Technical Bulletin

BT17L016GB-01

ELFOEnergy Edge

Air source inverter heat pump for outdoor installation

WSAN-XMi 21÷81 RANGE

Nominal heating capacity **(A7/W45) from 5 to 16 kW**
Nominal cooling capacity **(A35/W7) from 5 to 15 kW**

- **HIGH SEASONAL EFFICIENCY**
- **FULL INVERTER DC TECHNOLOGY**
- **100% SILENT OPERATION**

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.

Clivet hydronic system

Designed to provide high energy efficiency and sustainability of the investment, the wide range of Clivet liquid chillers and heat pumps for high efficiency air conditioning of Residential and Commercial spaces and for Industrial applications it is available with air or water source.

Specialization

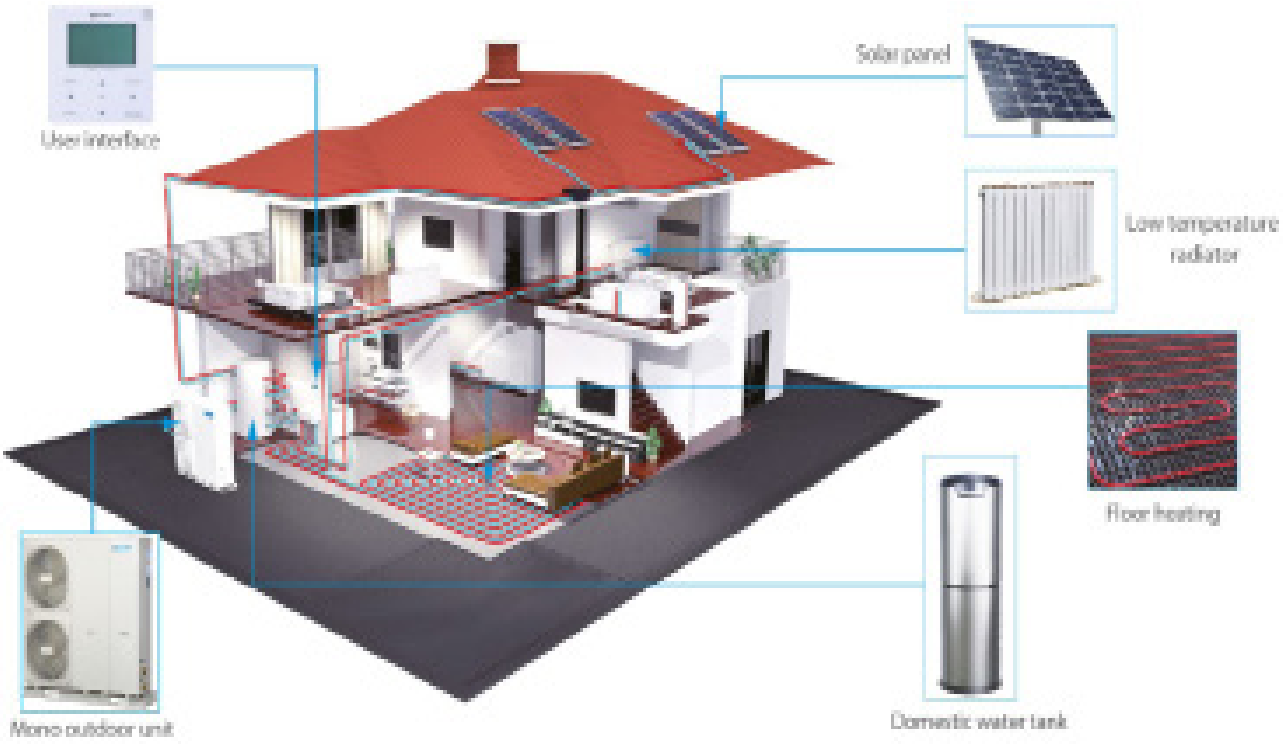
Every intended use has specific requirements which determine the overall efficiency. For this, the Clivet hydronic system always offers the best solution in every project.

- Modular range with over 8000 kW of overall capacity
- Capacity control with Screw and modular Scroll technology
- Multifunction versions
- Outdoor or indoor (ductable type) installation

A single system that guarantees comfort all year around

Heating, cooling, domestic hot water in one system

ELFOEnergy Edge is an integrated system that heats and cools space, as well as produces domestic hot water. It offers total comfort solution all year round. The system can completely replace the traditional gas or fuel boilers, but I also able to work together with them.



Energy efficiency and Comfort

A single system that guarantees comfort all year round:

- high energy efficiency at partial load with inverter technology
- use resources suited to the building's requirements
- wide operation range to guarantee comfort in every condition.

Simpler system

- Industrialized solution for quick and expert installation
- Main features are assembled built-in
- Installation and adjustment errors exclusion
- Wirings and connections are clear and preconfigured
- Maintenance easiness.

Application flexibility

To guarantee the maximum flexibility, ELFOEnergy Edge can be combined together with:

- floor heating coils
- low temperature radiators
- fan coil units
- domestic hot water tank
- mixed systems

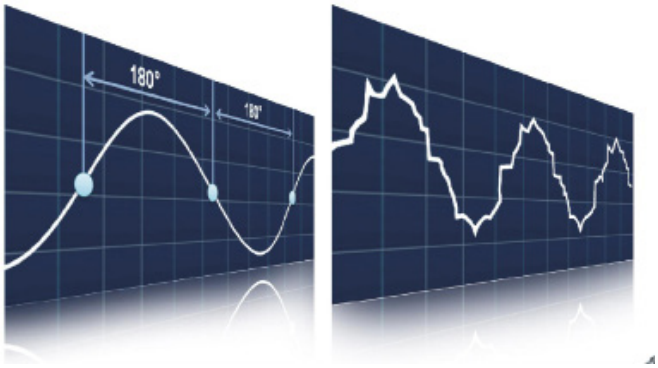
It is also compatible with auxiliary heat source such as solar energy and boiler.

Advanced technology and benefits

Inverter compressor

High energy efficiency

The upgraded DC driven system of inverter model forms a full-DC frequency conversion system and dramatically reduces power consumption by more than 30%.

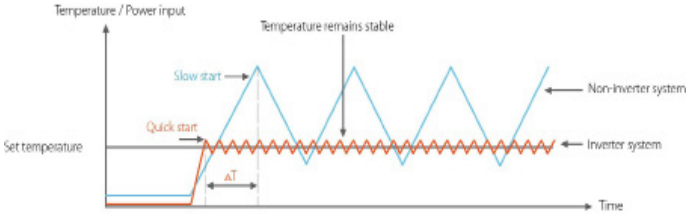


Smooth 180°shine wave, operation efficiency is improved around 30%

Conventional saw tooth wave, low operation efficiency

Constant level of water temperature, more comfort

Thanks to the DC inverter technology, the rotary speed of compressor is precisely controlled according to the energy demand. The set temperate remains stable and that provides the user with more comfort.



Quick start-up

Inverter system supplies power according to the energy demand by adjusting motor rotary frequency, so it is possible to achieve comfort conditions in less time than system without inverter and the start-up time is reduced.

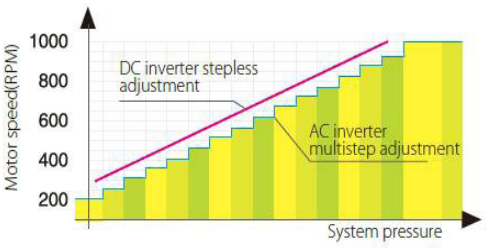
Less frequent start/stop

The inverter technology ensures fewer start/stop cycles. This obviously expands compressor's lifespan and reduces sharp noise.

Brushless DC fan motor

Brushless DC fan motor helps to meet up-to-date heating and cooling demands with low noise fan, as well as low power consumption.

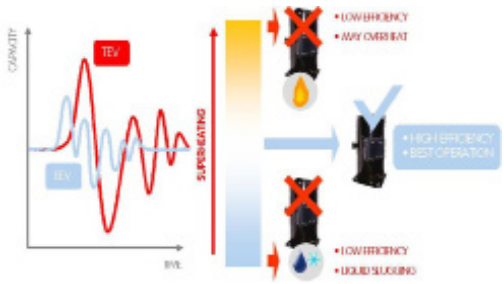
- Brushless fan motor with step-less control 0~820RPM
- Newly designed fan blower as well the fan guard with CFD air flow technology (Computational Fluid Dynamic) bring super quiet and high efficient operation.



Thermostatic electronics

The thermostatic electronic expansion valve (TEE) adapts quickly and precisely to the effective load required for use, permitting a stable and accurate adjustment and optimal operation of the compressor.

There is also an additional increase in efficiency in comparison to traditional thermostatic mechanical valves (TEM) and a longer compressor life.



Domestic hot water production

ELFOEnergy Edge heat pumps can produce domestic hot water up to outdoor temperatures of -20°C.

The temperature of the water produced can reach 60°C even during the summer when outdoor temperatures reach 30°C.

This allows using heat pumps throughout the year and to perfectly be adapted either to configurations of systems with radiant panels and terminal units or to new or renovated buildings.

To ensure a better production efficiency and so reduced operation costs, thanks to the experience on the monitored systems, Clivet recommends defining the set point of the domestic hot water between 48-50°C.

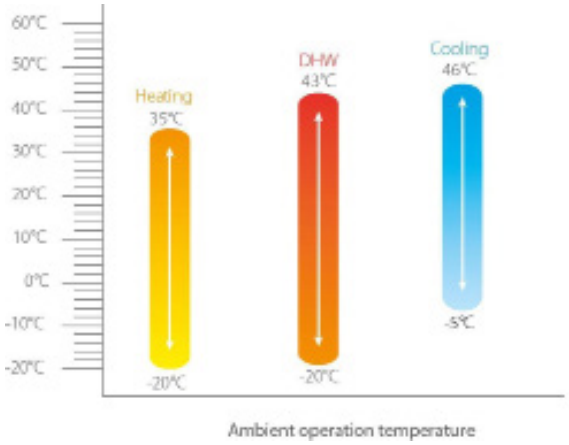
Extended operating limits

ELFOEnergy Edge offers a complete solution to any needs requested by the system, being able to operate in heating, cooling or domestic hot water mode.

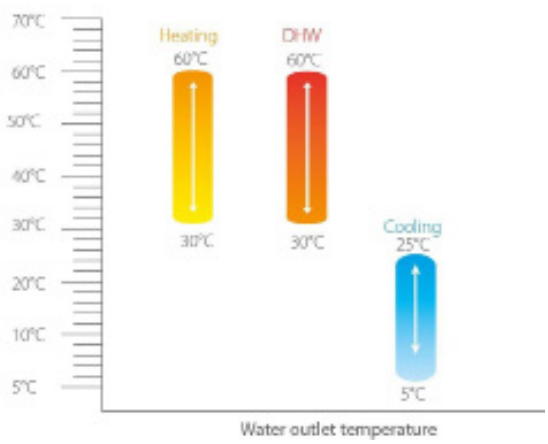
In all operating modes, wide operation ranges are guaranteed both in terms of outdoor air temperature and leaving water temperature.

Compressor and heat exchangers are sized only to guarantee the best performances. For example, ELFOEnergy Edge is in fact able to provide a thermal capacity of 80% at -7°C.

Built-in backup electric heater for additional heating during extremely cold outdoor temperatures.



Ambient operation temperature



Water outlet temperature

100% silent operation

For a superior comfort

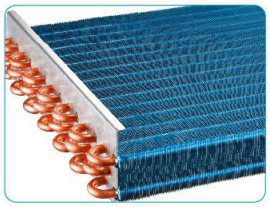
Beyond increasing the efficiency of the unit, the special constructive features of ELFOEnergy Edge minimise the sound level making it particularly silent.

Thanks to the automatic modulation of the power capacity, the Inverter DC Compressor provides only the heat energy required by the system, therefore when the need decreases silence increases.

This advantage is greater during the night, when the energy requirement is minimal but silence is essential.

Thanks to the dynamic modulation of the speed in relation to the conditions, the fan reduces electric consumptions and optimises the operation of the refrigeration circuit in all use conditions, further increasing its silence.

Distinctive design features



Fin-coil heat exchanger

Φ9.5mm inner-threaded copper pipes optimize heat exchange efficiency. Plate type hydrophilic aluminum foil used for air side heat exchange, which is easy for water drain and prevents forest to a great extent. Blue coating increases the resistance against corrosive agents, enhance durability.

Hydronic modular

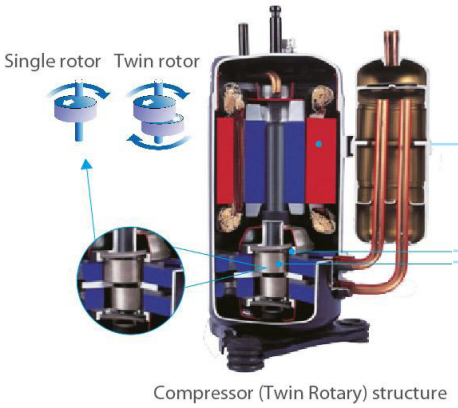
Intergrated hydronic modular with DC water pump and back-up electric heater.

Brushless DC fan motor

DC fan motor with stepless control helps to meet heating and cooling demands with low noise fan, super quiet operation, as well low power consumption.

DC inverter compressor

The newly designed twin rotary DC inverter compressor with permanent magnet brings low working sound, wide working frequency and precession control.
The upgraded DC motor power system of inverter model forms a full DC frequency conversion system and dramatically reduces power consumption by more than 30%.



Compressor (Twin Rotary) structure

High efficiency DC motor:

- Innovative design
- High density neodymium magnet
- Concentrated type stator
- Wider operating frequency range

Better balance and Extremely Low Vibration:

- Twin eccentric cams
- 2 balance weights

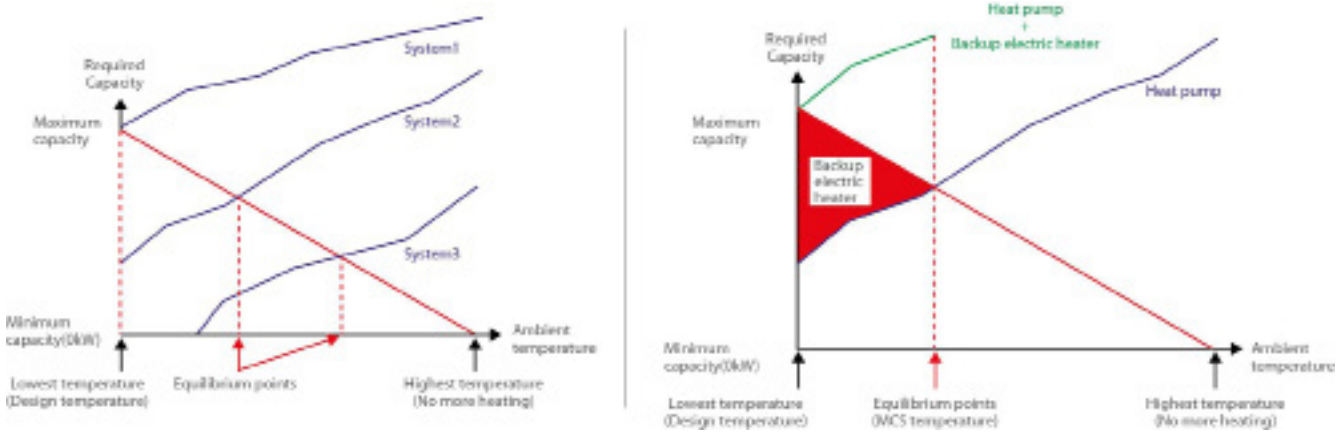
Highly Stable Moving Parts:

- Optimal material matching rollers and vanes
- Optimize compressor drive technolog
- Highly robust bearings
- Compact structure

ELFOEnergy Edge system configurations

ELFOEnergy Edge system consists of a heat pump and a back-up electric heater in the hydronic modular (accessory separately supplied for sizes 21-41). Heat pump's capacity decreases with the ambient temperate, electric heater is used to provide the insufficient heat requirement. Below an extreme ambient temperature, the heat pump cannot provide capacity any more for the system's safety as well as energy efficiency. Typically there are three different systems for selection under certain situation:

- System 1: Heat pump covers the required capacity and no extra heating capacity is necessary.
- System 2: Heat pump covers the required capacity up to the equilibrium point. When the ambient temperature is below the equilibrium point, the back-up electric heater supplies the insufficient heat requirement.



- System 3: The heat pump of system cannot cover the required capacities. When the ambient temperature is out of range for heat pump, there system must have an auxiliary heat source (AHS) capable of providing all required capacity.

  In System 1, heat pump covers the required capacity at all times, but the solution may be expensive due to the large heat pump selection. As ELFOEnergy Edge system consists of a heat pump and a back-up electric heater in the hydronic modular, System 2 may be a cheaper solution. The back-up electric heater is not used too frequently during the year and supplies the insufficient heat necessary at low outdoor air temperature.

Easy installation & Easy maintenance

- All hydronic components are located within the outdoor unit
- Water pipes run indoors from the outdoor unit, only need to connect water piping
- Compact structure, easy for transportation and installation
- Two doors design for easy access to inner parts for easy maintenance

Intelligent energy management

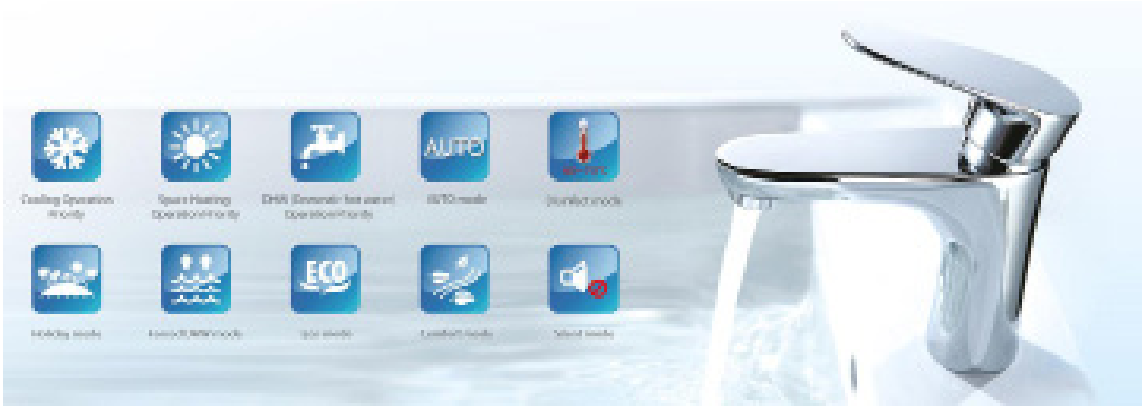
User interface

The remote control supplied as standard, equipped with an easy to read wide display, allows all the operations to configure and control the unit. Main features of this latest generation device are:

- Newly designed LCD wired controller
- 150m signal wire permitted
- With thermostat function
- Complete weekly or daily schedulation

Priority setting function and multi-modes choice

To guarantee more comfort and the maximum flexibility to the user, different preset functions are available for any need.



- Cooling Operation Priority: when there is a request of cooling capacity from the plant, this has the priority respect to the current operating mode.
- Space Heating Operation Priority: when there is a request of heating capacity from the plant, this has the priority respect to the current operating mode.
- DHW (Domestic hot water) Operation Priority: when there is a request of domestic hot water from the plant, this has the priority respect to the current operating mode.
- AUTO mode: operation mode is automatically set on heating or cooling, depending on outdoor air temperature.
- Disinfect mode: function used to kill legionella.
- Holiday mode: this function allows to prevent freezing of the plant when away for holidays and to start the unit before the coming back.
- Forced DHW mode: when activated, the unit quickly supplies domestic hot water, with priority respect to the current operating mode.
- Comfort mode: operating mode that offers the best comfort conditions.
- Eco mode: operating mode for a higher energy saving.
- Silent mode: operating mode for a reduced noise emission, with settable duration and silence level.

Operating modes can be set and scheduled on user interface.

Standard unit technical specifications

Compressors

Inverter controlled rotary-type hermetic compressor equipped 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 in a sound-absorbing hood, that reduces its sound emissions.

A crankcase heater, which starts automatically, keeps the oil from being diluted by the refrigerant when the compressor stops.

Structure

Structure and base made entirely of sturdy sheet steel, thickness of 12/10, hot dip galvanized and painted, for the parts in view, with polyester powder Pantone Warm Grey 2 C that guarantees excellent mechanical characteristics and high corrosion strength over time.

Panelling

External paneling made of sheet steel, thickness of 8/10 and 10/10, hot dip galvanized and painted with polyester powder Pantone Warm Grey 2 C that guarantees excellent mechanical characteristics and high corrosion strength over time. The panels can be easily removed to fully access internal components.

Internal exchanger

Direct expansion heat exchanger, braze-welded AISI 316 stainless steel plates, in pack without seals using copper as the brazing material, with low refrigerant charge and large exchange surface, complete with:

- external thermal insulation no-condensation, thickness 17 mm, in expanded polypropylene (EPP);
- antifreeze heater to protect the water side exchanger, preventing the formation of frost if the water temperature falls below a set value.

External exchanger

Direct expansion finned coil exchanger made with copper pipes placed on staggered rows mechanically expanded to better adhere to the fin collar. The fins are made from aluminum with a hydrophilic treatment. They are appropriately distanced to ensure the maximum heat exchange efficiency. A particula refrigerant circuit prevents the formation of frost on the base of the exchanger during winter operation.

Fan

Axial fans with sickle profile blades terminating ABS ASG-20 resin reinforced with 20% glass fiber, directly coupled to the electronic controlled motor (IP23), driven by the magnetic switching of the stator.

The brushless technology and the special supply increase both the life expectancy and the efficiency. As a result the electric consumption is reduced up to 50%. Fans are housed in aerodynamically shaped structures to increase efficiency and reduce noise level. The assembly is protected by accident prevention guards.

Both fans and prevention guards are designed with CFD technology. Supplied with variable speed control.

Hydronic assembly

Circulator with cast-iron body and impeller, equipped with direct current Brushless motor (3-speed regulation) with IP44-protection complete with thermoformed insulated casing. All connections are screwed.

Refrigeration circuit

Refrigeration circuit with:

- electronic expansion valve
- 4-way reverse cycle valve
- filter dryer
- liquid receiver
- inlet liquid separator
- pressure probes
- low pressure safety
- high pressure safety

Drain pan

Condensate collection tray provided with drain circuit made of sheet steel, thickness of 8/10 and 10/10, hot dip galvanized and painted with polyester powder Pantone Warm Grey 2 C that guarantees excellent mechanical characteristics and high corrosion strength over time.

Electrical panel

The capacity section includes:

- terminals main power
- general protection fuse
- auxiliary components protection fuse
- hydronic circuit control module protection fuse
- back-up heater circuit breaker (Size 21-81)

The control section includes:

- compressor overload protection and timer
- relay for remote cumulative fault signal
- defrosting cycle optimization
- condenser control
- set point compensation with outdoor temperature
- double set-point
- auxiliary generator control
- dry contact for remote ON/OFF

The control keypad includes:

- remote wired controller with dot-matrix display
- multifunction keys for ON/OFF control
- cold, hot and auto operation mode
- display and alarm reset
- daily or weekly schedule

Water circuit

- water side safety vale set to 3 bar
- steel mesh strainer (installation by the Customer)
- flow switch
- back-up electric heater (Size 51-81)
- manometer
- expansion vessel
- relief valve
- temperature sensor for domestic hot water tank with 10m cable (installation by the Customer)

Accessories

- IBHX - Back-up electric heater (Size 21-41)
- KTFLX - Hose kit for connection to the chiller/heat pump
- QERAX - Connection electrical panel of the DHW storage heater
- ACS500X - 500-litre domestic hot water storage tank
- ACS300X - 300-litre domestic hot water storage tank
- ACS5SX - 500-litre domestic hot water storage tank with solar coil
- ACS3SX - 300-litre domestic hot water storage tank with solar coil
- 3DHWX - Three-way valve for domestic hot water

General technical data

Size			21	31	41	51	61	71	81	61	71	81
Radiant panels										**Radiant panels**		
Heating												
Heating capacity (EN 14511:2013)	1,10	kW	4,64	6,55	8,64	10,4	12,1	14,8	16,4	12,3	14,1	16,3
COP (EN 14511:2013)	2		4,79	4,52	4,30	4,66	4,61	4,31	4,08	4,54	4,35	4,19
ErP Space Heating Energy Class - AVERAGE Climate - W35	9		A++	A++	A++	A++	A++	A++	A++	A++	A++	A++
SCOP - AVERAGE Climate - W35	12		4,48	4,53	4,16	4,13	4,23	4,40	4,25	4,45	4,28	4,18
Cooling												
Cooling capacity (EN 14511:2013)	5,10	kW	4,77	6,63	8,35	10,4	12,2	14,2	14,9	12,7	14,1	15,1
EER (EN 14511:2013)	6		4,72	4,53	3,97	5,00	4,70	4,46	4,10	4,67	4,34	4,03
Water flow-rate	5	l/s	0,22	0,31	0,40	0,49	0,59	0,66	0,71	0,58	0,65	0,71
Useful pump discharge head	5	kPa	61,5	47,5	35,4	53,5	40,5	31,5	24	41,3	31,5	24
Terminal units										**Terminal units**		
Heating												
Heating capacity (EN 14511:2013)	3	kW	4,72	6,72	9,19	10,2	12,6	14,1	16,1	12,0	14,1	16,1
COP (EN 14511:2013)	2		3,29	3,35	3,49	3,35	3,26	3,16	3,09	3,25	3,18	3,07
Cooling												
Cooling capacity (EN 14511:2013)	7	kW	4,65	6,69	8,06	9,90	12,2	13.0	13,8	12,3	13,8	15,3
EER (EN 14511:2013)	6		2,98	2,70	2,30	3,20	2,95	2,89	2,68	2,91	2,70	2,38
SEER	12		4,61	4,75	4,52	5,24	5,34	4,86	4,34	5,02	4,88	4,92
Water flow-rate	7	l/s	0,22	0,32	0,39	0,49	0,58	0,59	0,63	0,58	0,60	0,63
Useful pump discharge head	7	kPa	61,5	48,0	36,9	54,5	41,6	40,1	34,8	41,9	38,2	34,8
Radiators										**Radiators**		
Heating												
Heating capacity (EN 14511:2013)	4	kW	4,80	6,20	9,40	8,90	10,6	11,6	13,4	12,5	14,4	16,2
COP (EN 14511:2013)	2		2,53	2,61	2,85	2,63	2,75	2,66	2,57	2,82	2,79	2,76
ErP Space Heating Energy Class - AVERAGE Climate - W55	9		A++	A++	A++	A++	A++	A++	A++	A++	A++	A++
SCOP - AVERAGE Climate - W55	12		3,30	3,30	3,25	3,25	3,25	3,25	3,20	3,25	3,28	3,23
Water flow-rate	4	l/s	0,14	0,19	0,28	0,26	0,31	0,35	0,40	0,37	0,43	0,48
Useful pump discharge head	4	kPa	65,3	63,4	52,3	77,2	75,3	73,3	66,9	70,8	62,9	55,5
Compressor												
Type of compressors			Rotary Inverter DC							Rotary Inverter DC		
Refrigerant			R-410A							R-410A		
No. of compressors		Nr	1	1	1	1	1	1	1	1	1	1
Oil charge		l	0,4	0,4	0,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4
Refrigerant Charge		Kg	2,4	2,4	2,4	3,6	3,6	3,6	3,6	3,6	3,6	3,6
User side exchanger												
Type of internal exchanger	8		PHE							PHE		
Water content		l	0,54	0,54	0,54	1,01	1,01	1,01	1,01	1,01	1,01	1,01
External Section Fans												
Type of fans			Brushless DC motor							Brushless DC motor		
No. of fans		Nr	1	1	1	2	2	2	2	2	2	2
Standard airflow		l/s	847	847	847	1708	1708	1708	1708	1708	1708	1708
Installed unit power		kW	0,09	0,09	0,09	0,18	0,18	0,18	0,18	0,18	0,18	0,18
Water circuit												
Maximum water side pressure		kPa	300	300	300	300	300	300	300	300	300	300
Safety valve calibration		kPa	300	300	300	300	300	300	300	300	300	300
Minimum circuit water volume		l	30	30	30	35	40	45	50	40	45	50
Total internal water volume		l	2	2	2	5,5	5,5	5,5	5,5	5,5	5,5	5,5
Expansion tank volume		l	2	2	2	5	5	5	5	5	5	5
Expansion tank maximum working pressure		bar	8	8	8	8	8	8	8	8	8	8
Back-up electric heater capacity	11	kW	3	3	3	3	3	3	3	4,5	4,5	4,5
Power supply												
Standard power supply			230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	400/3/50+N	400/3/50+N	400/3/50+N

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 811/2013 (rate heat output ≤70 kW at specified reference conditions) and the Commission delegated Regulation (EU) No 813/2013 (rated heat output ≤400 kW at specified reference conditions).
'Contains fluorinated greenhouse gases'(GWP 2087,5)

1. Entering/leaving water temperature user side 30/35 °C, Entering external exchanger air temperature 7 °C (R.H. = 85%)
2. COP (EN 14511:2013) Heating performance coefficient. Ratio between delivered heating capacitu and power input in compliance with EN 14511:2013. The overall power absorbed is calculed by adding the power absorbed by the compressor + the power absorbed by the fan - the percentage value of the fan to overcome external pressure drop + the power absorbed by the pump - the percentage value of the pump to overcome pressure drop outside + thepower absorbed by the auxiliary electrical circuit
3. Entering/leaving water temperature user side 40/45 °C, Entering external exchanger air temperature 7 °C (R.H. = 85%)
4. Entering/leaving water temperature user side 47/55 °C, Entering external exchanger air temperature7 °C (R.H. = 85%)
5. Entering/leaving water temperature user side 23/18 °C, Entering external exchanger air temperature35 °C
6. EER (EN 14511:2013) cooling performance coefficient. Ratio between delivered coolimg capacitu and power input in compliance with EN 14511:2013. The overall power absorbed is calculated by adding the power absorbed by the compressor + the powerabsorbed by the fan - the percentage value of the fan to overcome external pressure drop + the power absorbed by the pump - the percentage value of the pump to overcome presure drop outside + thepower absorbed by the auxiliary electrical circuit.
7. User side entering/leaving water temperature 12/7 °C, external exchanger entering air 35°C
8. PHE = plate exchanger
9. Seasonal Space Heating Energy Efficiency Class according to Commission delegated Regulation (EU) No 811/2013. W = Water outlet temperature (°C)
10. Data referred to unit operation with inverter frequency optimized for this application.
11. Accessory separately supplied for sizes 21-41.
12. Data calculated according to the EN 14825:2016 Regulation

Electrical data

Supply voltage 230/1/50

Size			21	31	41	51	61	71	81
F.L.A. - Full load current at max admissible conditions									
F.L.A. - Pump		[A]	0,26	0,26	0,26	0,35	0,35	0,35	0,35
F.L.A. - Total		[A]	14,8	15,2	15,2	27,6	27,6	28,0	28,0
F.L.I. - Full load power input at max admissible conditions									
F.L.I. - Pump		[kW]	0,056	0,056	0,056	0,07	0,07	0,07	0,07
F.L.I. - Total		[kW]	3,40	3,50	3,50	6,35	6,35	6,45	6,45
M.I.C. - Maximum inrush current									
M.I.C. - Total		[A]	14,8	15,2	15,2	27,6	27,6	28,0	28,0

Power supply 230/1/50 Hz +/-10%
The pump is included in the total values calculation
For non standard voltage please contact Clivet technical office

Supply voltage 400/3/50+N

Size			61	71	81
F.L.A. - Full load current at max admissible conditions					
F.L.A. - Pump		[A]	0,35	0,35	0,35
F.L.A. - Total		[A]	14,6	14,8	14,8
F.L.I. - Full load power input at max admissible conditions					
F.L.I. - Pump		[kW]	0,07	0,07	0,07
F.L.I. - Total		[kW]	6,80	6,80	6,90
M.I.C. - Maximum inrush current					
M.I.C. - Total		[A]	14,6	14,8	14,8

Power supply 400/3/50 (+ NEUTRAL) +/- 10%
Maximum Phase Unbalance: 2%
The pump is included in the total values calculation
For non standard voltage please contact Clivet technical office

Sound levels

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)
21	67	70	61	61	60	55	49	44	**49**	**64**
31	70	69	62	63	62	57	53	50	**51**	**66**
41	72	70	65	65	62	59	56	54	**53**	**67**
51	74	70	67	66	61	56	50	46	**52**	**67**
61	78	74	69	68	64	59	53	48	**55**	**69**
71	82	75	73	71	68	63	56	51	**58**	**73**
81	82	76	74	71	68	63	57	52	**58**	**73**

Sound levels refer to units with full load under nominal test conditions.
The sound pressure level refers to a distance of 1 meter from the outer surface of the unit operating in open field.
Noise levels are determined using the tensiometric method (UNI EN ISO 9614-2)
Data referred to the following conditions:
- internal exchanger water = 12/7 °C
- Ambient temperature = 35 °C

Admissible water flow rates

Size		21	31	41	51	61	71	81
Minimum flow	[l/s]	0,139	0,139	0,139	0,236	0,236	0,236	0,236
Maximum flow-rate	[l/s]	0,595	0,595	0,595	0,967	0,967	0,967	0,967

Correction factors for glycol use

% ethylene glycol by weight			0%	10%	20%	30%	40%	50%
Freezing point		°C	0	-4	-9	-16	-23	-37
Correction factor for unit cooling capacity			1	0,984	0,973	0,965	0,96	0,95
Correction factor for flow rate			1	1,019	1,051	1,092	1,145	1,2
Correction factor for system pressure drop			1	1,118	1,268	1,482	1,791	2,1

The correction factors shown refer to water and glycol ethylene mixes used to prevent the formation of frost on the exchangers in the water circuit during inactivity in winter.

Fouling Correction Factors

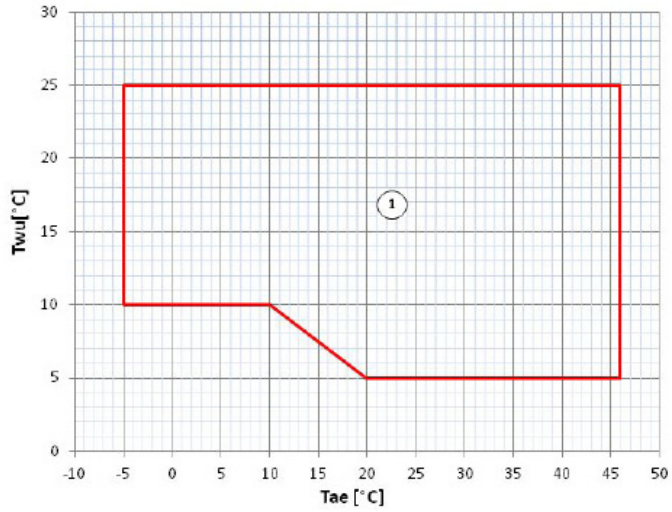
	Internal exchanger	
m^2C/W	**F1**	**FK1**
0,44x10(-4)	-	-
0,44x10(-4)	0,96	0,99
0,44x10(-4)	0,93	0,98

The cooling performance values provided in the tables are based on the external exchanger having clean plates (fouling factor 1). For different fouling factor values, multiply the performance by the coefficients shown in the table.
F1 = Cooling capacity correction factors
FK1 = Compressor power input correction factor

Operating range

Cooling

ELFOEnergy Edge 21 - 81



Twu [°C] = Leaving exchanger water temperature
Tae [°C] = External exchanger inlet air temperature

1. Normal operating range

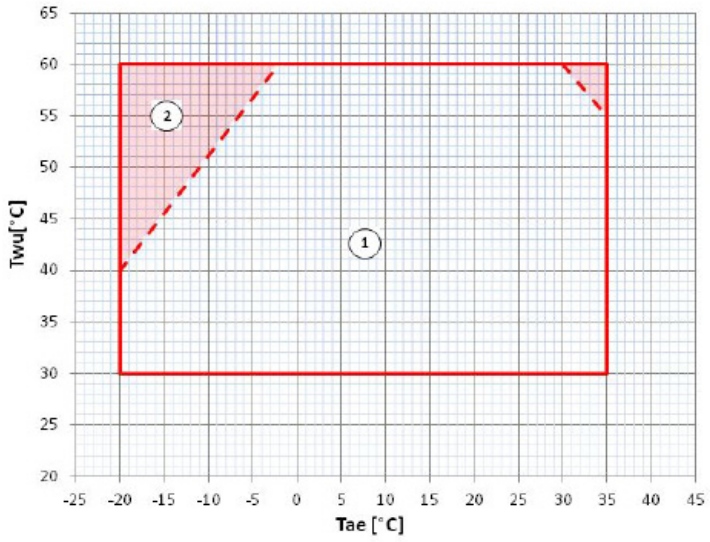
Heating

ELFOEnergy Edge 21 - 41

Twu [°C] = Leaving exchanger water temperature
Tae [°C] = External exchanger inlet air temperature

1. Normal operating range

ELFOEnergy Edge 21-41 with IBHX option - ELFOEnergy Edge 51-81

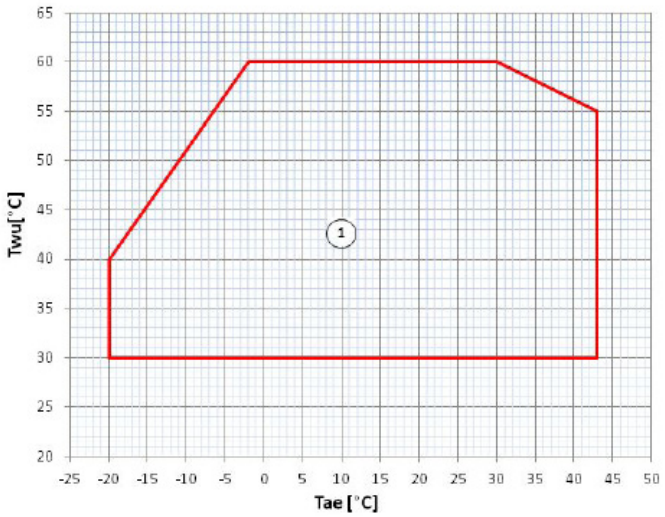


Twu [°C] = Leaving exchanger water temperature
Tae [°C] = External exchanger inlet air temperature

1. Normal operating range
2. Operating range with only back-up heater

DHW

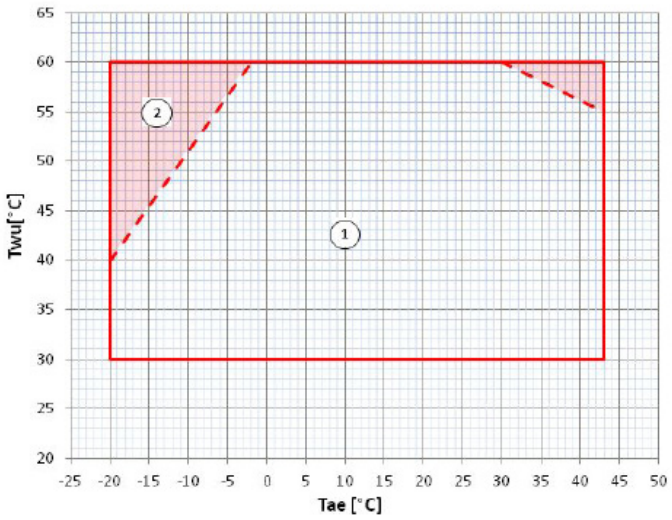
ELFOEnergy Edge 21 - 41



Twu [°C] = Leaving exchanger water temperature
Tae [°C] = External exchanger inlet air temperature

1. Normal operating range

ELFOEnergy Edge 21-41 with IBHX option - ELFOEnergy Edge 51-81

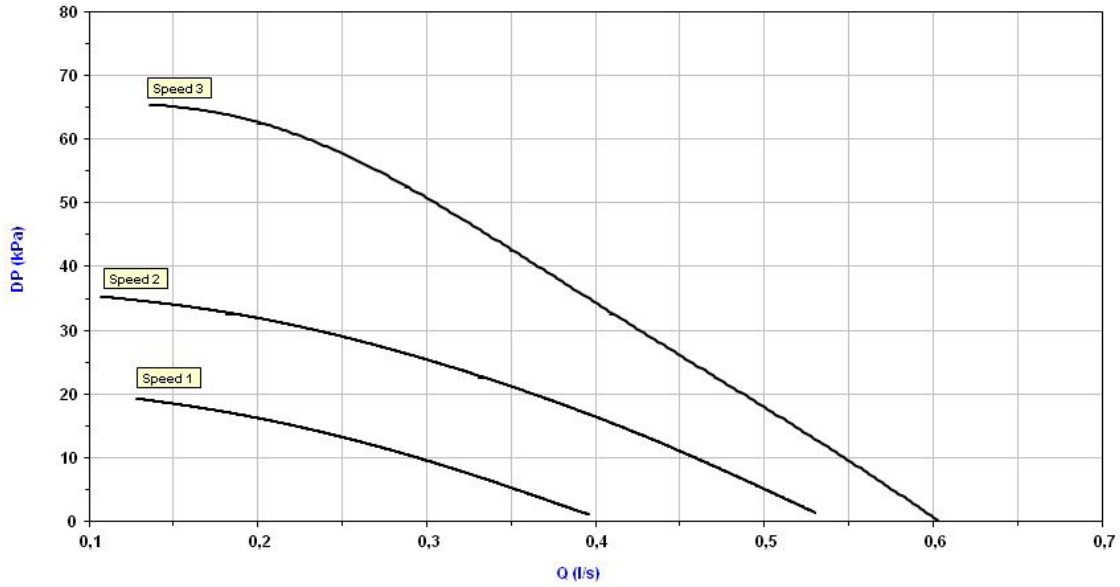


Twu [°C] = Leaving exchanger water temperature
Tae [°C] = External exchanger inlet air temperature

1. Normal operating range
2. Operating range with only back-up heater

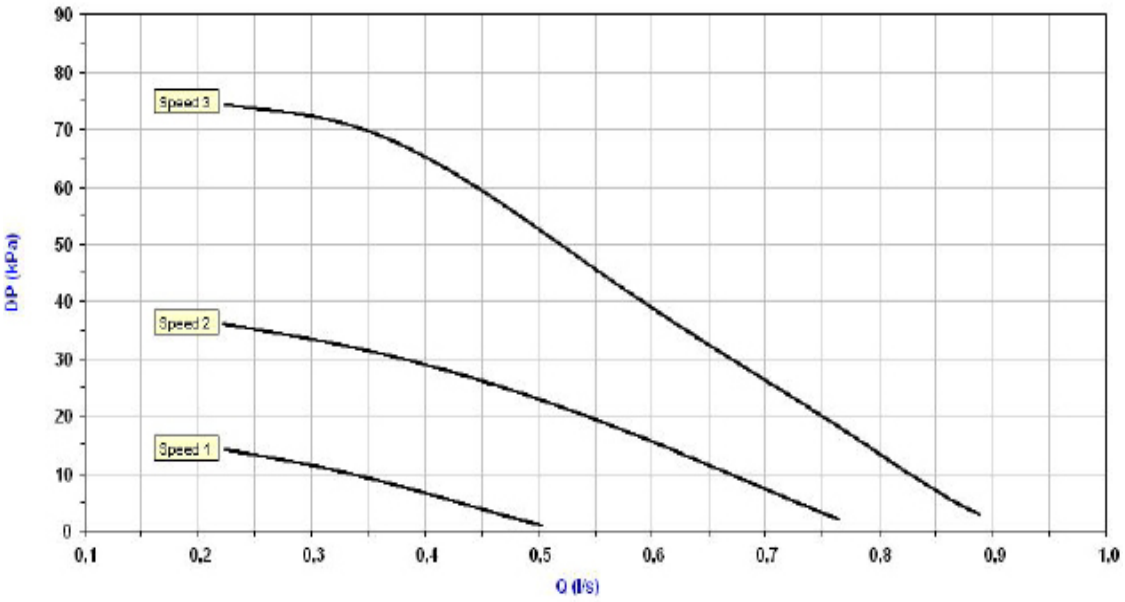
Pump performance

Size 21 - 41



Available pressure curves with hydronic assembly
DP = Available pressure [kPa]
Q = Water flow-rate [l/s]
The heads are intended as available at the unit connections
The pressure drops of the steel mesh strainer, supplied with the unit, have not been taken into consideration

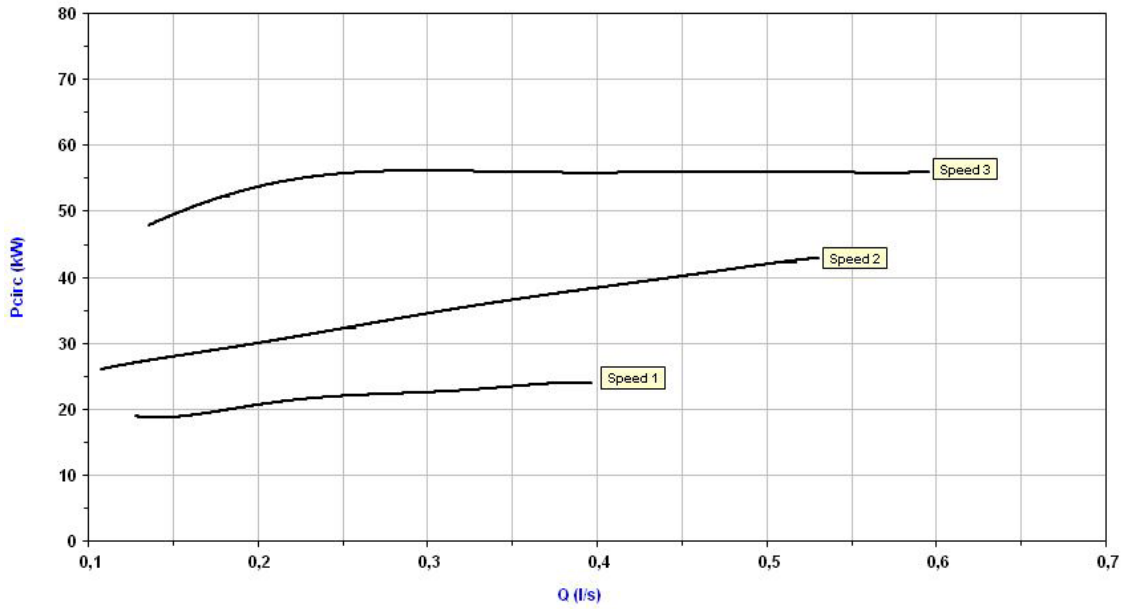
Size 51 - 81



Available pressure curves with hydronic assembly
DP = Available pressure [kPa]
Q = Water flow-rate [l/s]
The heads are intended as available at the unit connections
The pressure drops of the steel mesh strainer, supplied with the unit, have not been taken into consideration

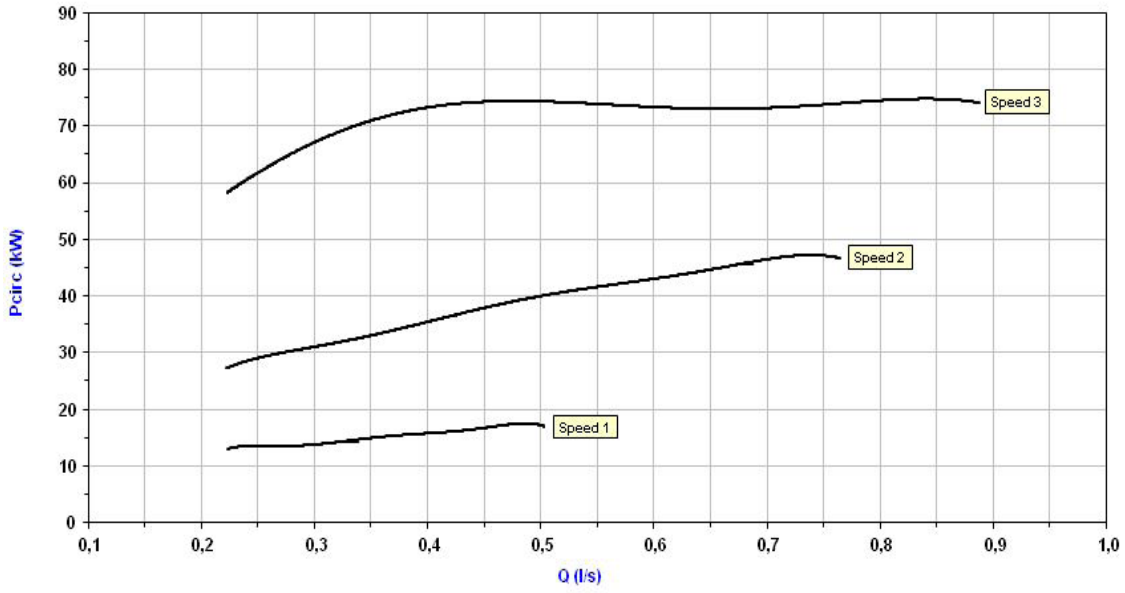
Pump absorption curves

Size 21 - 41



Pcirc = Circulator absorbed power [kW]
Q = Water flow-rate [l/s]

Size 51 - 81



Pcirc = Circulator absorbed power [kW]
Q = Water flow-rate [l/s]

Minimum and maximum water volume

The unit is equipped with an expansion vessel of 2l (sizes 21-41) or 5l (sizes 51-81) that has a default pre-pressure of 1,5 bar.
To assure proper operation of the unit with this configuration, the pre-pressure of the expansion vessel might need to be adjusted and the minimum and maximum water volume must be checked.

Installation height difference (a)	Water volume ≤160 l	Water volume >160 l
≤7 m	No pre-pressure adjustment required.	Pre-pressure must be decreased. Check if the water volume is lower than maximum allowed water. If higher, an additional additional expansion vessel for the circuit is required.
>7 m	Pre-pressure must be increased. Check if the water volume is lower than maximum allowed water. If higher, an additional additional expansion vessel for the circuit is required.	An additional expansion is required.

(a) Installation height difference H [m]: height difference between the highest point of the water circuit and the unit. If the unit is located at the highest point of the installation, the installation height is considered to be 0 m.

Calculating pre-pressure of the expansion vessel

The pre-pressure (Pg) to be set depends on the maximum installation height difference (H) and is calculated as follow:

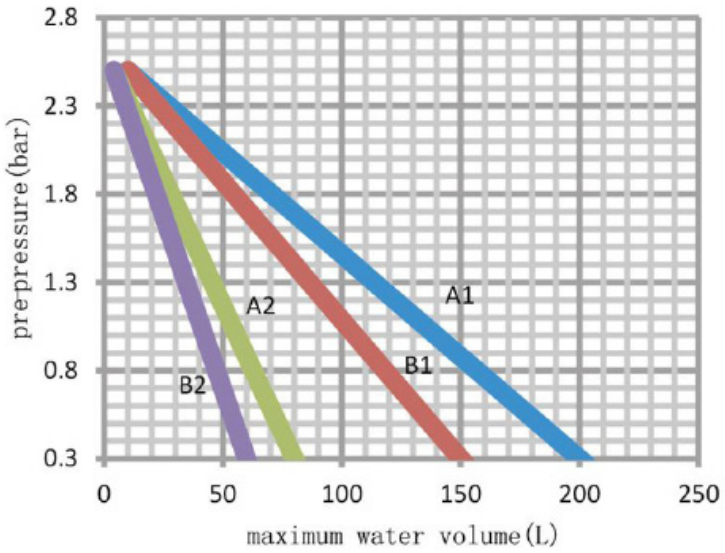
Pg=(H/10+0.3) [bar]

Pre-pressure of the expansion vessel has to be adjusted accordingly.

Only dry nitrogen has to be used to set the expansion vessel pre-pressure. Inappropriate setting of the expansion vessel pre-pressure will lead to malfunctioning of the system. Pre-pressure should only be adjusted by a licensed installer.

Checking allowed water volume

- Minimum allowed water volume of the installation, excluding the internal volume, has to be at least 20 l.
- Maximum allowed water volume in the entire circuit can be determined from the graph below with the pre-pressure (Pg) calculated. If the water volume in the entire water circuit is lower than the value found, an additional expansion vessel for the circuit is required.



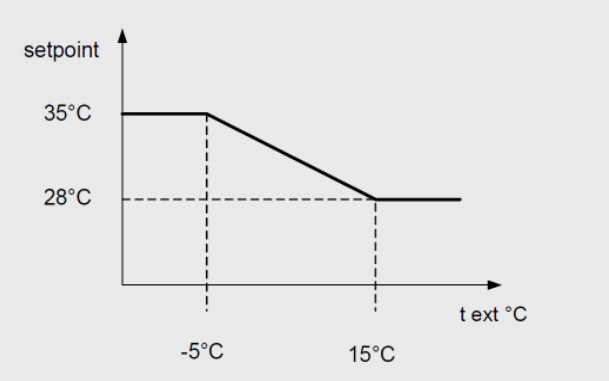
- A1: System without glycol for 1-phase 51-81 units and 3-phase 61-81 units
- A2: System without glycol for the 21 and 41 units
- B1: System with 25% propylene glycol for 1-phase 51-81 units and 3-phase 61-81 units
- B2: System with 25% propylene glycol for the 21 and 41 units

Control

Climatic compensation with outdoor air temperature

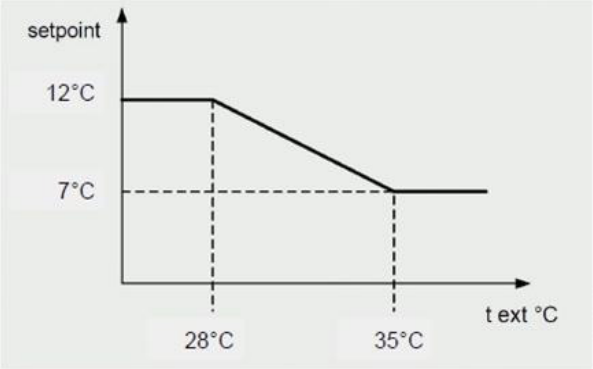
The needs of building heat capacity decreases at the fresh air temperature increasing.
Power supply is not necessary for the terminal units always at the same temperature; for each kind of terminal unit it is better to have a water temperature that changes according with outdoor air temperature, with linear trend (what is commonly defined climatic control) for a high seasonal energy efficiency.
The following graph shows an example of climatic control on the water supply temperature.

Climatic curve in Heating



With a decreasing outdoor air temperature, the climatic function increases the supply water set point
Set point = 7°C
Compensated set point = 12°C

Climatic curve in Cooling



With a increase outdoor air temperature, the climatic function decreasing the supply water set point:
Set point = 35°C
Compensated setpoint = 28°C

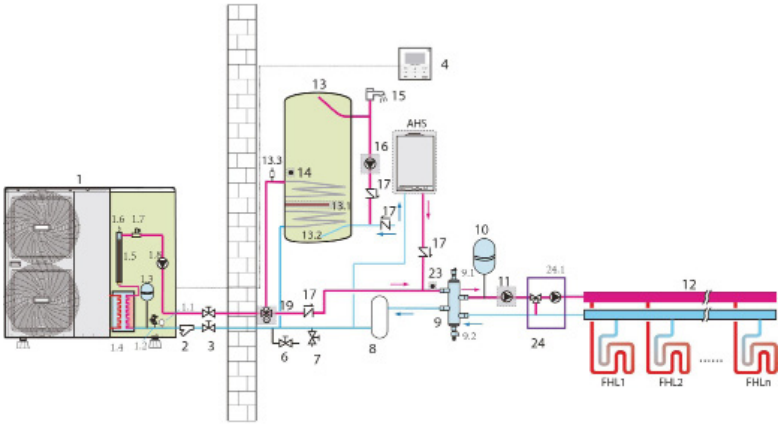
Management of the auxiliary generator

ELFOEnergy Edge unit can manage (on/off) an auxiliary generator (boiler).
The configuration of the system involves an auxiliary generator connected in parallel to the heat pump and controlled via a dedicated digital output.
The auxiliary generator is managed as a replacement or in integration for the heat pump.

Typically there are 3 applicative situations

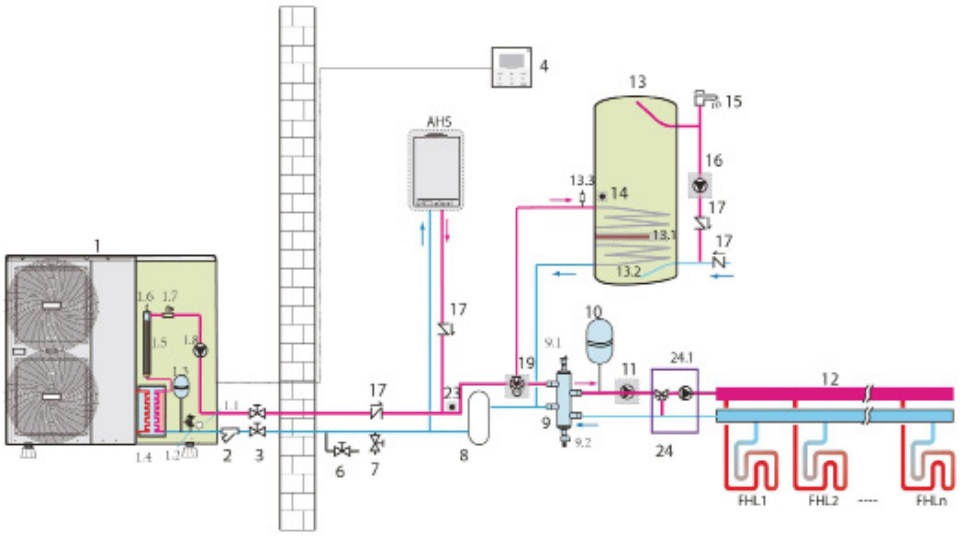
The permission signal for the auxiliary boiler is determined by the outdoor temperature, through a thermistor located in the unit. Bivalent operation is possible for both space heating operation and domestic water heating operation.
Three different applications are possible.

Application a: if the auxiliary boiler only provides heating capacity for ambient heating, the boiler must be integrated in the piping work and wired according to the following illustration.
Circulation pump (11), DHW pump (16), 3-way valve (19), booster heater (13.1) and mixing pump (24.1) can be directly managed by the unit.



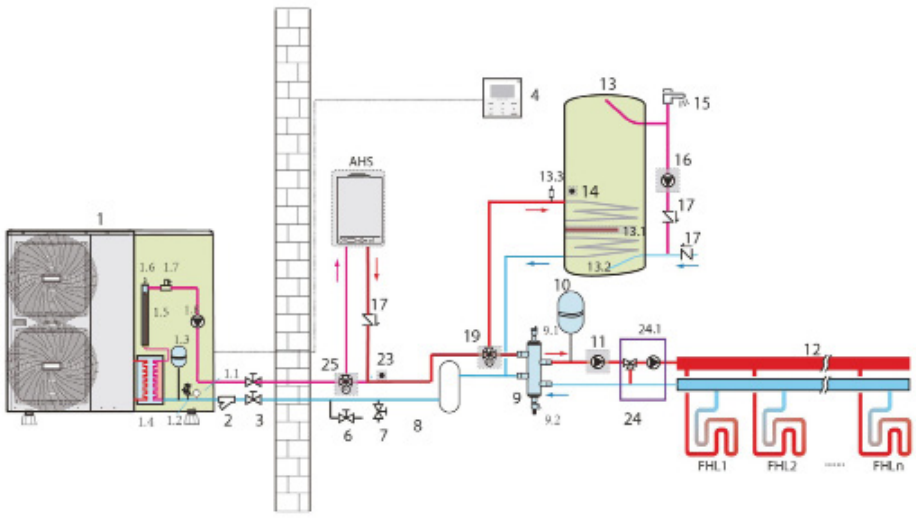
1. outdoor unit	1.6 air purge valve	6. drain valve	10. expansion vessel	13.3 air purge valve	23. T1B: temperature sensor
1.1 manometer	1.7 flow switch	7. fill valve	11. P_o: circulation pump	14. T5: temperature sensor (supplied with the unit)	24. mixing station
1.2 pressure relief valve	1.8 P_i: circulation pump insidethe unit	8. buffer tank	12. collector	15. hot water tap	24.1 P_c: mixing pump
1.3 expansion vessel	2. y-shape filter (supplied with the unit)	9. balance tank	13. domestic hot water tank	16. P_d: DHW pump	25. 3-way valve
1.4 plate heat exchanger	3. stop valve	9.1 air purge valve	13.1 booster heater	17. non-return valve	FHL 1...n floor heating loop
1.5 back-up heater	4. user interface (supplied with the unit)	9.2 drain valve	13.2 heat exchanger coil	19. SV1: 3-way valve	

Application b: If the auxiliary boiler is also providing heating for domestic hot water, the boiler must be integrated in the piping work and wired according to the following illustration. Circulation pump (11), DHW pump (16), 3-way valve (19), booster heater (13.1) and mixing pump (24.1) can be directly managed by the unit.



1. outdoor unit
1.1 manometer
1.2 pressure relief valve
1.3 expansion vessel
1.4 plate heat exchanger
1.5 back-up heater
1.6 air purge valve
1.7 flow switch
1.8 P_i: circulation pump inside the unit
2. y-shape filter (supplied with the unit)
3. stop valve
4. user interface (supplied with the unit)
6. drain valve
7. fill valve
8. buffer tank
9. balance tank
9.1 air purge valve
9.2 drain valve
10. expansion vessel
11. P_o: circulation pump
12. collector (field supply)
13. domestic hot water tank
13.1 booster heater
13.2 heat exchanger coil
13.3 air purge valve
14. T5: temperature sensor (supplied with the unit)
15. hot water tap
16. P_d: DHW pump
17. non-return valve
19. SV1: 3-way valve
23. T1B: temperature sensor
24. mixing station
24.1 P_c: mixing pump
25. 3-way valve
FHL 1...n floor heating loop
AHS additional heating source (boiler)

Application c: this application can be used if the temperature of water from the outdoor unit could not be high enough for particular requests. In this case, an additional 3-way valve should be installed and the control cable connected to the boiler is also connected to the 3-way valve (25).
If the temperature of water from outdoor unit is high enough to satisfy the request, the boiler will then be bypassed. Instead when the temperature is not high enough, the 3-way valve will open and the water from outdoor unit will flow through the boiler and be heated.
Circulation pump (11), DHW pump (16), 3-way valve (19), booster heater (13.1) and mixing pump (24.1) can be directly managed by the unit.



1. outdoor unit
1.1 manometer
1.2 pressure relief valve
1.3 expansion vessel
1.4 plate heat exchanger
1.5 back-up heater
1.6 air purge valve
1.7 flow switch
1.8 P_i: circulation pump insidethe unit
2. y-shape filter (supplied with the unit)
3. stop valve
4. user interface (supplied with the unit)
6. drain valve
7. fill valve
8. buffer tank
9. balance tank
9.1 air purge valve
9.2 drain valve
10. expansion vessel
11. P_o: circulation pump
12. collector
13. domestic hot water tank
13.1 booster heater
13.2 heat exchanger coil
13.3 air purge valve
14. T5: temperature sensor (supplied with the unit)
15. hot water tap
16. P_d: DHW pump
17. non-return valve
19. SV1: 3-way valve
23. T1B: temperature sensor
24. mixing station
24.1 P_c: mixing pump
25. 3-way valve
FHL 1...n floor heating loop

Two zones control: space heating with a two room thermostat, require different operating water temperatures

ELFOEnenergy Edge allows to control two zones with different temperatures. Besides to offer more flexibility, the water pump cycle time is reduced guaranteeing a high energy saving.

In a typical application, the floor heating loops require a lower water temperature in heating mode compared to fan coil units. To achieve these two set points, a mixing station is used to adapt the water temperature according to requirements of the floor heating loops. The fan coil units are directly connected to the unit water circuit and the floor heating loops are after the mixing station. Control of this mixing station is not done by the unit.

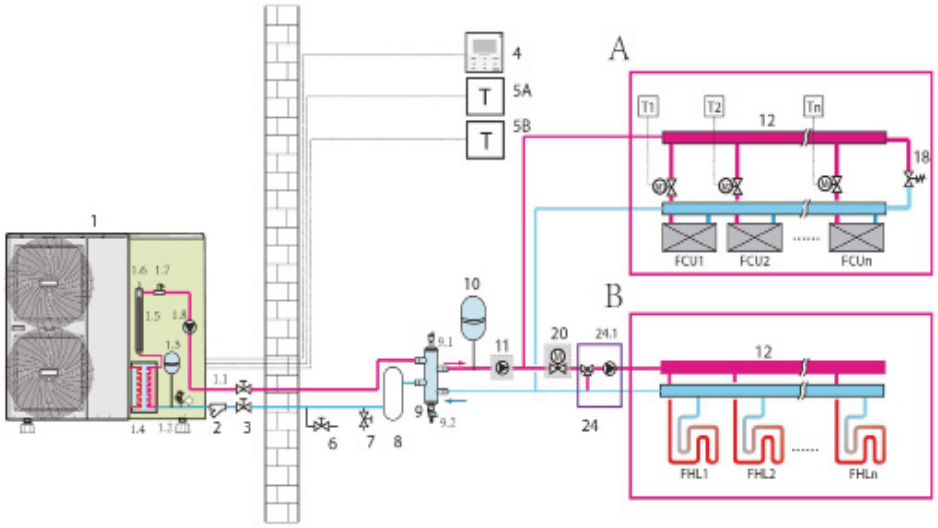
ELFOEnenergy Edge offers a dual set point control function: depending on the required water temperature (floor heating loops and/or fan coil units are required) the first set point or second set point can be activated.

The first set point of water leaving temperature (related to zone A) is set directly on user interface, the second set point (related to zone B) is managed with a climatic curve (selectable on user interface). When there is request of heating from both zones, the target water leaving temperature will be highest of them.

When cooling capacity is requested from thermostat 5A, heat pump operates in cooling mode and only fan coil units will be fed.

In this case, 2-way valve (20) is closed in order to avoid cooled water goes through floor heating loops and mixing pump (24.1) is switched off.

Circulation pump (11), 2-way valve (20) and mixing pump (24.1) can be directly managed by the unit.



1. outdoor unit
1.1 manometer
1.2 pressure relief valve
1.3 expansion vessel
1.4 plate heat exchanger
1.5 back-up heater
1.6 air purge valve
1.7 flow switch
1.8 P_i: circulation pump in the unit
2. y-shape filter (supplied with the unit)
3. stop valve
4. user interface (supplied with the unit)
5a: Room thermostat zone A
5b: Room thermostat zone B
6. drain valve
7. fill valve
8. buffer tank
9. balance tank
9.1 air purge valve
9.2 drain valve
10. expansion vessel
11. P_o: outside circulation pump
12. collector
18. bypass valve
20. SV2:2-way valve
24. mixing station
24.1 P_c: mixing pump
FHL 1...n floor heating loop
FCU 1...n fan coil units
M1...n motorized valve
T1 . . . n room thermostat

Performances in cooling

Supply voltage 230/1/50

Size	Tae	Leaving internal exchanger water temperature (°C)														
		7			10			12			15			18		
	°C	kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER
21	20	5, 55	1,12	4,94	5,95	1,32	4,51	6,45	1,11	5,81	6,99	1,12	6,25	7,68	1,15	6,70
	25	5,25	1,27	4,14	5,64	1,25	4,51	6,11	1,26	4,87	6,63	1,28	5,16	7,29	1,30	5,60
	30	4,94	1,41	3,51	5,34	1,40	3,81	5,77	1,40	4,12	6,27	1,45	4,33	6,89	1,46	4,74
	35	4,65	1,56	2,98	5,04	1,56	3,24	5,44	1,55	3,50	5,91	1,62	3,65	6,49	1,62	4,00
	40	4,35	1,73	2,52	4,74	1,72	2,75	5,09	1,72	2,96	5,54	1,79	3,09	6,09	1,80	3,39
	46	4,05	1,90	2,14	4,44	1,89	2,35	4,75	1,89	2,52	5,16	1,97	2,62	5,69	1,97	2,88
31	20	7,99	1,79	4,47	8,56	2,09	4,09	9,28	1,76	5,26	10,05	1,77	5,66	11,06	1,82	6,07
	25	7,55	2,01	3,75	8,12	1,99	4,09	8,79	1,99	4,41	9,53	2,04	4,68	10,49	2,07	5,07
	30	7,11	2,24	3,18	7,68	2,22	3,46	8,30	2,22	3,73	9,02	2,30	3,92	9,91	2,31	4,29
	35	6,69	2,48	2,70	7,26	2,47	2,93	7,82	2,47	3,17	8,50	2,57	3,31	9,34	2,57	3,63
	40	6,26	2,74	2,28	6,82	2,74	2,49	7,33	2,73	2,68	7,96	2,85	2,80	8,76	2,85	3,07
	46	5,83	2,99	1,95	6,38	3,00	2,13	6,95	3,05	2,28	7,43	3,16	2,35	8,35	3,27	2,55
41	20	9,63	2,53	3,81	10,33	2,97	3,48	11,21	2,50	4,48	11,66	2,42	4,83	12,80	2,47	5,17
	25	9,10	2,84	3,20	9,80	2,81	3,48	10,62	2,83	3,76	11,06	2,78	3,98	12,14	2,81	4,32
	30	8,57	3,16	2,71	9,27	3,15	2,94	10,03	3,15	3,18	10,46	3,13	3,34	11,47	3,14	3,65
	35	8,06	3,50	2,30	8,76	3,50	2,50	9,45	3,50	2,70	9,86	3,50	2,82	10,81	3,50	3,09
	40	6,82	3,50	1,95	7,43	3,50	2,12	8,00	3,50	2,29	8,33	3,50	2,38	9,16	3,50	2,62
	46	5,95	3,50	1,70	6,55	3,50	1,87	6,80	3,50	1,94	7,85	3,50	2,24	8,65	3,50	2,47
51	20	11,83	2,23	5,30	12,66	2,61	4,84	13,73	2,20	6,24	14,87	2,22	6,71	16,36	2,27	7,20
	25	11,17	2,51	4,45	12,01	2,48	4,84	13,01	2,49	5,23	14,11	2,55	5,54	15,52	2,58	6,01
	30	10,52	2,79	3,77	11,37	2,77	4,10	12,29	2,78	4,43	13,34	2,87	4,65	14,67	2,89	5,08
	35	9,90	3,09	3,20	10,74	3,09	3,48	11,57	3,08	3,76	12,58	3,21	3,92	13,82	3,21	4,30
	40	9,27	3,42	2,71	10,09	3,42	2,95	10,84	3,41	3,18	11,79	3,55	3,32	12,97	3,56	3,64
	46	8,63	3,76	2,30	9,44	3,75	2,52	10,11	3,74	2,70	10,99	3,90	2,81	12,11	3,91	3,10
61	20	14,57	2,98	4,89	15,60	3,49	4,47	16,92	2,94	5,75	18,33	2,96	6,19	20,16	3,04	6,63
	25	13,77	3,36	4,10	14,81	3,32	4,47	16,03	3,33	4,82	17,39	3,40	5,11	19,12	3,45	5,54
	30	12,97	3,73	3,47	14,01	3,71	3,78	15,14	3,71	4,08	16,45	3,84	4,28	18,08	3,86	4,69
	35	12,20	4,14	2,95	13,23	4,13	3,21	14,26	4,12	3,46	15,50	4,29	3,61	17,03	4,30	3,96
	40	11,42	4,57	2,50	12,44	4,57	2,72	13,36	4,56	2,93	14,52	4,75	3,06	15,98	4,76	3,36
	46	10,64	5,02	2,12	11,64	5,01	2,32	12,46	5,00	2,49	13,54	5,22	2,60	14,92	5,23	2,85
71	20	15,53	3,24	4,79	16,63	3,80	4,38	18,03	3,20	5,63	19,53	3,22	6,06	21,48	3,31	6,50
	25	14,67	3,65	4,02	15,78	3,61	4,38	17,08	3,62	4,72	18,53	3,70	5,01	20,38	3,75	5,43
	30	13,82	4,06	3,40	14,93	4,03	3,70	16,13	4,04	4,00	17,52	4,18	4,20	19,26	4,20	4,59
	35	13,00	4,50	2,89	14,10	4,49	3,14	15,20	4,48	3,39	16,52	4,67	3,54	18,15	4,67	3,88
	40	12,17	4,98	2,45	13,25	4,97	2,67	14,24	4,95	2,87	15,48	5,17	2,99	17,03	5,18	3,29
	46	11,33	5,46	2,07	12,40	5,45	2,28	13,27	5,44	2,44	14,43	5,68	2,54	15,90	5,69	2,80
81	20	16,49	3,71	4,44	17,65	4,35	4,06	19,14	3,66	5,22	20,73	3,69	5,62	22,81	3,78	6,03
	25	15,58	4,18	3,73	16,75	4,13	4,06	18,13	4,14	4,38	19,67	4,24	4,64	21,63	4,29	5,04
	30	14,67	4,65	3,16	15,84	4,62	3,43	17,13	4,62	3,71	18,60	4,78	3,89	20,45	4,80	4,26
	35	13,80	5,15	2,68	14,97	5,14	2,91	16,13	5,13	3,15	17,53	5,34	3,28	19,27	5,35	3,60
	40	12,92	5,70	2,27	14,07	5,69	2,47	15,11	5,67	2,66	16,43	5,92	2,78	18,07	5,92	3,05
	46	12,03	6,25	1,92	13,16	6,24	2,11	14,09	6,22	2,26	15,32	6,50	2,36	16,88	6,42	2,63

External exchanger inlet air temperature = Tae [°C]

kWf = Cooling capacity [kW]

kWe_tot = Unit total power input [kW]

Performances in function of the inlet/outlet water temperature differential = 5°C

Cooling capacity and EER are calculated according to EN 14511:2013

Performances in heating

Supply voltage 230/1/50

Size	Tae D.B/W.B	Leaving internal exchanger water temperature (°C)														
		30			35			45			55			60		
	°C	kWt	kWe_tot	COP	kWt	kWe_tot	COP	kWt	kWe_tot	COP	kWt	kWe_tot	COP	kWt	kWe_tot	COP
21	-20/-20,1	1,61	0,83	1,93	1,67	0,93	1,80	1,67	1,12	1,49	1,64	1,24	1,32	1,48	1,16	1,27
	-10/-10,5	2,66	0,94	2,84	2,68	1,03	2,61	2,61	1,25	2,10	2,56	1,43	1,78	2,30	1,34	1,71
	-7/-8	2,98	0,97	3,07	2,99	1,06	2,82	2,90	1,29	2,25	2,83	1,49	1,90	2,55	1,40	1,82
	0/-0,6	3,66	1,04	3,50	3,63	1,13	3,20	3,50	1,38	2,54	3,41	1,63	2,09	3,07	1,53	2,01
	2/1,1	3,91	1,06	3,70	3,88	1,14	3,39	3,73	1,39	2,68	3,64	1,66	2,20	3,28	1,55	2,11
	7/6	4,96	1,08	4,58	4,91	1,17	4,20	4,72	1,43	3,29	4,61	1,73	2,66	4,15	1,62	2,56
	10/8,2	5,27	1,10	4,77	5,22	1,20	4,35	5,03	1,45	3,47	4,89	1,76	2,77	4,40	1,65	2,66
	15/13	6,00	1,13	5,32	5,95	1,23	4,82	5,70	1,50	3,81	5,54	1,82	3,04	4,98	1,71	2,92
	18/14	6,44	1,18	5,47	6,39	1,29	4,94	6,10	1,52	4,00	5,93	1,86	3,19	5,34	1,74	3,06
31	-20/-20,1	2,29	1,17	1,96	2,38	1,30	1,83	2,37	1,57	1,51	2,34	1,74	1,35	2,11	1,63	1,29
	-10/-10,5	3,79	1,31	2,89	3,82	1,44	2,65	3,72	1,74	2,13	3,64	2,01	1,81	3,27	1,88	1,74
	-7/-8	4,25	1,36	3,13	4,25	1,48	2,87	4,13	1,80	2,30	4,03	2,09	1,93	3,62	1,96	1,85
	0/-0,6	5,21	1,46	3,56	5,17	1,58	3,26	4,98	1,92	2,59	4,85	2,27	2,13	4,36	2,13	2,05
	2/1,1	5,56	1,48	3,77	5,52	1,60	3,45	5,32	1,95	2,73	5,18	2,32	2,24	4,66	2,17	2,15
	7/6	7,06	1,51	4,67	6,99	1,63	4,28	6,72	2,01	3,35	6,57	2,42	2,71	5,91	2,27	2,60
	10/8,2	7,50	1,54	4,86	7,44	1,68	4,43	7,16	2,03	3,53	6,95	2,46	2,82	6,26	2,31	2,71
	15/13	8,54	1,58	5,42	8,47	1,73	4,91	8,11	2,09	3,88	7,89	2,55	3,09	7,10	2,39	2,97
	18/14	9,17	1,65	5,57	9,09	1,81	5,03	8,68	2,13	4,08	8,44	2,60	3,25	7,60	2,44	3,12
41	-20/-20,1	3,13	1,53	2,04	3,25	1,70	1,91	3,25	2,06	1,58	3,20	2,28	1,40	2,88	2,14	1,35
	-10/-10,5	5,19	1,72	3,01	5,22	1,89	2,76	5,09	2,29	2,22	4,98	2,63	1,89	4,48	2,47	1,81
	-7/-8	5,81	1,78	3,26	5,82	1,95	2,99	5,65	2,36	2,39	5,51	2,74	2,01	4,96	2,57	1,93
	0/-0,6	7,12	1,92	3,71	7,07	2,08	3,40	6,82	2,52	2,70	6,63	2,99	2,22	5,97	2,80	2,13
	2/1,1	7,61	1,94	3,93	7,55	2,10	3,60	7,27	2,56	2,85	7,09	3,04	2,33	6,38	2,85	2,24
	7/6	9,65	1,99	4,86	9,56	2,15	4,46	9,19	2,63	3,49	8,98	3,18	2,83	8,08	2,98	2,71
	10/8,2	10,25	2,03	5,06	10,17	2,20	4,62	9,79	2,66	3,68	9,51	3,23	2,94	8,56	3,03	2,82
	15/13	11,68	2,07	5,64	11,59	2,26	5,12	11,09	2,75	4,04	10,78	3,35	3,22	9,71	3,14	3,09
	18/14	12,54	2,16	5,80	12,44	2,37	5,24	11,87	2,80	4,25	11,55	3,41	3,38	10,39	3,20	3,25
51	-20/-20,1	3,47	1,77	1,96	3,61	1,97	1,83	3,60	2,38	1,51	3,55	2,64	1,35	3,20	2,47	1,29
	-10/-10,5	5,76	1,99	2,89	5,80	2,18	2,65	5,65	2,65	2,13	5,52	3,04	1,81	4,97	2,85	1,74
	-7/-8	6,45	2,06	3,13	6,45	2,25	2,87	6,27	2,73	2,30	6,11	3,17	1,93	5,50	2,97	1,85
	0/-0,6	7,90	2,22	3,56	7,85	2,41	3,26	7,56	2,92	2,59	7,36	3,45	2,13	6,62	3,24	2,05
	2/1,1	8,45	2,24	3,77	8,38	2,43	3,45	8,07	2,96	2,73	7,86	3,52	2,24	7,08	3,30	2,15
	7/6	10,71	2,30	4,67	10,62	2,48	4,28	10,20	3,04	3,35	9,97	3,68	2,71	8,97	3,45	2,60
	10/8,2	11,38	2,34	4,86	11,29	2,55	4,43	10,87	3,08	3,53	10,56	3,74	2,82	9,50	3,51	2,71
	15/13	12,96	2,39	5,42	12,86	2,62	4,91	12,31	3,17	3,88	11,97	3,87	3,09	10,77	3,63	2,97
	18/14	13,92	2,50	5,57	13,80	2,75	5,03	13,18	3,23	4,08	12,82	3,95	3,25	11,54	3,70	3,12

External exchanger inlet air temperature = Tae [°C]
D.B. = Dry bulb
W.B. = Wet bulb
kWt = Heating capacity [kW]
kWe_tot = Unit total power input [kW]
Performances in function of the inlet/outlet water temperature differential = 5°C
The data of the heat capacity and COP include defrostings
Heating capacity and COP are calculated according to EN 14511:2013

Performances in heating

Supply voltage 230/1/50

Size	Tae D.B/W.B	Leaving internal exchanger water temperature (°C)														
		30			35			45			55			60		
	°C	kWt	kWe_tot	COP	kWt	kWe_tot	COP	kWt	kWe_tot	COP	kWt	kWe_tot	COP	kWt	kWe_tot	COP
61	-20/-20,1	4,29	2,25	1,91	4,46	2,50	1,78	4,45	3,02	1,47	4,39	3,35	1,31	3,95	3,14	1,26
	-10/-10,5	7,11	2,53	2,81	7,16	2,77	2,58	6,98	3,36	2,08	6,82	3,86	1,77	6,14	3,62	1,70
	-7/-8	7,96	2,61	3,05	7,97	2,86	2,79	7,74	3,46	2,23	7,55	4,02	1,88	6,80	3,77	1,80
	0/-0,6	9,76	2,82	3,47	9,69	3,05	3,17	9,34	3,71	2,52	9,09	4,38	2,07	8,18	4,11	1,99
	2/1,1	10,43	2,84	3,67	10,35	3,08	3,36	9,97	3,75	2,66	9,71	4,46	2,18	8,74	4,18	2,09
	7/6	13,23	2,91	4,54	13,11	3,15	4,16	12,60	3,87	3,26	12,31	4,67	2,64	11,08	4,37	2,53
	10/8,2	14,06	2,97	4,73	13,95	3,23	4,31	13,42	3,91	3,44	13,04	4,75	2,75	11,74	4,45	2,64
	15/13	16,01	3,04	5,27	15,89	3,32	4,78	15,21	4,03	3,77	14,79	4,91	3,01	13,31	4,60	2,89
	18/14	17,19	3,17	5,42	17,05	3,48	4,89	16,28	4,11	3,97	15,83	5,01	3,16	14,25	4,70	3,03
71	-20/-20,1	4,80	2,59	1,85	4,99	2,88	1,73	4,98	3,49	1,43	4,91	3,86	1,27	4,42	3,62	1,22
	-10/-10,5	7,96	2,92	2,73	8,01	3,20	2,50	7,81	3,88	2,01	7,63	4,46	1,71	6,87	4,18	1,64
	-7/-8	8,91	3,02	2,95	8,92	3,30	2,71	8,66	4,00	2,17	8,45	4,64	1,82	7,61	4,35	1,75
	0/-0,6	10,93	3,25	3,36	10,85	3,53	3,08	10,46	4,28	2,44	10,17	5,06	2,01	9,16	4,74	1,93
	2/1,1	11,68	3,28	3,56	11,58	3,56	3,26	11,16	4,33	2,58	10,87	5,15	2,11	9,78	4,83	2,03
	7/6	14,81	3,36	4,40	14,68	3,64	4,04	14,10	4,46	3,16	13,78	5,39	2,56	12,40	5,05	2,46
	10/8,2	15,73	3,43	4,58	15,61	3,73	4,18	15,02	4,51	3,33	14,59	5,48	2,66	13,13	5,14	2,56
	15/13	17,92	3,51	5,11	17,78	3,84	4,63	17,02	4,65	3,66	16,55	5,67	2,92	14,89	5,32	2,80
	18/14	19,24	3,66	5,25	19,08	4,02	4,74	18,22	4,74	3,84	17,72	5,78	3,06	15,95	5,42	2,94
81	-20/-20,1	5,48	3,03	1,81	5,70	3,37	1,69	5,69	4,07	1,40	5,61	4,51	1,24	5,05	4,23	1,19
	-10/-10,5	9,09	3,41	2,67	9,15	3,74	2,45	8,92	4,53	1,97	8,72	5,21	1,67	7,84	4,88	1,61
	-7/-8	10,17	3,52	2,89	10,19	3,85	2,65	9,89	4,67	2,12	9,65	5,42	1,78	8,68	5,08	1,71
	0/-0,6	12,48	3,80	3,29	12,39	4,12	3,01	11,94	5,00	2,39	11,62	5,91	1,97	10,46	5,54	1,89
	2/1,1	13,33	3,83	3,48	13,23	4,15	3,19	12,74	5,06	2,52	12,41	6,02	2,06	11,17	5,64	1,98
	7/6	16,91	3,93	4,30	16,76	4,25	3,95	16,10	5,21	3,09	15,73	6,29	2,50	14,16	5,90	2,40
	10/8,2	17,96	4,01	4,48	17,82	4,36	4,09	17,15	5,27	3,26	16,48	6,33	2,60	15,00	6,00	2,50
	15/13	20,46	4,09	5,00	20,30	4,48	4,53	19,43	5,43	3,58	18,17	6,37	2,85	17,00	6,21	2,74
	18/14	21,97	4,28	5,14	21,79	4,70	4,64	20,80	5,53	3,76	19,09	6,43	2,97	18,21	6,33	2,88

External exchanger inlet air temperature = Tae [°C]
D.B. = Dry bulb
W.B. = Wet bulb
kWt = Heating capacity [kW]
kWe_tot = Unit total power input [kW]
Performances in function of the inlet/outlet water temperature differential = 5°C
The data of the heat capacity and COP include defrostings
Heating capacity and COP are calculated according to EN 14511:2013

Performances in cooling

Supply voltage 400/3/50+N

Size	Tae	Leaving internal exchanger water temperature (°C)														
		7			10			12			15			18		
	°C	kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER
61	20	14,69	3,05	4,82	15,73	3,57	4,41	17,06	3,01	5,67	18,48	3,03	6,10	20,33	3,11	6,54
	25	13,88	3,43	4,05	14,93	3,39	4,41	16,16	3,40	4,75	17,53	3,48	5,04	19,28	3,53	5,47
	30	13,07	3,81	3,43	14,12	3,79	3,72	15,27	3,79	4,02	16,58	3,92	4,23	18,23	3,94	4,62
	35	12,30	4,23	2,91	13,34	4,22	3,16	14,38	4,21	3,42	15,63	4,38	3,56	17,17	4,39	3,91
	40	11,51	4,68	2,46	12,54	4,67	2,69	13,47	4,66	2,89	14,64	4,86	3,02	16,11	4,86	3,31
	46	10,72	5,13	2,09	11,73	5,12	2,29	12,56	5,11	2,46	13,65	5,33	2,56	15,04	5,34	2,82
71	20	16,49	3,68	4,47	17,65	4,32	4,09	19,14	3,64	5,26	20,73	3,66	5,66	22,81	3,76	6,07
	25	15,58	4,15	3,75	16,75	4,10	4,09	18,13	4,11	4,41	19,67	4,20	4,68	21,63	4,26	5,07
	30	14,67	4,61	3,18	15,84	4,58	3,46	17,13	4,59	3,73	18,60	4,74	3,92	20,45	4,77	4,29
	35	13,80	5,11	2,70	14,97	5,10	2,93	16,13	5,09	3,17	17,53	5,30	3,31	19,27	5,31	3,63
	40	12,92	5,65	2,28	14,07	5,65	2,49	15,11	5,63	2,68	16,43	5,87	2,80	18,07	5,88	3,07
	46	12,03	6,21	1,94	13,16	6,19	2,13	14,09	6,18	2,28	15,32	6,45	2,38	16,88	6,46	2,61
81	20	18,28	4,63	3,94	19,57	5,43	3,60	21,22	4,57	4,64	22,98	4,60	4,99	25,28	4,72	5,35
	25	17,27	5,22	3,31	18,57	5,15	3,60	20,11	5,17	3,89	21,81	5,29	4,12	23,98	5,36	4,47
	30	16,26	5,80	2,80	17,57	5,77	3,05	18,99	5,77	3,29	20,62	5,97	3,46	22,67	6,00	3,78
	35	15,30	6,43	2,38	16,59	6,42	2,59	17,89	6,40	2,79	19,44	6,67	2,91	21,36	6,68	3,20
	40	14,32	6,66	2,15	15,60	6,69	2,33	16,76	6,68	2,51	17,95	6,82	2,63	19,56	6,77	2,89
	46	13,34	6,88	1,94	14,60	6,88	2,12	15,62	6,79	2,30	16,23	6,83	2,38	17,99	6,90	2,61

External exchanger inlet air temperature = Tae [°C]

kWf = Cooling capacity [kW]

kWe_tot = Unit total power input [kW]

Performances in function of the inlet/outlet water temperature differential = 5°C

Cooling capacity and EER are calculated according to EN 14511:2013

Performances in heating

Supply voltage 400/3/50+N

Size	Tae D.B/W.B	Leaving internal exchanger water temperature (°C)														
		30			35			45			55			60		
	°C	kWt	kWe_tot	COP	kWt	kWe_tot	COP	kWt	kWe_tot	COP	kWt	kWe_tot	COP	kWt	kWe_tot	COP
61	-20/-20,1	4,09	2,15	1,90	4,25	2,39	1,78	4,24	2,89	1,47	4,18	3,20	1,31	3,76	3,00	1,25
	-10/-10,5	6,77	2,42	2,80	6,82	2,65	2,57	6,65	3,21	2,07	6,50	3,69	1,76	5,85	3,46	1,69
	-7/-8	7,58	2,50	3,04	7,59	2,73	2,78	7,37	3,31	2,23	7,19	3,84	1,87	6,47	3,60	1,80
	0/-0,6	9,30	2,69	3,46	9,23	2,92	3,16	8,90	3,54	2,51	8,66	4,19	2,07	7,79	3,93	1,99
	2/1,1	9,94	2,72	3,66	9,86	2,94	3,35	9,49	3,58	2,65	9,25	4,26	2,17	8,33	4,00	2,08
	7/6	12,60	2,78	4,53	12,49	3,01	4,15	12,00	3,69	3,25	11,73	4,46	2,63	10,55	4,18	2,53
	10/8,2	13,39	2,84	4,71	13,28	3,09	4,30	12,78	3,73	3,43	12,42	4,53	2,74	11,18	4,25	2,63
	15/13	15,25	2,90	5,26	15,13	3,18	4,76	14,48	3,85	3,76	14,08	4,69	3,00	12,67	4,40	2,88
	18/14	16,37	3,03	5,40	16,24	3,33	4,88	15,50	3,92	3,95	15,08	4,79	3,15	13,57	4,49	3,02
71	-20/-20,1	4,80	2,58	1,86	4,99	2,87	1,74	4,98	3,47	1,44	4,91	3,84	1,28	4,42	3,60	1,23
	-10/-10,5	7,96	2,90	2,74	8,01	3,18	2,52	7,81	3,86	2,03	7,63	4,43	1,72	6,87	4,15	1,65
	-7/-8	8,91	3,00	2,97	8,92	3,28	2,72	8,66	3,97	2,18	8,45	4,61	1,83	7,61	4,32	1,76
	0/-0,6	10,93	3,23	3,38	10,85	3,50	3,10	10,46	4,25	2,46	10,17	5,03	2,02	9,16	4,71	1,94
	2/1,1	11,68	3,26	3,58	11,58	3,53	3,28	11,16	4,30	2,59	10,87	5,12	2,12	9,78	4,80	2,04
	7/6	14,81	3,34	4,43	14,68	3,61	4,06	14,10	4,43	3,18	13,78	5,35	2,57	12,40	5,02	2,47
	10/8,2	15,73	3,41	4,61	15,61	3,71	4,21	15,02	4,48	3,35	14,59	5,45	2,68	13,13	5,11	2,57
	15/13	17,92	3,48	5,14	17,78	3,81	4,66	17,02	4,62	3,68	16,55	5,63	2,94	14,89	5,28	2,82
	18/14	19,24	3,64	5,29	19,08	4,00	4,77	18,22	4,71	3,87	17,72	5,75	3,08	15,95	5,39	2,96
81	-20/-20,1	5,48	3,05	1,80	5,70	3,39	1,68	5,69	4,10	1,39	5,61	4,54	1,23	5,05	4,26	1,19
	-10/-10,5	9,09	3,43	2,65	9,15	3,76	2,43	8,92	4,56	1,96	8,72	5,24	1,66	7,84	4,91	1,60
	-7/-8	10,17	3,55	2,87	10,19	3,88	2,63	9,89	4,70	2,10	9,65	5,45	1,77	8,68	5,11	1,70
	0/-0,6	12,48	3,82	3,27	12,39	4,14	2,99	11,94	5,03	2,37	11,62	5,95	1,95	10,46	5,58	1,88
	2/1,1	13,33	3,86	3,46	13,23	4,18	3,16	12,74	5,09	2,50	12,41	6,06	2,05	11,17	5,68	1,97
	7/6	16,91	3,95	4,28	16,76	4,27	3,92	16,10	5,24	3,07	15,73	6,33	2,49	14,16	5,93	2,39
	10/8,2	17,96	4,03	4,45	17,82	4,39	4,06	17,15	5,30	3,24	16,66	6,44	2,59	15,00	6,04	2,48
	15/13	20,46	4,12	4,97	20,30	4,51	4,50	19,43	5,47	3,55	18,89	6,66	2,84	17,00	6,25	2,72
	18/14	21,97	4,30	5,10	21,79	4,73	4,61	20,80	5,57	3,73	20,23	6,80	2,98	18,21	6,37	2,86

External exchanger inlet air temperature = Tae [°C]
D.B. = Dry bulb
W.B. = Wet bulb
kWt = Heating capacity [kW]
kWe_tot = Unit total power input [kW]
Performances in function of the inlet/outlet water temperature differential = 5°C
The data of the heat capacity and COP include defrostings
Heating capacity and COP are calculated according to EN 14511:2013

Accessories separately supplied

Every accessory is marked with a configuration code, for instance IBHX.

When the letter X is placed at the end, this means that the accessory is supplied separately. If there is no X in the code, the accessory is mounted in the factory.

IBHX – Back-up electrical heater

The back-up electrical heater provide additional heating capacity during extremely cold outdoor temperatures operation conditions. Nominal capacity is 3 kW and it is adjustable.

Back-up heater is designed to be wall mounted in indoor locations only, water piping connections provided by the customer.

Back-up heater requires dedicated power supply: 230/1/50

Dimensions are: 80mm x 220mm x 280mm

Water inlet/outlet connections: G1”

Accessory available only for sizes 21 and 41, built-in solution as standard for the other sizes.

KTFLX - Hose kit for connection to the chiller/heat pump

The kit is made up of: no. 2 of flexible pipes, length 300 mm, necessary for the connection of the unit to the installation.

For size from 21 to 41 the diameter is G1”.

For size from 51 to 81 the diameter is G1”1/4.

KSAX - 100-litre circuit breaker

Storage tank Fe360b and anti-corrosion treatment with organic enamelling, external insulation with polyurethane and polyethylene mat, thickness 50 mm maximum of operation 6 bar.

Diameter 500 mm, height 900 mm, 8 connections.

Suitable for all WSAN-XMi sizes.

QERAX - Connection electrical panel of the DHW storage heater

Remote electrical panel for the control of DHW tank electric heater.

The panel is made up of a Gewiss box (190x140x70mm) with a relay to receive the in-line 230V power supply from the outdoor unit and to transfer it via the XT2 terminal block to the resistors placed on the tank. Electrical panel is equipped with fuse protection and must be supplied with 230V voltage via the XT1 terminal board.

It is suggested to install the electrical panel close to the tank because the resistance cable supplied is 1,5m long. If necessary, disconnect the cable and install one of adequate length by avoiding junctions of the original one.

ACS500X - 500-litre domestic hot water storage tank

Carbon steel storage tank, glass lining process in accordance with DIN 4753.3, external 50 mm rigid polyurethane insulation, 6 sq m exchange coil suitable for heat pumps (max. 25 kW), maximum working pressure 6 bar, equipped with anodic protection and 3 kW electric heater (single phase) with safety thermostat.

Suitable for sizes 21-81 WSAN-XMi

Size of the 500-litre boiler: 750x1690mm

For the electrical connection to the unit, it is compulsory to select the option QERAX in combination with this accessory.

ACS300X - 300-litre domestic hot water storage tank

Carbon steel storage tank, glass lining process in accordance with DIN 4753.3, external 50 mm rigid polyurethane insulation, 4 sq m exchange coil suitable for heat pumps (max. 10 kW), maximum operating pressure 6 bar, equipped with anodic protection and 2 kW electric heater (single phase) with safety thermostat.

Suitable for sizes 21-51 WSAN-XMi

Size of the 300-litre boiler: 600x1615mm

For the electrical connection to the unit, it is compulsory to select the option QERAX in combination with this accessory.

ACS5SX - 500-litre domestic hot water storage tank with solar coil

Carbon steel storage tank, glass lining process in accordance with DIN 4753.3, external 50 mm rigid polyurethane insulation, upper 4,9 sq m exchange coil suitable for heat pumps (max. 25 kW), lower 1,8 sq m exchange coil for thermal solar panels, maximum working pressure 6 bar, equipped with anodic protection and 3 kW electric heater (single phase) with safety thermostat.

Suitable for sizes 21-81 WSAN-XMi

Size of the 500-litre boiler: 750x1690mm

For the electrical connection to the unit, it is compulsory to select the option QERAX in combination with this accessory.

ACS3SX - 300-litre domestic hot water storage tank with solar coil

Carbon steel storage tank, glass lining process in accordance with DIN 4753.3, external 50 mm rigid polyurethane insulation, upper 3,7 sq m exchange coil suitable for heat pumps (max. 10 kW), lower 1,2 sq m exchange coil for thermal solar panels, maximum operating pressure 6 bar, equipped with anodic protection and 2 kW electric heater (single phase) with safety thermostat.

Suitable for sizes 21-51 WSAN-XMi

Size of the 300-litre boiler: 600x1615mm

For the electrical connection to the unit, it is compulsory to select the option QERAX in combination with this accessory.

3DHWX - Three-way valve for domestic hot water

The 3-way switching valve for the deviation of the water flow to a DHW heating storage tank is separately supplied.

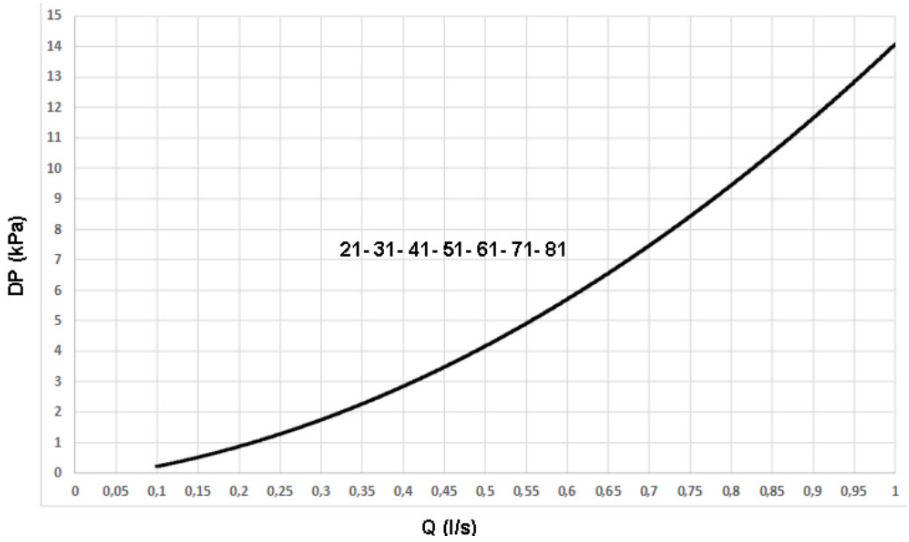
If the DHW temperature does not reach the set-point.

The unit controller closes a digital output to control the flow diverter valve from the installation to the tank till the achievement of the DHW Set-point set in the user interface.

For sizes from 21 to 41 the 3-way valve is of G1"1/4 with G1" connections

For size from 51 to 81 the 3-way valve is G1"1/4"

3-way valve pressure drop

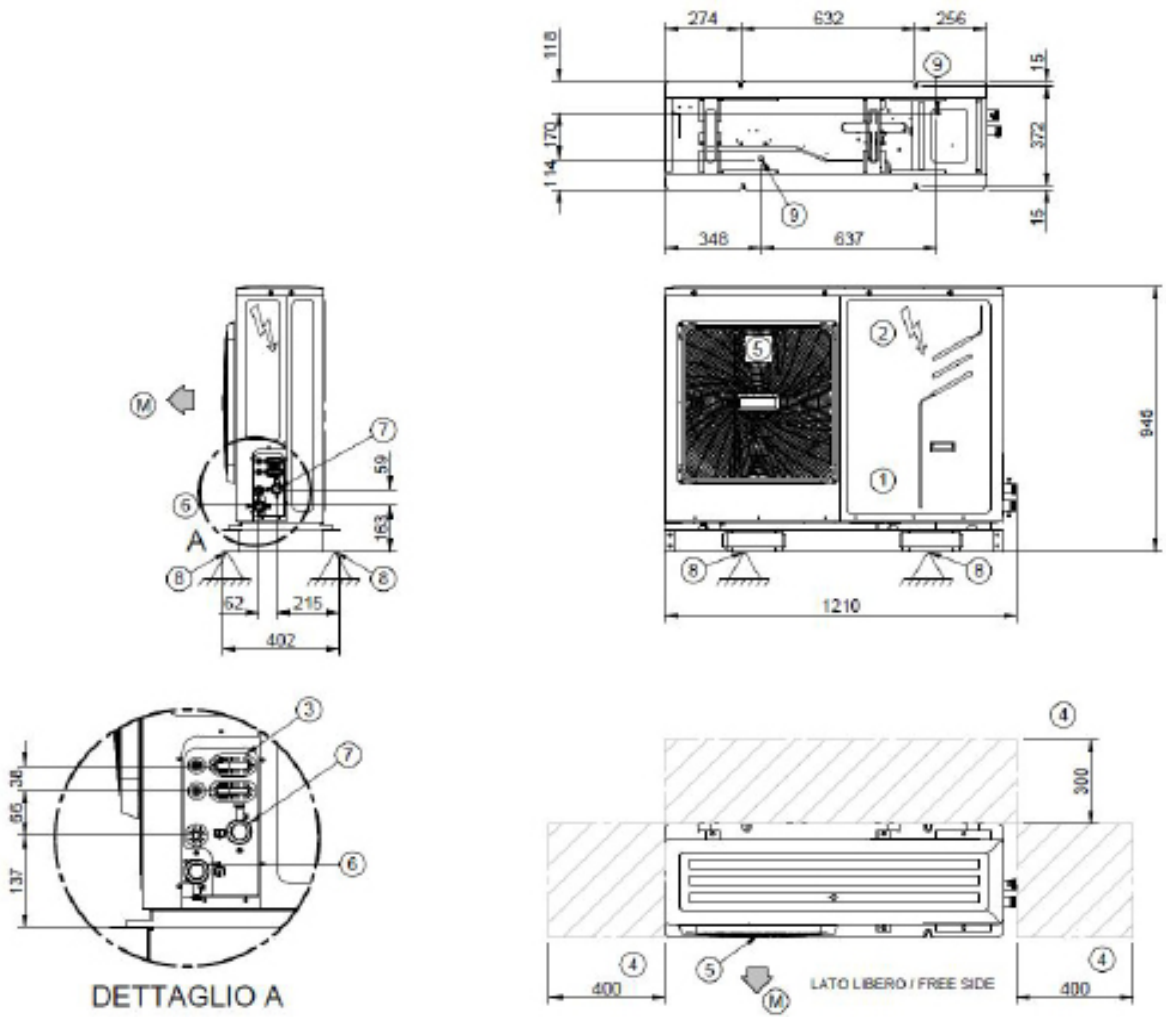


DP [kPa] = Available pressure
Q [l/s] = water flow-rate

Dimensional drawings

DAAPA21_0 REV01
Data: 05/12/2016

ELFOEnergy Edge - Size 21-41



1. Compressor compartment
2. Electrical panel
3. Power input
4. Functional spaces
5. Electric fan (supply - return)
6. Internal exchanger water inlet (OD = 1" GAS)
7. Internal exchanger water outlet (OD = 1" GAS)
8. Support point
9. Drain hole

(M) Air Supply

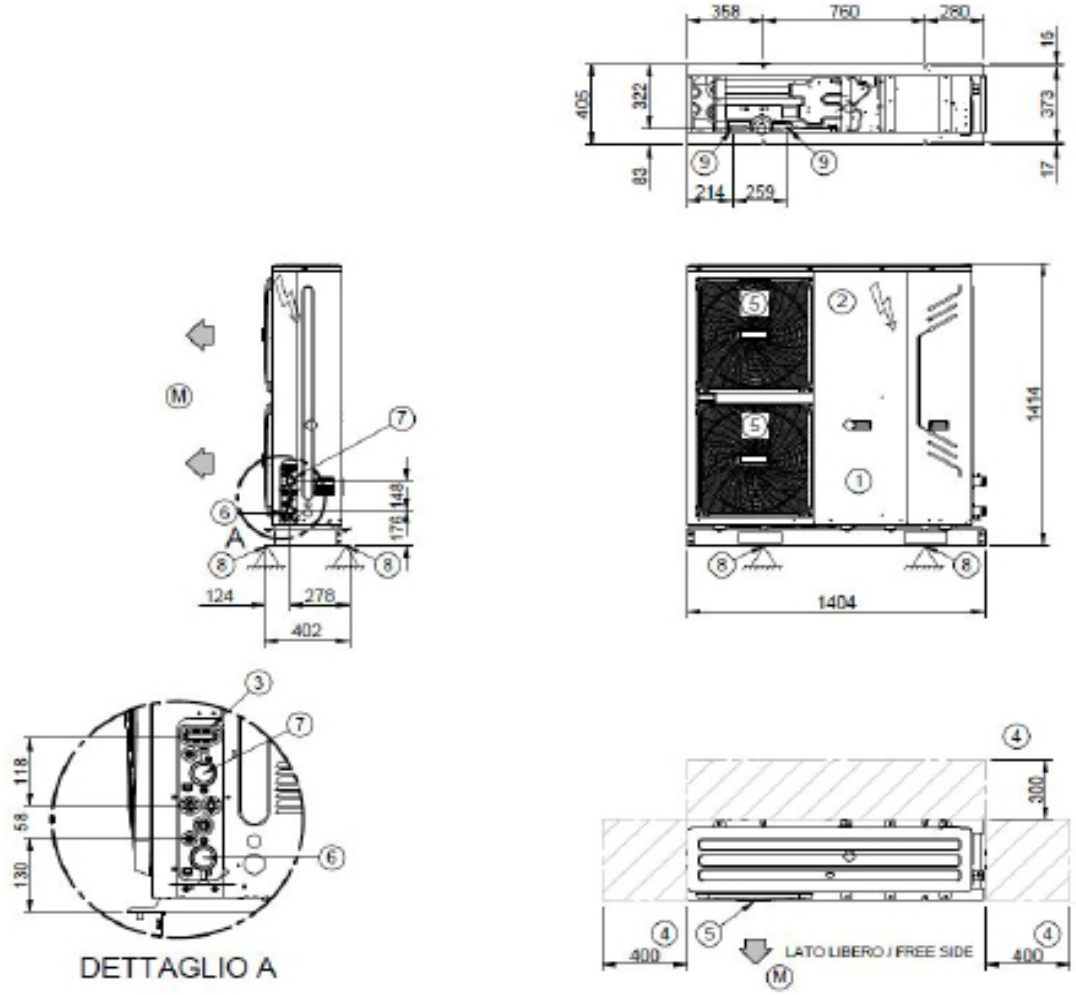
Size			21	31	41
Length		mm	1210	1210	1210
Depth		mm	402	402	402
Height		mm	945	945	945
Operating weight		kg	99	99	99
Shipping weight		kg	117	117	117

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

Dimensional drawings

DAAPA51_0 REV01
Data: 05/12/2016

ELFOEnergy Edge - Size 51-81



1. Compressor compartment
2. Electrical panel
3. Power input
4. Functional spaces
5. Electric fan (supply - return)
6. Internal exchanger water inlet (OD = 1" 1/4 GAS)
7. Internal exchanger water outlet (OD = 1" 1/4 GAS)
8. Support point
9. Drain hole

(M) Air Supply

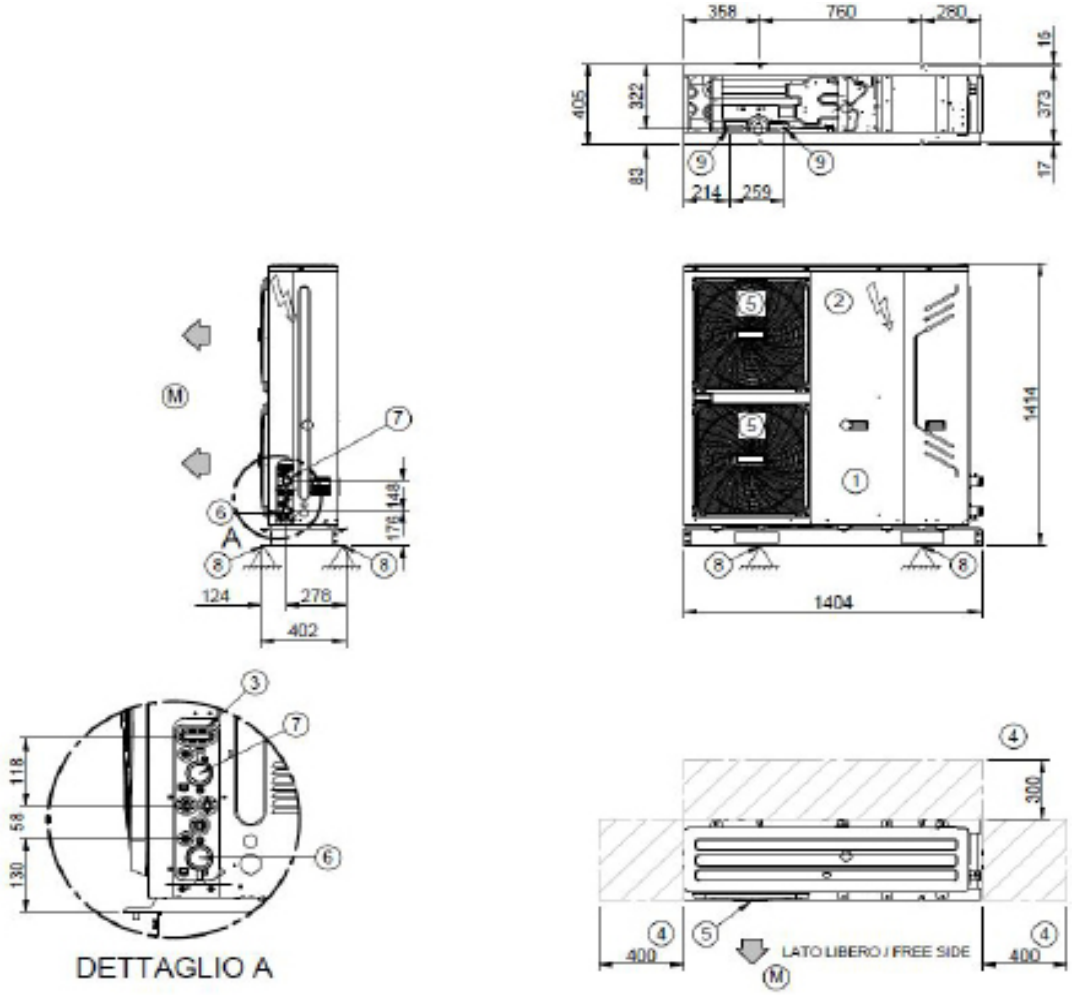
Size			51	61	71	81
Length		mm	1404	1404	1404	1404
Depth		mm	405	405	405	405
Height		mm	1414	1414	1414	1414
Operating weight		kg	162	162	162	162
Shipping weight		kg	183	183	183	183

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

Dimensional drawings

DAAPA51_0 REV01
Data: 19/05/2017

ELFOEnergy Edge - Size 61-81 - Trifase



1. Compressor compartment
2. Electrical panel
3. Power input
4. Functional spaces
5. Electric fan (supply - return)
6. Internal exchanger water inlet (OD = 1" 1/4 GAS)
7. Internal exchanger water outlet (OD = 1" 1/4 GAS)
8. Support point
9. Drain hole

(M) Air Supply

Grandezze			61	71	81
Lunghezza		mm	1404	1404	1404
Profondità		mm	405	405	405
Altezza		mm	1414	1414	1414
Peso in funzionamento		kg	177	177	177
Peso di spedizione		kg	198	198	198

La presenza di accessori opzionali può comportare una variazione significativa dei pesi riportati.

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