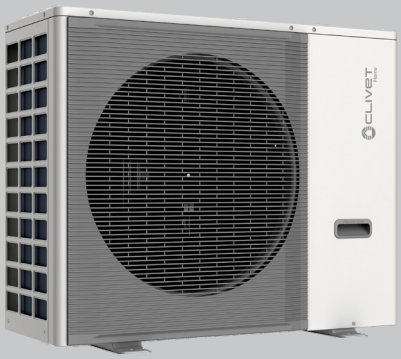
Two section air-water heat pump for heating, cooling and DHW production

SPHERA EVO 2.0 Box

SQKN-YEE 1 BC + MiSAN-YEE 1 S 2.1-8.1

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

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.

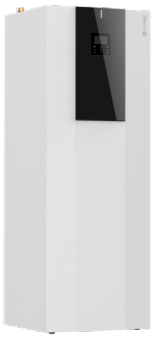
SPHERA EVO 2.0 Box

- 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 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



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SPHERA EVO 2.0 Invisible

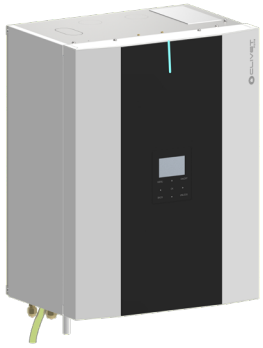
- Version for built-in installation
- 50-litre DHW storage can be expanded up to 300-litres
- Compact dimensions for easy installation in walls
- Also available in the hybrid version with 24 kW gas boiler
- Built-in WiFi for connection to the dedicated APP

R-32

SPHERA EVO 2.0 - BOX - Indoor unit

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

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



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

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

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

The capacity section includes:
- main power supply terminals.

The control section includes:
- 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 are:
- T5 temperature probe for temperature control in DHW storage tanks (length 4.5m and 6mm bulb);
- T1B temperature probe for low temperature area control in the 2 area kit (length 4.5m and 6mm bulb);
- T1 temperature probe for external boiler connection kit (1.6m length and 6mm bulb).
- Wi-Fi per connessione all'APP dedicata alla gestione dell'unità.

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

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

Integration electric heater in STAINLESS STEEL with 2-3 and 4 kW single-phase or 6-9 kW three-phase capacities.
The electric heater can operate both for the system and for the production of domestic hot water in two different modes:

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

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

1PUM

Single pump with larger available head

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

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

Accessories separately supplied

KIRE2HX -
KIRE2HLX

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

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

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

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

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:

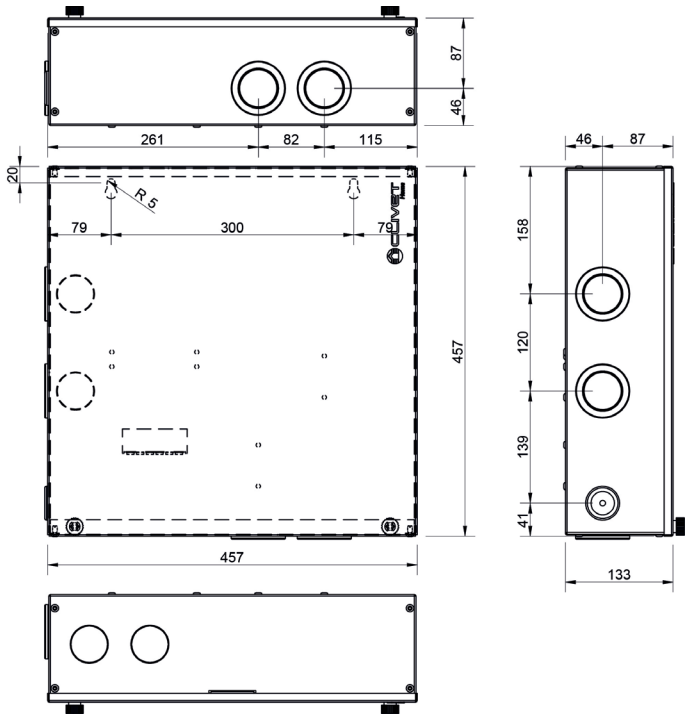
- makes the connected hydraulic circuits independent;
- ensures effective operation of the secondary circulator that provides the hydraulic demand of air conditioning systems
- air extraction system;
- thermally insulated black EPP
- zone manifold connection kit

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 l hydraulic circuit breaker**

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

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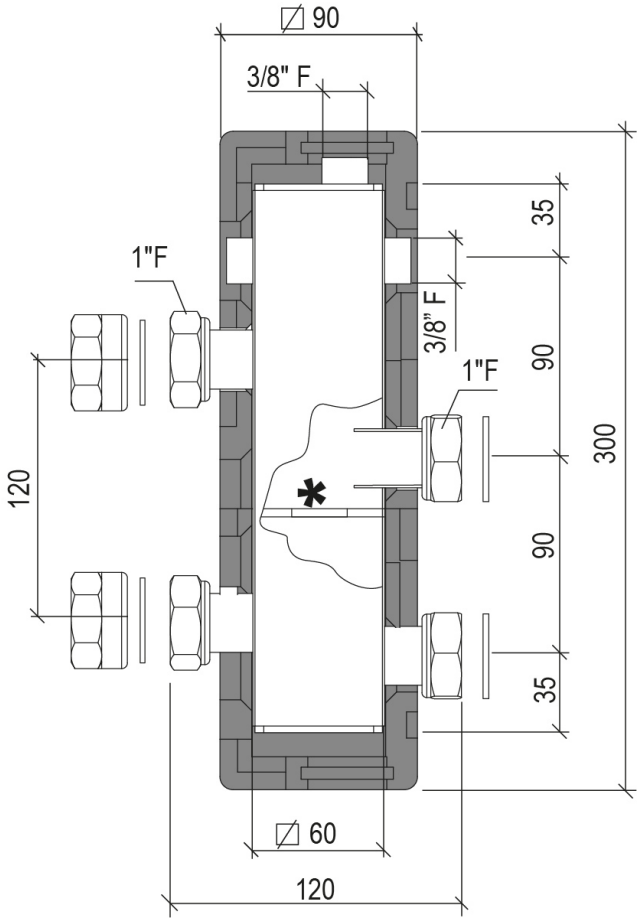
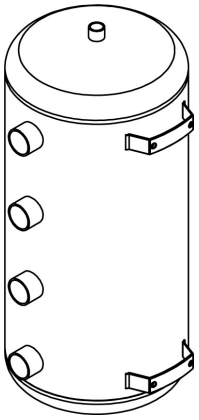


Accessories separately supplied

DI50X **50-litre circuit breaker**

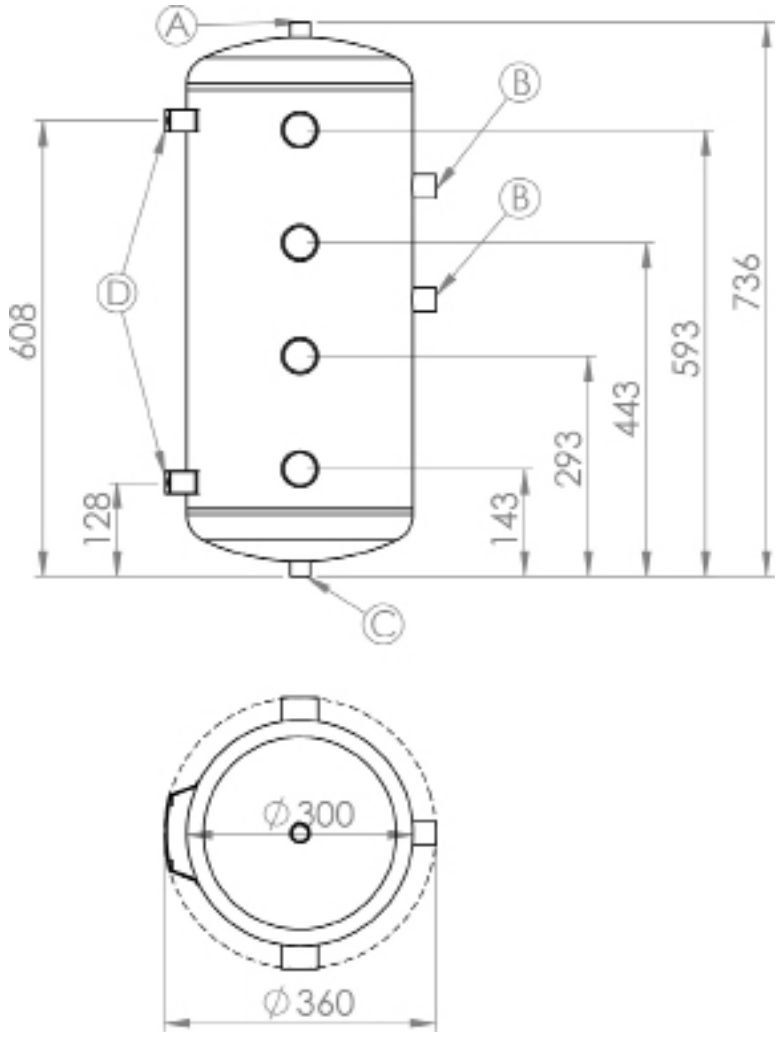
Technical 50-litre storage tank with the function of a hydraulic separator and inertial tank ensures effective operation of the secondary circulators that provide the hydraulic demand of air conditioning systems.
With the possibility of connecting two zones.



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



ACS200X **200-liter domestic hot water storage tank**
ACS300X **300-liter domestic hot water storage tank**
ACS500X **500-liter domestic hot water storage tank**

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

		ACS200X	ACS300X	ACS500X
Capacity	[litri]	196	273	475
Diameter	[mm]	640	640	790
Height	[mm]	1215	1615	1705
Surface of exchanger	[m^2]	1,5	1,8	2,2
Surface of solar exchanger	[m^2]	\	\	\
Max pressure of hot water	[bar]	10	10	10
Tank energy class	[-]	B	B	B
Storage dispersion	[W]	51	63	80
Thermal dispersions	[W/K]	1,13	1,40	1,78
Electric heater	[kW]	2,0	2,0	2,0

Data according to DIN 4708 / EN 12897 / en 15332

SCS08X **0.8 m^2 solar exchanger for flange installation**
SCS12X **1.2 m^2 solar exchanger for flange installation**

The kit is available in two sizes: 0.8 m^2 when combined with the 200 and 300 litre tank and 1.2 m^2 when combined with the 500 litre tank.
The kit is comprised of:
- tin-plated finned copper coil
- plastic cover

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

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.

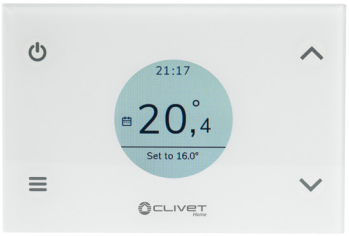
⚠ The external boiler connection kit excludes configuration with additional electric heater.
⚠ Check that the boiler pressure drops are compatible with the head of the unit.
⚠ Not required for SPHERA EVO 2.0 BOX Hybrid version

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

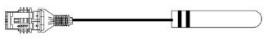
SWCX **SwitchConnect radio receiver**

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**

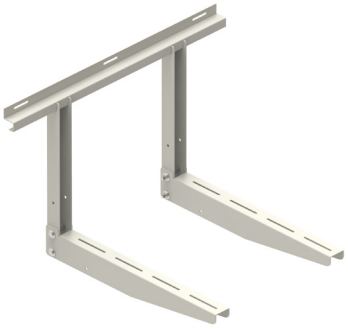
The antivibration mounts for floor installation reduce the vibrations of the compressor during its operation. They are secured to the feet of the base plate.

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

Accessories separately supplied

HYUC24 **Hybrid solution with 24kW 4-pipe boiler (GAS BOILER UC 24.4)**
HYUC34 **Hybrid solution with 34kW 4-pipe boiler (GAS BOILER UC 33.4)**
HYFE24 **Hybrid solution with 24kW 4-pipe boiler (GAS BOILER FE 24.4)**
HYFE34 **Hybrid solution with 34kW 4-pipe boiler (GAS BOILER FE 33.4)**

Boiler to be combined with hybrid version heat pump, making a system designed to work with the boiler as a support, replacement or back-up for the heat pump.
The boiler can produce DHW instantaneously, allowing simultaneous heating or cooling operation by the heat pump.
The heat pump manages and optimises the system by means of a water temperature probe (T1) located on the boiler supply line.

The kit includes:

- 24kW or 34kW condensing boiler
- 10 m long temperature probe (T1)

Gas Boiler UC

Gas Boiler FE

Note: all boiler versions are prepared for the connection of smoke intake/discharge fittings, which must be selected separately according to the installation required.
All boiler versions are standard supplied ready for methane or LPG operation. The UC versions require a pressure reducer to be fitted on site to the nozzle, which is standard supplied with the boiler. Refer to the manual for further details.

⚠ The hybrid solution excludes the possibility of selecting electric heaters in the system.

Accessories available for boilers

KCSAFX **Vertical coaxial fitting ø 60/100mm**

Vertical coaxial flanged polypropylene fitting, 60/100mm diameter, which allows combustion gas discharge and air intake by means of two coaxial ducts.

CCOAX **90 ° coaxial curve for horizontal outlet ø 60 / 100mm adjustable 360°**

Curve for smoke discharge and air intake, combinable 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 smoke discharge and air intake through an external wall with exhaust 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.

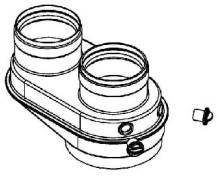
KAS80X **Vertical fittings ø 80mm**

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

⚠ Compatible only with GAS BOILER UC

KSDFX **Smoke discharge splitter kit ø 80mm**

Polypropylene kit to split the air intake and the smoke discharge into two 80mm connections with inspection inlets to connect to vertical or bent pipes

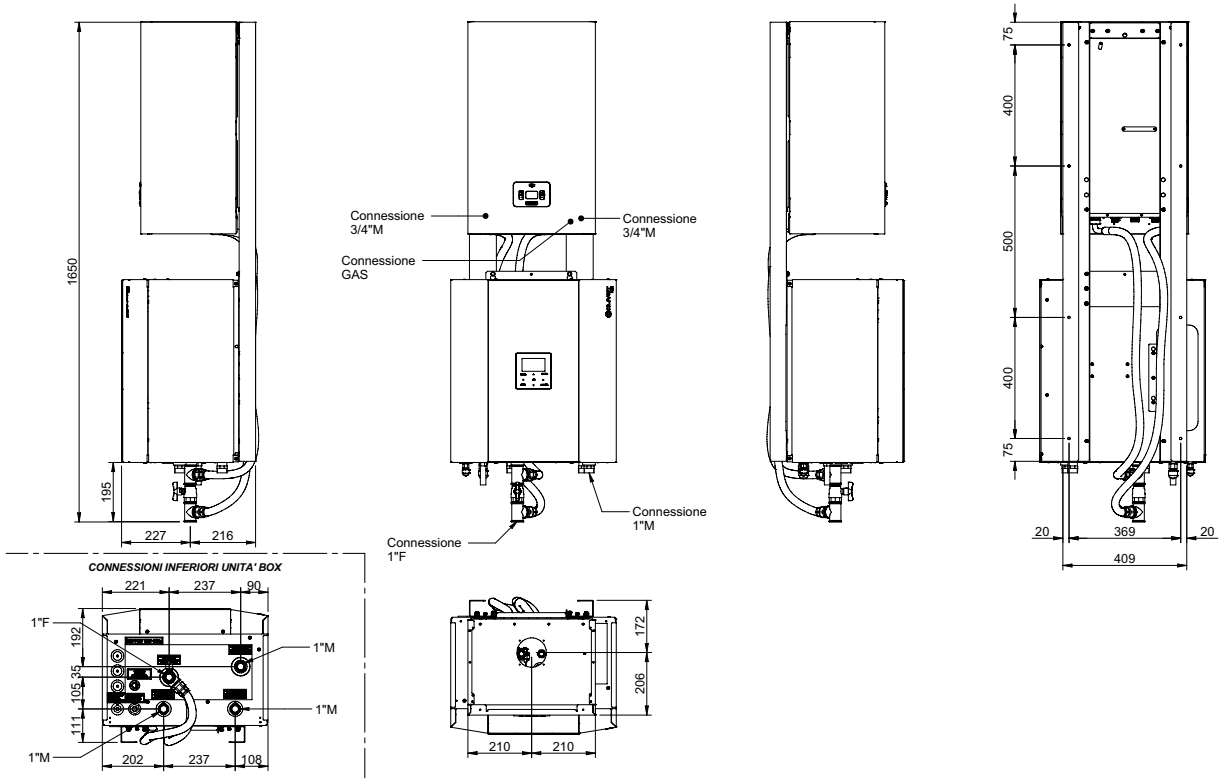


KISX **Simplified installation kit with fittings for Sphera EVO Box Hybrid**

The kit allows to facilitate the installation of the indoor unit and the boiler, making them a single element. As the hydraulic connections between the two are also included.

Technical data:
2 fixing brackets in painted steel
2 flexible hoses (ø 1”)
2 1” F-F-F TEE fittings
1 1” water valve

SQKN-YEE 1 BC Hybrid dimensional with installation kit



General technical data

Performance

SIZE			2.1	3.1	4.1	5.1	6.1*	7.1*	8.1*
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	8,67 / 9,10	11,16 / 11,80	11,72 / 12,86	12,88 / 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	35,8	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 18/23°C, source side air 35°C Heat power data, Total power input and COP in accordance with EN 14511:2018.
5. User side entering/leaving water temperature 7/12°C, source side air 35°C Heat power data, Total power input and COP in accordance with EN 14511:2018.
6. The product is conforming with the European ErP Directives, which includes Commission Delegated Regulation (EU) N. 811/2018 and Commission Delegated Regulation N. 813/2013, Clima Average, High Temperature 47/55°C.

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*
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. Dati secondo EN 16147:2017

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

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			Assiale						
Standard 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	1104x523x866	1104x523x866	1104x523x866	1104x523x866	1104x523x866
Packaging (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). Data referred to the following full load conditions: Heating - utility side water inlet/outlet 47/55°C, air source side 7°C. Cooling - utility side water inlet/outlet 12/7°C, air source side 35°C.
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	B
Characteristics				
Maximum system pressure		bar	3,0	3,0
System expansion tank	1	l	8,0	8,0
Preload expansion tank		bar	1,0	1,0
System water connections		inch	1''	1''
Dimensions				
Operation (L x P x A)		mm	547 x 386 x 604	547 x 386 x 604
Packaging (L x P x A)		mm	720 x 600 x 550	720 x 600 x 550
Operation weight		kg	50	53
Shipping weight		kg	58	61

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

Hydraulic data - Indoor unit + Outdoor unit

SIZE			2.1	3.1	4.1	5.1	6.1	7.1	8.1
			A	A	A	A	B	B	B
Characteristics									
Minimum system water content	1	l	40	40	40	40	40	40	40
Minimum water flow rate allowed		l/s	0,16	0,16	0,16	0,16	0,16	0,16	0,16
Maximum water flow rate allowed		l/s	0,61	0,61	0,61	0,61	0,92	0,92	0,92

1. Consider the water content of the area with less volume

Configuration compatibility table SPHERA EVO 2.0 Box

INDOOR UNIT		SQKN-YEE 1 BC A	SQKN-YEE 1 BC A	SQKN-YEE 1 BC B	INTEGRATION ELECTRIC HEATER			
	Pump	Std	1PUM	STd	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

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	B
Power supply 220-240V ~ 50Hz			
F.L.A. - Full load current at max admissible conditions	A	0,50	0,90
F.L.I. - Full load power input at max admissible conditions	kW	0,10	0,20
M.I.C - Maximum inrush current	A	0,50	0,90

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

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

Unit configured with oversized pump

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

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

Integration electric heaters - 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.

External 2 zone kit

SIZE		KIRE2HX - KIRE2HLX
Power supply 220-240V ~50Hz		
F.L.A. - Full load current at max admissible conditions	A	0,45
F.L.I. - Full load power input at max admissible conditions	kW	0,10

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

Storage tanks for domestic hot water

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

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

Auxiliary drain pan

SIZE		DTX
Power supply 220-240V ~50Hz		
F.L.A. - Full load current at max admissible conditions	A	0,40
F.L.I. - Full load power input at max admissible conditions	kW	0,08

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

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 leve
	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 leve
	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)

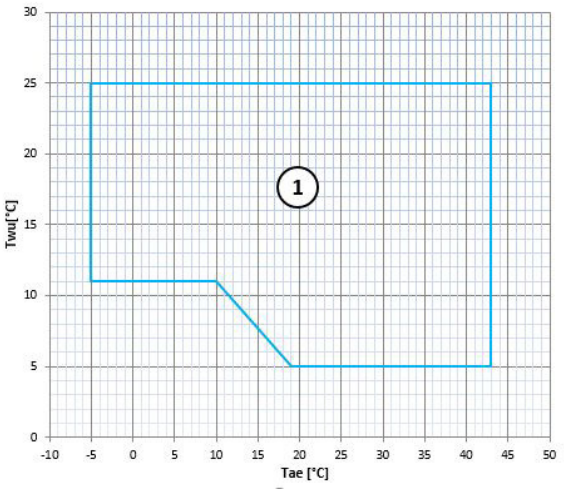
Super-silenced mode

SIZE	Sound pressure level	Sound power leve
	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

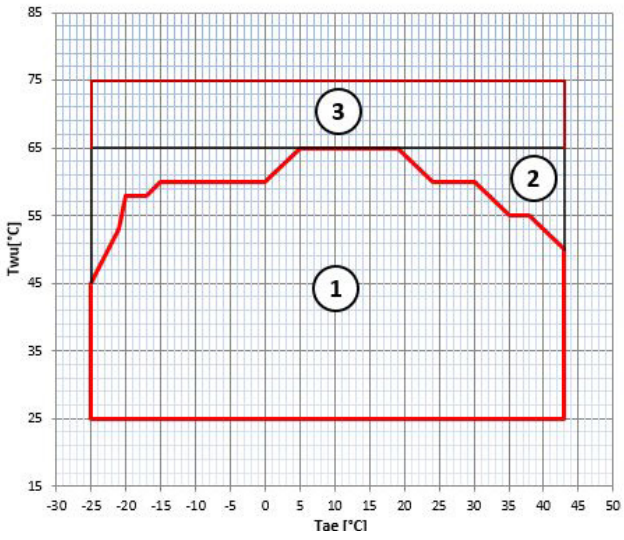
Cooling



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

1. Normal operating range

Heating



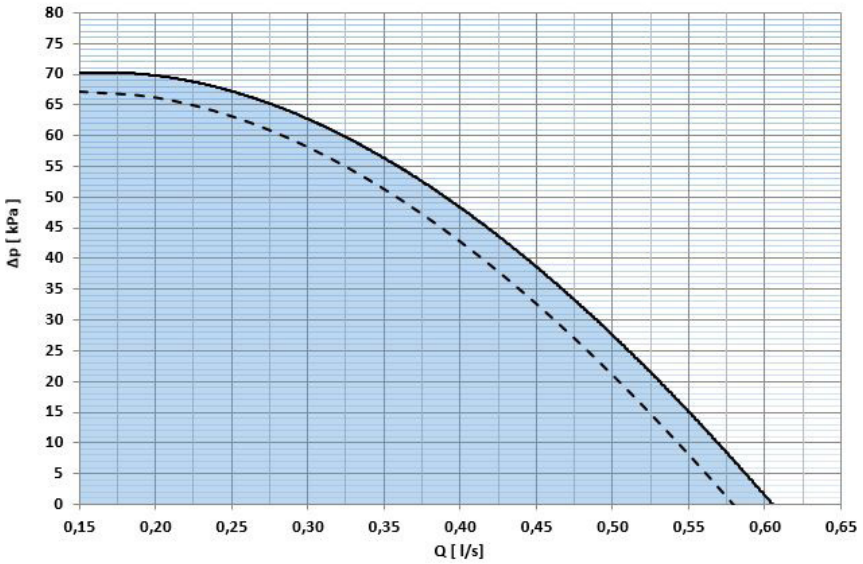
Twu [°C] = Exchanger water outlet temperature
Tae [°C] = Outdoors exchanger air inlet temperature

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.

General technical data

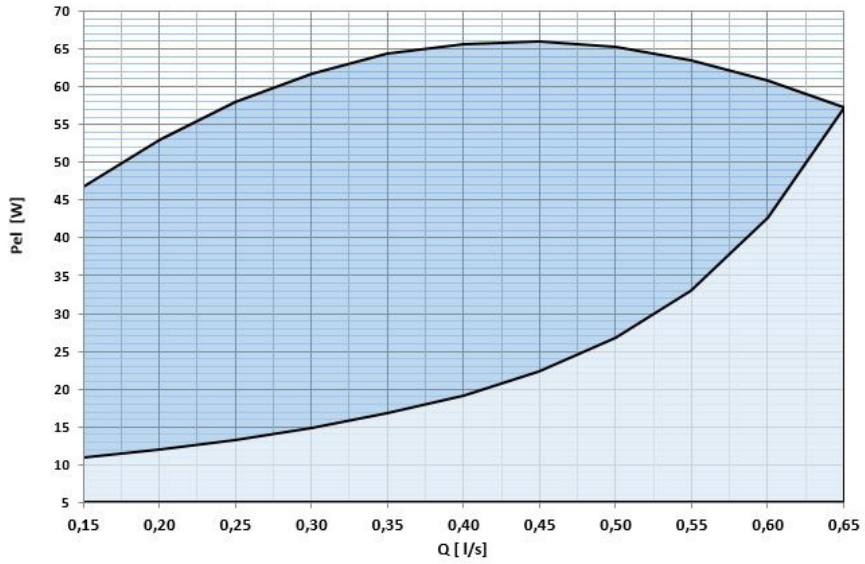
Available pressure of the standard circulator at the unit A connections



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

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

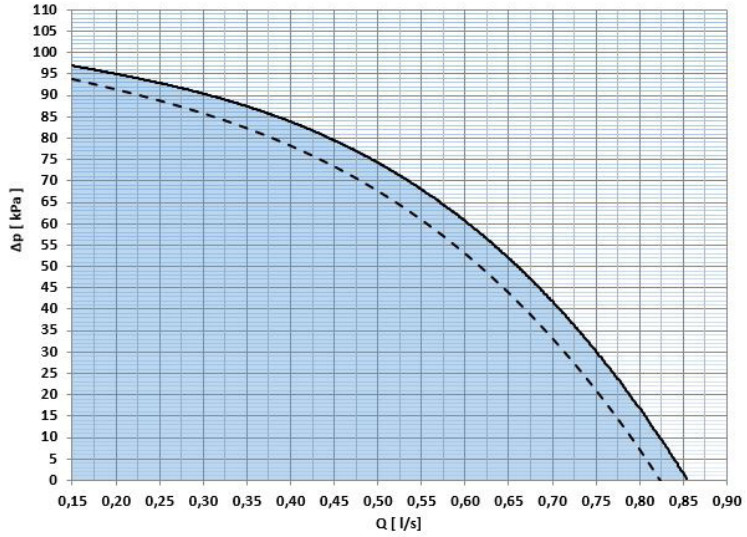
Absorption of the standard circulator at the unit 190 L A



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

Circulator operating field

Head of the circulator with increased pump at the unit A connections

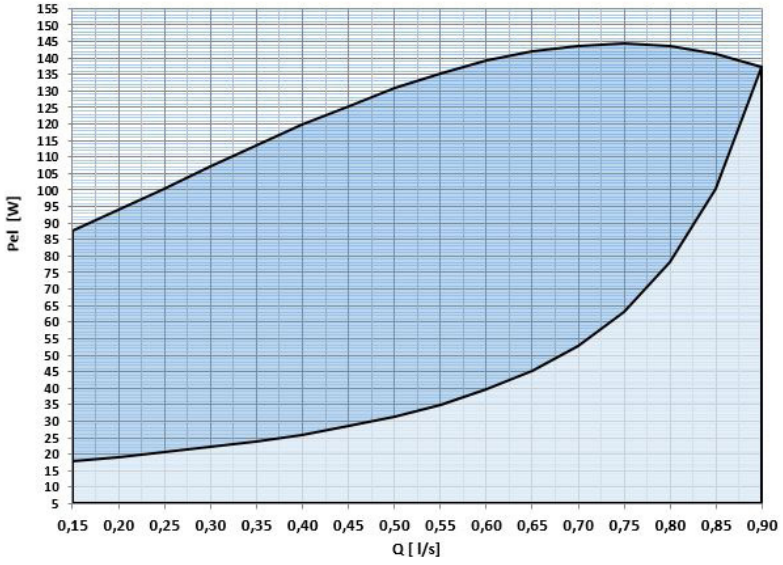


ΔP [kPa] = Available pressure
Q [l/s] = Water flow-rate

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

Circulator operating field

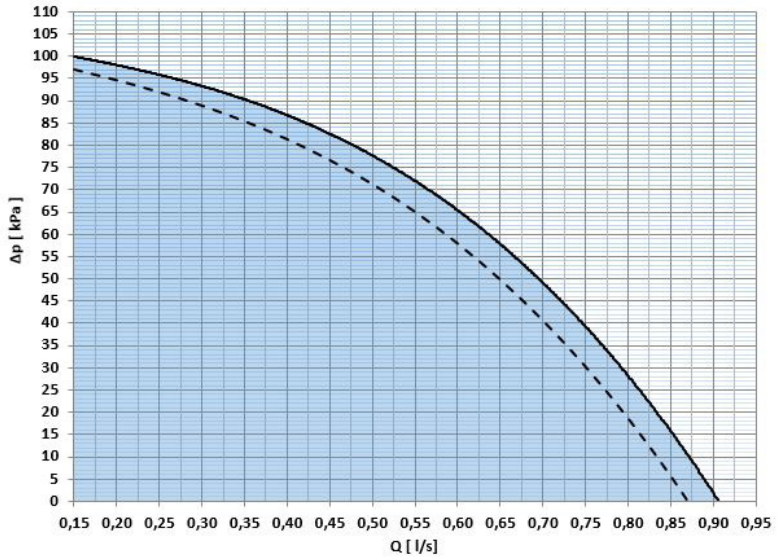
Absorption of the circulator increased at the unit 250 L A



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

Circulator operating field

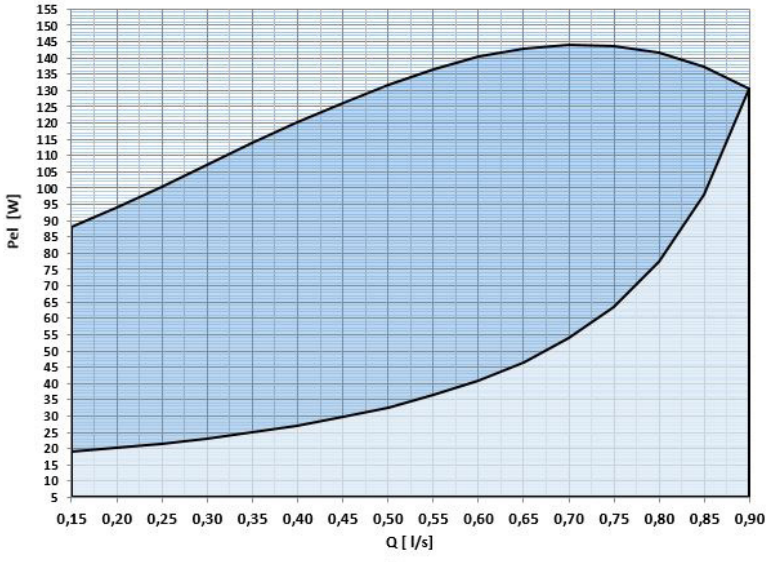
Head of the circulator with increased pump at the unit B connections



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

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

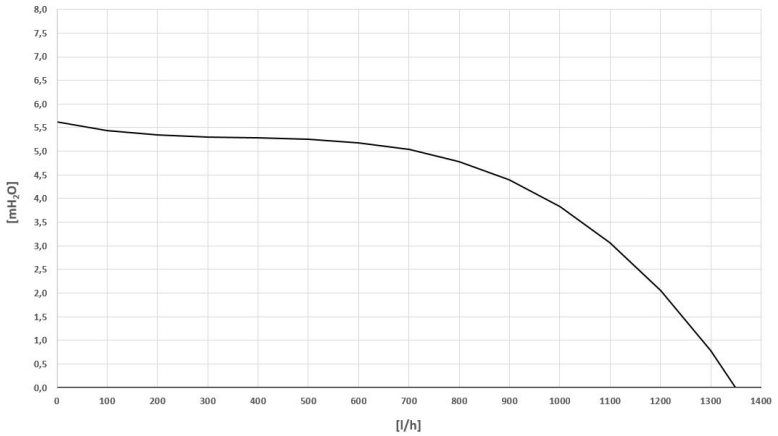
Absorption of the circulator increased at the unit 250 L B



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

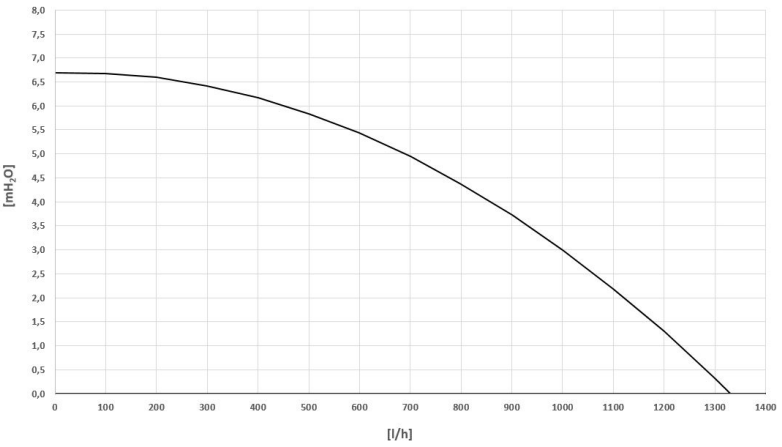
Circulator operating field

Available pressure of the circulator GAS BOILER UC



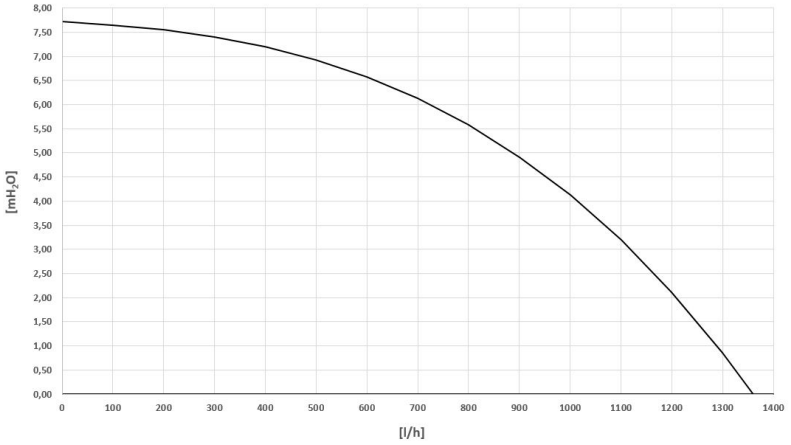
[mH2O] = Available pressure
[l/h] = Water flow-rate

Available pressure of the circulator GAS BOILER FE 24.4



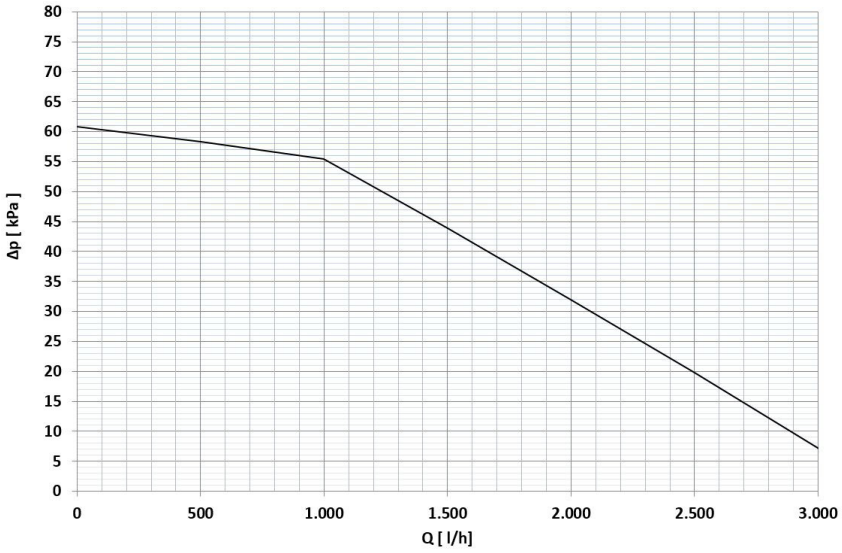
[mH2O] = Available pressure
[l/h] = Water flow-rate

Available pressure of the circulator GAS BOILER FE 33.4



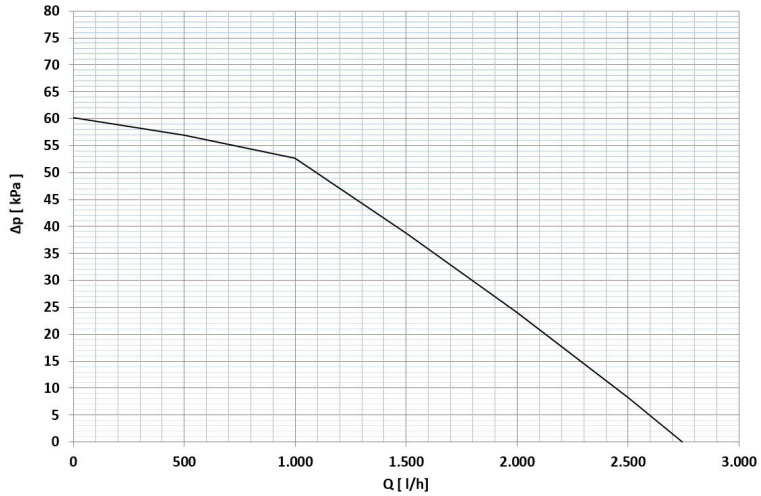
[mH2O] = Available pressure
[l/h] = Water flow-rate

Pressure drop for direct booster system circulator



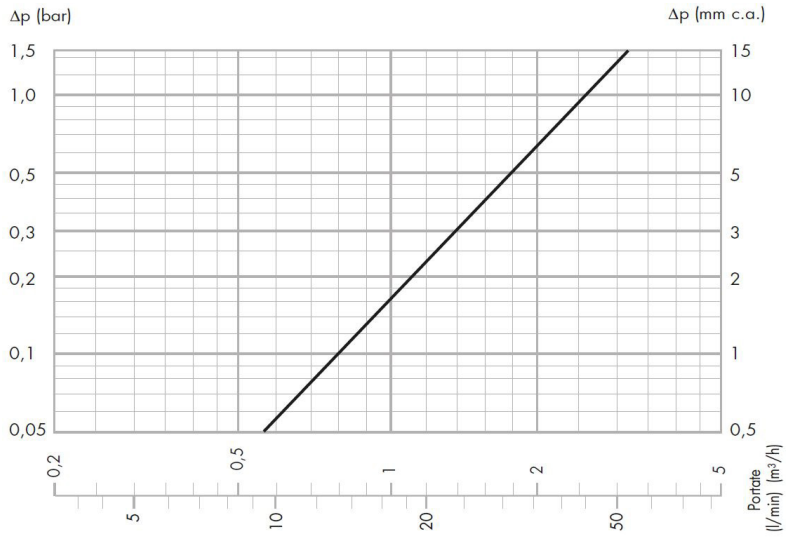
ΔP [kPa] = Available pressure
Q [l/h] = Water flow-rate

Available head for mixed booster system circulator

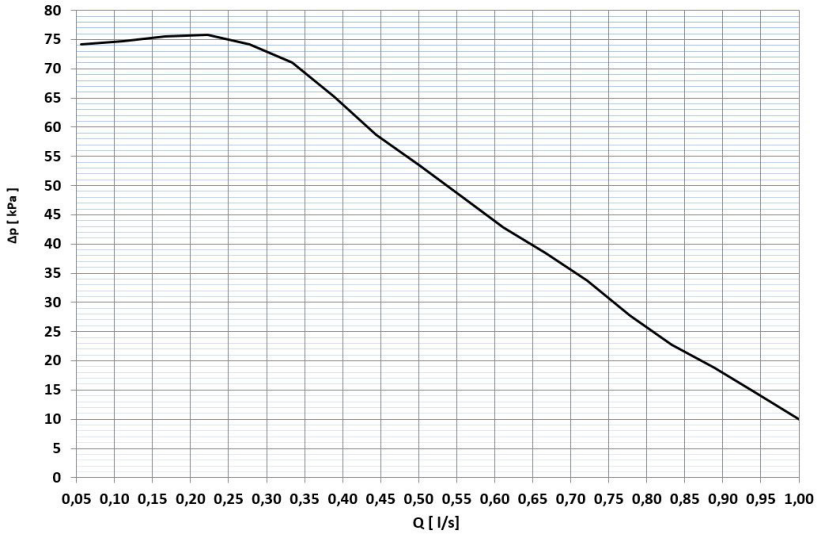


Pel [W] = Electrical power input
Q [l/h] = Water flow-rate

Pressure drops - VDACSX accessory

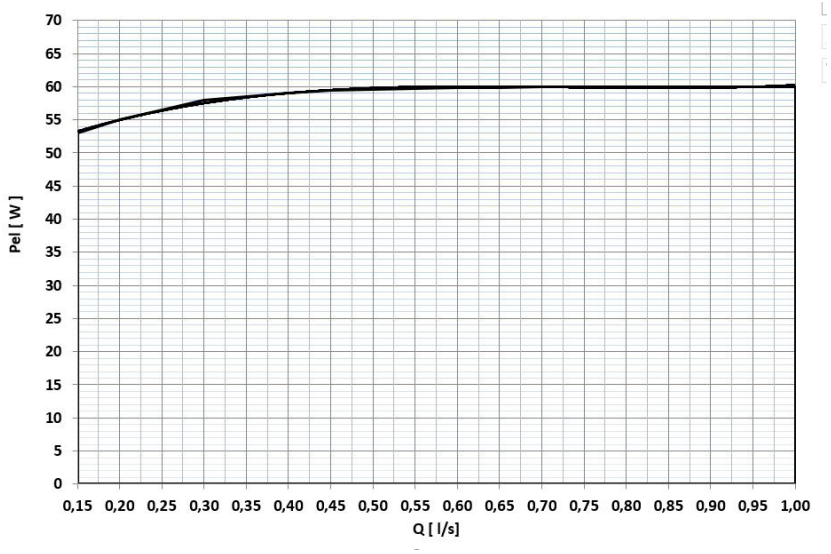


KCSX secondary circuit kit available pressure



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

KCSX secondary circuit kit absorption



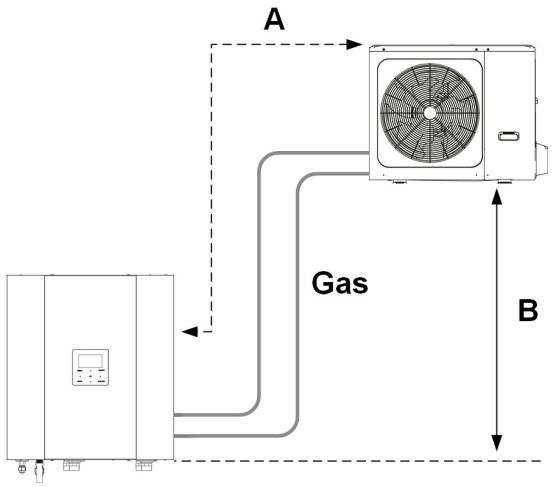
Pel [W] = Electrical power input
Q [l/s] = Water flow-rate

Refrigerant connections

Sizing the refrigerant pipes

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

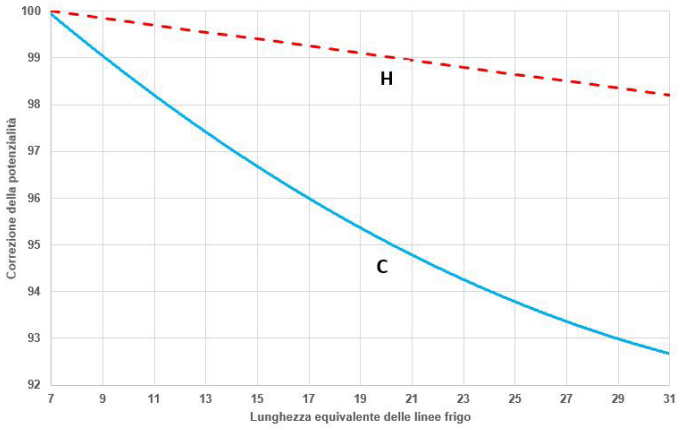
⚠ To correctly install the refrigerant pipes and charge the refrigerant gas, refer to the SPHERA EVO 2.0 MANUAL



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 metre	kg/m	0,020	0,020	0,038	0,038	0,038	0,038	0,038

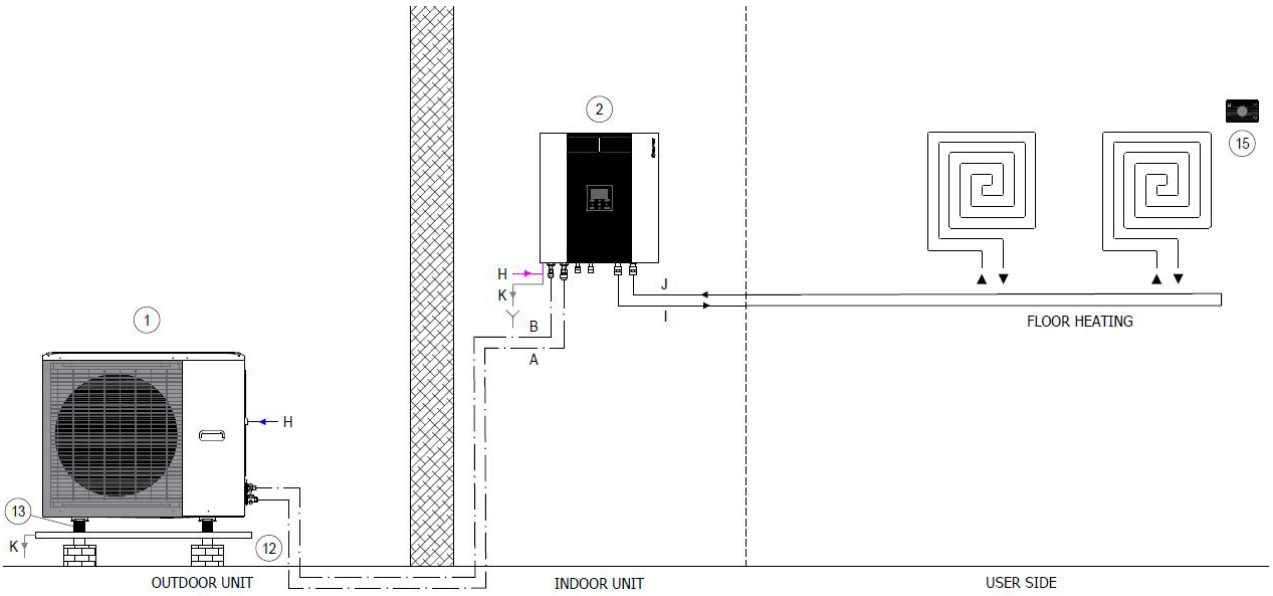
Determination of cooling and heating power loss

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



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

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

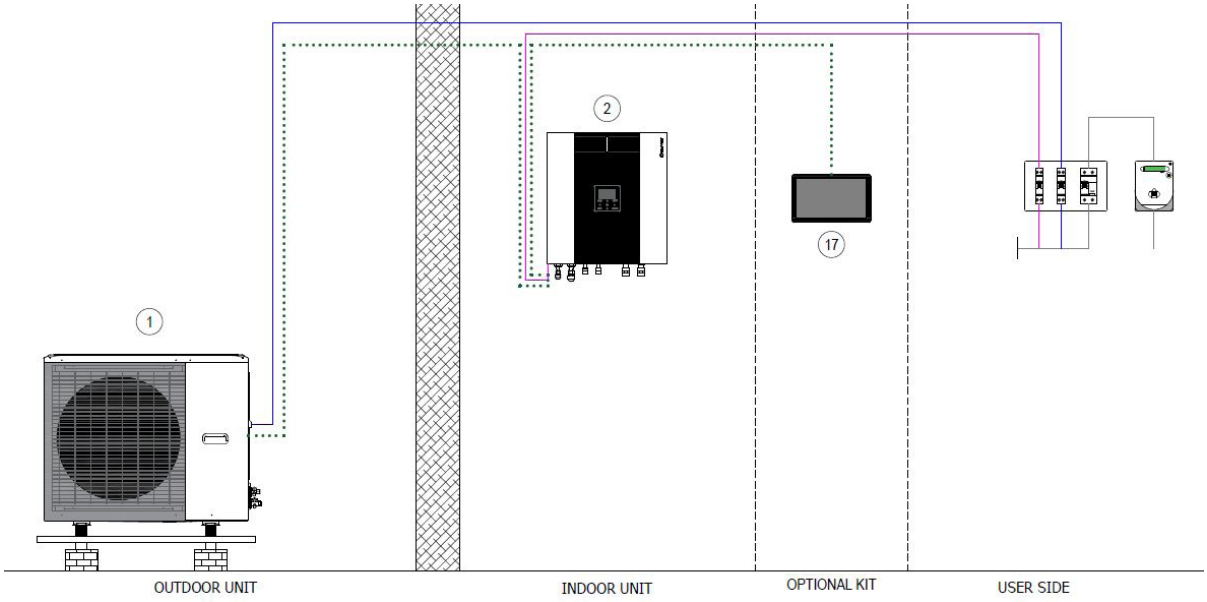
220-240V~50Hz
380-415V 3N ~50HZ con EH3 - EH6 - EH9

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.



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. Ingresso ricircolo ACS
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

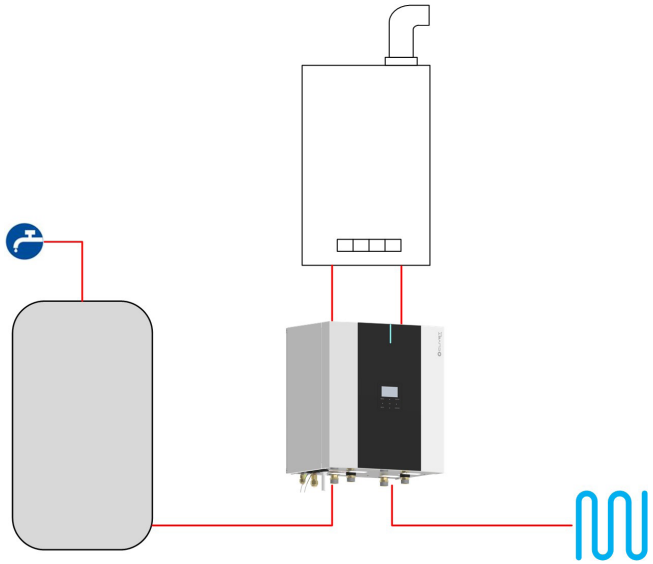
Auxiliary and hybrid version heat sources

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

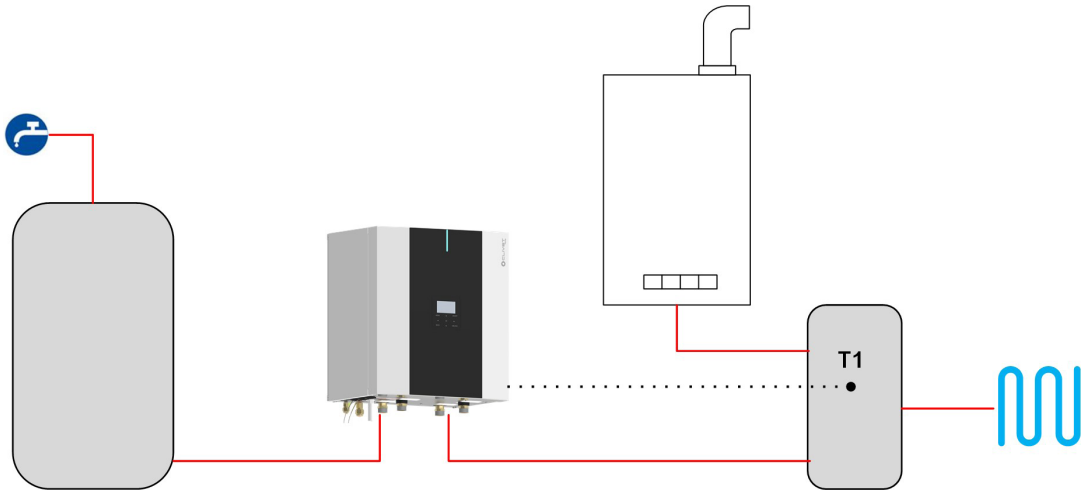
The additional electric heater or boiler can operate as::
- Integration: when it is not convenient/possible to work with the heat pump capacity alone
- Replacement: outside the work settings of the heat pump
- Back-up: in case of unit failure (the unit keeps the pump running at maximum speed)

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

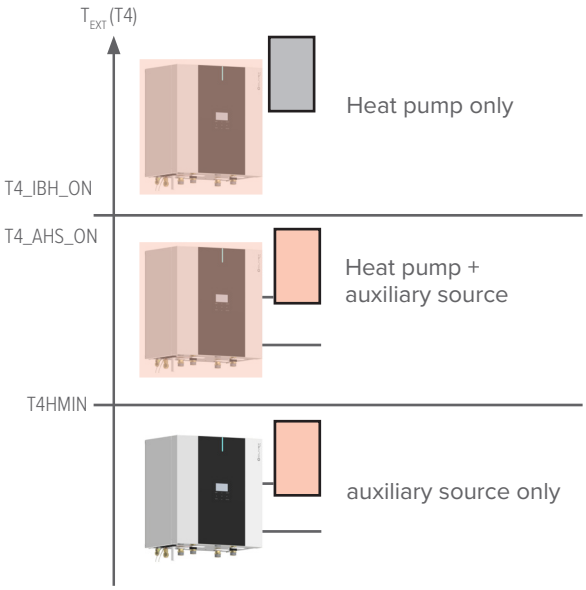


Auxiliary and hybrid version heat sources

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:

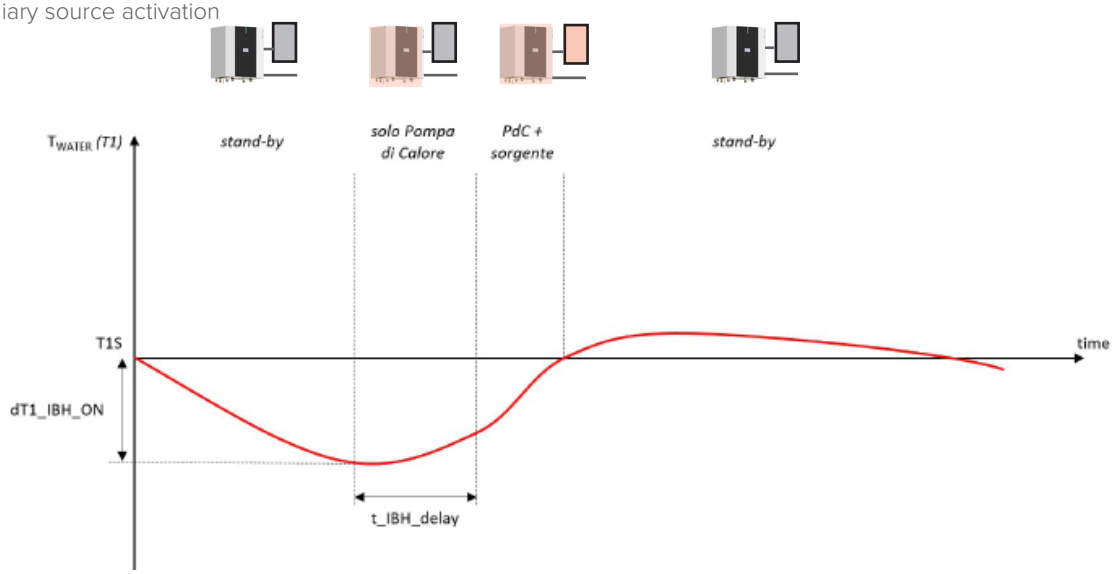
- very low outdoor temperature

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



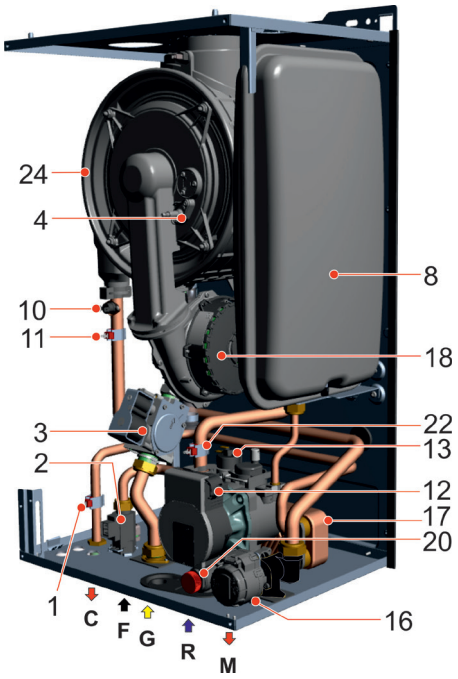
⚠ The BACKUP HEATER function on the HMI allows activation of the IBH or AHS auxiliary source to be forced

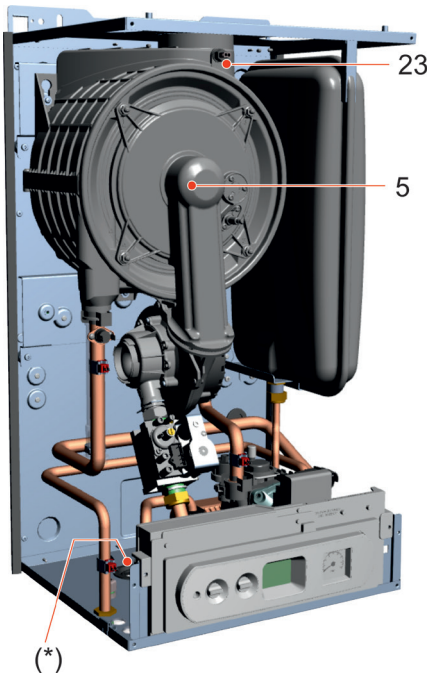
The unit can manage the AHS set-point dynamically with a 0-10V signal, with parameters:

- 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

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



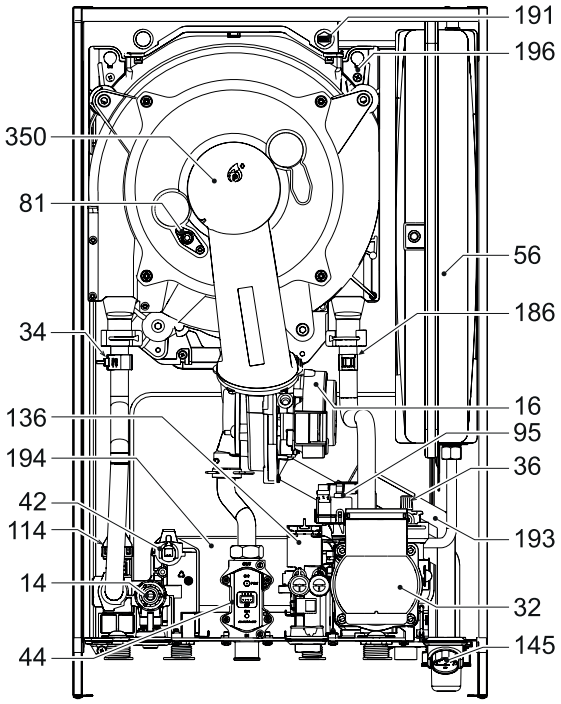


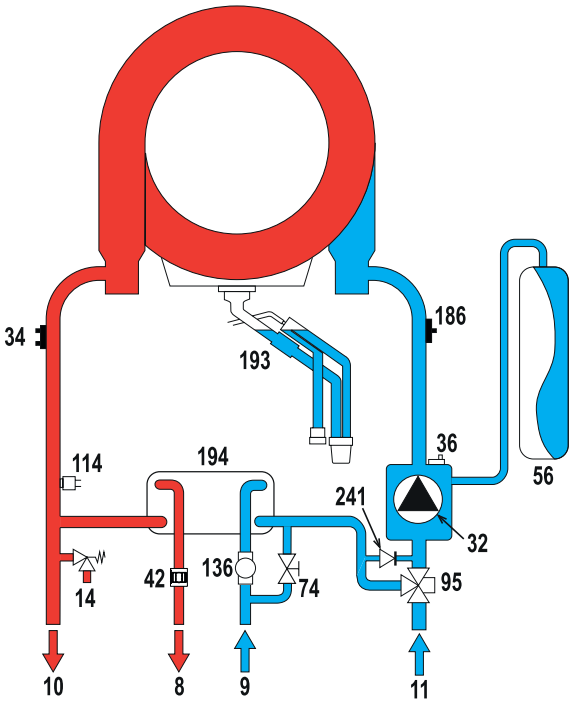
#	NAME	DESCRIPTION
1	SS	DHW water temperature sensor
2	FLS	Flow switch with cold water filter
3	VG	Gas valve
4	E.ACC/RIL	Switch-on Electrode/ detection
5	-	Burner
8	-	Expansion tank
10	TL	Safety thermostat
11	SR	Water temperature sensor - Hating supply
12	P	Circulator
13	DK	Low water control pressure 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%).

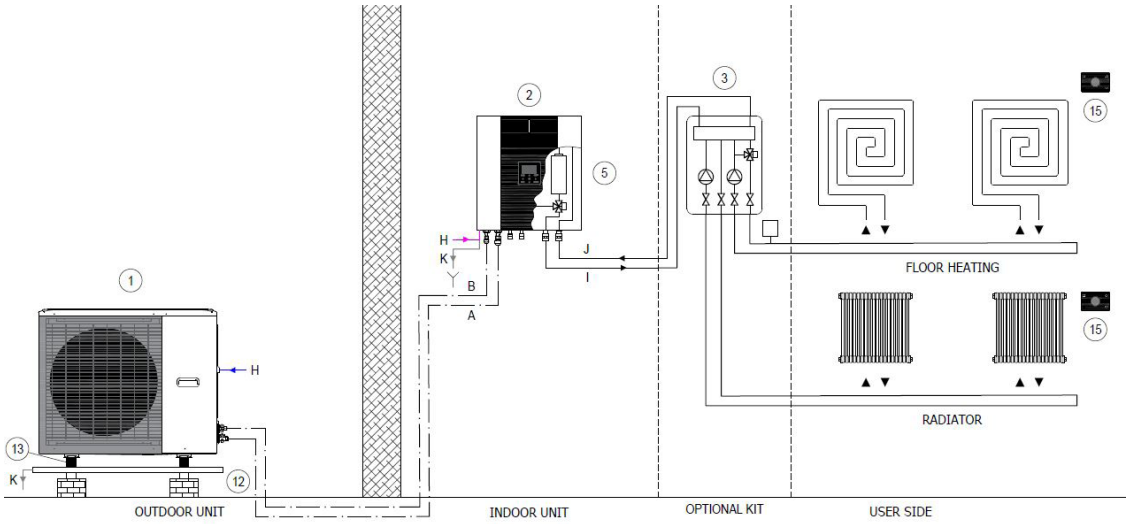
The FE GAS BOILER is made as follows:



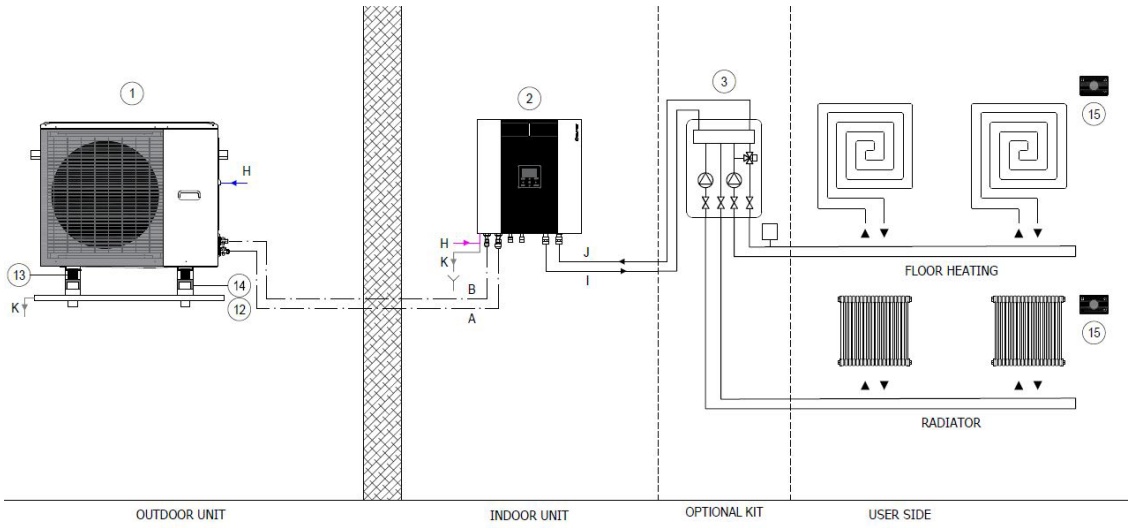


#	DESCRIPTION
8	DHW outlet (G 1/2")
9	DHW water inlet (G 1/2")
10	System supply (G 3/4")
11	System return (G 3/4")
14	Pressure relief valve
16	Fan
32	Circulator
34	Water temperature sensor - Hating supply
36	Automatic air vent
42	DHW water temperature sensor
44	Gas valve
56	Expansion tank
74	System filling 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

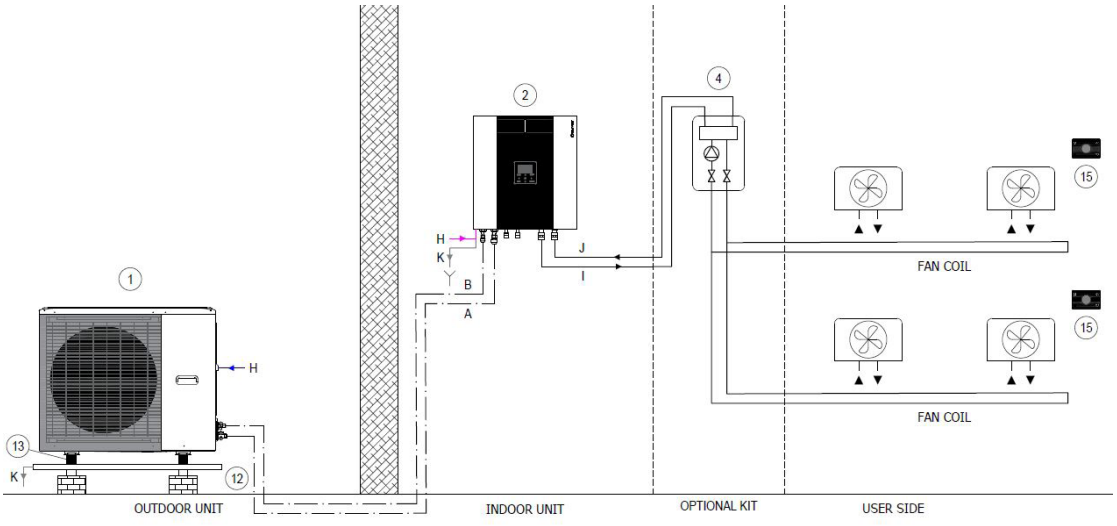
General description of the system and possible connections



Additional electric heater

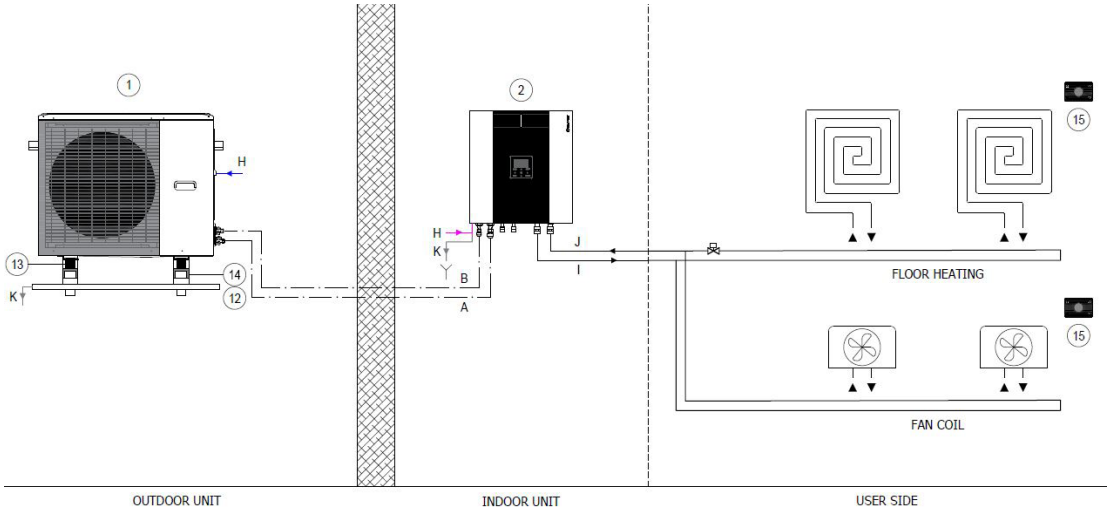


2 zone kit

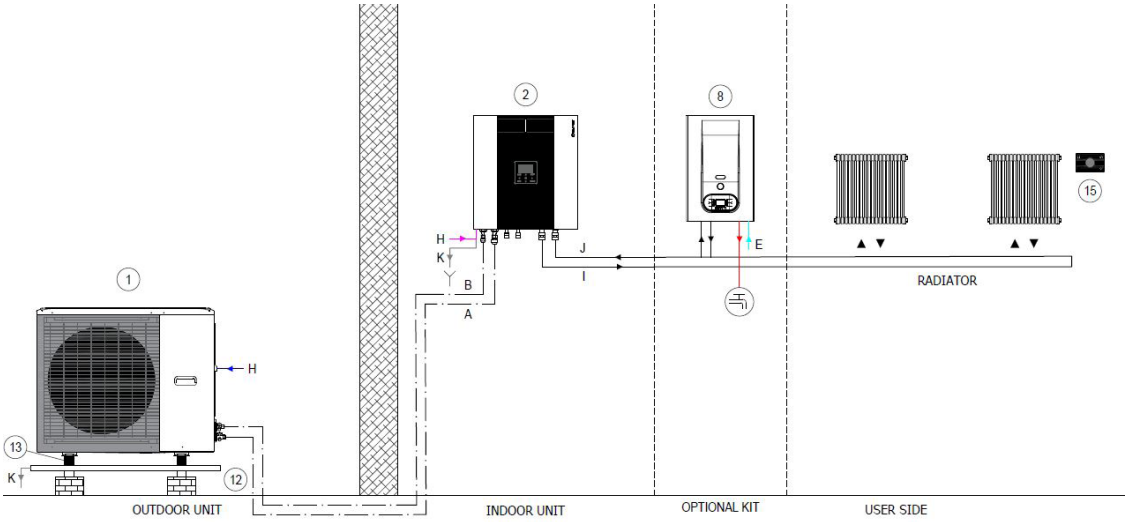


Single zone kit

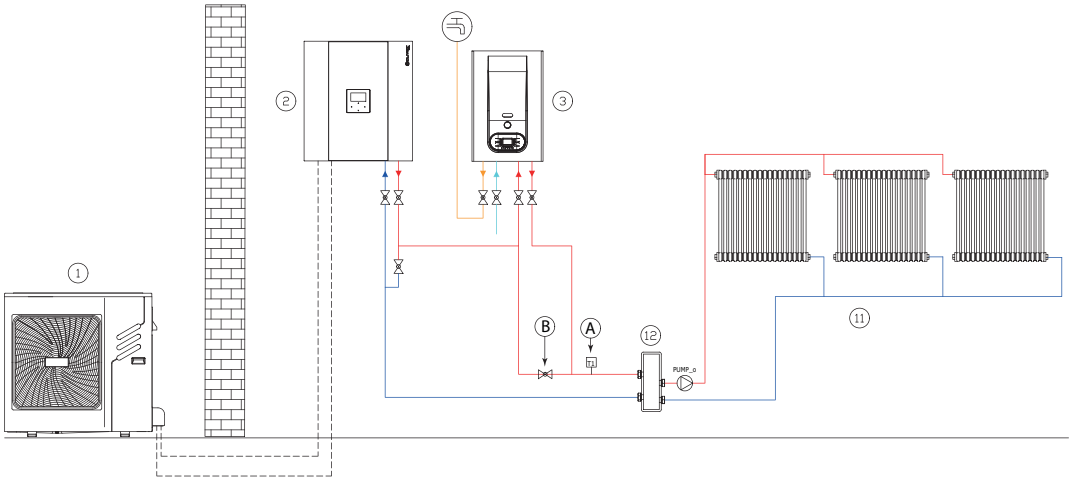
General description of the system and possible connections



Single Zone

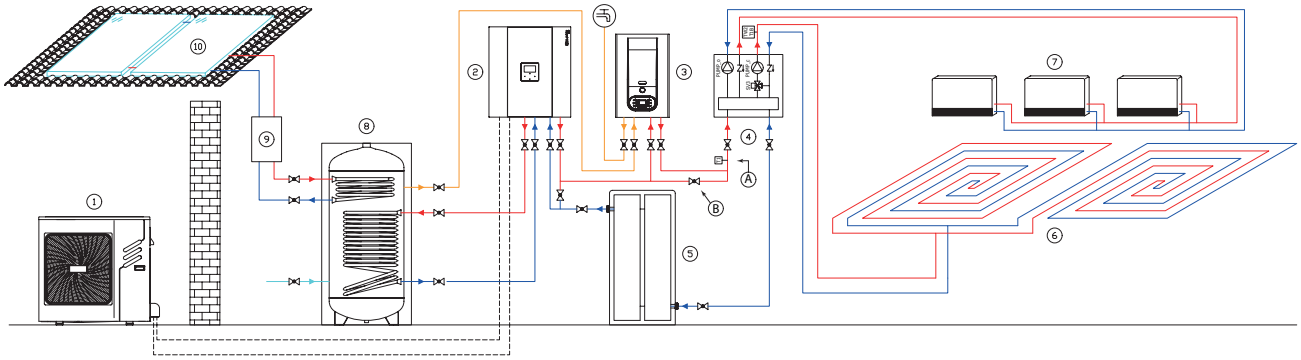


Hybrid solution

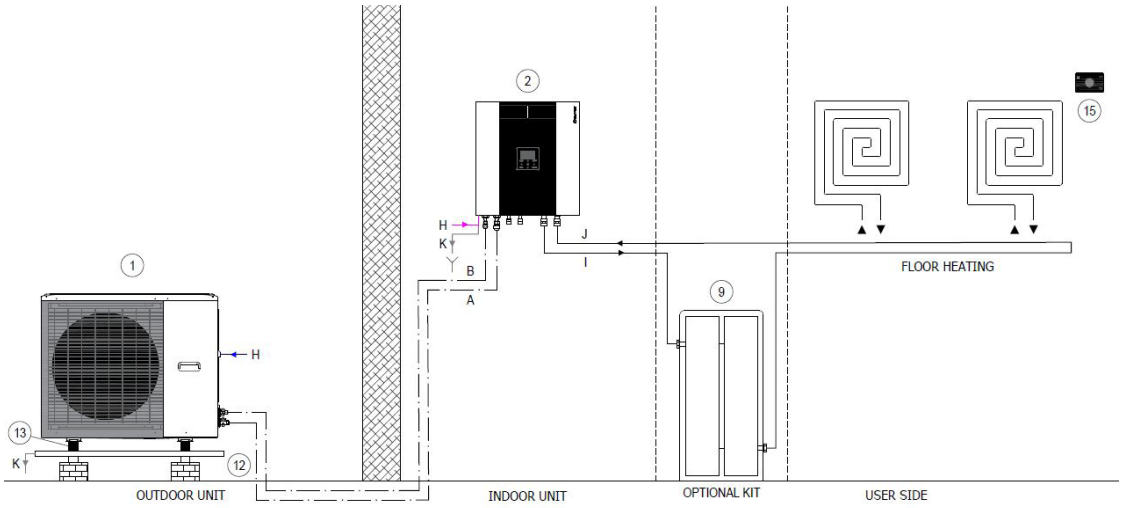


Hybrid solution "Factory made"

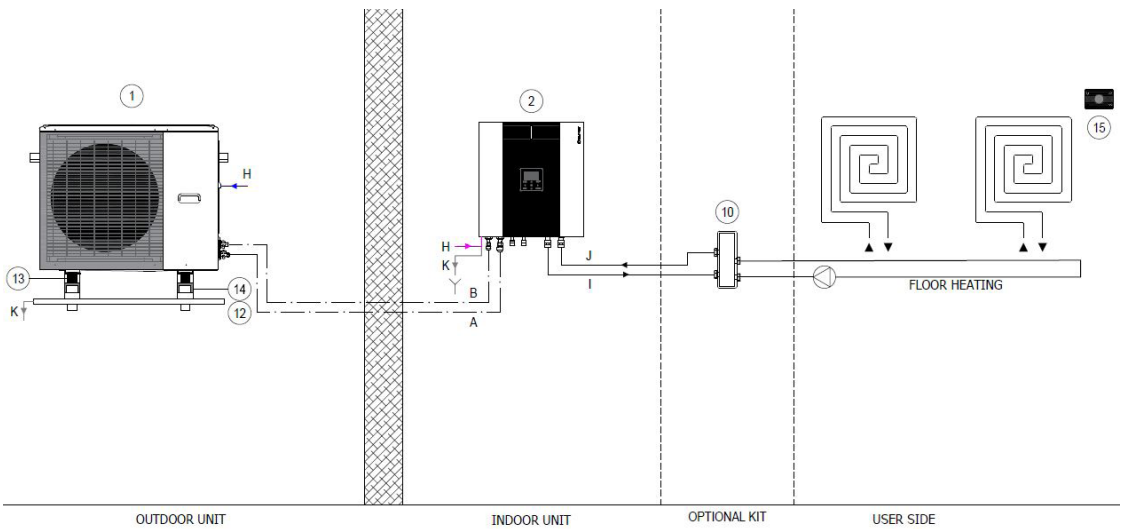
General description of the system and possible connections



Hybrid solution "Factory made" with DHW storage tank ACS

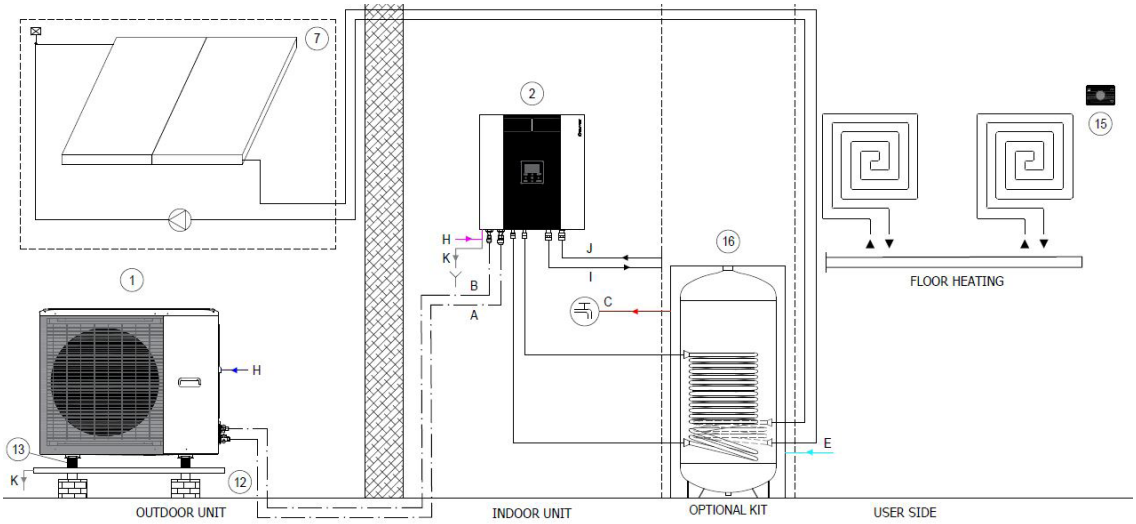


Inertial storage 40 L

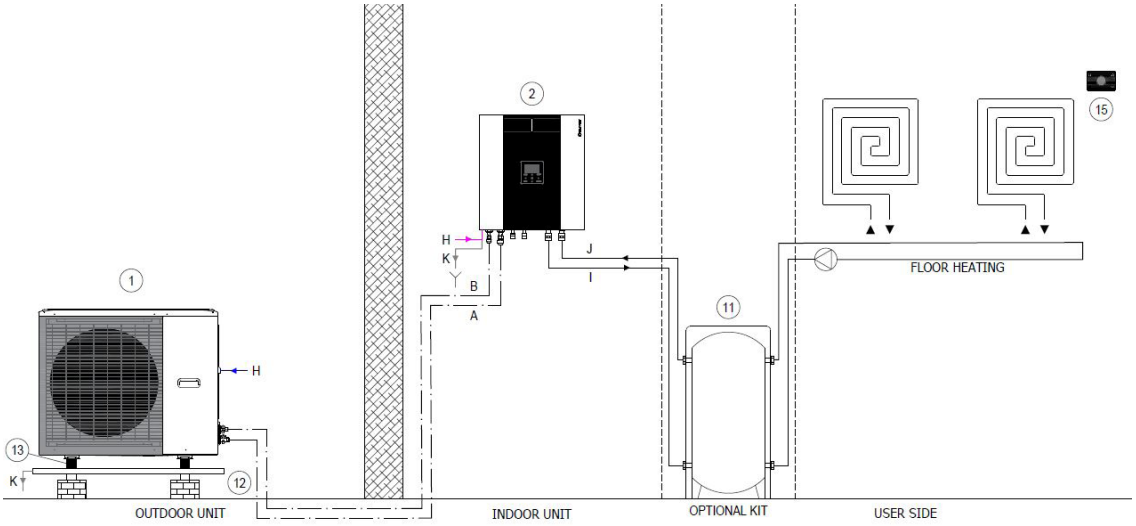


1 L circuit breaker

General description of the system and possible connections



DHW storage



circuit breaker 50L - inertial storage 60L

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

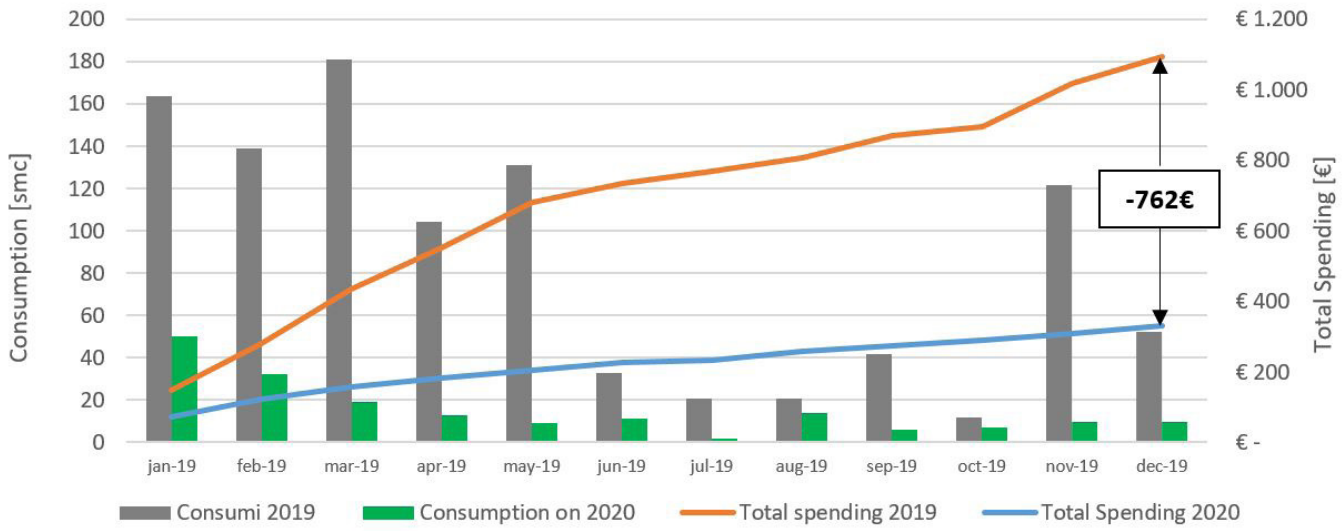
UNI/TS 11300 Part 3

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
8.1	14,20	10,53	7,12	2,91	2,45	3,54	5,38	7,88

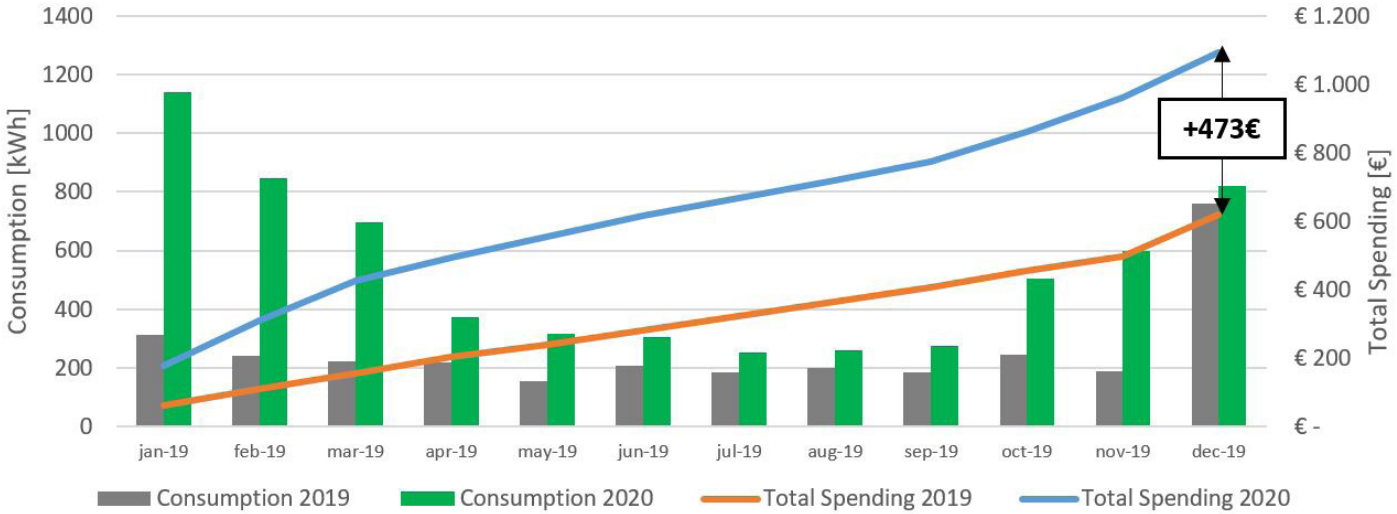
Reference conditions prescribed by UNI/TS 11300-3:
1. External air temperature B.S. 35°C Refrigerated water temperature at the fancoil inlet/outlet 12/7 °C
2. External air temperature B.S. 30°C Refrigerated water temperature at the fancoil outlet /7 °C
3. External air temperature B.S. 25°C Refrigerated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

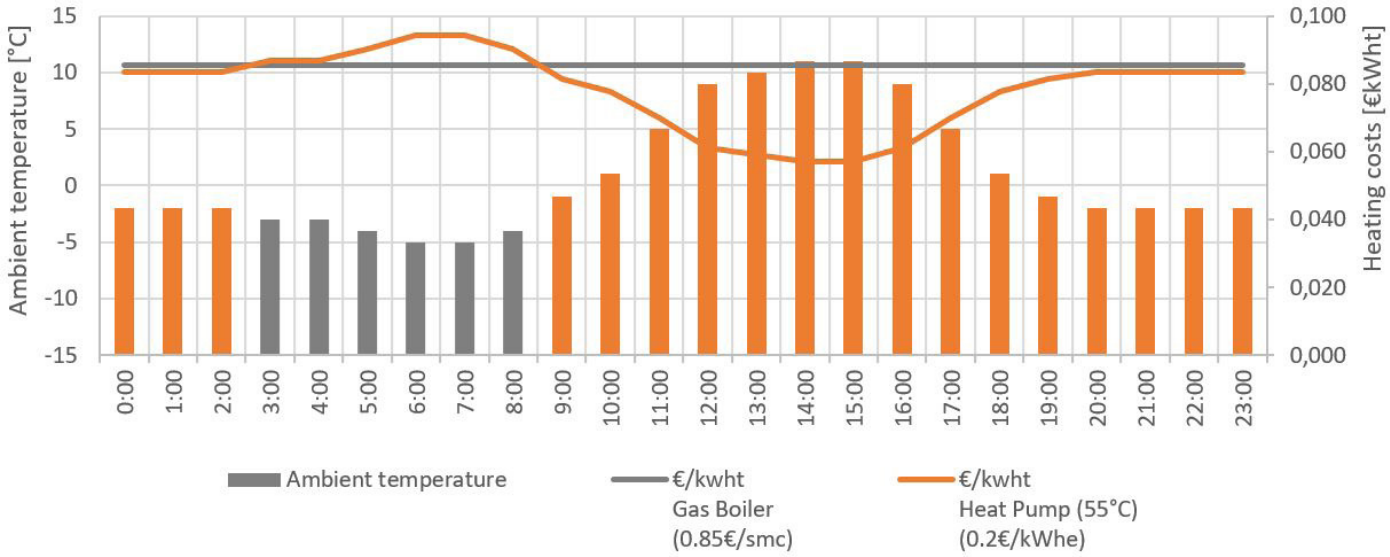
Year	Natural gas cost	Electricity cost	Total cost	Savings	
2019	1092 €	620 €	1712 €	289 €	-20%
2020	330 €	1093 €	1423 €		

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.

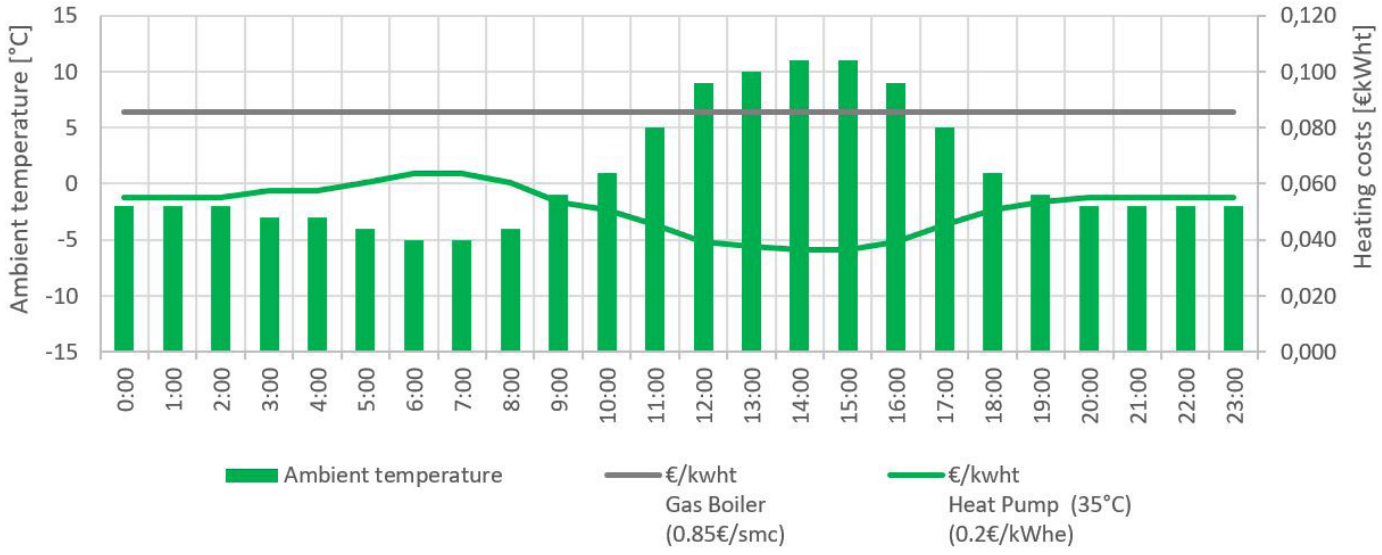
EuroSwitch Function

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.

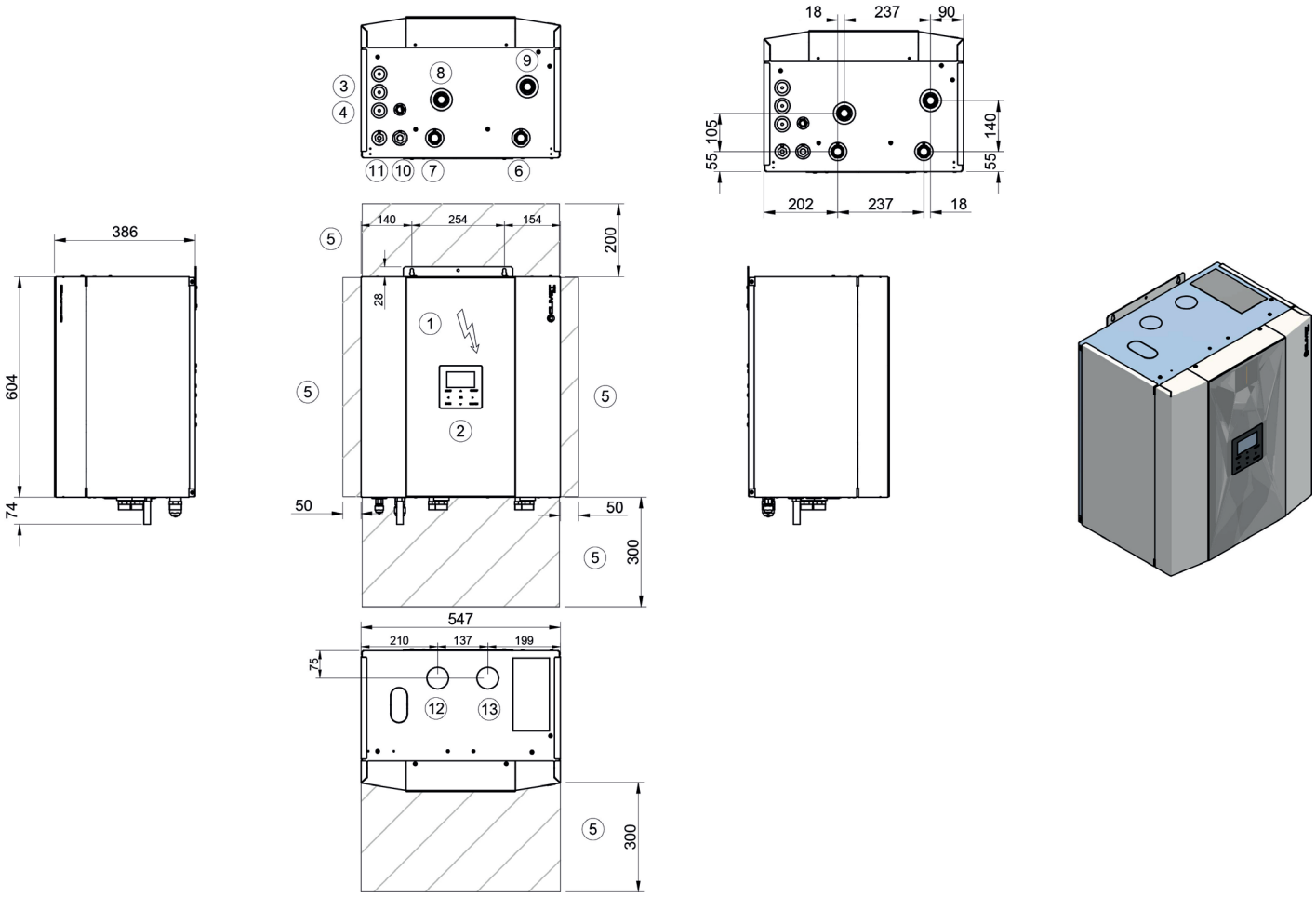


Case 2 - Typical day in January - Radiant floor (supply temperature = 35°C)

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.

SPHERA EVO 2.0 BOX (indoor unit)

DAAGM0001_00
DATA/DATE 07/06/2021



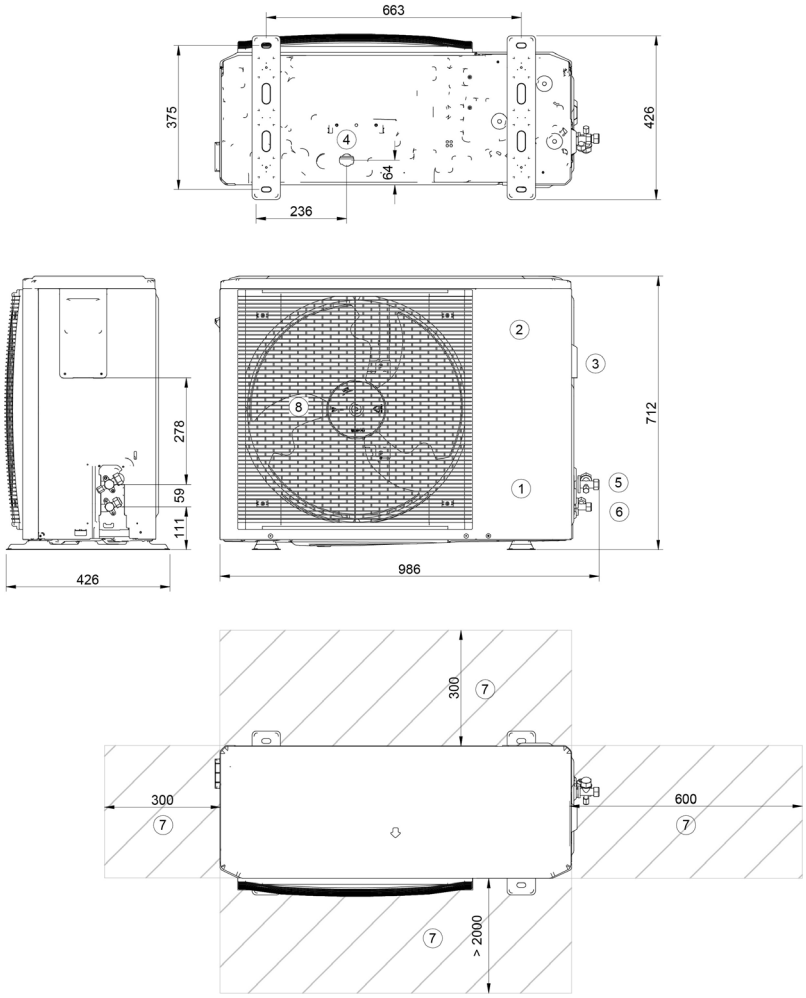
1. Electrical panel
2. Unit control keypad
3. Power input
4. Condensate drain
5. Functional spaces
6. DHW exchanger supply
7. DHW exchanger return
8. System outlet
9. System return
10. 5/8" SAE intake connection
11. 3/8" SAE liquid connection
12. Gas boiler inlet (optional)
13. Gas boiler outlet (optional)

SIZE		GABC	GBBC
Operation weight	kg	52	54
Shipping weight	kg	60	62

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

SPHERA EVO 2.0 (outdoor unit) - 2.1 ÷ 3.1

DAAQ80002_REV00
DATA/DATE 29/04/2021



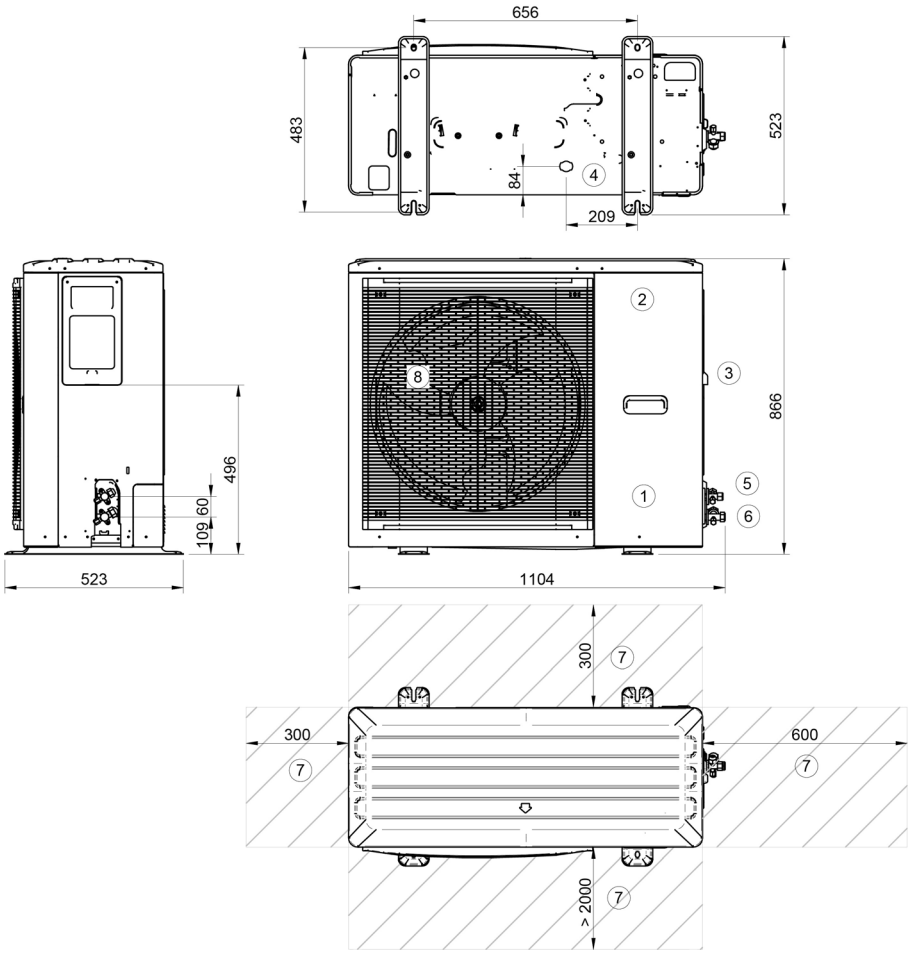
1. Compressor enclosure
2. Electrical panel
3. Power input
4. Condensate drain
5. Gas connections (1/4")
6. Gas connections (5/8")
7. Functional spaces
8. Electrical fan

SIZE			2.1	3.1
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_REV01
DATA/DATE 29/01/2021



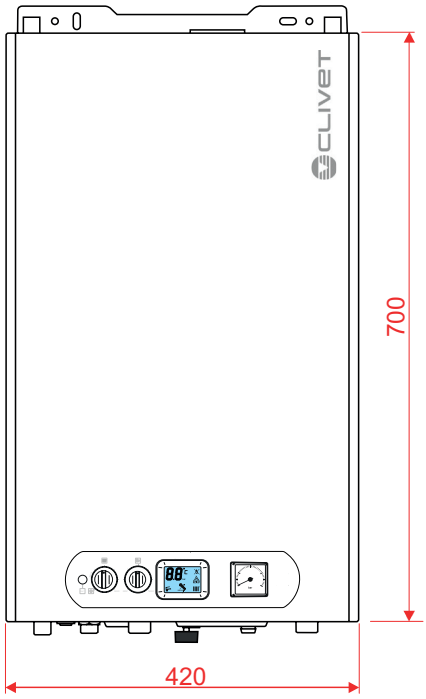
1. Compressor enclosure
2. Electrical panel
3. Power input
4. Condensate drain
5. Gas connections (3/8")
6. Gas connections (5/8")
7. Functional spaces
8. Electrical fan

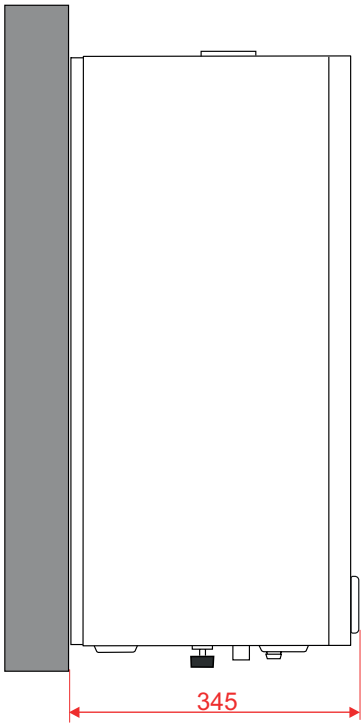
SIZE		4.1 / 1Ph	5.1 / 1Ph	6.1 / 1Ph	6.1 / 3Ph	7.1 / 1Ph	7.1 / 3Ph	8.1 / 1Ph	8.1 / 3Ph
Operation weight	kg	77	77	96	112	96	112	96	112
Shipping weight	kg	88	88	110	125	110	125	110	125

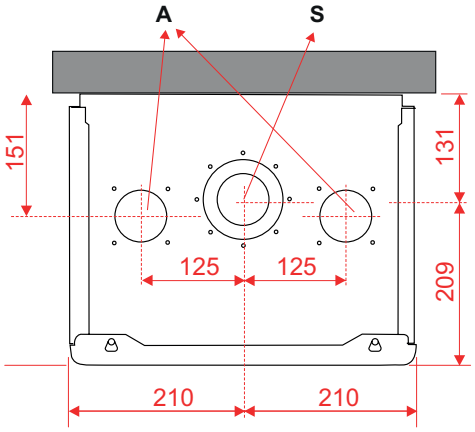
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensionalidrawings

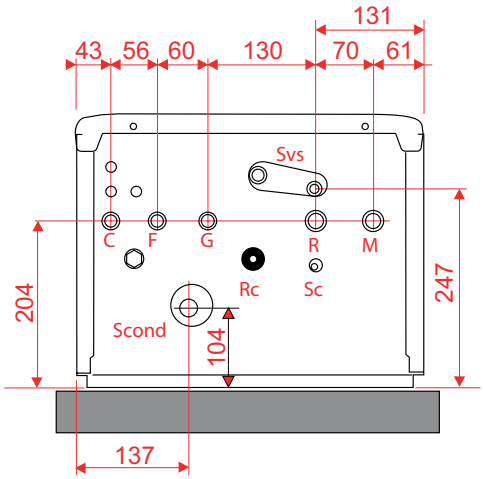
GAS BOILER UC







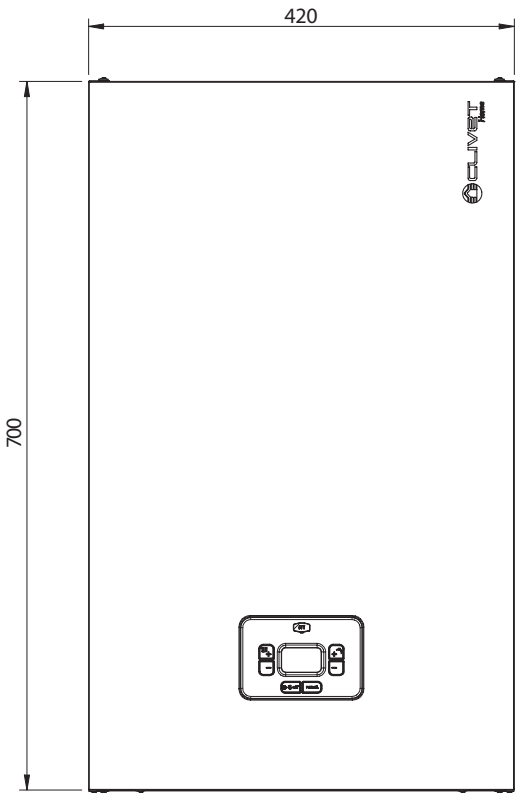
View from above



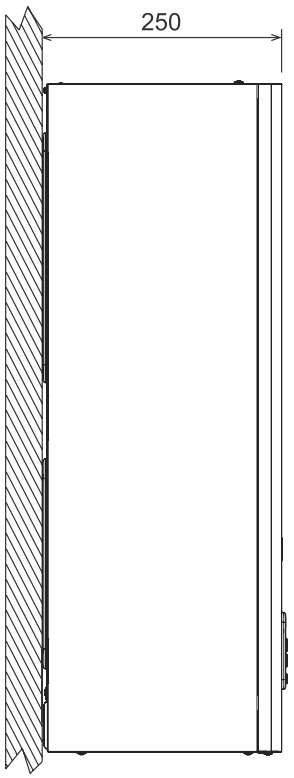
Seen from below

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 discharge Ø 80

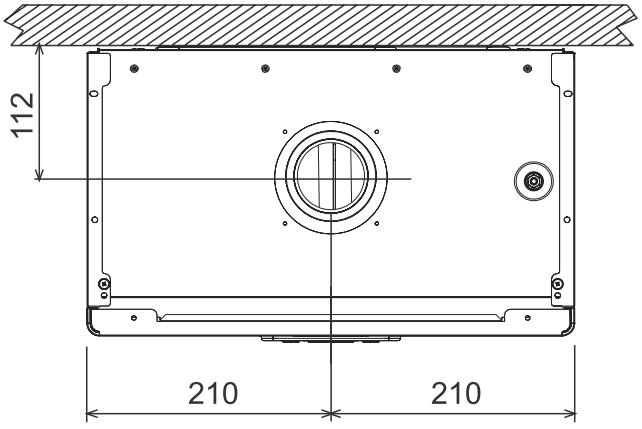
GAS BOILER FE 24.4



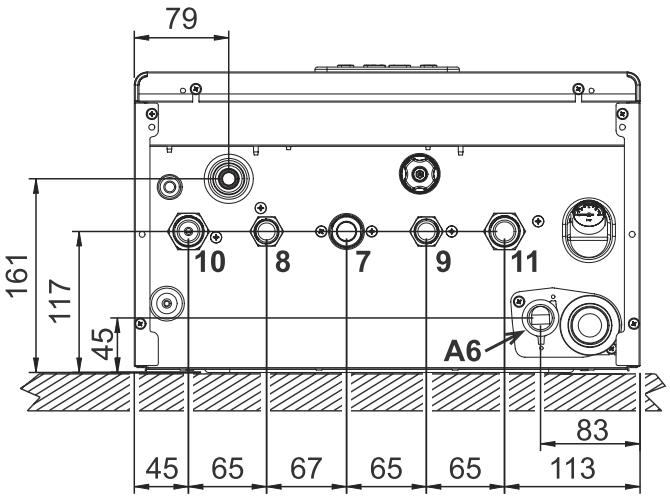
Front view



Side view



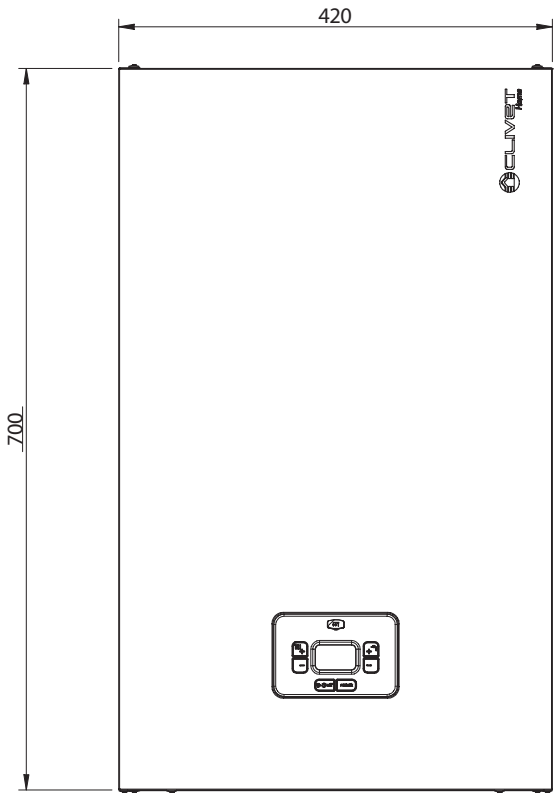
View from above



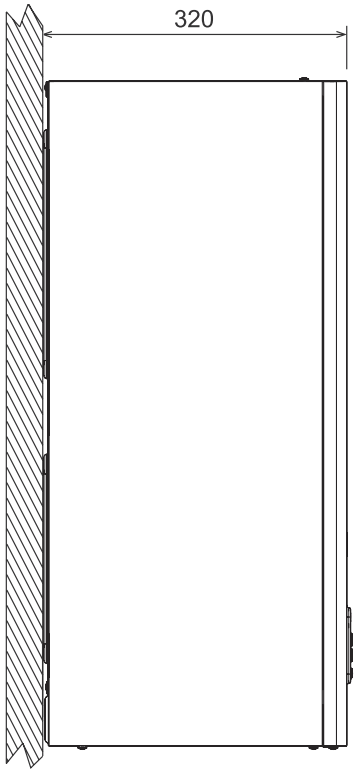
Seen from below

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 outle Ø 1/2"
A6 = Condensate drain (Ø 22,5)
Air intake and smoke discharge Ø 80

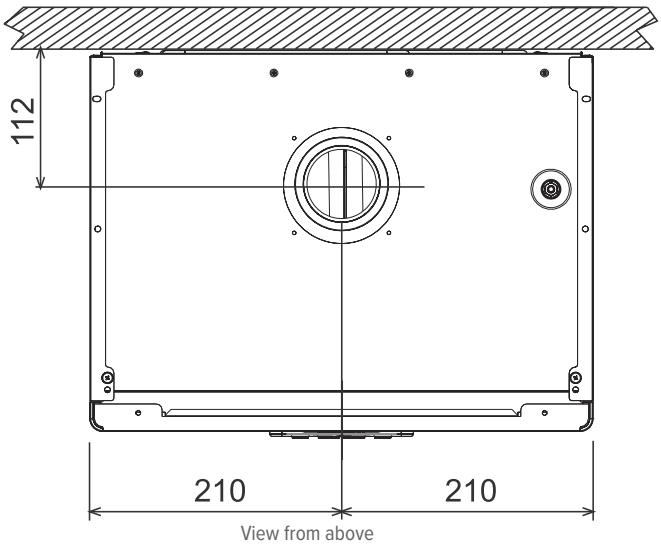
GAS BOILER FE 33.4



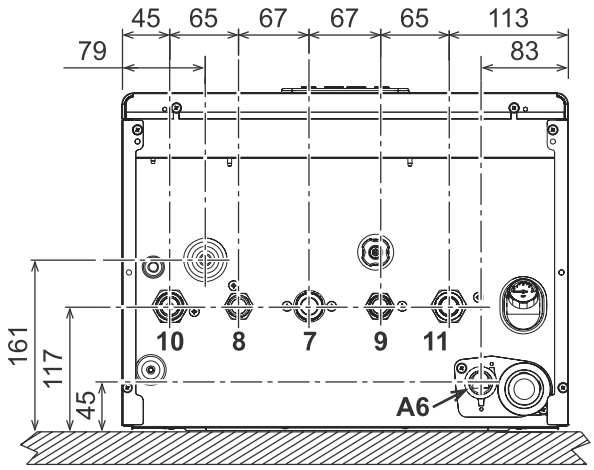
Front view



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 outle Ø 1/2"
A6 = Condensate drain (Ø 22,5)
Air intake and smoke discharge Ø 80

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