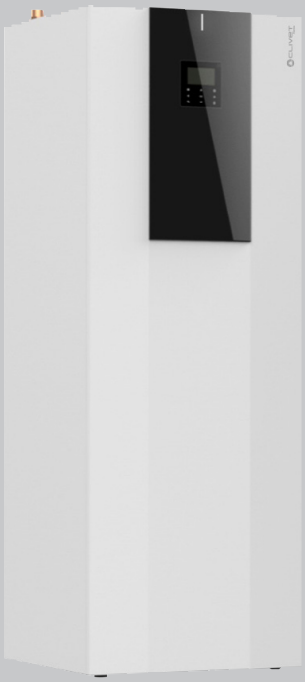
Two section air-water heat pump for heating, cooling and DHW production

SPHERA EVO 2.0 - Tower

SQKN-YEE 1 TC + MiSAN-YEE 1 S 2.1 ÷ 8.1 RANGE

TECHNICAL BULLETIN



SIZE	2.1	3.1	4.1	5.1	6.1	7.1	8.1
HEATING CAPACITY KW	4,32	6,18	8,30	10,9	12,13	14,51	16,01
COOLING CAPACITY KW	4,55	6,44	8,10	10,00	12,06	13,79	14,84

DHW STORAGE
190 L - A
250 L - A -B

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 2.0 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 2.0 system is composed of a latest generation high efficiency outdoors moto-condensing unit connected via refrigerant connections to an indoors unit.
It is the second generation of heat pumps for residential use.

SPHERA EVO 2.0 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
- Also available in the hybrid version with 24 kW or 34 kW gas boiler

R-32

SPHERA EVO 2.0 Box

- Box Version
- Integrated 3-way valve for DHW
- Compact dimensions
- Class A+++ Low temperature
- Built-in WiFi for connection to the dedicated APP
- Also available in the hybrid version with 24 kW or 34 kW gas boiler

R-32

SPHERA EVO 2.0 Invisible

- Version for built-in installation
- 50-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 gas boiler
- Built-in WiFi for connection to the dedicated APP

R-32

SPHERA EVO 2.0 - Tower - 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.

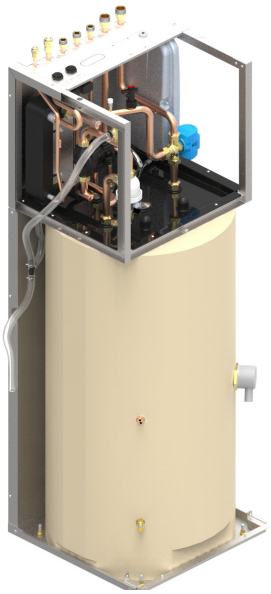
Domestic hot water
- 190-litre or 250-litre DHW storage tank with vitrified internal surface and external polyurethane insulation (50mm thick)
- Magnesium anode
- 2 kW safety and anti-legionella heating element
- Internal exchanger in vitrified steel with an exchange surface of 2 m^2
- Set-up for domestic hot water recirculation circuit
- Storage 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:
- remote microprocessor control with single-area thermostat function;
- 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;
- remote interface terminal with graphic display;
- cascade operation.
- Inside the electrical panel there is a T1B temperature probe for low temperature area control in the 2-area kit (length 4.5 m and 6 mm bulb).

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
- Cover cap for remotely controlled keypad



SPHERA EVO 2.0 - 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, increases its lifespan and reduces 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

EH024
EH3
EH6
EH9

Integration electric heater

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 (6 e 9kW) electric heater changes the voltage of the indoor unit only. The outdoor unit remains with single phase power supply.
⚠ The configuration with additional electrical resistance excludes the external boiler connection kit and the hybrid solution.

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,
- 1 sonda per la gestione della temperatura del circuito miscelato

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

KCSX

Secondary circuit kit (1-litre circuit breaker + pump)

The single-zone kit consists of a DIX hydraulic separator combined with a high efficiency pump, all inside a box for easy installation. Allows interaction between the primary circuit circulator and the secondary circuit circulator. Furthermore, the separator also has the function of a deaerator. With the following benefits and advantages:

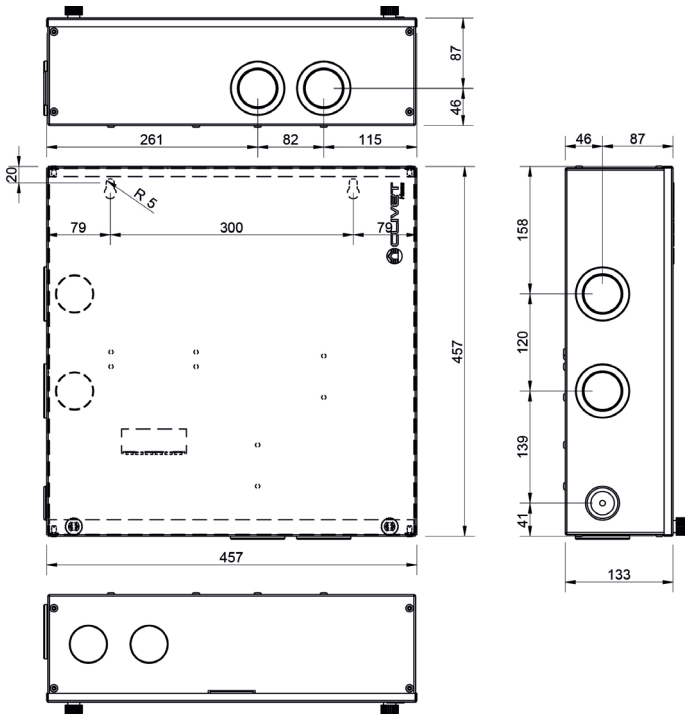
- makes the connected hydraulic circuits independent;
- ensures effective operation of the secondary circulator that provides the hydraulic demand of air conditioning systems
- air extraction system;
- thermally insulated black EPP
- zone manifold connection kit

The kit is comprised of:

- 1 1-litre circuit breaker;
- 2 copper pipes;
- 1 circulator;
- closing plates

Dimensions:
Length 457 mm
Height 457 mm
Depth 133 mm

DIMENSIONAL



DIX **1-litre circuit braker**

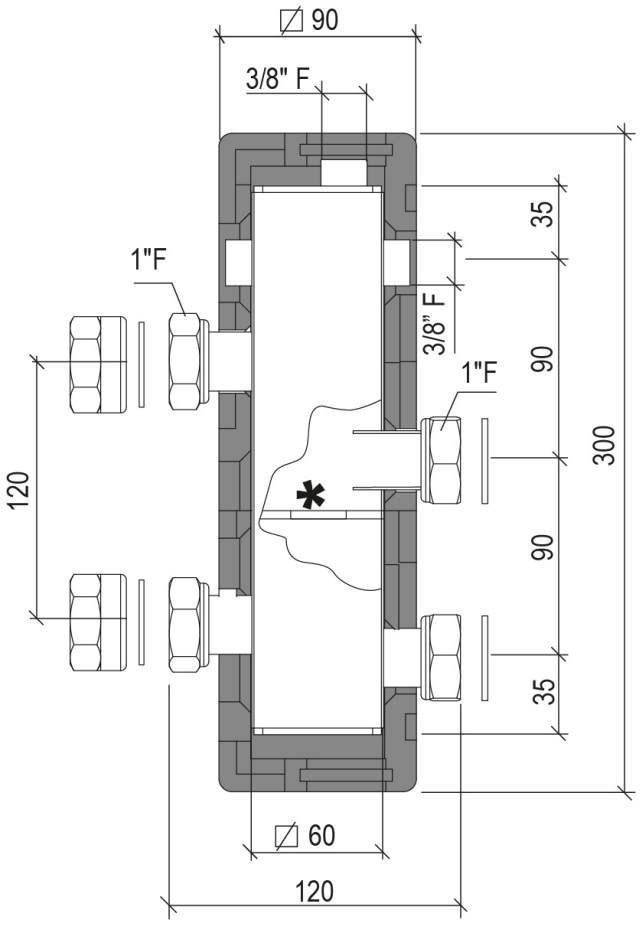
The CP60 hydraulic separator is a compensation chamber designed to make connected hydraulic circuits independent.
It is used when the circulator of the primary circuit interacts with one or more parts of the secondary circuit in the same system.
Furthermore, the separator performs the function of a deaerator.
With the following benefits and advantages:

- makes the connected hydraulic circuits independent;
- ensures effective operation of the secondary circulators that provide the hydraulic demand of air conditioning systems
- air extraction system;
- thermally insulated black EPP
- zone manifold connection kit

Technical data:
Nominal diameter DN 20
Connection 1" F
Max overall dimensions 120 x 420 x 945
Max temperature 110°C
Max pressure 6 bar
Circuit breaker material S235 steel
Insulation material EPP (40 g/l)
Insulation thickness 20 mm

The kit is supplied with a plate for wall mounting

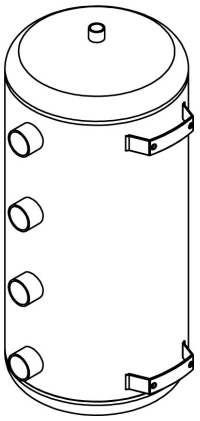
DIMENSIONAL



Accessories separately supplied

DI50X **50-litre circuit breaker**

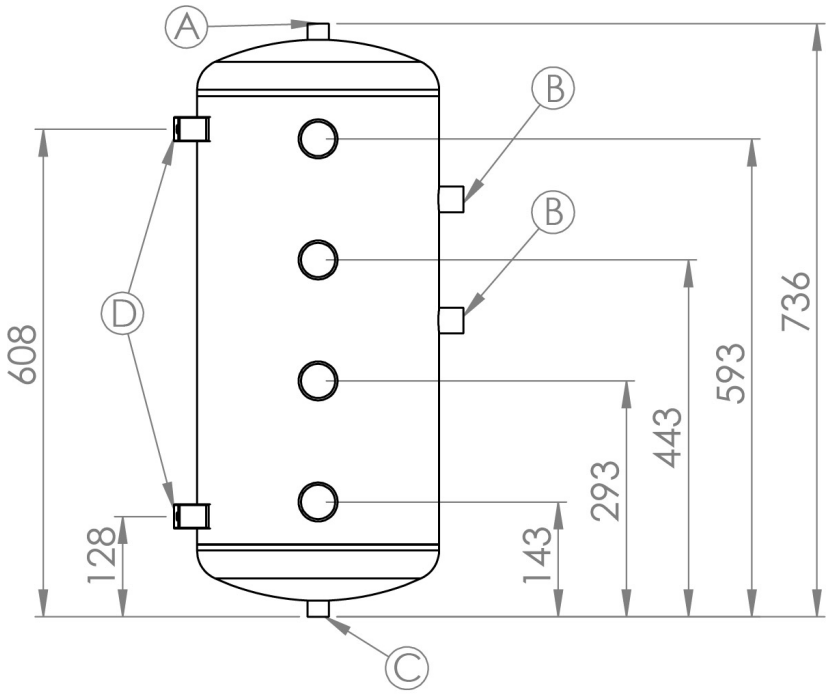
Technical 50-litre storage tank with the function of a hydraulic separator and inertial tank ensures effective operation of the secondary circulators that provide the hydraulic demand of air conditioning systems.
With the possibility of connecting two zones.

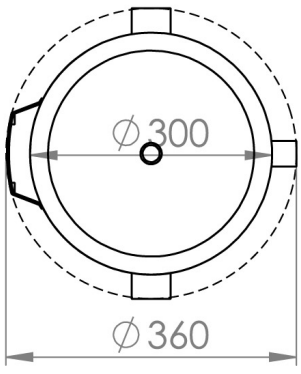


Technical data:
Circuit breaker diameter 380 mm
Circuit breaker height 933 mm
Connections 1"1/4 F
Max temperature 95°C
Max pressure 6 bar
Circuit breaker material S235JR steel
Circuit breaker capacity 57 litres
Circuit breaker weight 25 kg
Insulation material Polyurethane foam
Insulation thickness 40 mm
Energy class B
Specific heat loss 0.76 W/K

The kit is supplied with brackets for wall mounting.

DIMENSIONAL





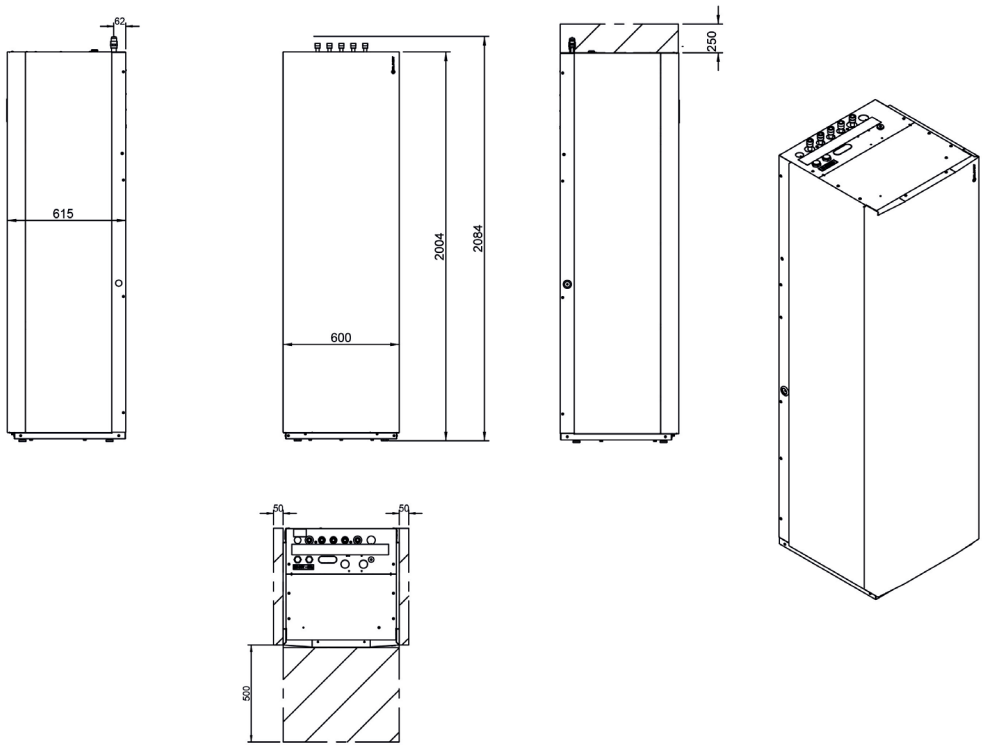
ACSA250X **250L additional domestic hot water storage tank**

Additional storage tank to increase the available amount of domestic hot water.
IThe kit includes:

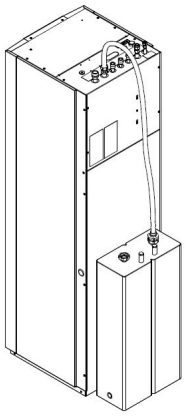
- 250-litre DHW storage tank in vitrified steel with external polyurethane insulation (50mm thick) and magnesium anode;
- circulation pump, ensures both storage tanks are at the same temperature;
- 16-litre DHW side expansion tank, 1.5 bar pre-charge;
- DHW side pressure relief valve set at 6 bar;
- anti-scalding thermostatic valve;
- set-up for DHW recirculation (recirculation pump not included);
- drain pan;
- temperature probe for additional storage tank;
- storage tank drain valve.

For the technical characteristics of the storage tank, use those of the standard 250L storage tank

DIMENSIONAL



ACI40X **40L system inertial storage tank**



Inertial storage tank to be installed outside the unit. Extremely compact, supplied with air vents and support brackets for wall installation. Suitable for all SPHERA EVO 2.0 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 consisting of:

- 1 40-litre ST37.1 steel storage tank for ACI40X
- 1 2-metre flexible hose
- Extremely compact:
  LENGTH: 440 mm
  DEPTH: 220 mm
  HEIGHT: 887 mm
- Maximum working temperature: 100°C
- Maximum operating pressure: 6 bar
- Thermally-isolated with EPP 40 g/l
- Insulation thickness 30 mm
- Automatic air vent

Accessories separately supplied

ANEDX **Electronic anode to protect DHW boiler**

Electronic impressed current anode (supplied separately) to protect the internal surface of the DHW tank.
The kit contains:

- Electronic anode (15cm);
- Electric module + power supply (220-240V ~50Hz)
- Instruction manual

The device maintains its performance and reliability over time.
The power supply is separate from that of the unit and does not require any routine maintenance.

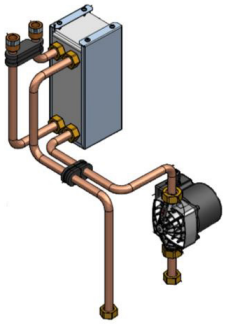
COFX **Casing sheets for the inertial storage cover**

Decorative metal sheets serving as a cover for the inertial storage tank, if installed at the back of the unit.

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

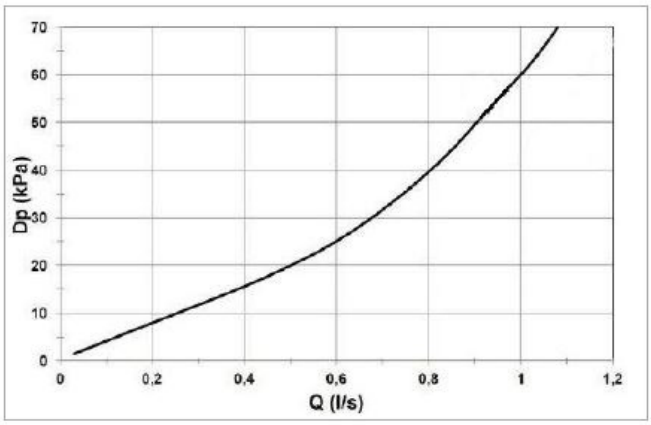
The kit, which can be installed inside the unit, consists of:

- 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



Through the circulator, the domestic hot water is taken directly from the tank and heated, through the stainless steel plate exchanger with a heat exchange capacity of 2703 W/K, with the hot water coming from the solar collectors.
In this case, for operation, it is necessary to connect a solar circulation group, which can be installed outside the unit. For sizing of the solar collector system and of the components, see the ELFOSun technical documentation. For correct operation, the temperature probe of the solar panel regulation control unit must be positioned in the specific well of the SPHERA EVO 2.0 storage tank.

Solar heat exchanger pressure drop



⚠ The solar integration for DHW excludes the external boiler connection kit.

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 2.0 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.
⚠ Not required for SPHERA EVO 2.0 Tower Hybrid version

KCCE4X **Kit collegamento caldaia esterna 4 tubi**

Kit offering the option of connecting the water circuit to an external boiler. Ideal for boilers with circulator and instant production in heating and DHW mode.
The boiler must have a dry ON/OFF contact or 0-10V input.
The internal logics of SPHERA EVO 2.0 permit use of the boiler both together with or instead of the heat pump for greater comfort even at the coldest temperatures.
The kit consists of:

- copper pipe for connection;
- plastic gaskets;
- kit installation manual.

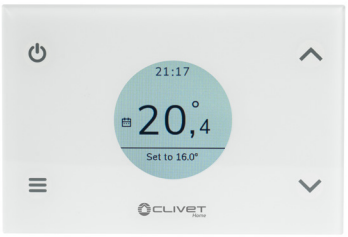
⚠ The kit excludes the configuration with an additional electric heater, the solar integration kit.

Accessories separately supplied

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

T1BX **DHW temperature probe and additional heating source at 10 m**
T1B30X **DHW temperature probe and additional heating source at 30 m**

NTC water temperature probe with 10 m or 30 m cable.
The probe can be used to detect temperatures:
Tsolar: solar thermal circuit
T1: boiler or external electric heater
T5: DHW tank
Tw2: mixed zone 2
Tbt1/Tbt2: hydraulic separator

⚠ *The unit is equipped with a T1BX probe as standard.*

DTX **Auxiliary drain pan**

Outdoor unit

The base plate of the outdoor unit is fitted with a drain for the condensate produced during the winter phase in the defrosting period. This can help (not guarantee) condensate flow correctly into the relevant drains.

To ensure the condensate is drained correctly, in the various operating conditions it is mandatory to use the auxiliary condensate drain pan with drainage to be connected to the drain trap, according to the relevant technical standards and regulations in force.

An anti-freeze heater is also included in the drain pan. It prevents the condensate produced from freezing when the outdoor temperature drops below zero.

APAVX **Kit of antivibration mounts for floor installation**

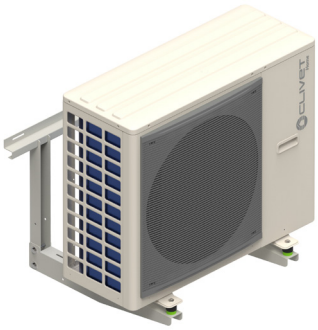
The antivibration mounts for floor installation reduce the vibrations of the compressor during its operation. They are secured to the feet of the base plate.

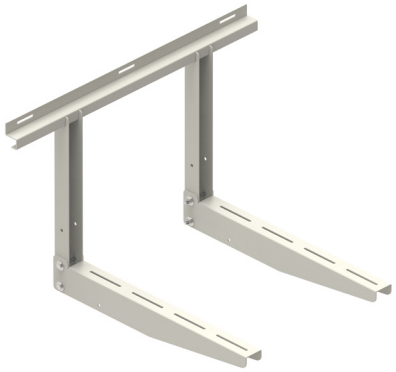
ASTFX **Kit of antivibration mounts for wall bracket installation**

The antivibration mounts reduce the vibrations of the compressor during its operation. They are secured to the wall support brackets

KSIPX **Kit with wall fixing brackets**

Wall fixing bracket for outdoor unit, adjustable, in galvanised steel painted with polyester powders for outdoor use..





VDACSX **Thermostatic switching valve for DHW**

The thermostatic switching valve is used in the DHW circuit.

It is designed to divert the water from the DHW storage tank directly to the utility as the water temperature is suitable for use. If the temperature is not adequate for direct use, the switching valve ensures the water passes inside the boiler which, thanks to instant production, guarantees continuous supply.

1 1/4 "M connections.
Body in anti-dezincification alloy. Chromium-plated.
PSU shutter.
Stainless steel springs.
EPDM sealing elements.
Maximum inlet temperature 100°C.
Adjustment range: 38÷52°C
Accuracy: ± 2°C
Max (static) working pressure: 10 bar
Max (dynamic) working pressure: 5 bar
Default calibration: 40°C
Minimum range for steady operation: 4 l/min

⚠ Reductions for connections of different diameters are the responsibility of the client

Hybrid version

Boiler to be combined with hybrid heat pump to form a system that can work together with the boiler, as a back-up for the heat pump.
The logic of the heat pump controls all the boilers with an ON/OFF signal to ensure optimal operation of the system.
The boilers can be used as standard with natural gas or LPG, depending on the type of supply available in the field.

The kit includes a condensing boiler and a 10-metre long temperature probe (T1) to be connected in the field.

⚠ *The hybrid version excludes the possibility of selecting electric heaters in the system*

Stand-alone systems

GAS BOILER_UC / GAS BOILER_FE 24.4-33.4 - 4-pipe condensing boiler for hybrid heat pumps

The boiler can produce DHW instantly, allowing the heat pump to work in heating or cooling mode at the same time.
For the FE version, the setpoint via 0-10V signal is controlled by the heat pump.
Flue gas intake/discharge fittings can be connected to all versions of the boiler and are to be selected according to the required installation.

Note: to work with LPG, the UC versions require a reducer (supplied as standard with the boiler) which is to be fitted on the nozzle in the field

Flue accessories for boilers

KCSAFX

Vertical coaxial fitting ø 60/100mm
Vertical coaxial flanged polypropylene fitting, measuring 60/100mm in diameter, for the discharge of gas and intake of air for combustion via two coaxial ducts

CCOAX

90° coaxial elbow for ø 60/100 mm horizontal outlet that can be adjusted at 360°
Elbow for the discharge of gas and intake of air, that can be combined with ø 60/100 coaxial pipe with terminal.
The internal section is used for the discharge of the combustion gas while the external section is used for the intake of combustion air.

TCOAX

Coaxial pipe L = 1000mm ø 60/100 with terminal
Pipe for flue gas discharge and air intake through an external wall, with discharge terminal
The internal section is used for the discharge of the combustion gas while the external section is used for the intake of combustion air.

KAS80X

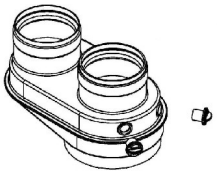
ø 80 mm vertical fittings
Two vertical flanged polypropylene fittings, 80 mm diameter, with inspection ports, which allow the combustion gas discharge and air intake to be split directly from the boiler body

⚠ *Only compatible with GAS BOILER UC 24.4-33.4*

KSDFX

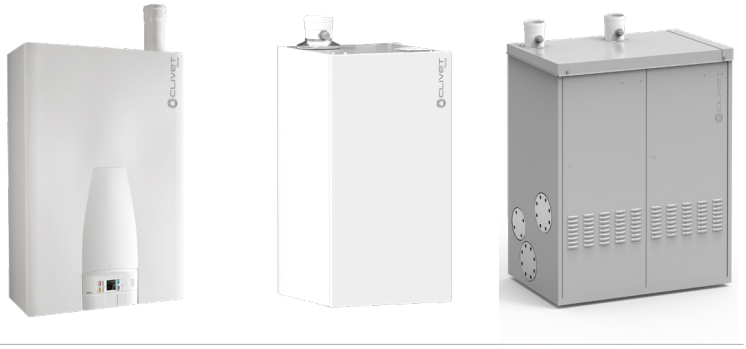
ø 80mm flue gas splitter kit
Polypropylene kit to split the air intake and the flue gas discharge into two 80 mm connections with inspection ports to connect to vertical or bent pipes

⚠ Compatible only with FE 24,4 and FE 33,4 boilers



Centralized systems

GAS BOILER_UC 70.2-115.2-200F.2 - 2-pipe condensing boiler for hybrid heat pumps
All the versions use the 0-10V signal of the heat pump to control the set-point, and version 200F.2 also uses Modbus communication.
The 70.2 and 115.2 versions are for wall installation, while the 200F.2 is for installation on a base.

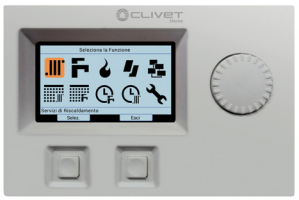


INAILX — **INAIL safety kit for installation of single boiler**
INAIL-approved 1/2" safety hydraulic kit including pressure gauge, pressure gauge holder, 2 inspection wells, 100 °C lockout thermostat, thermometer, safety pressure switch.

FH100X — **ø 100 mm vertical flue gas terminal**
Discharge terminal for boilers for outdoor installation, with weather protection

HIDUCX — **Remote control for UC 70.2-115.2 boilers**
Remote control to manage Heating/ACS parameters and display the operating parameters and alarms.
It also permits communication via Modbus

⚠ *Only compatible with GAS BOILER UC 70.2-115.2*



Prestazioni

SIZE			2.1		3.1		4.1		5.1		6.1*	7.1*	8.1*
STORAGE TANK CAPACITY			190 L	250 L	190 L	250 L	190 L	250 L	190 L	250 L	250 L	250 L	250 L
Heating													
Air 7°C - Water 35°C													
Nominal heating capacity / Max	1	kW	4,32 / 6,26		6,18 / 7,41		8,30 / 9,11		10,09 / 10,3		12,13 / 14,60	14,51 / 15,5	16,01 / 16,80
Total power input	1	kW	0,80		1,19		1,56		2,01		2,42	3,09	3,52
COP	1	-	5,42		5,21		5,31		5,01		5,00	4,70	4,55
Water flow-rate	1	l/s	0,21		0,30		0,41		0,49		0,57	0,67	0,75
Nominal available pressure	1	kPa	31,2		36,5		33,1		31,0		25,7	31,7	22,6
Maximum available pressure	1	kPa	69	95	62	90	47	83	31	76	70	55	39
Air -7°C - Water 35°C													
Nominal heating capacity / Max	2	kW	4,17 / 6,25		6,05 / 6,97		7,33 / 8,35		8,20 / 9,30		10,49 / 13,85	12,23 / 14,09	13,43 / 14,33
Total power input	2	kW	1,32		2,01		2,27		2,67		3,36	4,33	4,90
COP	2	-	3,16		3,00		3,23		3,07		3,13	2,82	2,74
Water flow-rate	2	l/s	0,22		0,29		0,34		0,40		0,56	0,62	0,70
Nominal available pressure	2	kPa	35,0		39,8		34,0		31,7		65,8	63,1	47,7
Maximum available pressure	2	kPa	69	94	64	91	58	88	49	84	71	63	49
Air 7°C - Water 45°C													
Nominal heating capacity / Max	3	kW	4,16 / 5,96		6,03 / 7,13		8,22 / 8,98		10,01 / 10,30		12,30 / 14,50	14,00 / 15,70	16,01 / 16,60
Total power input	3	kW	1,06		1,57		2,08		2,59		3,24	3,84	4,45
COP	3	-	3,93		3,83		3,95		3,86		3,80	3,65	3,60
Water flow-rate	3	l/s	0,19		0,30		0,39		0,49		0,60	0,67	0,76
Nominal available pressure	3	kPa	32,3		36,4		34,9		31,0		51,6	41,8	21,7
Maximum available pressure	3	kPa	70	95	63	90	51	85	31	76	65	55	38
Air 7°C - Water 55°C													
Nominal heating capacity / Max	4	kW	4,08 / 5,74		5,94 / 6,90		7,50 / 7,80		9,60 / 9,72		12,07 / 13,90	13,85 / 14,50	16,00 / 16,20
Total power input	4	kW	1,36		1,93		2,35		3,10		3,89	4,53	5,52
COP	4	-	3,00		3,07		3,19		3,10		3,10	3,05	2,90
Water flow-rate	4	l/s	0,12		0,18		0,23		0,29		0,36	0,41	0,48
Nominal available pressure	4	kPa	35,6		33,4		31,2		33,6		14,1	16,5	17,4
Maximum available pressure	4	kPa	70	98	70	96	69	94	63	91	90	105	80
Cooling													
Air 35°C - Water 18°C													
Nominal cooling capacity / max	5	kW	4,55 / 6,88		6,44 / 7,65		8,10 / 11,13		10,00 / 12,03		12,06 / 15,02	13,79 / 15,30	14,84 / 16,38
Total power input	5	kW	0,75		1,23		1,58		2,10		3,00	3,73	4,07
EER	5	-	6,08		5,24		5,12		4,77		4,02	3,70	3,65
Water flow-rate	5	l/s	0,22		0,32		0,38		0,48		0,60	0,63	0,71
Nominal available pressure	5	kPa	34,9		34,8		34,6		10,6		13,1	16,3	15,1
Maximum available pressure	5	kPa	69	94	61	89	51	85	32	76	65	61	48
Air 35°C - Water 7°C													
Nominal cooling capacity / max	6	kW	4,26 / 6,14		6,25 / 6,39		7,46 / 7,94		9,10 / 9,10		11,80 / 11,80	12,86 / 12,86	14,2 / 14,2
Total power input	6	kW	1,22		2,02		2,24		2,94		4,29	5,04	5,80
EER	6	-	3,50		3,09		3,33		3,09		2,75	2,55	2,45
Water flow-rate	6	l/s	0,20		0,29		0,36		0,43		0,54	0,59	0,64
Nominal available pressure	6	kPa	5,8		36,1		34,3		36,8		18,1	20,3	25,1
Maximum available pressure	6	kPa	70	95	64	91	56	87	43	82	74	67	60

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 47/55 °C, source side air 7°C U.R.= 85% Heat power data, Total power input and COP in accordance with EN 14511:2018.
5. 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.
6. 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.

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.

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

SIZE			2.1		3.1		4.1		5.1		6.1*	7.1*	8.1*
STORAGE TANK CAPACITY			190 L	250 L	190 L	250 L	190 L	250 L	190 L	250 L	250 L	250 L	250 L
ERP													
Clima Average High temperature Heat pumps													
Nominal power	7	kW	4		6		7		9		12	13	13
SCOP	7	-	3.32		3.54		3.72		3.73		3.56	3.52	3.48
Generator energy class	7	-	A++		A++		A++		A++		A++	A++	A++
ηs	7	%	130		138		146		146		139	138	136
System energy class	7	-	A++		A++		A++		A++		A++	A++	A++
ηs	7	%	135		143		151		151		144	143	141
Clima Average Low temperature Heat pumps													
Nominal power	8	kW	5		6		8		10		12	14	16
SCOP	8	-	5,13		5,15		5.32		5.27		5.00	4.91	4.89
Generator energy class	8	-	A+++		A+++		A+++		A+++		A+++	A+++	A+++
ηs	8	%	202		203		210		208		196	193	193
System energy class	8	-	A+++		A+++		A+++		A+++		A+++	A+++	A+++
ηs	8	%	207		208		215		213		201	198	198
Average climatic conditions - Heat pump for application with Fan coil													
Nominal power	9	kW	4		6		7		9		12	13	14
SEER	9	-	5,09		5,42		5.95		6.01		5.16	5.10	4.87
Generator energy class	9	-	A+++		A+++		A+++		A+++		A+++	A+++	A+++
ηs	9	%	201		214		235		238		203	201	192
Heat pump for Domestic Hot Water application													
Load profile declared	10	-	L	XL	L	XL	L	XL	L	XL	XL	XL	XL
ηwh	10	%	120	123	120	123	116	125	116	125	124	124	124
Sanitary water energy class	10	-	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+

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, Medium temperature 47/55°C
8. 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
9. 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 12/7°C
10. Data according to EN 16147: 2017

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

Construction - Outdoor unit

SIZE			2.1	3.1	4.1	5.1	6.1	7.1	8.1
Characteristics									
Compressor						Twin Rotary			
Refrigerant						R32			
Refrigerant charge		kg	1.50	1.50	1.65	1.65	1.84	1.84	1.84
GWP		t_{CO2}	675	675	675	675	675	675	675
Equivalent tons of CO2 (*)		t_t	1.02	1.02	1.11	1,11	1.24	1.24	1.24
Oil charge		l	0,46	0,46	0,46	0,46	1,10	1,10	1,10
Type of fan						Axial			
Nominal air flow rate		m^3/h	2770	2770	4030	4030	4060	4060	4060
Outdoors unit sound pressure at 1 metre	1	dB(A)	42	44	45	47	50	51	53
Sound power	1	dB(A)	55	57	58	60	63	64	66
Dimensions									
Operation (L x P x A)		mm	986x426x712	986x426x712	1140x523x866	1140x523x866	1140x523x866	1140x523x866	1140x523x866
Packing (L x P x A)		mm	1065x485x800	1065x485x800	1180x560x890	1180x560x890	1180x560x890	1180x560x890	1180x560x890
Operation weight 230M / 400TN	2	kg	58	58	77	77	96/112	96/112	96/112
Shipping weight 230M / 400TN	2	kg	64	64	88	88	110/125	110/125	110/125

1. Sound pressure level determined using the intense metric method (UNI EN ISO 9614-2). 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.
2. Power supply 220-240V ~ 50Hz / Power supply 380-415V 3N~ 50Hz

(*) It contains fluorinated greenhouse gases.

General technical data

Construction - Indoor unit

SIZE			A - 190 L	A - 250 L	B - 250 L
System characteristics					
Maximum circuit pressure		bar	3,0	3,0	3,0
System expansion tank	1	l	8,0	8,0	8,0
Preload expansion tank		bar	1,0	1,0	1,0
System water connections		inch	1''	1''	1''
DHW characteristics					
Type Storage tank			Enameled steel	Enameled steel	Enameled steel
Volume of DHW tank		l	190	250	250
Internal pipe coil exchange surface		m^2	2,0	2,0	2,0
Storage dipersion		W/K (kWh/24h)	1.81 (1.95)	2.04 (2.20)	2.04 (2.20)
DHW safety heating element		kW	2,0	2,0	2,0
Maximum DHW circuit pressure	2	bar	10,0	10,0	10,0
Recommended sanitary expansion tank	3	l	12,0	16,0	16,0
DHW water connections		inch	3/4''	3/4''	3/4''
Dimensions					
Operation (L x P x A)		mm	600 x 615 x 1774	600 x 615 x 2084	600 x 615 x 2084
Packing (L x P x A)		mm	660 x 690 x 1890	660 x 690 x 2190	660 x 690 x 2190
Operation weight		kg	359	419	421
Shipping weight		kg	187	192	194

1. Sufficient volume up to a maximum of 60 litres of system water content.
2. The installation of the sanitary side safety valve is mandatory and left to the installer.
3. 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..

Configuration compatibility table SPHERA EVO 2.0 Tower

INDOOR UNIT		SQKN-YEE 1 TC A	SQKN-YEE 1 TC A	SQKN-YEE 1 TC B	INTEGRATION ELECTRIC HEATER			
	Storage	190L	250L	250L	EH024	EH3	EH6	EH9
OUTDOOR UNIT								
MiSAN-YEE 1 S 2.1		✓	✓	-	✓		✓	✓
MiSAN-YEE 1 S 3.1		✓	✓	-	✓		✓	✓
MiSAN-YEE 1 S 4.1		✓	✓	-	✓		✓	✓
MiSAN-YEE 1 S 5.1		✓	✓	-	✓		✓	✓
MiSAN-YEE 1 S 6.1		-	-	✓		✓	✓	✓
MiSAN-YEE 1 S 7.1		-	-	✓		✓	✓	✓
MiSAN-YEE 1 S 8.1		-	-	✓		✓	✓	✓

Condensing boiler technical data

MODEL				UC 24.4	UC 33.4	FE 24.4	FE 33.4
Heating capacity							
Nominal heating capacity (Qn)	-	Maximum	[kW]	24,0	34,0	24,5	34,8
		Minimum	[kW]	5,0	5,0	4,8	5,0
Heating capacity (Pn)	60/80°C	Maximum	[kW]	23,4	33,2	24,0	34,0
		Minimum	[kW]	4,8	4,8	4,7	4,9
	30/50°C	Maximum	[kW]	25,2	35,8	26,0	37,0
		Minimum	[kW]	5,3	5,4	5,2	5,4
Performance	60/80°C	Maximum	%	97,7	97,7	97,8	97,7
		Minimum	%	96,5	96,4	97,6	97,2
	30/50°C	Maximum	%	105,1	105,2	106,1	106,2
		Minimum	%	106,9	107,0	107,3	107,1
	30% di Pn	-	%	108,7	108,6	109,7	109,7
Boiler water content	-	-	[l]	2,5	2,8	3,4	4,3
Operating pressure	PMS	Maximum	[bar]	3	3	3	3
	-	Minimum	[bar]	0,5	0,5	0,8	0,8
Expansion tank	Volume	-	[l]	10	10	8	10
	Preload	-	[bar]	1	1	0,8	0,8
ACS performances							
Nominal heating capacity (Qnw)	-	Maximum	[kW]	28,0	34,0	28,5	34,8
		Minimum	[kW]	5,0	5,0	4,7	5,0
Heating capacity	-	Maximum	[kW]	27,3	33,2	28,0	34,0
		Minimum	[kW]	4,8	4,8	4,7	4,8
Specific flow rate	ΔT=25°C	-	[l/min]	16,2	19,2	16,1	19,5
	ΔT=30°C	-	[l/min]	13,5	16,0	13,4	16,2
DHW production in continuous operation	ΔT=45 K	-	[l/min]	9,0	10,6	8,9	10,8
	ΔT=40 K	-	[l/min]	10,1	11,9	10,0	12,1
	ΔT=35 K	-	[l/min]	11,6	13,6	11,5	13,9
	ΔT=30 K	-	[l/min]	13,5	15,8	13,4	16,2
	ΔT=25 K	-	[l/min]	16,2	19,0	16,1	19,5
Water temperature		Maximum	[°C]	60	60	65	65
		Minimum	[°C]	38	38	40	40
Operating pressure	PMW	Maximum	[bar]	6	6	9	9
	-	Minimum	[bar]	0,5	0,5	0,3	0,3
ErP data							
Seasonal efficiency *Medium climate*	Heating	ηs	%	93	93	94	94
		Energy class	-	A	A	A	A
	DHW	ηwh	%	87	90	85	85
		Energy class	-	A	A	A	A
		DHW profile	-	XL	XL	XL	XXL
Sound power level		Lwa	[dB(A)]	53	56	49	52
Thermal losses and smoke discharge							
Chimney losses	"burner ON 80/60°C"	Pmax	%	2,33	2,27	2,00	2,10
		Pmin	%	2,24	2,32	2,00	2,90
	"burner ON 50/30°C"	Pmax	%	1,70	1,15	1,40	1,40
		Pmin	%	1,37	1,44	1,00	1,00
Smoke temperature	80/60°C	Pmax	[°C]	66,5	64,9	66	67
		Pmin	[°C]	64,3	65,9	64	62
	50/30°C	Pmax	[°C]	53,6	52,7	52	53
		Pmin	[°C]	47,2	48,4	44	45
Smoke flow rate	-	Pmax	[g/s]	13,8	15,6	11,2	16
	-	Pmin	[g/s]	2,3	2,3	2,3	2,4
Nitrogen oxide (NOX) emissions		Class	-	6	6	6	6
		-	[mg/kWh]	45	49	35	33

Boilers for centralised systems

MODEL				UC 70.2	UC 115.2	UC 200.2
Heating Performance						
Modulation ratio	-	-	-	1: 7	1: 5.75	1: 10
Nominal heat capacity (Qn)	-	Maximum	[kW]	67.5	115.0	199.0
		Minimum	[kW]	9.6	20.0	20.0
Heating capacity (Pn)	60/80 °C	Maximum	[kW]	65.7	111.5	194.8
		Minimum	[kW]	9.1	19.2	19.1
	30/50 °C	Maximum	[kW]	68.7	120.0	205.2
		Minimum	[kW]	10.3	21.8	21.1
Efficiency	60/80 °C	Maximum	%	97.3	97.1	97.9
		Minimum	%	94.9	95.9	95.6
	30/50 °C	Maximum	%	101.7	104.6	103.1
		Minimum	%	107.6	108.8	105.4
	30% of Pn	-	%	107.3	107.3	108.9
Combustion efficiency	Reduced load		%	98.3	98.3	98.2
	Nominal load		%	97.4	97.7	98.0
Water content			[l]	3.9	9.0	22.0
Operating pressure	PMS	Maximum	[bar]	6	6	6
	-	Minimum	[bar]	0.5	0.5	0.5
ErP data						
Seasonal eff.	Heating	ηs	%	93	92	93
Average climate		Energy class	-	A	A	A
Sound power level		Lwa	[dB(A)]	63	-	-
Thermal losses and discharge of flue gas						
Casing losses	burner ON	Qn	%	0.09	0.7	0.14
		Qmin	%	3.44	2.69	2.60
Flue loss	burner ON	Pmax	%	2.62	2.29	2.00
		Pmin	%	1.66	1.87	1.80
Flue gas temperature (T_F-T_A)		Pmax	[°C]	51.3	46.6	40
		Pmin	[°C]	34	36	34
Flue gas flow rate	-	Pmax	[g/s]	111.4	184.6	319.57
	-	Pmin	[g/s]	15.9	34.3	34.3
Nitrogen oxide (NOX) emissions		Class	-	6	6	6
		-	[mg/kWh]	59	47	68

Hydraulic data - Indoor unit + Outdoor unit

SIZE			2.1		3.1		4.1		5.1		6.1	7.1	8.1
Characteristics			190 L	250 L	190 L	250 L	190 L	250 L	190 L	250 L	250 L	250 L	250 L
Minimum system water content	1	l	40		40		40		40		40	40	40
Minimum admitted water flow rate		l/s	0,16		0,16		0,16		0,16		0,16	0,16	0,16
Maximum admitted water flow rate		l/s	0,61	0,86	0,61	0,86	0,61	0,86	0,61	0,86	0,92	0,92	0,92
Net boiler capacity		l	182	240	182	240	182	240	182	240	240	240	240
DHW tank setpoint		°C	50	50	50	50	50	50	50	50	50	50	50
Water mixed at 40°C (V40)		l	204	269	204	269	204	269	204	269	269	269	269
Warm-up time	2	h:min	02:30	02:25	02:30	02:25	02:08	02:05	02:08	02:05	01:46	01:46	01:46
Energy consumption during heating	3	kWh	2,20	2,70	2,20	2,70	2,30	2,85	2,30	2,85	3,01	3,01	3,01

1. Consider the water content of the area with less volume
2. Time required to bring the water volume of the tank from a temperature of 10°C to a temperature of 50°C
3. Energy consumption to bring the water volume of the tank from a temperature of 10°C to a temperature of 50°C

Electrical data

Outdoor unit

SIZE		2.1	3.1	4.1	5.1	6.1	7.1	8.1
Power supply 220-240V ~ 50Hz								
F.L.A. - Full load current at max admissible conditions	A	10.0	11.8	15.0	16.4	24.5	25.9	27.7
F.L.I. - Full load power input at max admissible conditions	kW	2.20	2.60	3.30	3.60	5.40	5.70	6.10
M.I.C - Maximum inrush current	A	10.0	11.8	16,7	16.4	24.5	25.9	27.7
Power supply 380-415V 3N~ 50Hz								
F.L.A. - Full load current at max admissible conditions	A	-	-	-	-	8.20	8.70	9.30
F.L.I. - Full load power input at max admissible conditions	kW	-	-	-	-	5.40	5.70	6.10
M.I.C - Maximum inrush current	A	-	-	-	-	8.20	8.70	9.30

Indoor unit

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

General technical data

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	kW	0,08

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

Additional electric heater - EH024/EH3/EH6/EH9

SIZE		2 kW	3 kW	4 KW
Power supply 220-240V ~50Hz				
F.L.A. - Full load current at max admissible conditions	A	8,70	13,1	17,4
F.L.I. - Full load power input at max admissible conditions	kW	2,00	3,00	4,00

Power supply 220-240V ~50Hz +/- 10%
Size 2kW and 4kW available only for indoor unit A, size 3kW available only for indoor unit B

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.

⚠ The additional electric heater is not an accessory supplied separately, but a construction configuration.

Electrical data of the hybrid solution condensing boiler

MODEL			UC 24.4	UC 33.4	FE 24.4	FE 33.4
Power supply		[V-Hz]	230/50	230/50	230/50	230/50
F.L.A. - Full load current at max admissible conditions	-	[A]	0,41	0,53	0,36	0,43
F.L.I. - Full load power input at max admissible conditions	-	[kW]	0,095	0,122	0,082	0,099
Power supply fuse	-	-	3,15	3,15	3,15	3,15
Protection rating	IP	-	X5D	X5D	X4D	X4D

Power supply: +/-10%
The units comply with the requirements of European standards EN 60335-1 and EN 60335-2-40
Data to be added to standard indoor unit values.

Sound levels outdoor unit

Standard mode

SIZE	Sound power level								Sound pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
2.1	46	49	49	52	52	46	37	27	42	55
3.1	49	48	50	55	53	48	39	30	44	57
4.1	36	51	53	56	55	49	44	30	45	58
5.1	37	56	53	57	57	51	47	36	47	60
6.1	44	53	54	60	58	55	52	51	50	63
7.1	44	54	55	60	59	57	56	54	51	64
8.1	46	58	57	60	61	59	54	51	53	66

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 pressure level	Sound power level
	dB(A)	dB(A)
2.1	40	53
3.1	40	53
4.1	42	55
5.1	42	55
6.1	46	59
7.1	47	60
8.1	48	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 0.8.
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).

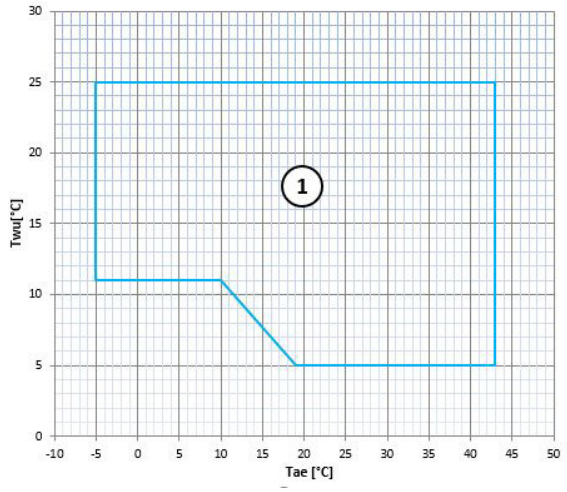
Super-silenced mode

SIZE	Sound pressure level	Sound power level
	dB(A)	dB(A)
2.1	37	50
3.1	38	51
4.1	39	52
5.1	39	52
6.1	41	54
7.1	41	54
8.1	41	54

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

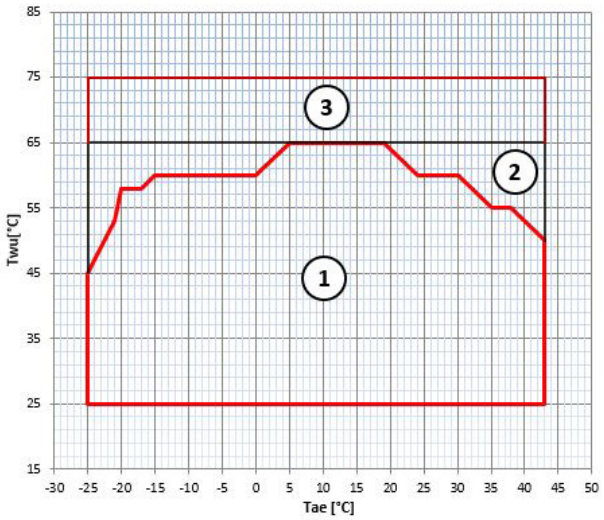
Cooling



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

1. Normal operating range

Heating



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

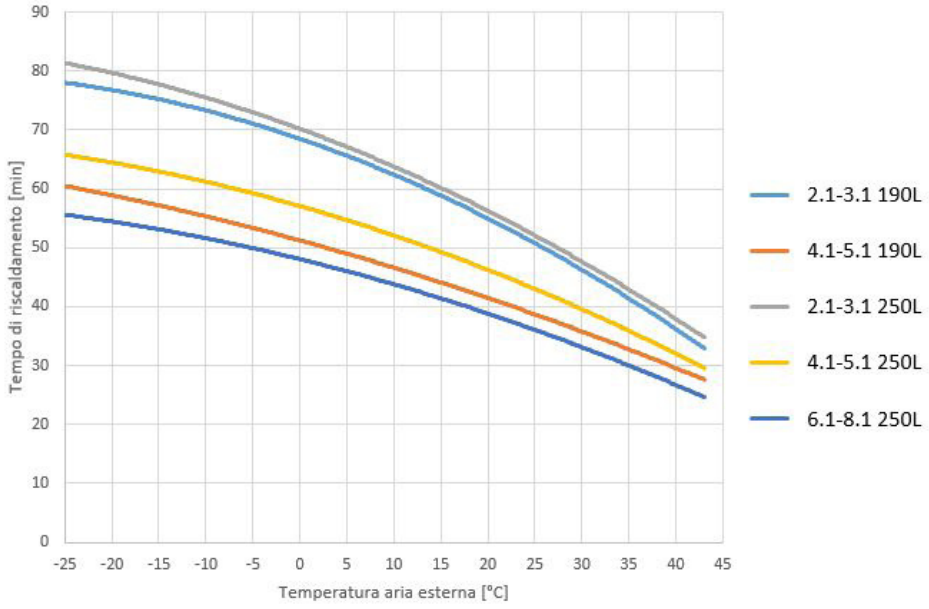
1. Normal operating range
2. Operating range with additional electric heater option
3. Hybrid system operating range

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

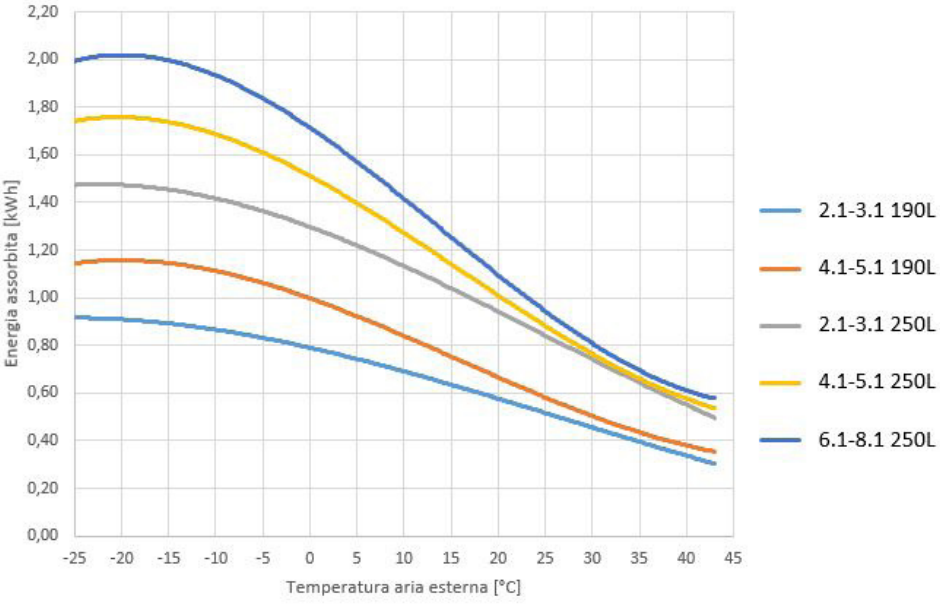
Performance curves in domestic hot water production

Curves referring to the switch-on of the unit from which 90 litres of water were taken out of a total of about 190 available (at an equivalent temperature of 40°C).

Heating time



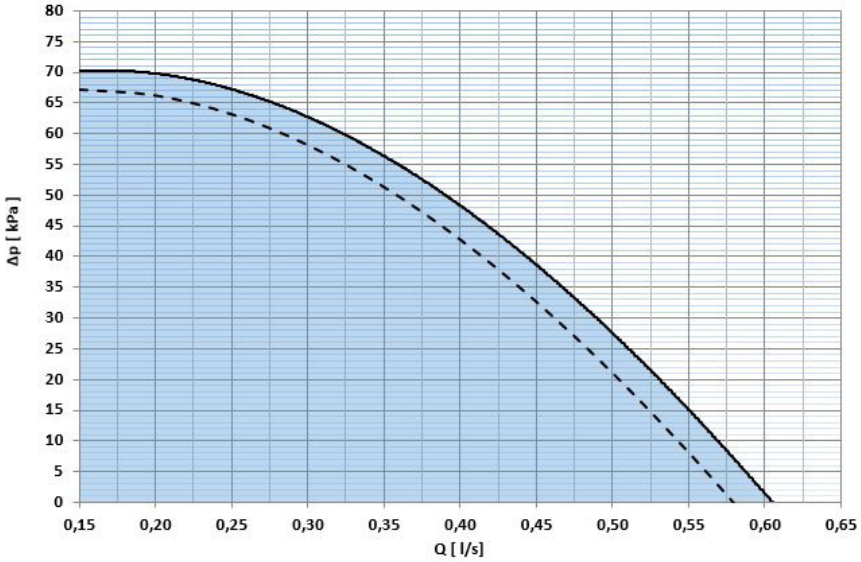
Energy consumption



Nominal test conditions:
- Storage temperature (T5) at power-off = 50°C
- Storage temperature (T5) at switch-on = 40°C
- Amount drawn = 3 l/min

General technical data

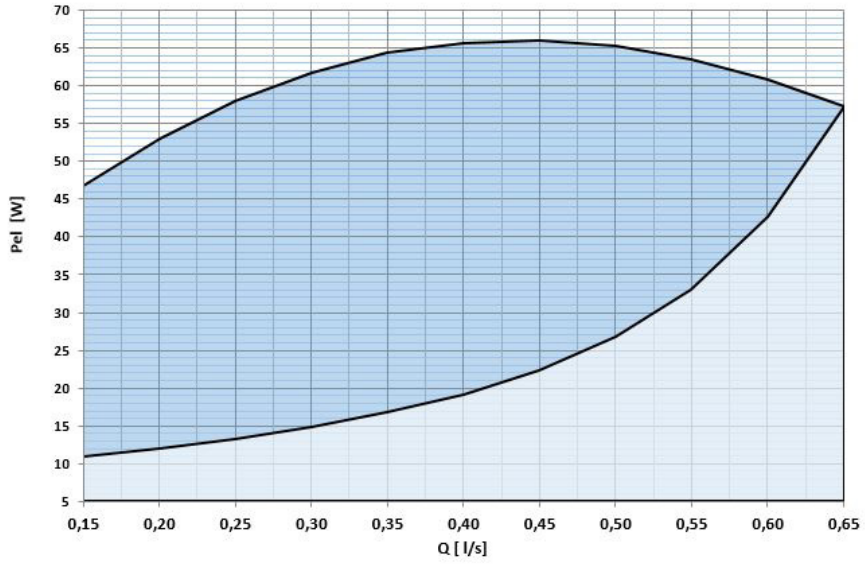
Available pressure of the standard circulator at the unit 190 L A connections



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

-------- Maximum head of the circulator with configuration of integration electric heater
Circulator operating field

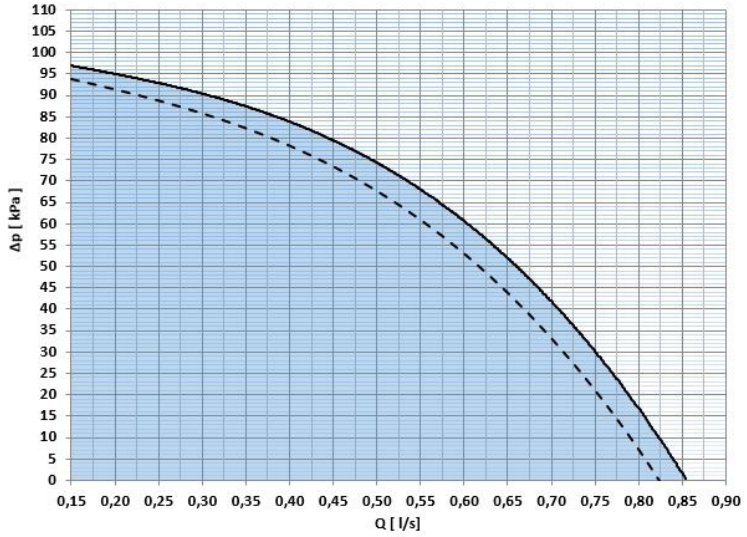
Absorption of the standard circulator at the unit 190 L - A



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

Circulator operating field

Available pressure of the standard circulator at the unit 250 L A connections

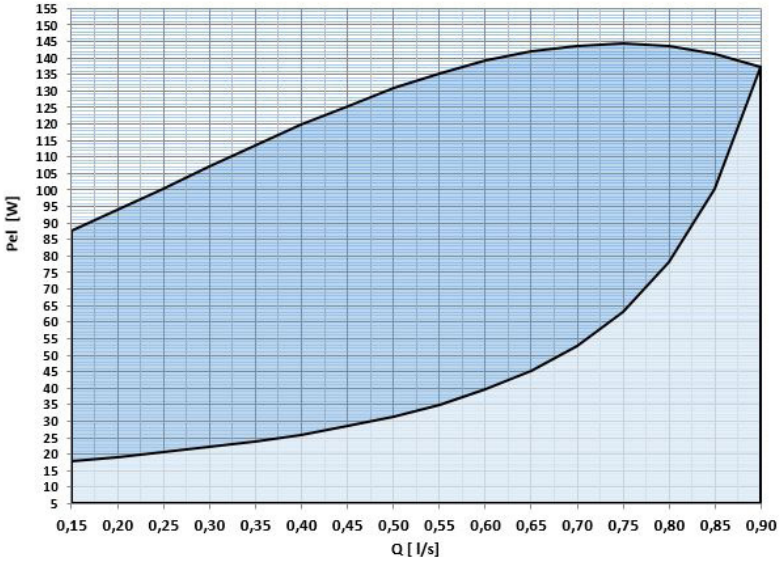


ΔP [kPa] = Available pressure
Q [l/s] = Water flow-rate

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

Circulator operating field

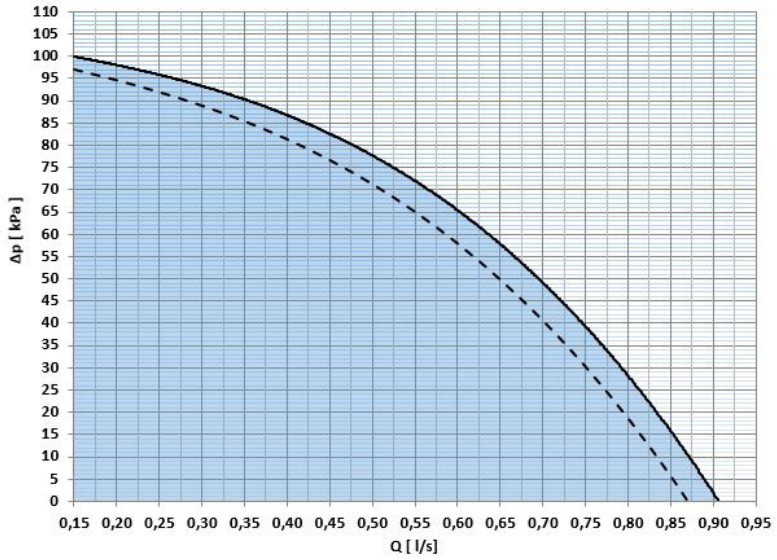
Absorption of the standard circulator at the unit 250 L - A



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

Circulator operating field

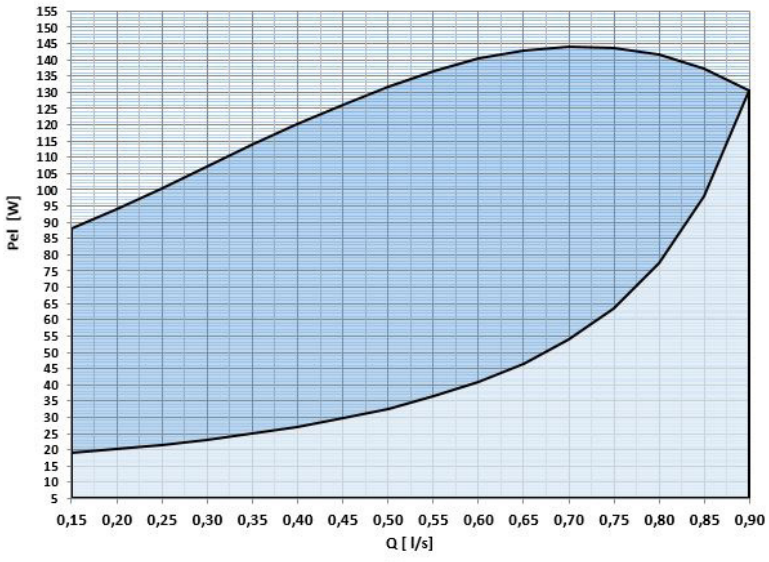
Available pressure of the standard circulator at the unit 250 L B connections



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

-------- Maximum head of the circulator with configuration of integration electric heater.
Circulator operating field

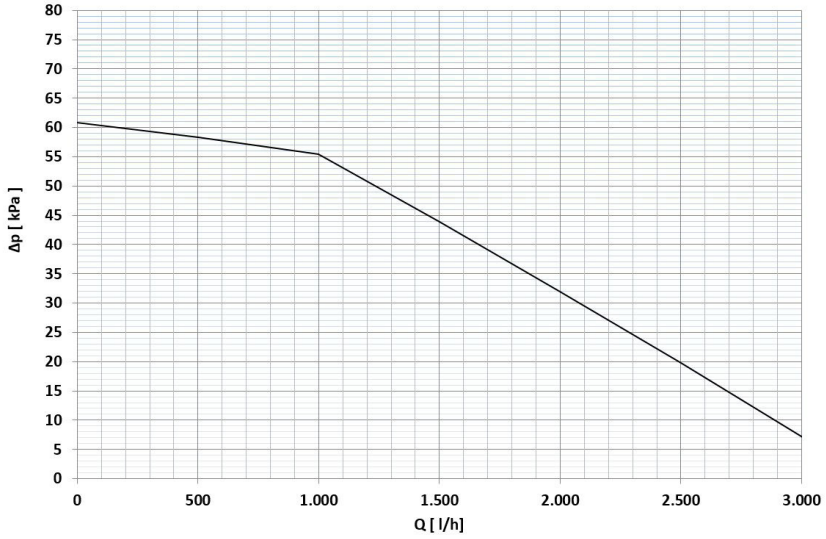
Absorption of the standard unit 250 L - B



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

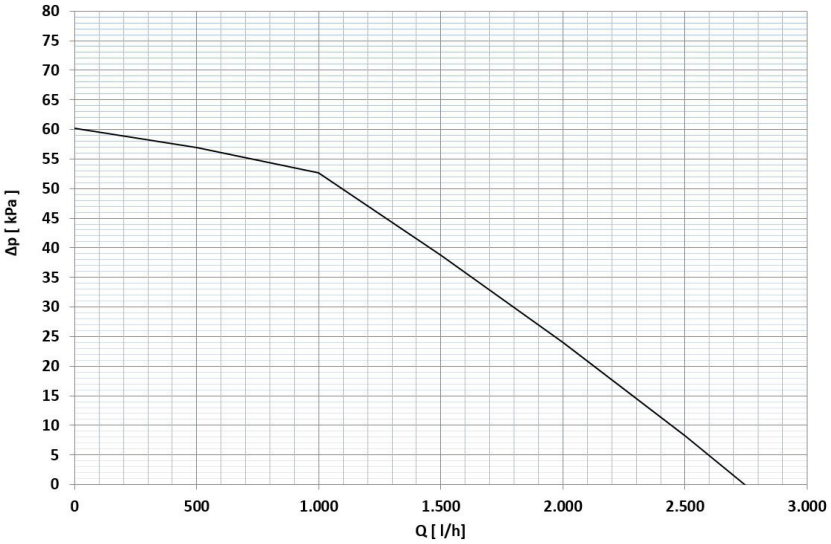
Circulator operating field

Available pressure for direct booster system circulator



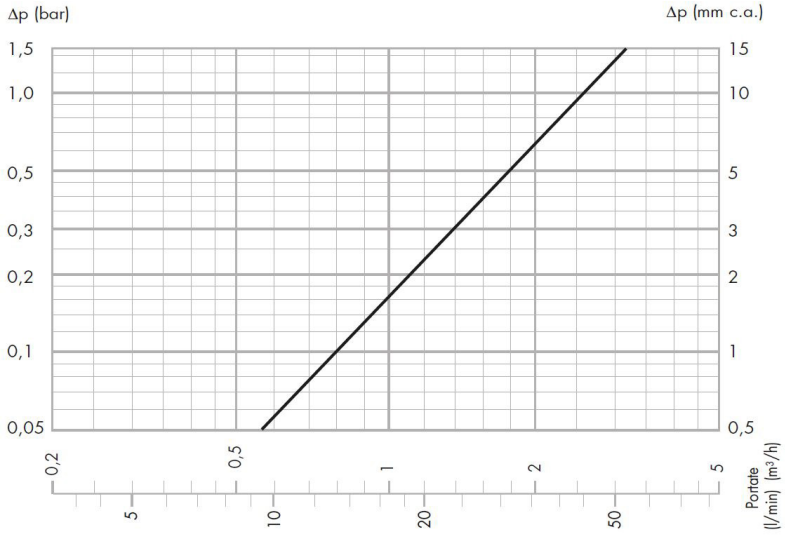
ΔP [kPa] = Available pressure
Q [l/h] = Water flow-rate

Available pressure for mixed booster system circulator



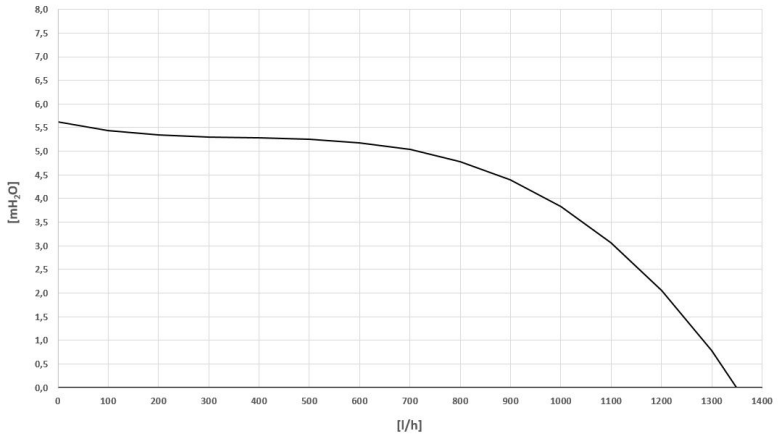
Pel [W] = Electrical power input
Q [l/h] = Water flow-rate

Pressure drops - VDACSX accessory



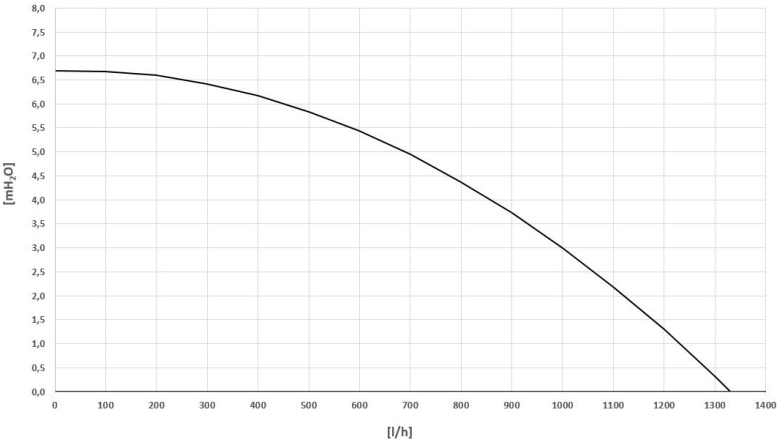
General technical data

Available pressure of the circulator - GAS BOILER UC



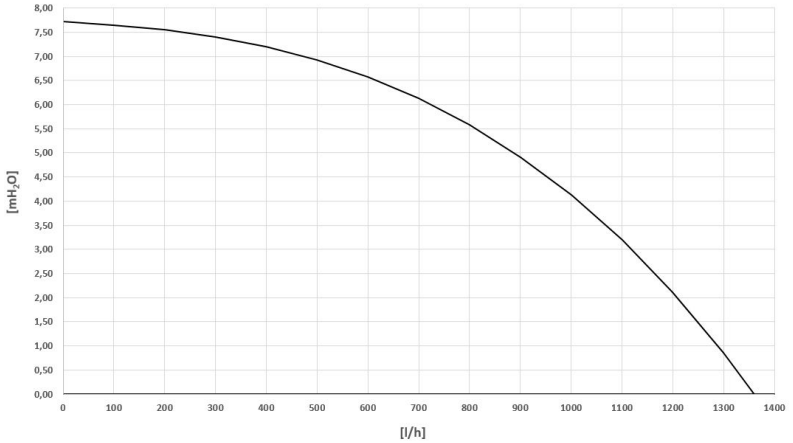
[mH2O] = Available pressure
[l/h] = Water flow-rate

Available pressure of the circulator - GAS BOILER FE 24.4



[mH2O] = Available pressure
[l/h] = Water flow-rate

Available pressure of the circulator - GAS BOILER FE 33.4

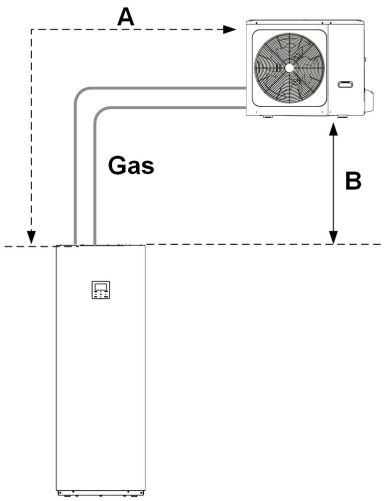


[mH2O] = Available pressure
[l/h] = Water flow-rate

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

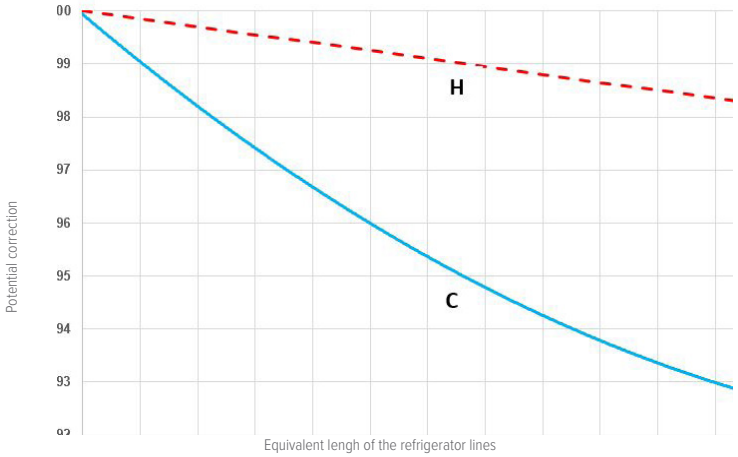


SIZE		2.1	3.1	4.1	5.1	6.1	7.1	8.1
Length and height difference of refrigerant pipes								
A - Refrigerant pipe min/max equivalent length	m	2 - 30	2 - 30	2 - 30	2 - 30	2 - 30	2 - 30	2 - 30
B - Maximum refrigerant pipe height difference with outdoor unit higher than indoors unit	m	25	25	25	25	25	25	25
B - Maximum refrigerant pipe height difference with outdoor unit underthan indoor unit	m	25	25	25	25	25	25	25
Diameters of refrigerant pipes								
Gas pipe diameter	inch	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"
Fluid line diameter	inch	1/4"	1/4"	3/8''	3/8''	3/8''	3/8''	3/8''
Additional charge per meter	kg/m	0,020	0,020	0,038	0,038	0,038	0,038	0,038

The refrigerant pre-charge in the outdoor units is sufficient for connection up to 15 m.

Determination of cooling and heating power loss

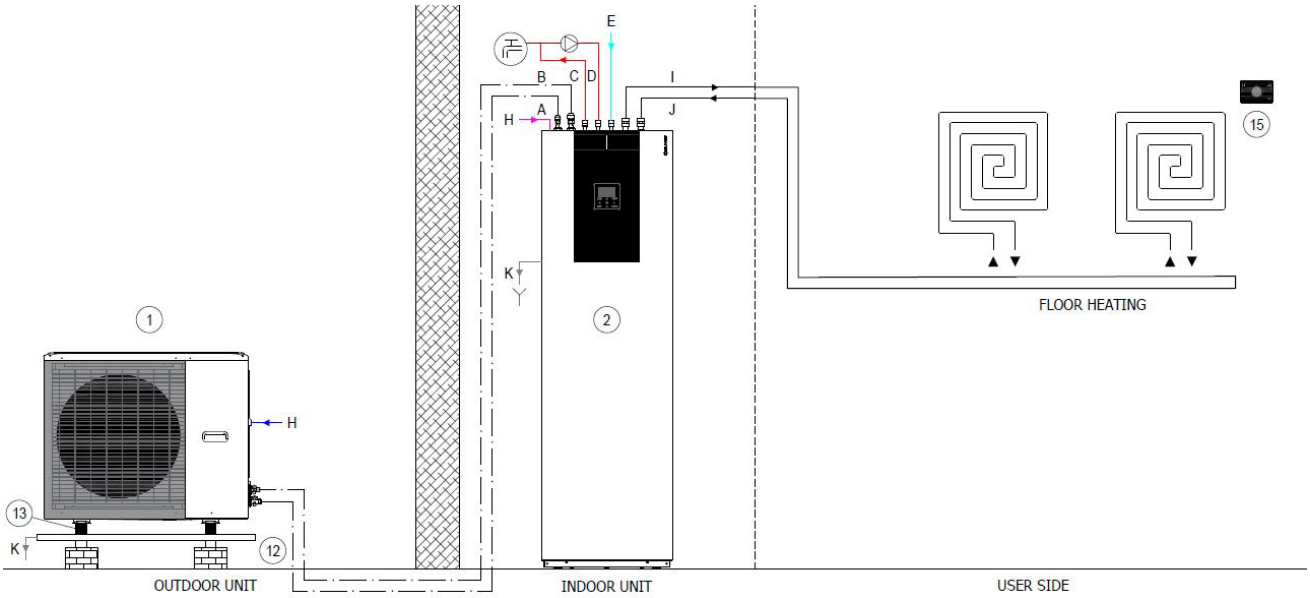
The equivalent length of the cooling lines results in a loss of cooling and heating power supplied to the circuit and DHW system.
The graph shows the amount of this loss of powergh



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

Water connections

Here are some diagrams of system connections provided as an indication. The connection and design of the system must be carried out in accordance with national regulations in force.
The diagrams do not report the mandatory components to be taken care of by the customer.



1. Outdoor unit
2. Indoor unit
3. 2 zone kit (KIRE2HX-KIRE2hXL)
4. Single zone kit (KCSX)
5. Integration electric heater (EH024 - EH3 - EH6 - EH9)
6. Drain-back solar integration for domestic hot water (SOLX) --> only Tower
7. Solar panel
8. Hybrid solution (HYSO24 - HYSO34)
9. 40L inertial storage tank (ACI40X)
10. 1-litre circuit breaker (DIX)
11. 50-litre circuit breaker- 60L inertial storage tank (DI50X - ACI60X)
12. Condensate drain pan (DTX)
13. Anti-vibration mount (APAVX - ASTFX)
14. Brackets wall (KSIPX)
15. Chronothermostat (HID-TCXB - HID-TCXN)
16.DHW storage (ACS200X- ACS300X - ACS500X + SCS08X - SCS12X)
17. ElfoControl[3] EVO

A. Liquid line
B. Gas line
C. DHW outlet
D. DHW recirculation inlet
E. Aqueduct inlet
F. Solar outlet
G. Solar inlet
H. Power input
I. System return
J. System supply
K. Condensate drain

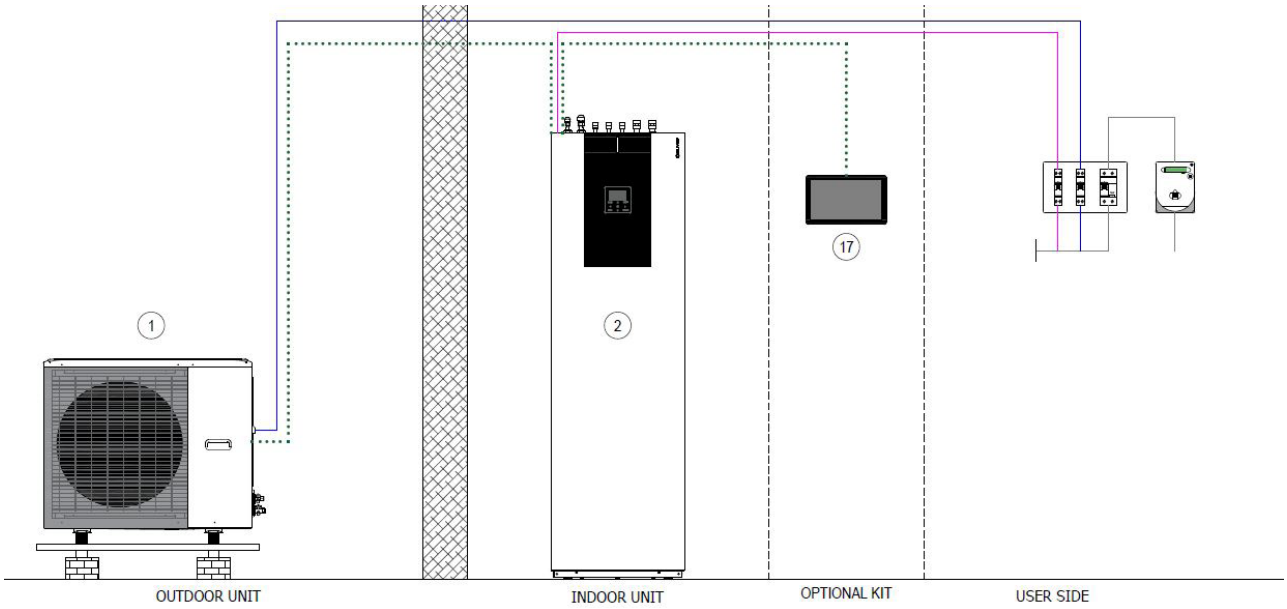
220-240V~50Hz
380-415V 3N ~50HZ con EH3 - EH6 - EH9

2.1 - 5.1 single phase 220-240V ~50Hz
6.1 - 8.1 single phase 220-240V ~50Hz
6.1 - 8.1 three-phase 380415V 3N~50Hz

BUS RS 485
Technical water
Domestic cold water
Domestic hot water
Condensate drain

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 2.0 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.



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2. Indoor unit
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5. Integration electric heater (EH024 - EH3 - EH6 - EH9)
6. Drain-back solar integration for domestic hot water (SOLX) --> only Tower
7. Solar panel
8. Hybrid solution (HYSO24 - HYSO34)
9. 40L inertial storage tank (ACI40X)
10. 1-litre circuit breaker (DIX)
11. 50-litre circuit breaker- 60L inertial storage tank (DI50X - ACI60X)
12. Condensate drain pan (DTX)
13. Anti-vibration mount (APAVX - ASTFX)
14. Brackets wall (KSIPX)
15. Chronothermostat (HID-TCXB - HID-TCXN)
16.DHW storage (ACS200X- ACS300X - ACS500X + SCS08X - SCS12X)
17. ElfoControl[3] EVO

A. Liquid line
B. Gas line
C. DHW outlet
D. DHW recirculation inlet
E. Aqueduct inlet
F. Solar outlet
G. Solar inlet
H. Power input
I. System return
J. System supply
K. Condensate drain

220-240V~50Hz
380-415V 3N ~50HZ con EH3 - EH6 - EH9

2.1 - 5.1 single phase 220-240V ~50Hz
6.1 - 8.1 single phase 220-240V ~50Hz
6.1 - 8.1 three-phase 380415V 3N~50Hz

BUS RS 485
Technical water
Domestic cold water
Domestic hot water
Condensate drain

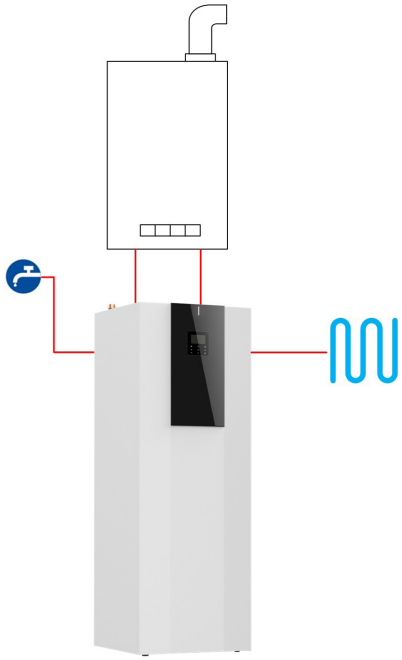
Auxiliary and hybrid version heat sources

The electrical connection must be carried out in accordance with national regulations in force. The connection must be carried out by specialised personnel who are qualified to work with live voltage.
SPHERA EVO 2.0 can be controlled with the built-in control panel. The unit can be called using: the ELFOControl3 EVO supervisory system or common electromechanical thermostats.
Refer to the installation manual for more information on the connections.

⚠ only one of IBH or AHS can be managed

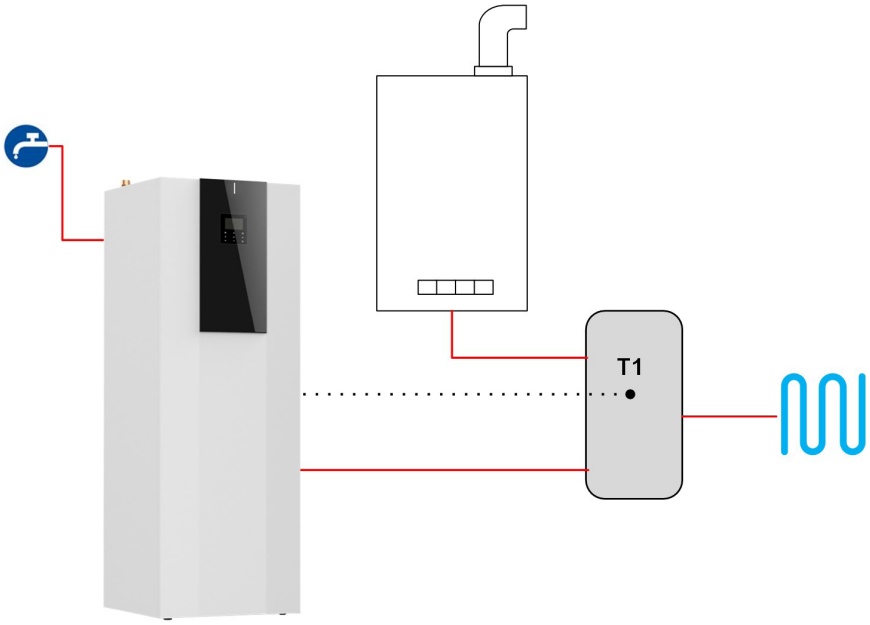
The additional electric heater or boiler can operate as::
- Integration: when it is not convenient/possible to work with the heat pump capacity alone
- Replacement: outside the work settings of the heat pump
- Back-up: in case of unit failure (the unit keeps the pump running at maximum speed)

A third-party supplier's boiler, if any, must be installed in parallel with the heat pump and can act:
- on the system and DHW: installed directly on the system, in this case its operation will require a dedicated T1 temperature probe (to be selected separately) to be installed downstream



⚠ Requires installation of the KCCEX kit, the T1 probe is included and must be fitted inside the indoor unit downstream of the boiler

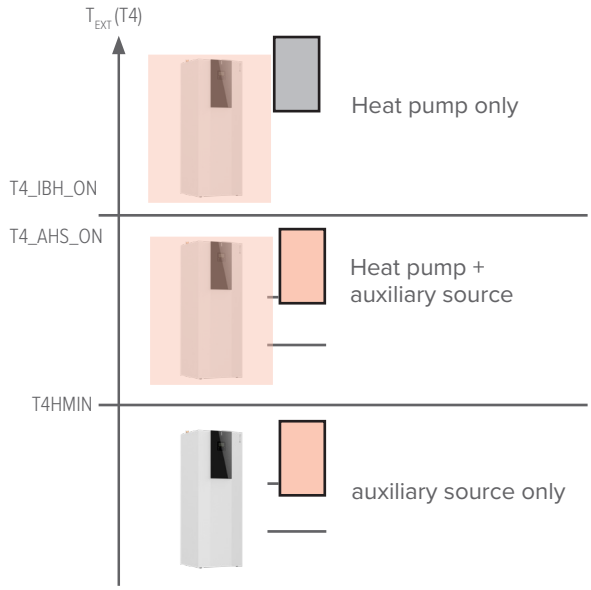
- only on the system: installed on a hydraulic separator, where the T1 probe (to be selected separately) must also be fitted



The activation operating mode (in Heating, DHW production or both) must be selected with the dip-switches on the board during installation.
Activation of the auxiliary source is linked to the simultaneous presence of 3 conditions, each of which is associated with a parameter that can be adjusted during initial start-up on the user interface:

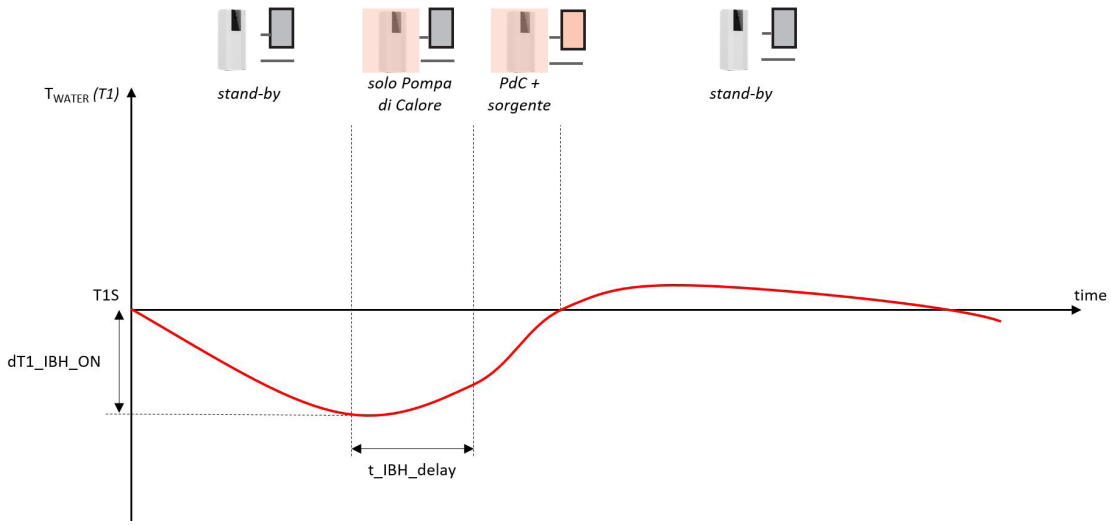
- very low outdoor temperature

parameter T4_IBH_ON or T4_AHS_ON (default -5°C, adjustable -15÷30): the minimum outdoor air temperature for heat pump operation only



⚠ To make the auxiliary source work only as a replacement for the unit, set the parameter to the same value as T4HMIN (default -15°C, adjustable -25÷15): the minimum outdoor air temperature at which the heat pump can operate.

- supply temperature too far from the set-point
  parameter dT1_IBH_ON or dt1_AHS_ON (default 5°C, adjustable 2÷10): the minimum ΔT between the water set-point TS1 and unit supply set-point T1
- too long to reach the set-point
  parameter t_IBH_DELAY or t_AHS_DELAY (default 30min, adjustable 5÷120): the maximum waiting time between compressor start-up and auxiliary source activation



⚠ The BACKUP HEATER function on the HMI allows activation of the IBH or AHS auxiliary source to be forced

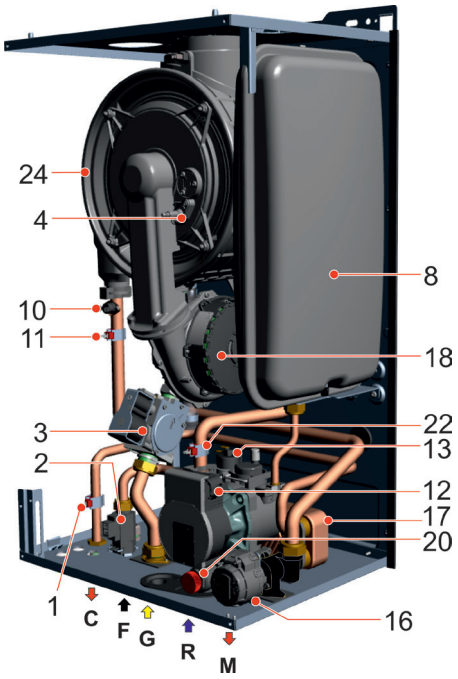
The unit can manage the AHS set-point dynamically with a 0-10V signal, with parameters:

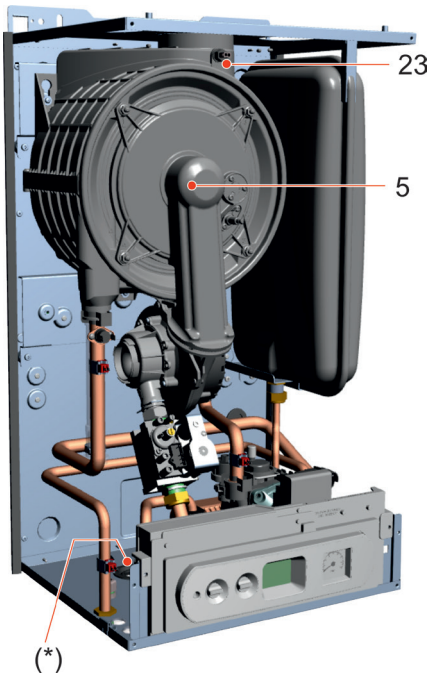
- MAX_SETHEATER (default: 80°C, adjustable) and MIN_SETHEATER (default: 30°C, adjustable): the minimum and maximum set-points that can be set in the boiler
- MAX_SIGHEATER (default: 10V, adjustable) and MIN_SIGHEATER (default: 3V, adjustable): the 0-10V signals linked to the minimum and maximum set-points that can be set in the boiler

Auxiliary and hybrid version heat sources

Hybrid versions with UC version boiler
The hybrid heat pumps are equipped with a 4-pipe boiler for DHW production and Heating.

The UC GAS BOILER is made as follows:



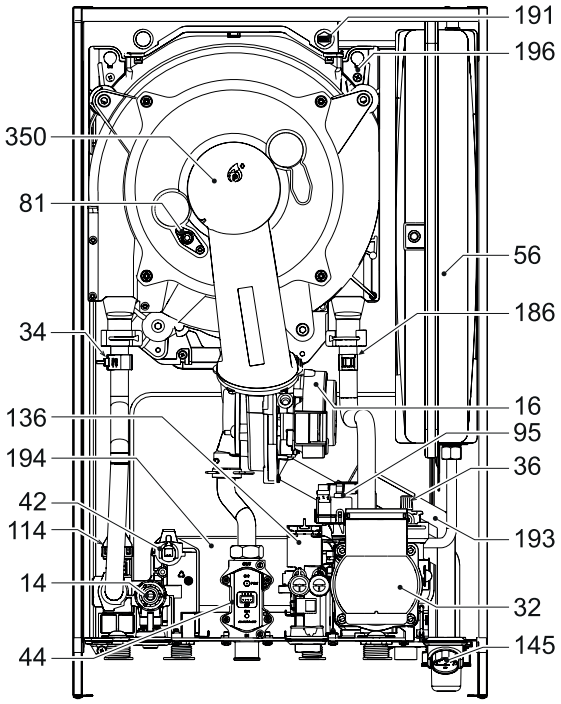


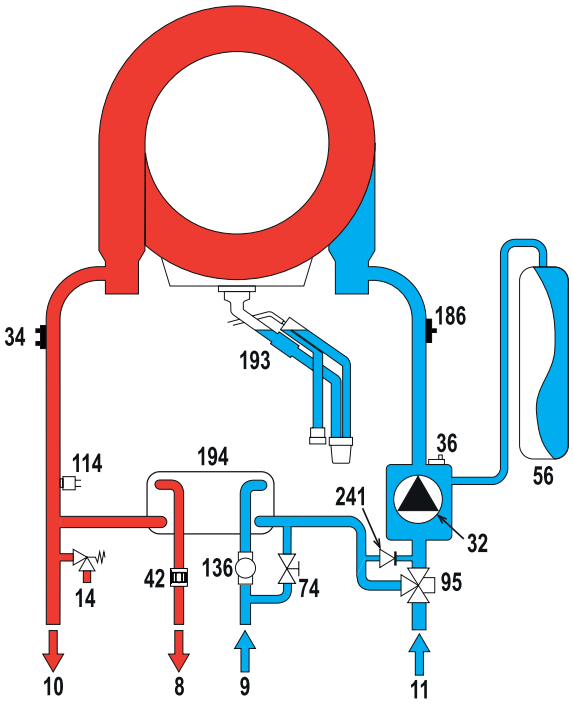
#	NAME	DESCRIPTION
1	SS	DHW water temperature sensor
2	FLS	Flow switch with cold water filter
3	VG	Gas valve
4	E.ACC/RIL	Switch-on Electrode/ detection
5	-	Burner
8	-	Expansion tank
10	TL	Safety thermostat
11	SR	Water temperature sensor - Hating supply
12	P	Circulator
13	DK	Low water control pressure switch
16	-	Switching valve
17	-	DHW plate exchanger
18	VM	Fan
20	-	Pressure relief valve
22	SRR	Water temperature sensor - return
23	TLC	Smoke manifold safety thermostat
24	-	Steel exchanger/condenser
(*)	-	Condensate drain trap outlet position
C	-	DHW output (G 1/2")
G	-	Gas inlet (G 3/4")
F	-	Water inlet for DHW (G 1/2")
M	-	System supply (G 3/4")
R	-	System return (G 3/4")

Versioni ibride con caldaia in versione FE

FE GAS BOILER is a boiler designed to operate on Natural Gas (G20), Liquid Gas (G30-G31), Propane Air (G230) and it can also regulate itself to operate with natural gas and hydrogen mixtures (80%/20%).

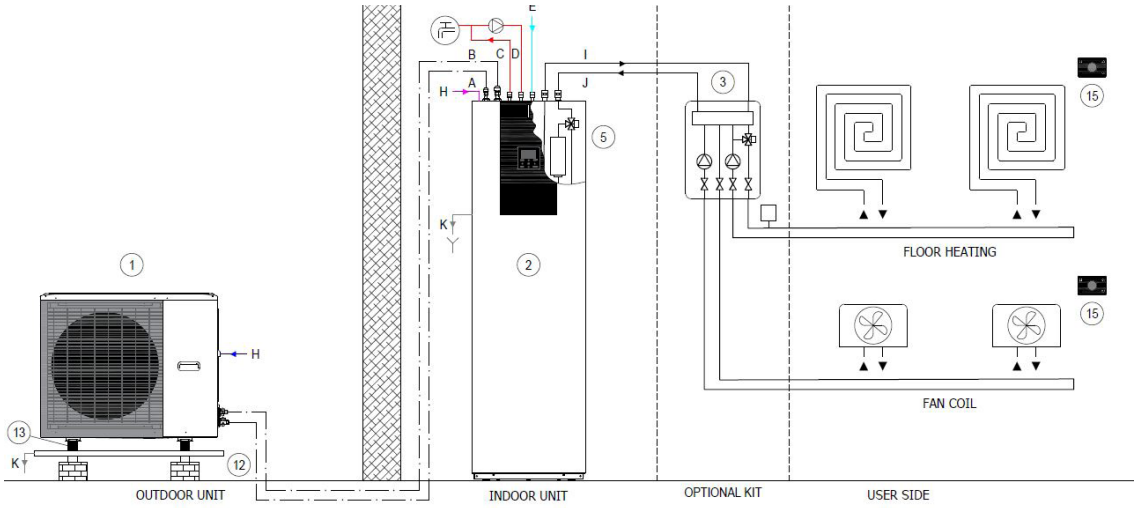
The FE GAS BOILER is made as follows:



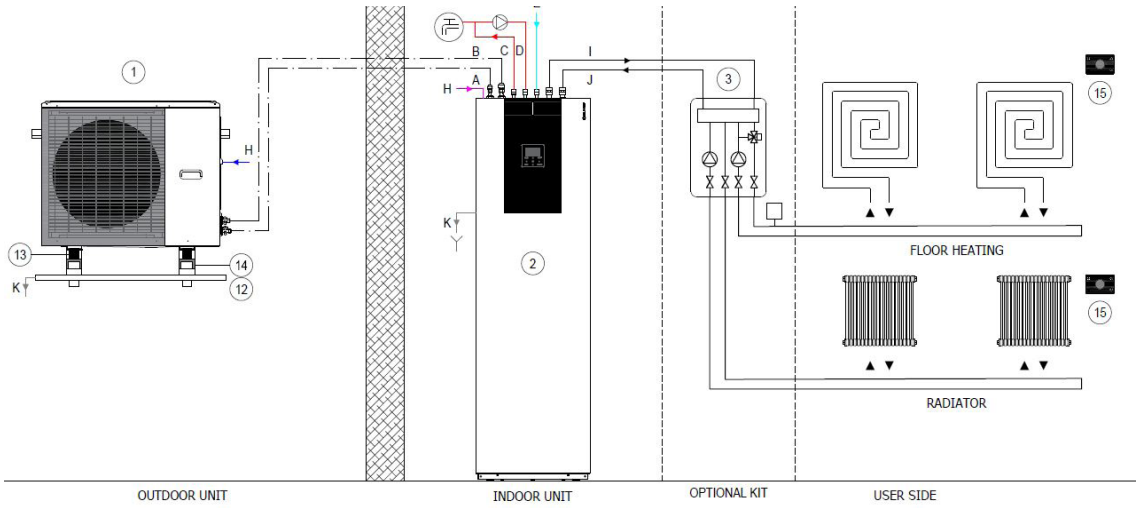


#	DESCRIPTION
8	DHW outlet (G 1/2")
9	DHW water inlet (G 1/2")
10	System supply (G 3/4")
11	System return (G 3/4")
14	Pressure relief valve
16	Fan
32	Circulator
34	Water temperature sensor - Hating supply
36	Automatic air vent
42	DHW water temperature sensor
44	Gas valve
56	Expansion tank
74	System filling shut-off valve
81	Switch-on Electrode/ detection
95	Switching valve
114	Water pressure switch
136	Flowmeter
145	Hydrometer
186	Water temperature sensor - return
191	Smoke temperature sensor
193	Sifone
194	Plate heat exchanger for DHW
196	Drain pan
241	Automatic bypass (inside the pump group)
350	Burner group/fan

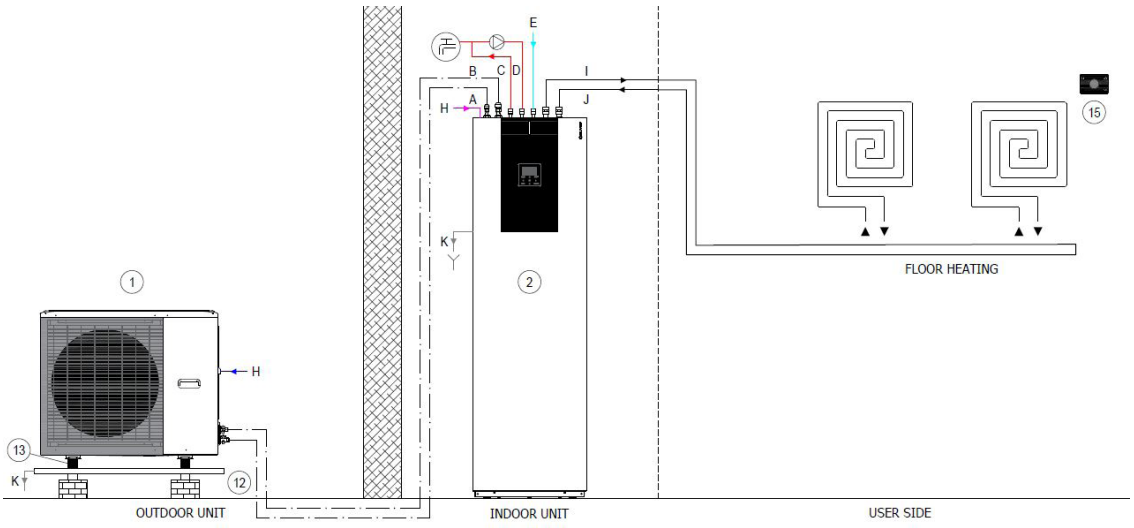
General description of the system and possible connections



Additional electric heater

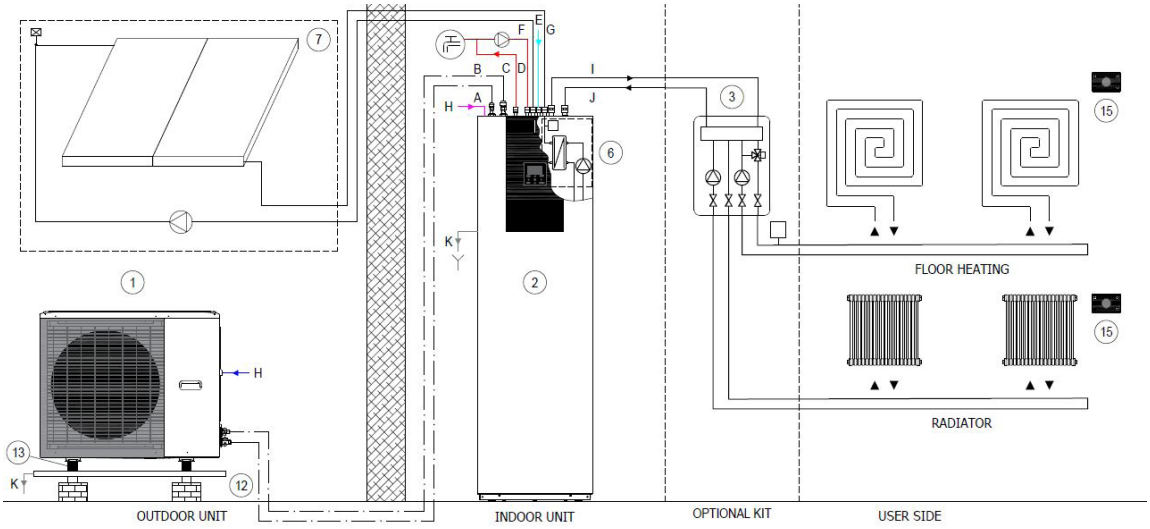


2 zone kit

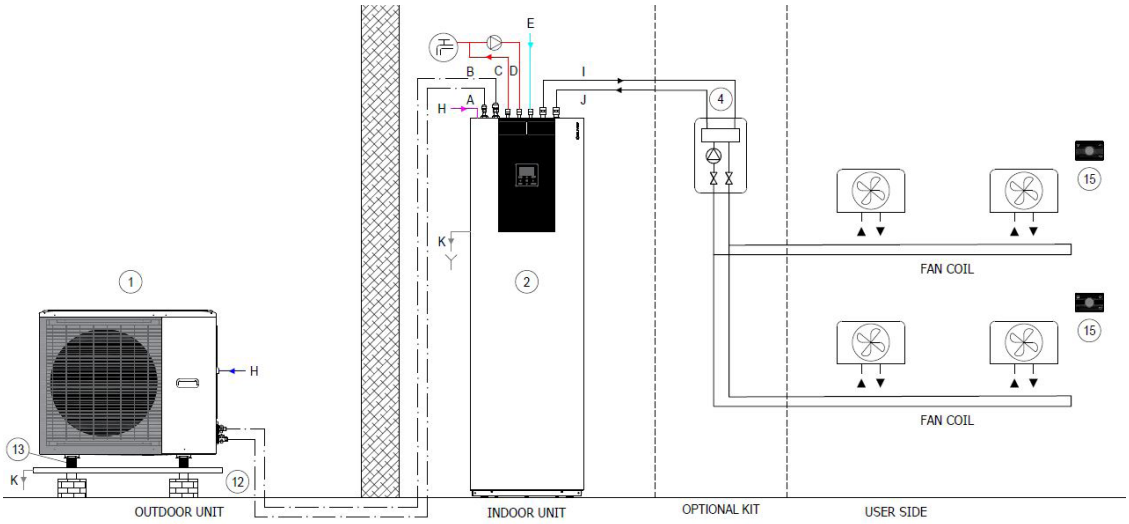


Single zone

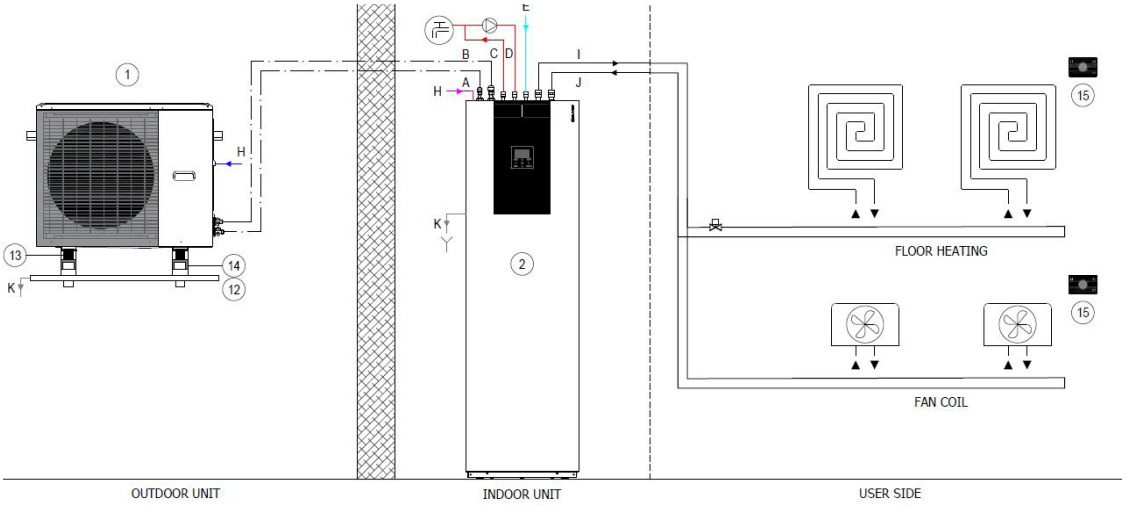
General description of the system and possible connections



Solar kit

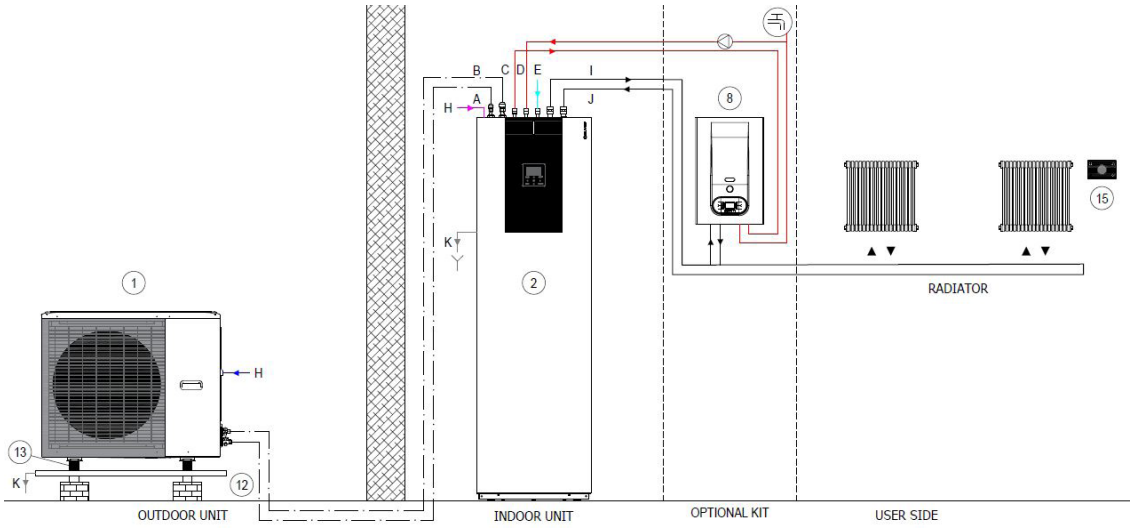


Single zone kit

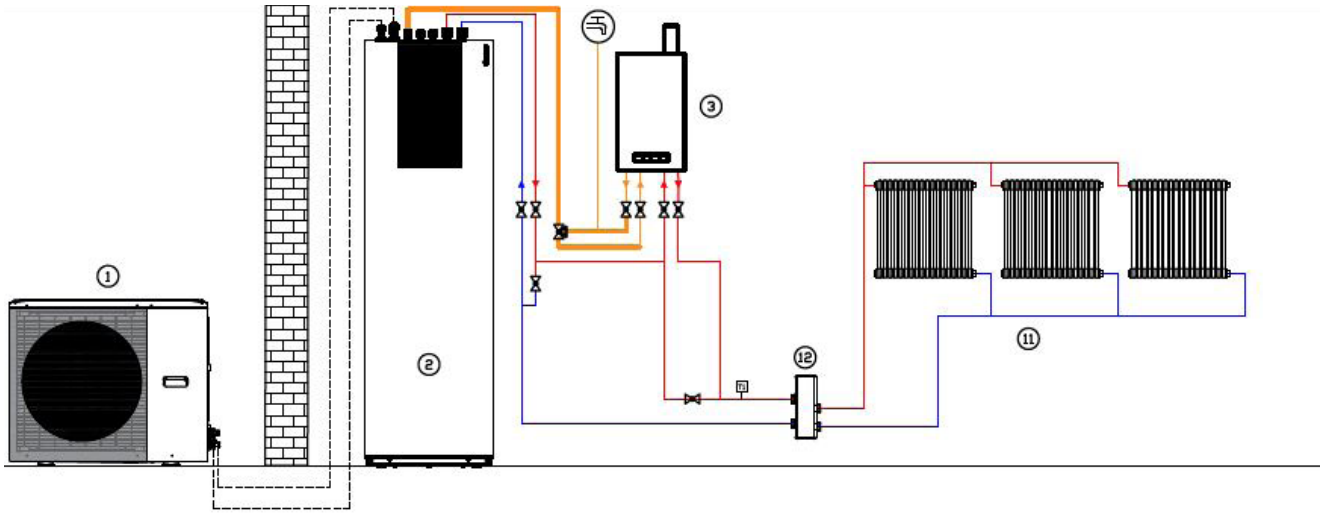


Single zone V2 by the customer) Shut-off valve to exclude the radiant floors in summer mode.

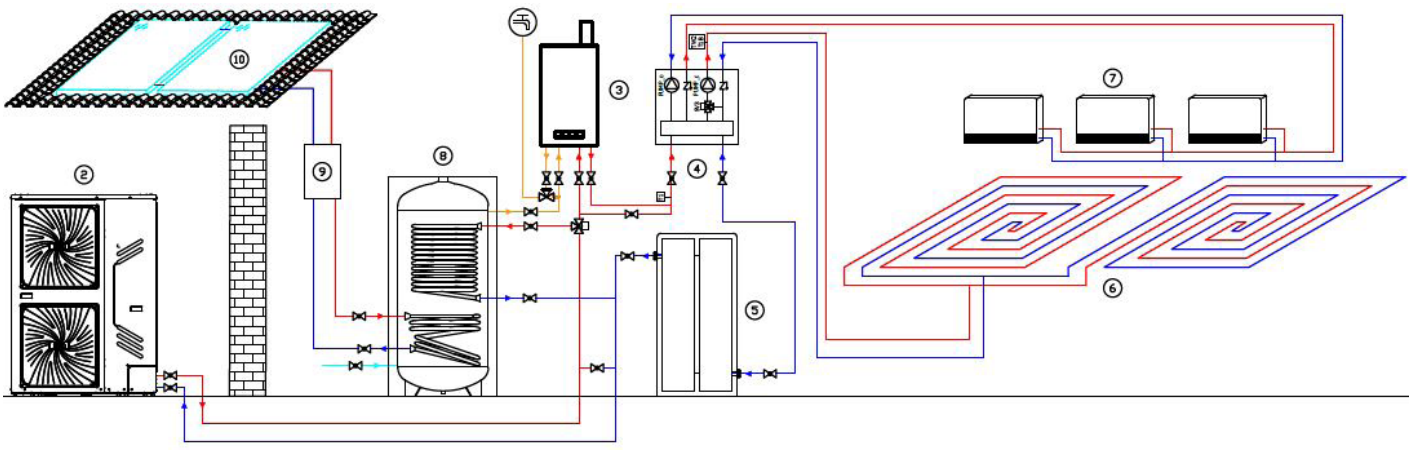
General description of the system and possible connections



Hybrid solution

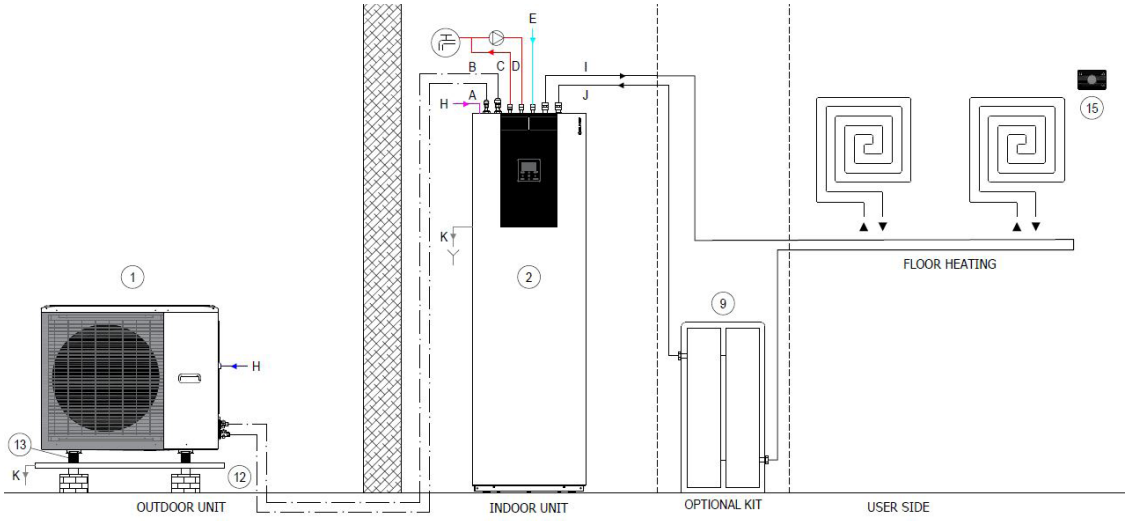


Hybrid solution "Factory made"

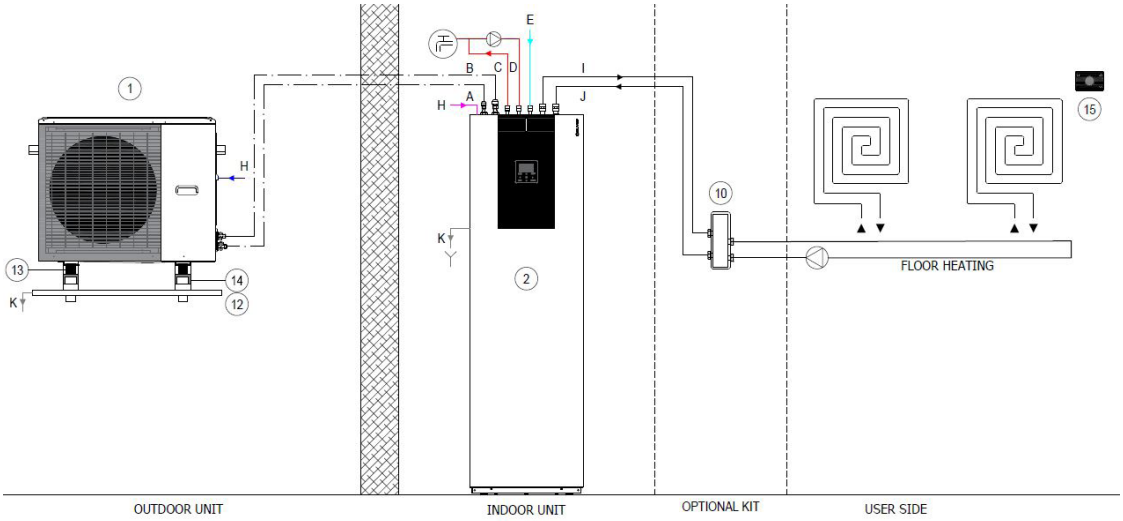


Hybrid solution "Factory made" with DHW storage tank ACS

General description of the system and possible connections

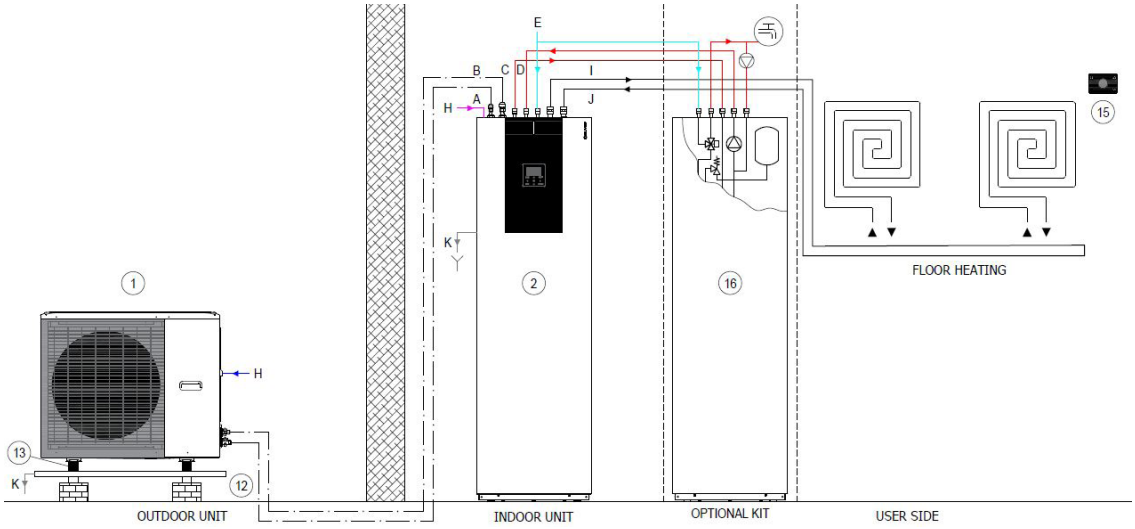


40 or 60 L inertial storage

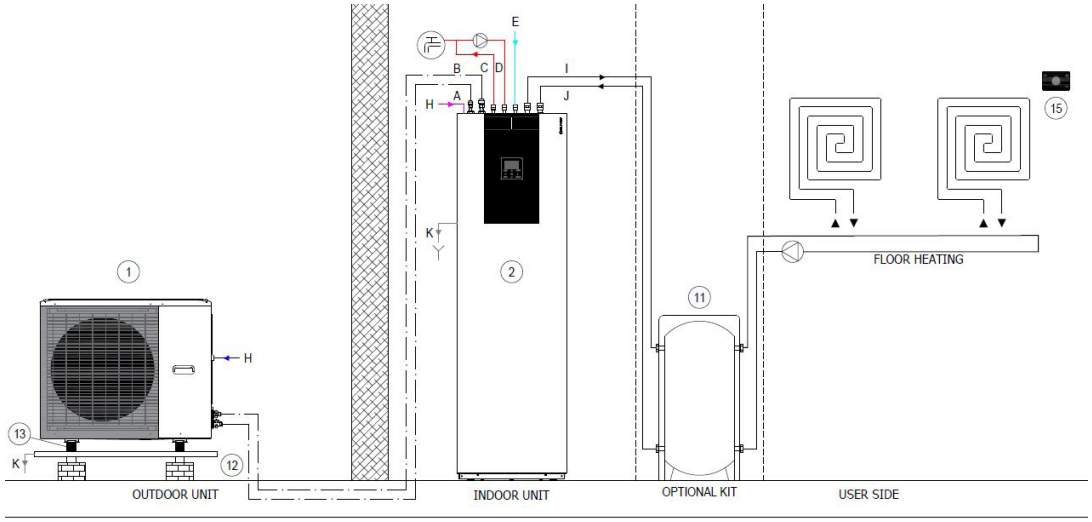


1 L circuit breaker

General description of the system and possible connections



Additional 250 L storage tank



50L circuit breaker - 60L inertial storage tank

1. Outdoor unit
2. Indoor unit
3. 2 zone kit (KIRE2HX-KIRE2hXL)
4. Single zone kit (KCSX)
5. Integration electric heater (EH024 - EH3 - EH6 - EH9)
6. Integrazione solare per sanitario (SOLX) --> solo nel tower
7. Solar panel
8. Hybrid solution (HYSO24 - HYSO34)
9. 40L inertial storage tank (ACI40X)
10. 1-litre circuit breaker (DIX)
11. 50-litre circuit breaker- 60L inertial storage tank (DI50X - ACI60X)
12. Condensate drain pan (DTX)
13. Anti-vibration mount (APAVX - ASTFX)
14. Brackets wall (KSIPX)
15. Chronothermostat (HID-TCXB - HID-TCXN)
16. DHW storage (ACS200X- ACS300X - ACS500X + SCS08X - SCS12X)
17. ElfoControl[3] EVO

A. Liquid line
B. Gas line
C. DHW outlet
D. DHW recirculation inlet
E. Aqueduct inlet
F. Solar outlet
G. Solar inlet
H. Power input
I. System return
J. System supply
K. Condensate drain

220-240V~50Hz
380-415V 3N ~50HZ con EH3 - EH6 - EH9

2.1 - 5.1 single phase 220-240V ~50Hz
6.1 - 8.1 single phase 220-240V ~50Hz
6.1 - 8.1 three-phase 380415V 3N~50Hz

BUS RS 485
Technical water
Domestic cold water
Domestic hot water
Condensate drain

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 2.0 - Size 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		4,74	4,50	4,32	4,33
	CR		1,00	0,65	0,44	0,19
	P	5,39	4,74	3,05	1,99	1,45
	COP (part load)		3,15	4,96	6,81	6,23
	COP (full load)		3,15	4,46	5,42	6,37
	Fcop		1,00	1,11	1,26	0,98
Data to be provided for power and COP under full load cold source air						
	Te	Tm	-7	2	7	12
2.1	Heating capacity ΦH,HP out (kW)	35°C	4,74	4,50	4,32	4,33
		45°C	4,31	4,35	4,16	4,16
		55°C	4,40	4,40	4,08	4,50
	COP	35°C	3,15	4,46	5,42	6,37
		45°C	2,51	3,27	3,93	4,52
		55°C	1,99	2,56	3,00	3,44
DHW Power and COP data under full load			Te			
	Te	Tm	7	15	20	35
2.1	Heating capacity ΦH,HP out (kW)	55°C	4,08	5,11	5,71	6,85
	COP	55°C	3,00	3,84	4,23	3,90

SPHERA EVO 2.0 - Size 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		5,51	5,89	6,18	6,28
	CR		1,00	0,57	0,35	0,15
	P	6,26	5,51	3,30	2,24	1,45
	COP (part load)		3,13	4,91	7,11	5,70
	COP (full load)		3,13	4,15	5,21	6,10
	Fcop		1,00	1,18	1,36	0,93
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 ΦH,HP out (kW)	35°C	5,51	5,89	6,18	6,28
		45°C	5,22	6,42	6,03	6,53
		55°C	5,15	5,46	5,94	6,64
	COP	35°C	3,13	4,15	5,21	6,10
		45°C	2,41	3,07	3,83	4,41
		55°C	2,03	2,56	3,07	3,55
DHW Power and COP data under full load			Te			
	Te	Tm	7	15	20	35
3.1	Heating capacity ΦH,HP out (kW)	55°C	5,94	6,99	7,33	8,80
	COP	55°C	3,07	3,97	4,44	4,10

Data for the UNI/TS 11300 calculation

SPHERA EVO 2.0 - Size 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		7,15	5,64	8,30	8,21
	CR		1,00	0,78	0,34	0,15
	P	8,13	7,15	4,65	2,91	1,85
	COP (part load)		3,30	5,17	7,08	6,01
	COP (full load)		3,30	3,69	5,31	6,41
	Fcop		1,00	1,40	1,33	0,94
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 ΦH,HP out (kW)	35°C	7,15	5,64	8,30	8,21
		45°C	6,34	6,59	8,22	8,07
		55°C	6,08	6,27	7,50	7,55
	COP	35°C	3,30	3,69	5,31	6,41
		45°C	2,56	3,26	3,95	4,69
		55°C	2,17	2,69	3,19	3,72
DHW Power and COP data under full load				Te		
	Te	Tm	7	15	20	35
4.1	Heating capacity ΦH,HP out (kW)	55°C	7,50	8,37	9,18	11,02
	COP	55°C	3,19	4,11	4,50	4,15

SPHERA EVO 2.0 - Size 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		8,45	9,30	10,09	10,26
	CR		1,00	0,56	0,33	0,14
	P	9,60	8,45	5,23	3,47	1,96
	COP (part load)		3,18	5,03	7,33	6,16
	COP (full load)		3,18	4,12	5,01	5,97
	Fcop		1,00	1,22	1,46	1,03
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 ΦH,HP out (kW)	35°C	8,45	9,30	10,09	10,26
		45°C	7,71	9,16	10,01	10,06
		55°C	7,08	8,49	9,60	9,19
	COP	35°C	3,18	4,12	5,01	5,97
		45°C	2,59	3,11	3,86	4,32
		55°C	2,11	2,66	3,10	3,65
DHW Power and COP data under full load			Te			
	Te	Tm	7	15	20	35
5.1	Heating capacity ΦH,HP out (kW)	55°C	9,60	8,99	8,78	10,54
	COP	55°C	3,10	4,03	4,53	4,18

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

SPHERA EVO 2.0 - Size 6.1

Data for determination of COPPL T delivery 20°C		Tdesignh	A	B	C	D
	Te	-10	-7	2	7	12
6.1	PLR	100%	88%	54%	35%	15%
	DC		10,69	13,01	12,13	12,26
	CR		1,00	0,50	0,35	0,15
	P	12,14	10,69	6,57	4,48	3,67
	COP (part load)		3,07	4,68	6,90	6,33
	COP (full load)		3,07	3,93	5,00	5,68
	Fcop		1,00	1,19	1,38	1,12
Data to be provided for power and COP under full load cold source air			Te			
	Te	Tm	-7	2	7	12
6.1	Heating capacity ΦH,HP out (kW)	35°C	10,69	13,01	12,13	12,26
		45°C	11,21	12,52	12,30	11,56
		55°C	10,10	12,05	12,07	10,89
	COP	35°C	3,07	3,93	5,00	5,68
		45°C	3,14	3,34	3,80	4,59
		55°C	1,76	2,88	3,10	3,78
DHW Power and COP data under full load			Te			
	Te	Tm	7	15	20	35
6.1	Heating capacity ΦH,HP out (kW)	55°C	12,07	12,30	13,71	16,45
	COP	55°C	3,10	4,19	4,59	4,23

SPHERA EVO 2.0 - Size 7.1

Data for determination of COPPL T delivery 20°C		Tdesignh	A	B	C	D
	Te	-10	-7	2	7	12
7.1	PLR	100%	88%	54%	35%	15%
	DC		12,33	12,71	14,51	12,31
	CR		1,00	0,60	0,34	0,17
	P	14,01	12,33	7,97	5,21	3,67
	COP (part load)		2,87	4,62	7,07	6,70
	COP (full load)		2,87	4,00	4,70	5,70
	Fcop		1,00	1,16	1,50	1,18
Data to be provided for power and COP under full load cold source air			Te			
	Te	Tm	-7	2	7	12
7.1	Heating capacity ΦH,HP out (kW)	35°C	12,33	12,71	14,51	12,31
		45°C	11,27	11,21	14,00	11,61
		55°C	10,35	11,71	13,85	10,94
	COP	35°C	2,87	4,00	4,70	5,70
		45°C	2,61	3,11	3,65	4,61
		55°C	2,18	2,91	3,05	3,80
DHW Power and COP data under full load			Te			
	Te	Tm	7	15	20	35
7.1	Heating capacity ΦH,HP out (kW)	55°C	13,85	12,35	13,76	16,51
	COP	55°C	3,05	4,21	4,60	4,25

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

SPHERA EVO 2.0 - Size 8.1

Data for determination of COPPL T delivery 20°C		Tdesignh	A	B	C	D
	Te	-10	-7	2	7	12
8.1	PLR	100%	88%	54%	35%	15%
	DC		13,82	14,30	16,01	15,20
	CR		1,00	0,59	0,34	0,16
	P	15,71	13,82	8,55	5,88	3,67
	COP (part load)		2,86	4,59	7,13	6,44
	COP (full load)		2,86	3,85	4,55	5,43
	Fcop		1,00	1,19	1,57	1,19
Data to be provided for power and COP under full load cold source air			**Te**			
	Te	Tm	-7	2	7	12
8.1	Heating capacity ΦH,HP out (kW)	35°C	13,82	14,30	16,01	15,20
		45°C	12,35	13,79	16,01	14,55
		55°C	11,23	13,32	16,00	13,91
	COP	35°C	2,86	3,85	4,55	5,43
		45°C	2,58	3,28	3,60	4,49
		55°C	2,13	2,80	2,90	4,00
DHW Power and COP data under full load				**Te**		
	Te	**Tm**	7	15	20	35
8.1	Heating capacity ΦH,HP out (kW)	55°C	16,00	13,91	13,90	16,68
	COP	55°C	2,90	4,39	4,86	4,49

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

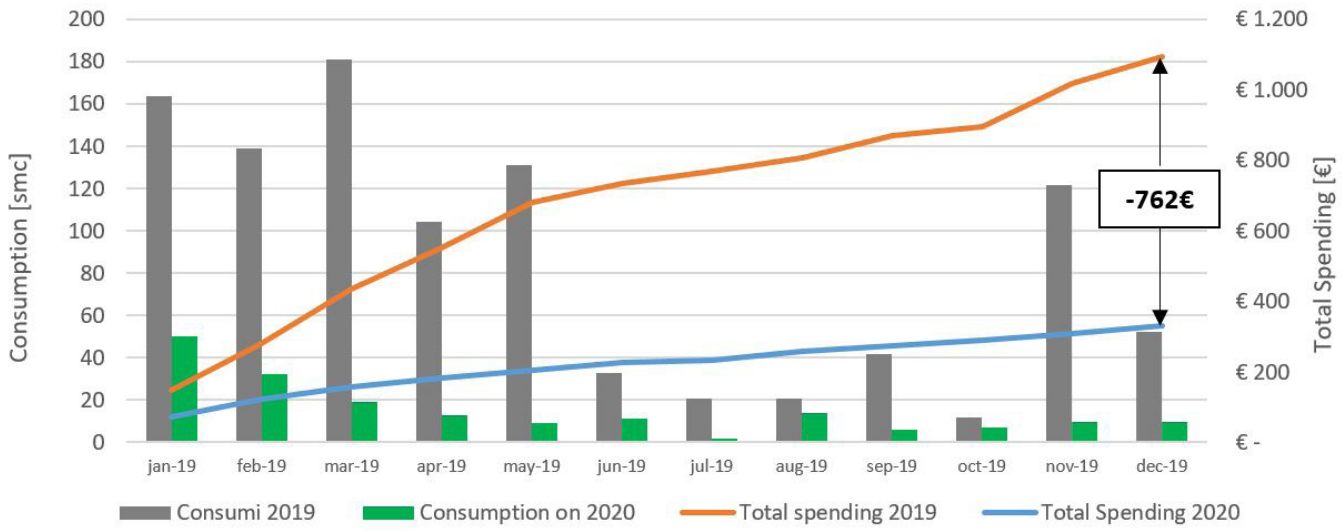
UNI/TS 11300 Part 3

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	4,26	3,20	2,05	0,90	3,50	4,71	5,84	5,81
3.1	6,25	4,59	2,96	1,35	3,09	4,43	6,17	7,40
4.1	7,46	5,20	3,51	1,63	3,33	4,48	6,67	9,30
5.1	9,10	6,43	4,25	1,94	3,09	4,26	6,73	10,48
6.1	11,80	8,89	6,01	2,91	2,75	3,89	5,73	7,88
7.1	12,86	9,40	6,29	2,91	2,55	3,78	5,71	7,88
SIZE	**Cooling capacity kW**				**EER**			
8.1	14,20	10,53	7,12	2,91	2,45	3,54	5,38	7,88

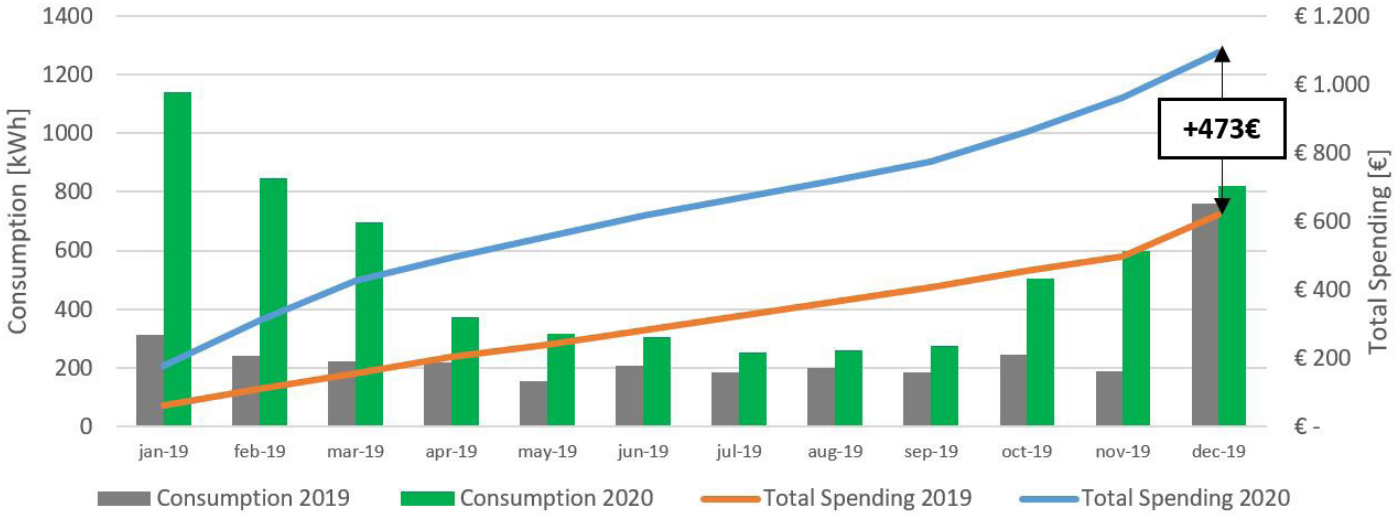
Reference conditions prescribed by UNI/TS 11300-3:
1. External air temperature B.S. 35°C Refrigerated water temperature at the fancoil inlet/outlet 12/7 °C
2. External air temperature B.S. 30°C Refrigerated water temperature at the fancoil outlet /7 °C
3. External air temperature B.S. 25°C Refrigerated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

Compared to traditional systems, SPHERA EVO 2.0 provides numerous advantages from an economic point of view and in terms of energy. Below is a real case in a domestic system before and after replacing a gas boiler with a SPHERA EVO 2.0 solution.

Natural gas



Electricity



The graphs show the consumption and cost of natural gas and electricity for 2019 and 2020 (heat pump installed at the end of December 2019).

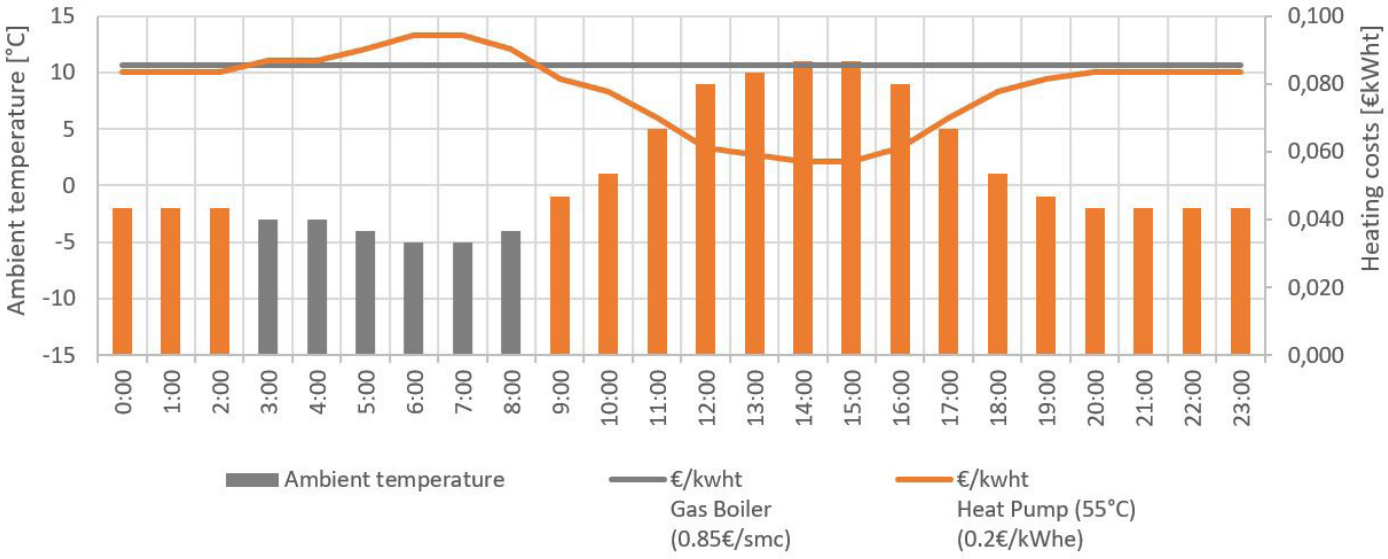
Year	Natural gas cost	Electricity cost	Total cost	Savings	
2019	1092 €	620 €	1712 €	289 €	-20%
2020	330 €	1093 €	1423 €		

The savings were obtained without changings any aspect of the previous system except for the heat generator.
The heating terminals are radiators with an operating temperature of 55°C. The use of low temperature terminals (underfloor heating) would allow for double the amount of savings.

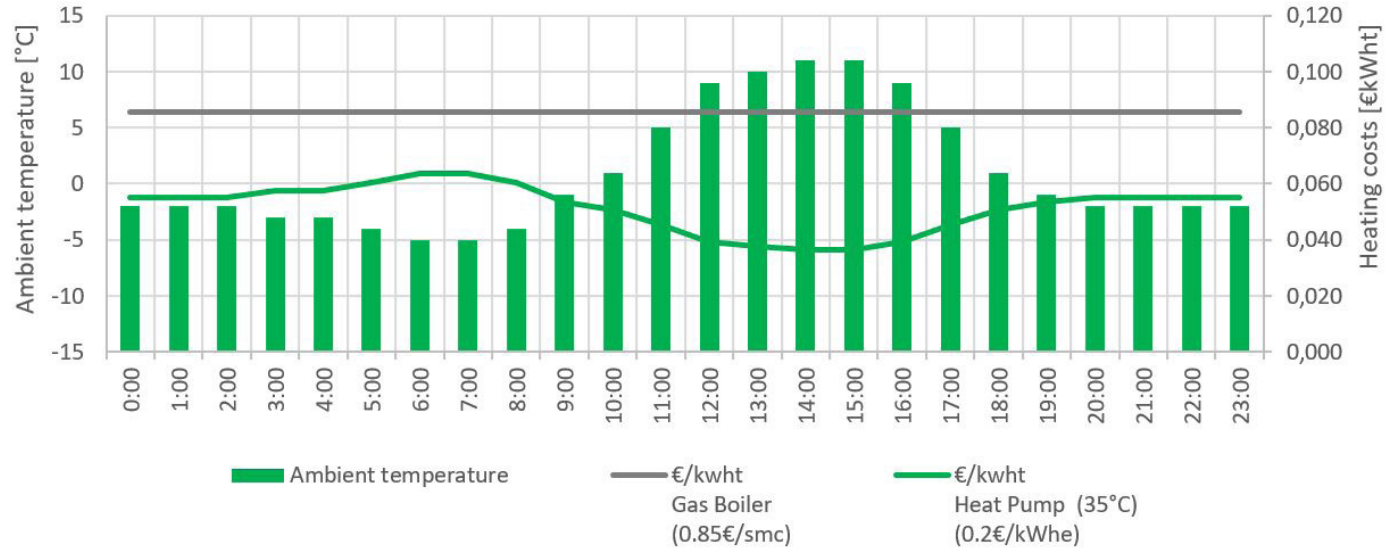
EuroSwitch Function

SPHERA EVO 2.0 provides a useful instrument for maximising savings, for hybrid systems with a gas boiler, through the EuroSwitch function. Based on the set price of natural gas and electricity, the heat pump will assign priority to its own operation rather than that of the boiler depending on its efficiency. The aim is to always use the most cost-effective heat source.

Case 1 - Typical day in January - Radiators (supply temperature = 55°C)



From 03:00am to 08:00am, heat will be produced by the boiler, while during other time slots, it will be produced by the heat pump.



Case 2 - Typical day in January - Radiant floor (supply temperature = 35°C)

Heat will be produced by the heat pump during the whole day.
The graphs show the trend of the daily temperature and of the cost for thermal energy. The heat pump's efficiency varies according to the outdoor temperature and the water temperature, while the boiler has a fixed efficiency. The calculations consider an average cost of natural gas equal to 0.85 €/SCM and of electricity equal to 0.2 €/SCM.

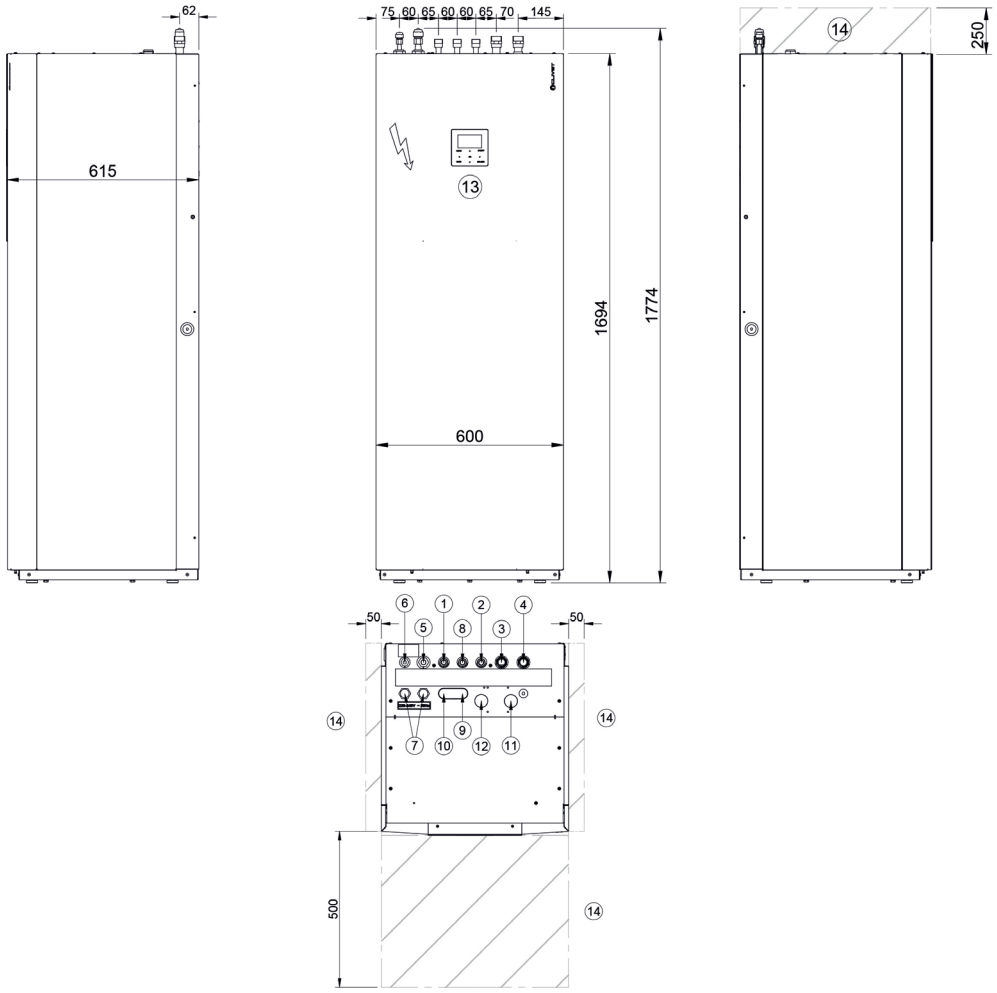
Management of units in cascade

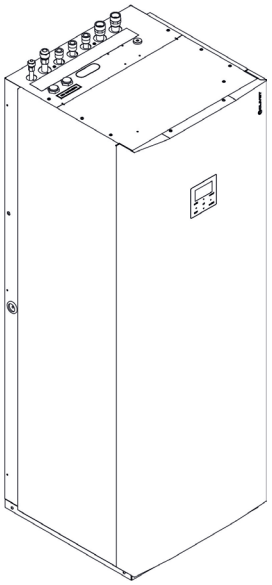
Many applications require units to be installed as back-up for the main system or have loads that can change significantly during annual operation. Cascade operation allows connection of up to 6 units in parallel, running a Master unit and activating the Slave units when its own capacity is not sufficient to meet the load of the system, ensuring maximum reliability and efficiency of the system.
The system rotates operation of all of the units by counting the compressor's operating hours, so as to use them evenly. In the event of failure of a unit, including the Master, the system ensures continuity of service.
Cascade management is provided as standard by the logic of the units; it must be set with the dip-switches (Master or Slave unit) on the board and all Slave units must be connected with a serial to the HMI of the Master. The slave units are automatically addressed by the Master at start-up.

Dimensional drawings

SPHERA EVO 2.0 - SQKN-YEE 1 TC A TOWER 190 L

DAAGL0001 REV00
DATA/DATE 07/06/2021





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

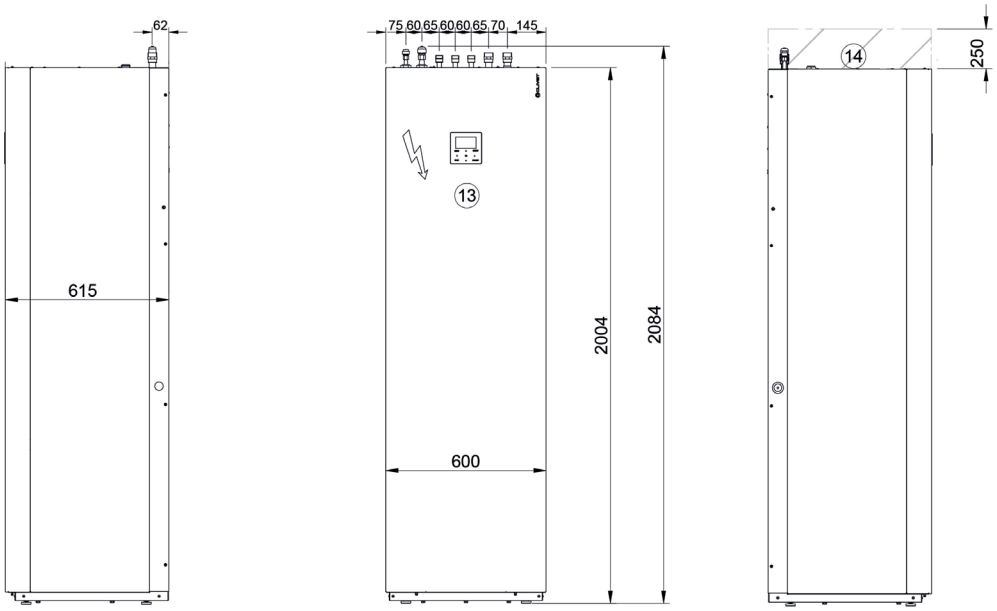
(*) see instructions in kit RGGL00009

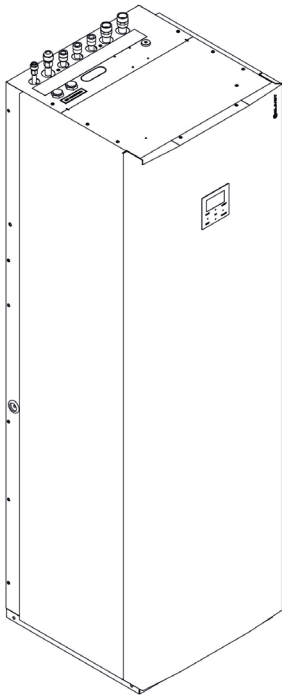
SIZE		190 L
Operation weight	kg	359
Shipping weight	kg	187

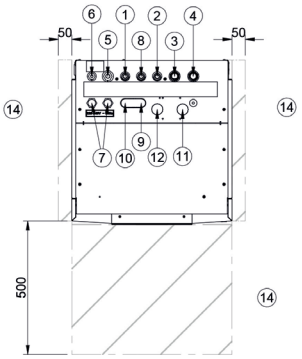
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

SPHERA EVO 2.0 - SQNK-YEE 1 TC A-B TOWER 250 L

DAAGL0002 REV00
DATA/DATE 07/06/2021







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

(*) see instructions in kit RGGL00001

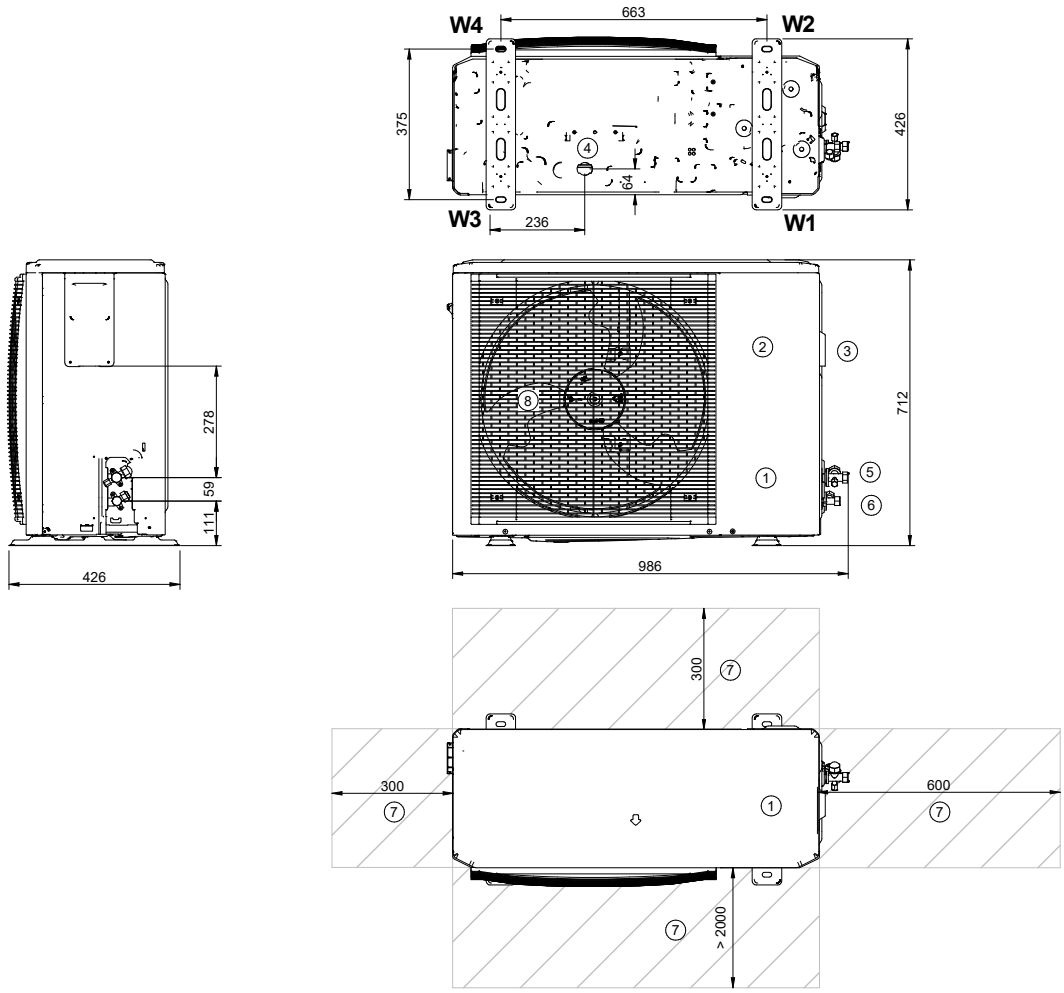
RANGE		GABC	GBBC
SIZE		250 L	250 L
Operation weight	kg	419	421
Shipping weight	kg	192	194

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

Dimensional drawings

SPHERA EVO 2.0 (outdoor unit) - 2.1 - 3.1

DAAQ80002_REV03
DATA/DATE 05/06/2023



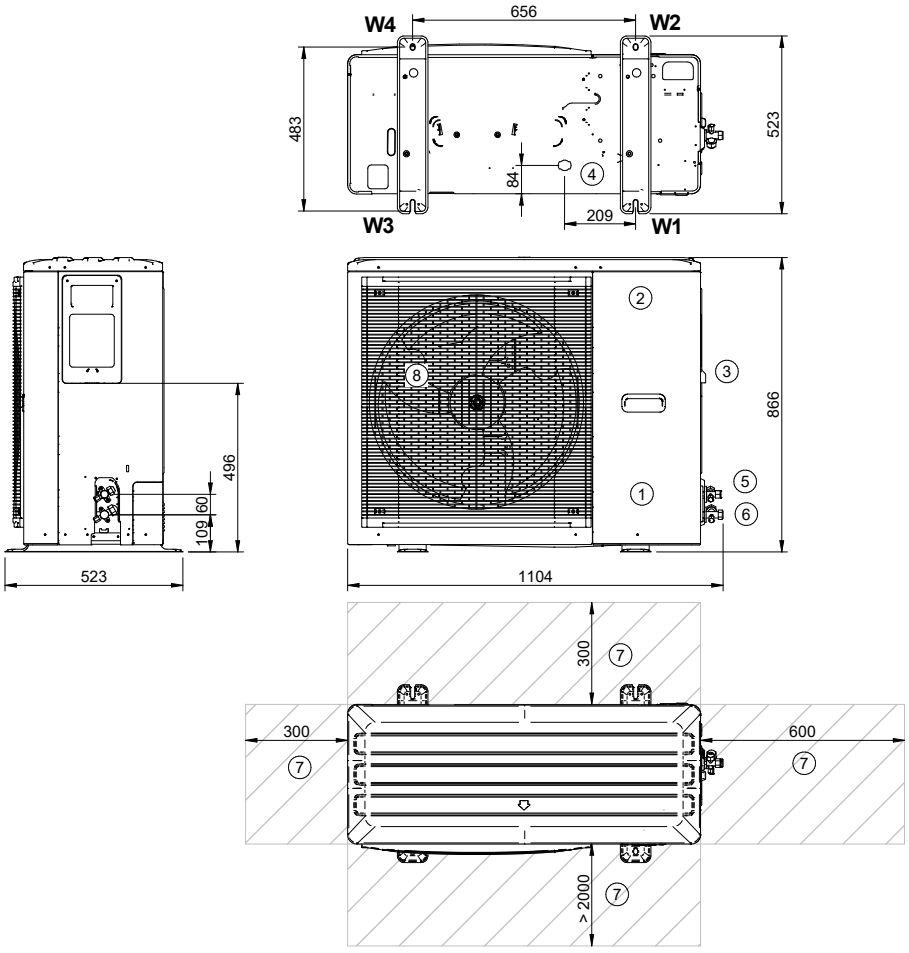
1. Compressor enclosure
2. Electrical panel
3. Power input
4. Condensate drain
5. Gas connections (1/4")
6. Gas connections (5/8")
7. Functional spaces
8. Electrical fan

SIZE			2.1	3.1
W1 Supporting Point		kg	23,9	23,9
W2 Supporting Point		kg	13,8	13,8
W3 Supporting Point		kg	12,9	12,9
W4 Supporting Point		kg	7,4	7,4
Operation weight		kg	58	58
Shipping weight		kg	64	64

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

SPHERA EVO 2.0 (outdoor unit) - 4.1 - 8.1

DAAQ80001_REV03
DATA/DATE 05/06/2023



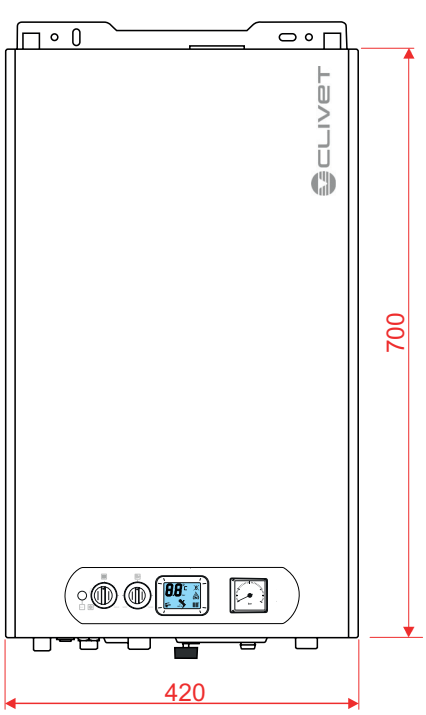
1. Compressor enclosure
2. Electrical panel
3. Power input
4. Condensate drain
5. Gas connections (3/8")
6. Gas connections (5/8")
7. Functional spaces
8. Electrical fan

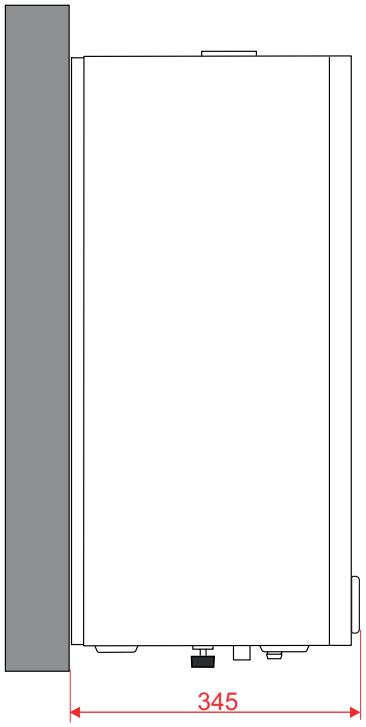
SIZE			4.1 / 1Ph	5.1 / 1Ph	6.1 / 1Ph	6.1 / 3Ph	7.1 / 1Ph	7.1 / 3Ph	8.1 / 1Ph	8.1 / 3Ph
W1 Supporting Point			30	30	30,4	40,3	30,4	40,3	30,4	40,3
W2 Supporting Point			17,8	17,8	29,1	34,8	29,1	34,8	29,1	34,8
W3 Supporting Point			18,4	18,4	18,6	19,8	18,6	19,8	18,6	19,8
W4 Supporting Point			10,9	10,9	17,9	17,1	17,9	17,1	17,9	17,1
Operation weight		kg	77	77	96	112	96	112	96	112
Shipping weight		kg	88	88	110	125	110	125	110	125

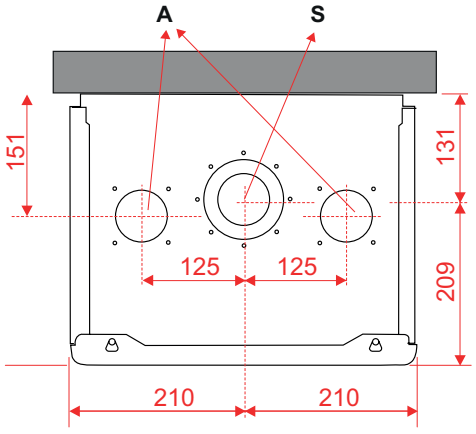
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional drawings

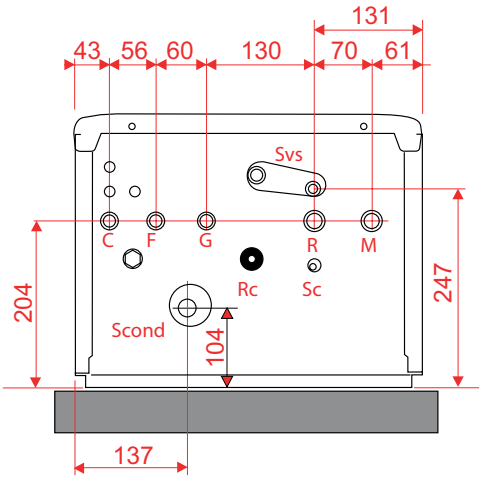
GAS BOILER UC







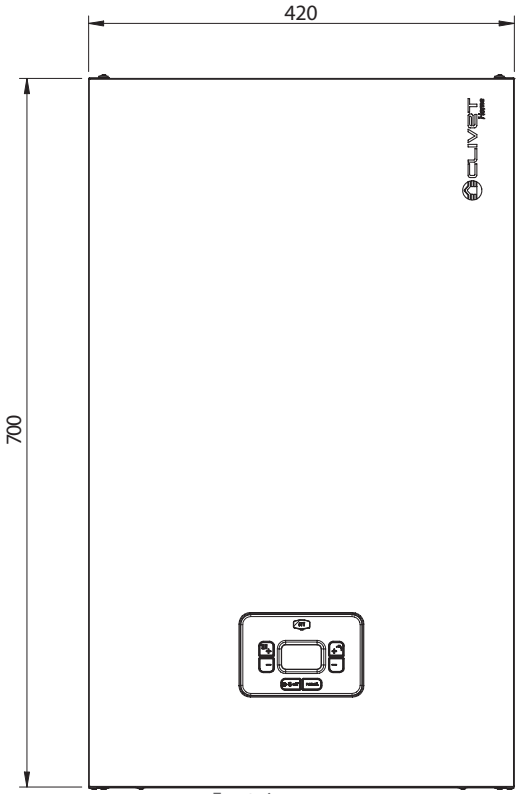
View from above



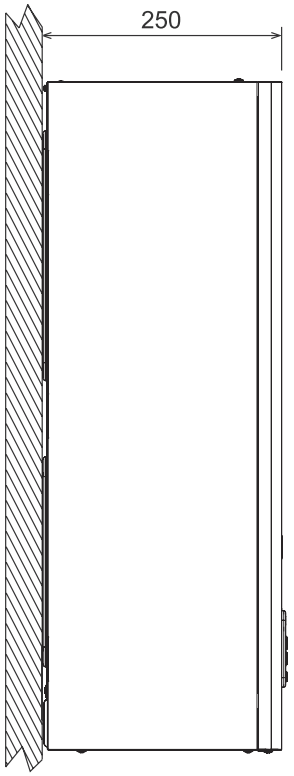
Seen from below

M = System supply Ø 3/4"
R = System return Ø 3/4"
G = Gas Ø 3/4"
F = Cold DHW inlet Ø 1/2"
C = Hot DHW outlet Ø 1/2"
SC = Condensate drain (Ø 18,1)
A = Air intake Ø 80
S = Smoke exhaust Ø 80

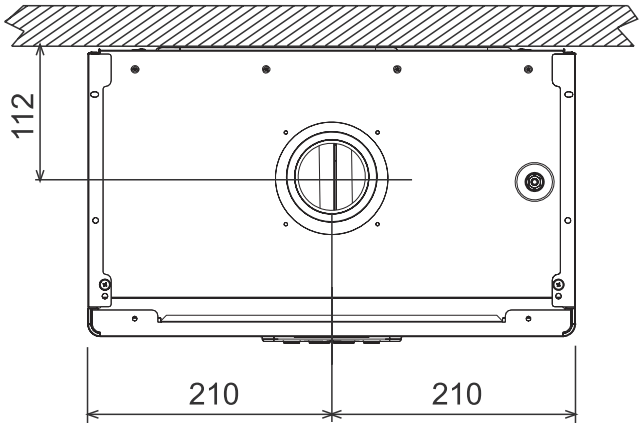
GAS BOILER FE 24.4



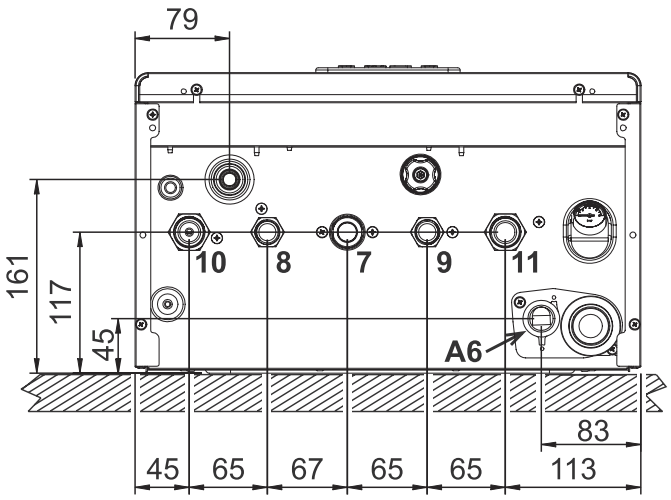
Front view



Side view



View from above

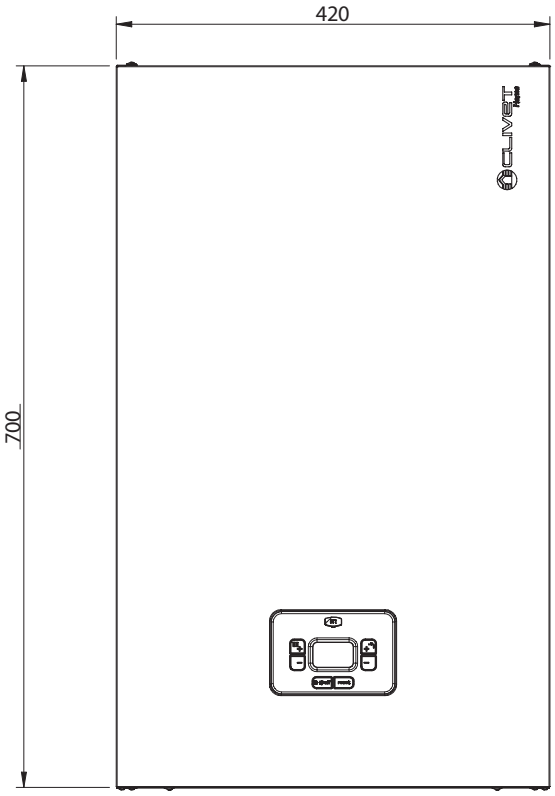


Seen from below

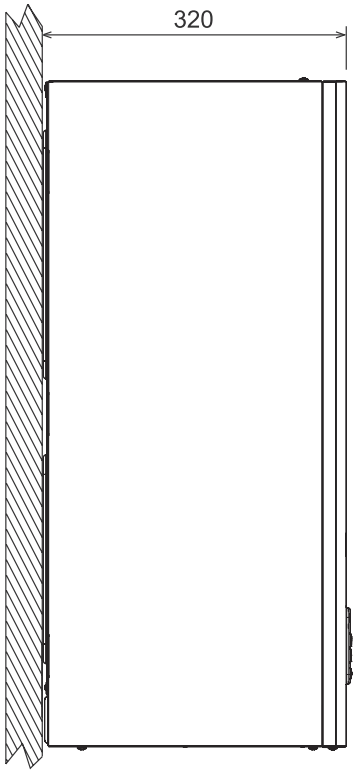
10 = System supply Ø 3/4"
11 = System return Ø 3/4"
7 = Gas Ø 3/4"
9 = Cold DHW inlet Ø 1/2"
8 = Hot DHW outlet Ø 1/2"
A6 = Condensate drain (Ø 22,5)
Air intake and Smoke exhaust Ø 80

Dimensional drawings

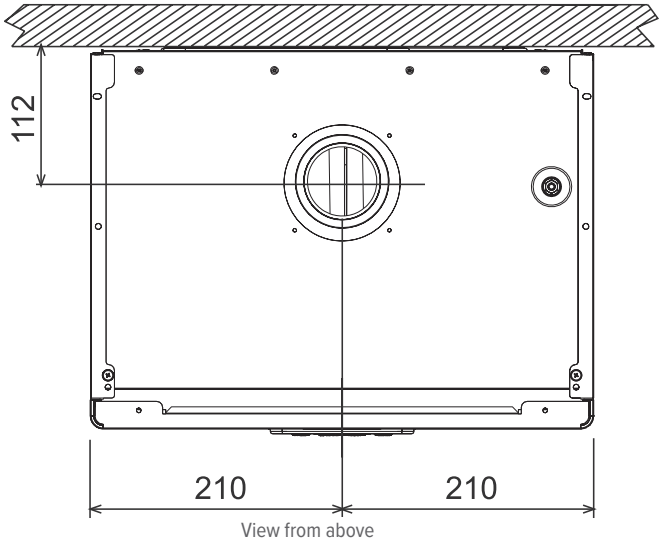
GAS BOILER FE 33.4



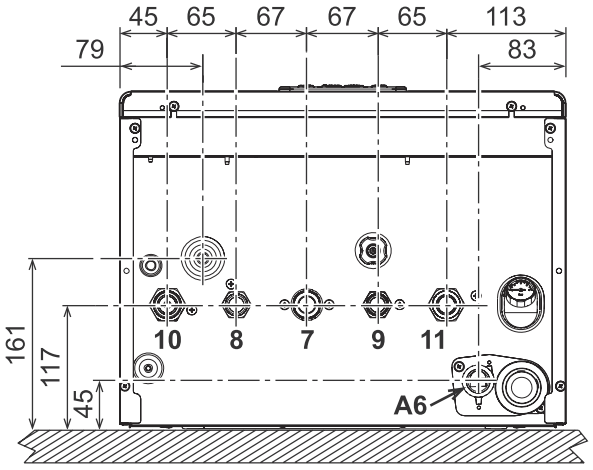
Vista frontale



Side view



View from above



Seen from below

10 = System supply Ø 3/4"
11 = System return Ø 3/4"
7 = Gas Ø 3/4"
9 = Cold DHW inlet Ø 1/2"
8 = Hot DHW outlet Ø 1/2"
A6 = Condensate drain (Ø 22,5)
Air intake and Smoke exhaust Ø 80

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CLIVET S.p.A.
Via Camp Lonc 25, Z.I. Villapaiera 32032 - Feltre (BL) - Italy
Tel. +39 0439 3131 - info@clivet.it

CLIVET GMBH
Hummelsbütteler Steindamm 84,
22851 Norderstedt, Germany
Tel. +49 40 325957-0 - info.de@clivet.com

Clivet Group UK LTD
Units F5 & F6 Railway Triangle,
Portsmouth, Hampshire PO6 1TG
Tel. +44 02392 381235 -
Enquiries@Clivetgroup.co.uk

CLIVET LLC
Office 508-511, Elektozavodskaya st. 24,
Moscow, Russian Federation, 107023
Tel. +7495 6462009 - info.ru@clivet.com

CLIVET MIDEAST FZCO
Dubai Silicon Oasis (DSO) Headquarter Building,
Office EG-05, P.O Box-342009, Dubai, UAE
Tel. +9714 3208499 - info@clivet.ae

Clivet South East Europe
Jaruščica 9b
10000, Zagreb, Croatia
Tel. +3851 222 8784 - info.see@clivet.com

CLIVET France
10, rue du Fort de Saint Cyr - 78180 Montigny le Bretonneux, France
info.fr@clivet.com

Clivet Airconditioning Systems Pvt Ltd
Office No.501 & 502,5th Floor, Commercial –I,
Kohinoor City, Old Premier Compound, Off LBS Marg, Kirol Road, Kurla West, Mumbai
Maharashtra 400070, India
Tel. +91 22 30930200 - sales.india@clivet.com