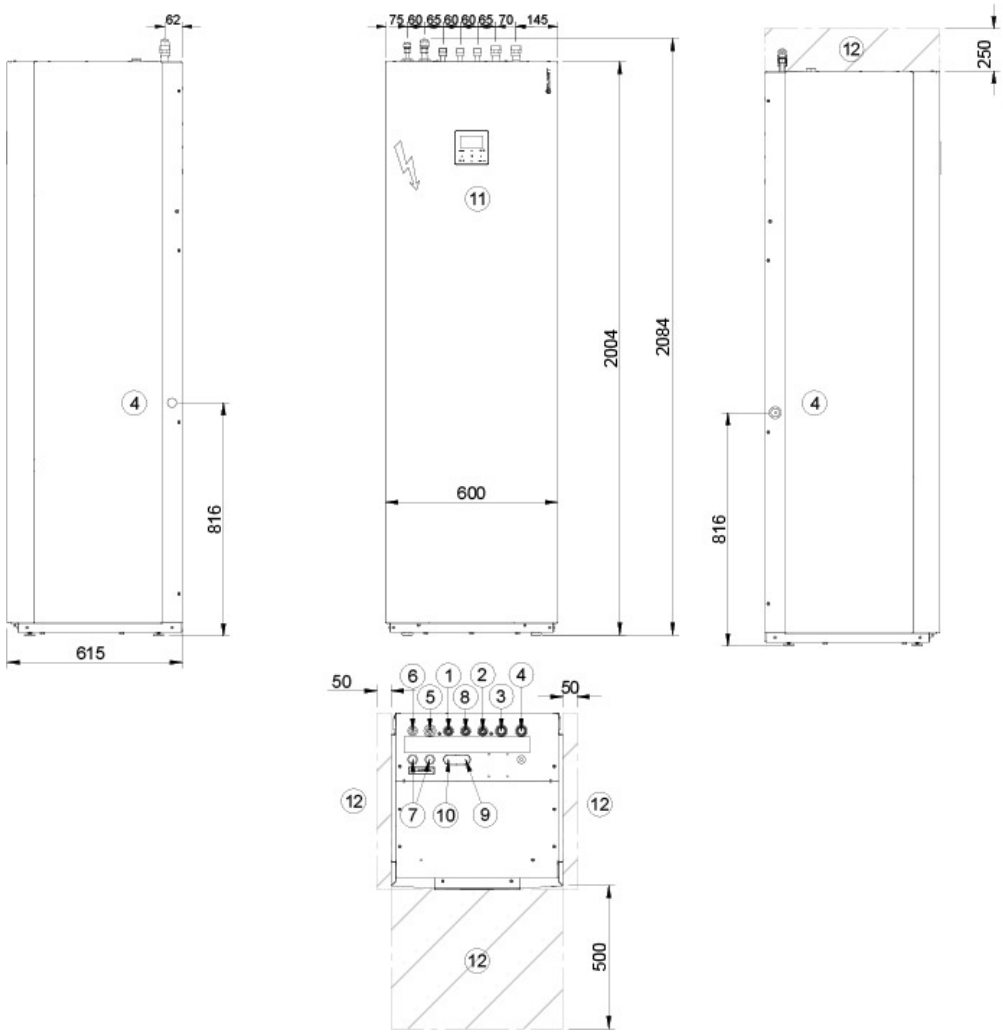
SIZE		190 L
Operation weight	kg	357
Shipping weight	kg	185

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

Dimensional drawings

SPHERA EVO-T Comfort (indoor unit) 250 L

DAAHL0001 REV01
DATA/DAT14/01/2020



1. Domestic hot water outlet M 3/4"
2. Mains inlet M 3/4"
3. Return for the utility installation M 1"
4. Supply for the utility installation M 1"
5. Return connection 5/8" SAE (*)
6. Liquid connection 3/8" SAE (*)
7. Electrical line inlet
8. DWH recirculation circuit inlet M 3/4"
9. Solar system inlet M 3/4" (separately supplied accessory)
10. Solar system outlet M 3/4" (separately supplied accessory)
11. Control keypad
12. Functional spaces for standard unit

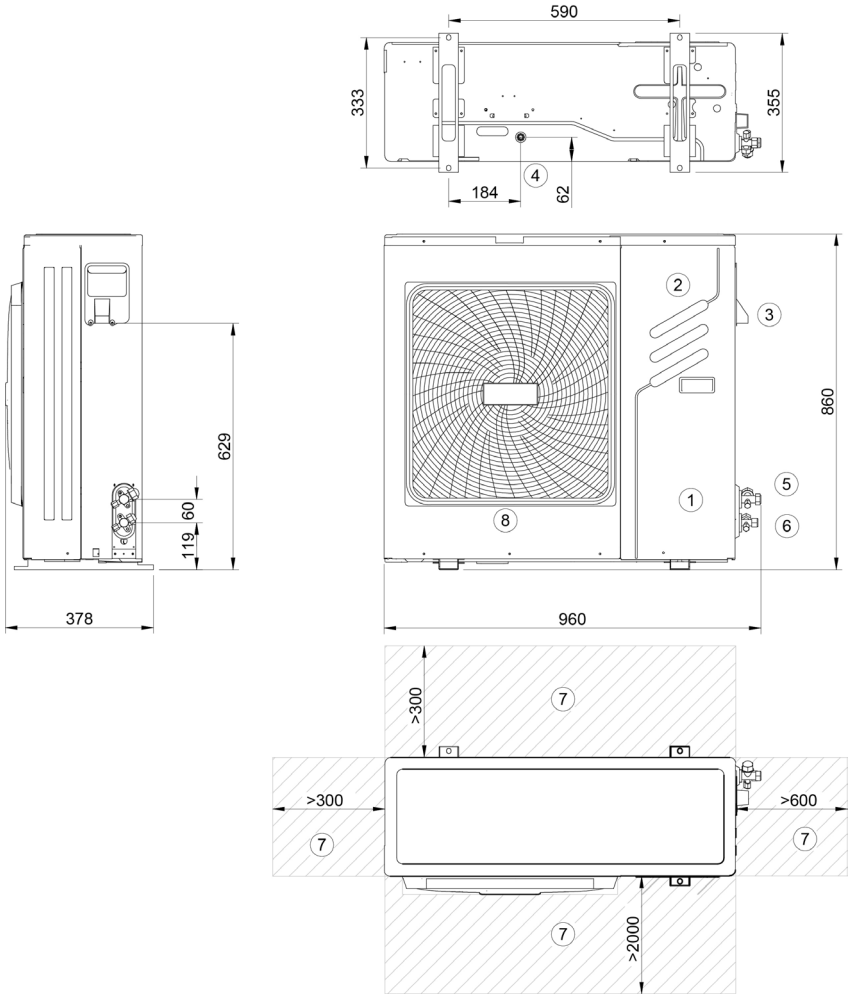
(*) see instructions in kit RGHL00001

SIZE		250 L
Operation weight	kg	417
Shipping weight	kg	190

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

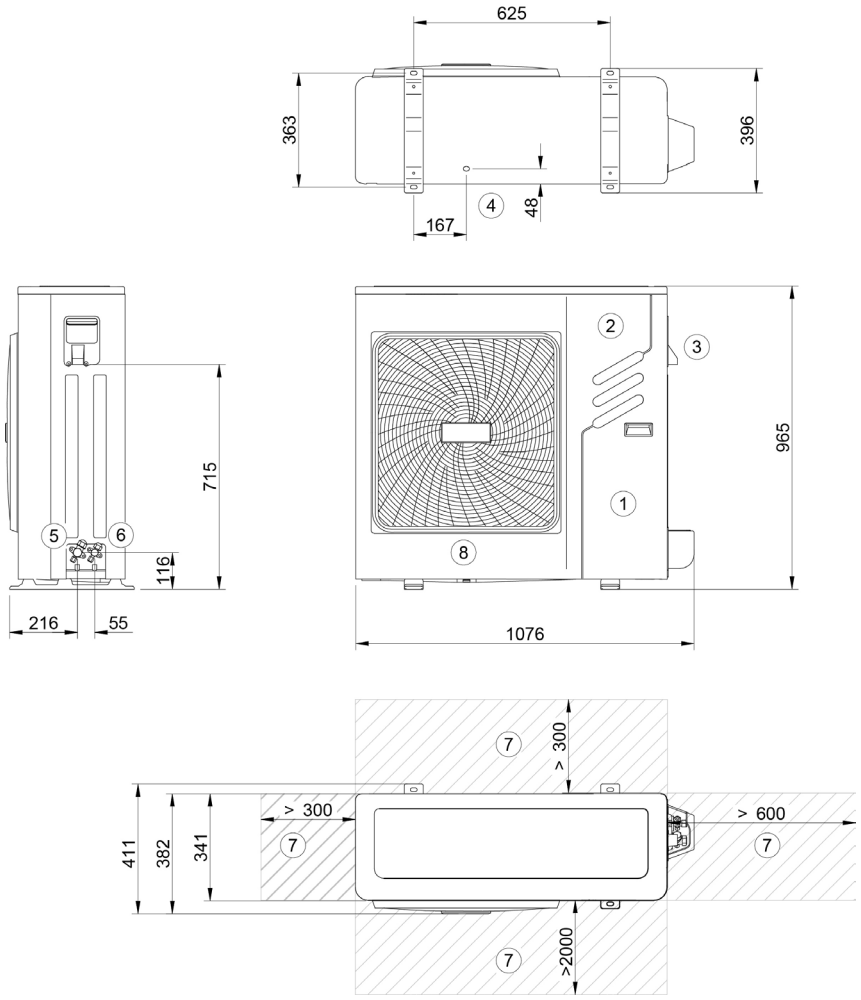
SIZE			2.1	3.1
Operation weight		kg	57	57
Shipping weight		kg	68	68

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 2.1 - 5.1 - - BT19L052GB-01

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