Technical Bulletin

BT14G004GB-17

ELFOEnergy Ground Medium²

Water cooled heat pump for indoor installation

WSHN-XEE2 10.2 - 120.2 RANGE

Nominal heating capacity **(W10/W45)** from 34 kW to 408 kW
Nominal cooling capacity **(W35/W7)** from 29 kW to 347 kW

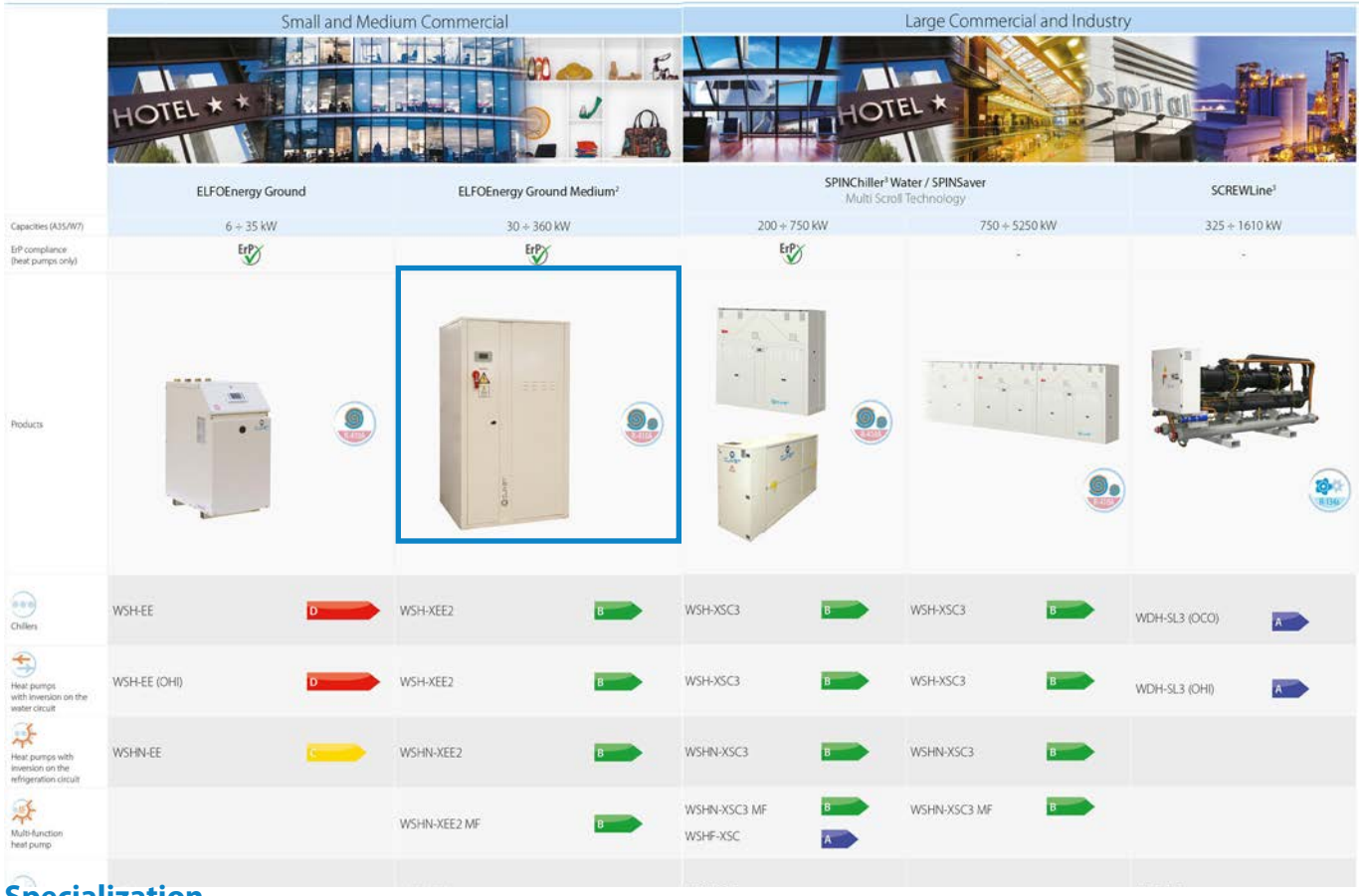
- **PRE-ASSEMBLED UNIT**
- **APPLICATION VERSATILITY**
- **HIGH SEASONAL EFFICIENCY**

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.

HYDRONIC System - 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

Centrality of the Air Renewal

From the Air Renewal depends the comfort in the spaces. Since it often represents the main building energetic load, it also determines the running costs of the entire system.

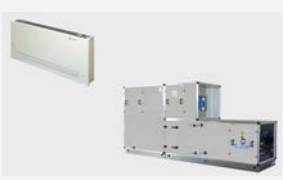
ZEPHIR3

Autonomous primary air energy thermodynamic recovery system

- Simplifies the system, reduces the heating and cooling generators
- Purifies the air with the standard electronic filters
- Increases the energy efficiency and it also allows a savings of 40% on the running costs
- From –40°C to +50°C of outdoor air temperature

Terminal and AHU complete system

The hydronic terminal units are very diffused for their versatility and reliability. The Clivet range includes many versions that simplify the application in differents type of installation and building.



ELFOSpace

High energy efficiency hydronic terminal units

AQX

Air-conditioning unit

- Cased and uncased terminal units, from 1 to 90 kW
- Horizontal and vertical installation
- Energy saving DC fans
- Fitted air conditioning units up to 160.000 m³/h
- EUROVENT certification

ELFOEnergy Ground Medium^2,three solutions to satisfy different installation requirements

GROUND MEDIUM^2 - HEAT PUMP WSHN-XEE2:

- Reversible-cycle heat pump

GROUND MEDIUM^2 - COOLING ONLY or HEATING ONLY WSH-XEE2:

- Water chiller or non-reversible heat pump
- Partial energy recovery

GROUND MEDIUM^2 - MULTIFUNCTION WSHN-XEE2 MF:

- Reversible-cycle heat pump
- Simultaneous production of hot and chilled water

Clivet. Change thing.

For 25 years, we have been offering solutions to ensure sustainable comfort and the well-being of people and environment.

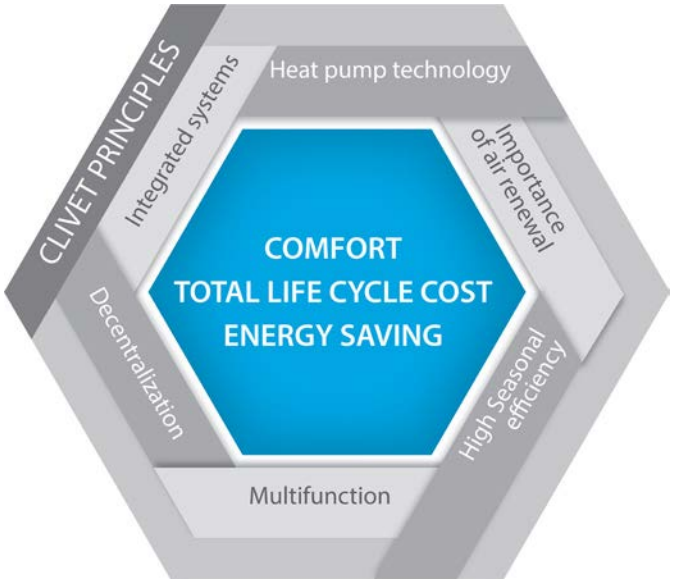
Clivet's business strategy has always been clearly defined as **the development of high efficiency systems.** It has placed its R&D department at the complete disposal of this strategy, investing significant financial and human resources in this area and identifying its mission as **"Comfort & Energy Saving"**, at a time when issues such as **energy saving and high efficiency** were not yet as central to public opinion as they are today.

Clivet principles for the building evaluation

All Clivet systems are based on six key principles that make Clivet's products and systems unique and unrepeatable.

These are the principles which underlie our creation of specialised systems for each application, and are part of Clivet's DNA.

This is the foundation for Clivet's new way of conceiving systems, the reference for the sustainable installations of the future.



ELFOEnergy Ground Medium²

Pre-assembled unit

ELFOEnergy Ground Medium² can be supplied equipped with components that are often provided separately.

- **Reduces design times:** all accessories have been selected to assure outstanding seasonal efficiency.
- **Reduces installation costs:** the accessories are already connected mechanically and electronically wired up, are controlled by a single controller and tested to be ready for immediate use.
- **Reduces overall dimensions:** the construction and layout of the plumbing components at the back of unit makes it possible, when the heating or chilling power demand is very high, to run several units together, considerably reducing the overall footprint and freeing up space for other equipment while facilitating maintenance.

Application versatility

ELFOEnergy Ground Medium² is suited to all types of room heaters, fancoil units, radiant systems and radiators.

Multiple configurations available:

- **Groundwater version and closed loop Geothermal version** on the source side
- **Source and user side hydronic units** with 1 or 2 ON/OFF pumps or VARYFLOW+ , or alternatively 2-way or 3-way modulating valve
- **3-way valve** for domestic hot water preparation

Water flow-rate continuous modulation (optional)

ELFOEnergy Ground Medium² enables adoption of both **source and user side hydronic units.**

The energy used for the vector pumping is fundamental on the seasonal efficiency.

The **VARYFLOW + modulating pumping unit** made up of two pumps in parallel controlled by inverter, allows a precise water flow-rate modulation reducing notably the consumptions and at the same time it guarantees its functionality also in case of temporary unavailability of one of the two pumps, guaranteeing about the 80% of the nominal flow-rate.

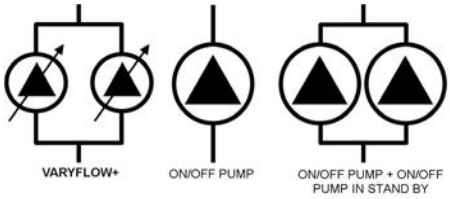
The water flow is modulated by keeping the supply/return water temperature differential constant.

When the system water temperature is critical, the **VARYFLOW+** controls the condensation/evaporation temperature by extending the operating range of ELFOEnergy Ground Medium².

In case of particular installation needs, the hydronic assemblies are also available:

- **ON/OFF pump:** the traditional solution with high available pressure.
- **ON/OFF pump + ON/OFF pump in stand-by:** the solution that favours reliability. The built-in control balances the operating hours of the two pumps and in case of any failure it signals the damage and automatically activates the stand-by pump.
- **2-way or 3-way modulating valves** with electronic control, extend the unit's operating range by modulating the source water flow in relation to temperature.

VARYFLOW+



High energy efficiency in the annual cycle

ELFOEnergy Ground Medium² **reduces yearly energy consumption thanks to its high partial load efficiency,** i.e., by far the most frequent condition throughout the system's life-cycle, which also increases the value of the property served. The main components are manufactured on an industrial scale, with maximum manufacturing reliability.

High energy efficiency recovery between 25% and 75% of the system load

The technology of the ELFOEnergy Ground Medium² sets the energy reference for water source heat pumps. The unit may be equipped with **modular scroll technology, ideal for partial loads, an electronic expansion valve** for a quick and precise response to the actual service demand, and high performance heat exchangers.

The exceptional performance of ELFOEnergy Ground Medium² at partial load makes it much more competitive and efficient than conventional solutions.

The modular scroll is the excellent solution for partial load

ELFOEnergy Ground Medium² employs highly efficient Scroll compressors, with spirals optimised for this type of use.

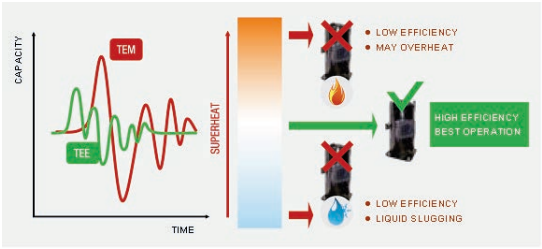
The advantages are:

- Compressors manufactured in large numbers on an industrial scale, with strict quality checks and highest reliability thanks to the high scale mass production volumes.
- The two sizes of Scroll compressors allow for several capacity steps. This way, only the necessary energy is supplied.
- **Efficiency increase that can exceed 50% of the operation with partial load, thanks to the larger thermal exchange surfaces available.**

Electronic expansion valve

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.**

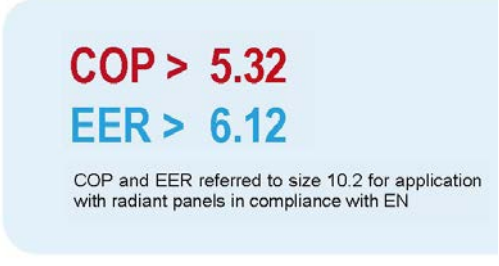
There is also an additional increase in efficiency in comparison to traditional thermostatic mechanical valves (TEM) and a longer compressor life.



Maximum exchange efficiency

The high energy efficiency of ELFOEnergy Ground Medium² is achieved by carefully dimensioning and rating all components.

To ensure optimal exchange in every climatic condition, the unit has been fitted with generously sized exchangers that have an anticondensation external thermal insulation and an anti-freeze heater to prevent ice from forming.



Advanced control

The control system combines in a single solution the operating efficiency and the user-friendliness. Continuously monitoring all of the unit operating parameters, it ensures the maintenance of an optimal energy efficiency. The control includes many safety functions and a complete alarm management.

It also includes advanced functions, such as daily and weekly programming and automatic maximum power consumption limitation (demand limit).

It allows the management of several units in cascade up to 1 master and 6 slave (Ecoshare).

The interface terminal has a backlit graphic display and a multifunction access keypad.

The multilevel menu is protected by different passwords according to the type of user.

Remote control (optional)

The remote control allows accessing to the same functions that are accessible by the built-in unit user interface, and can be installed at a maximum distance of 350 meters.

Remote system management

ELFOEnergy Ground Medium^2 is standard equipped with:

- potential-free contacts for remote display of the compressor status
- setting from user interface: Off / local On / serial On
- potential-free contact to remote any possible alarm

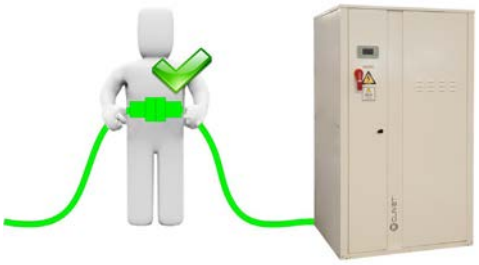
The various communication protocols allow the unit to exchange information with the main supervision systems by means of serial connections.

Controlled power supply

Proper power supply ensures optimal unit operation and protects its many electrical components.

The phase monitor, standard supplied:

- controls the presence and the exact sequence of the phases
- checks any voltage anomalies (-10%)
- automatically restarts the unit as soon as the proper power supply is restored.



Modularity

In the event of particularly large buildings requiring high capacities, it is advisable to use several units.

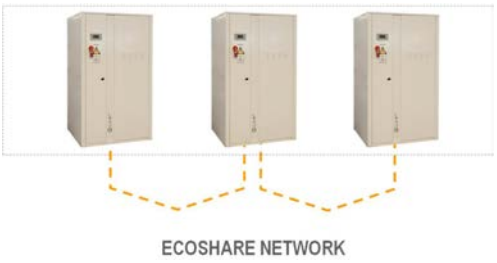
The Ground Medium^2 units are designed to be connected in parallel in modular logic, thereby granting the following advantages:

Increased flexibility, enhanced by the control that can adapt to the load

increased reliability, since the malfunction of one unit does not compromise the capacity supply of the other units.

Increased efficiency, since energy is produced where and when required, according to the served area.

The microprocessor control combined with ECOSHARE allows controlling up to 7 units in local network (1 Master unit and 6 Slave).

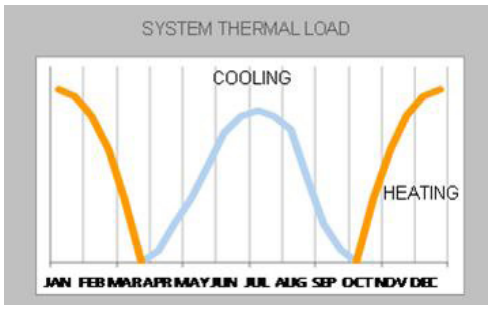


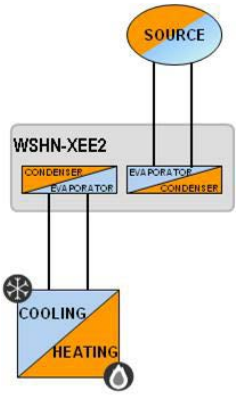
ELFOEnergy Ground Medium²

System solutions

Standard unit:

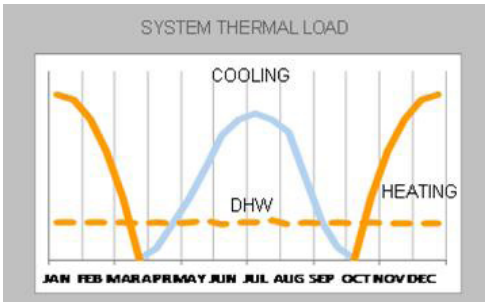
- **Production of chilled or hot water**

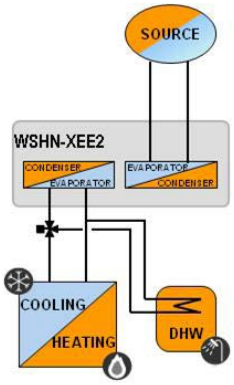




Unit with accessory User side DHW switching valve

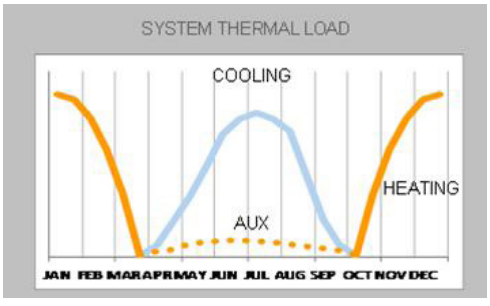
- **Production of chilled or hot water**
- **Priority hot water production with 3-way valve**

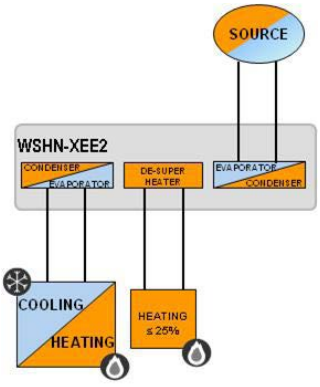




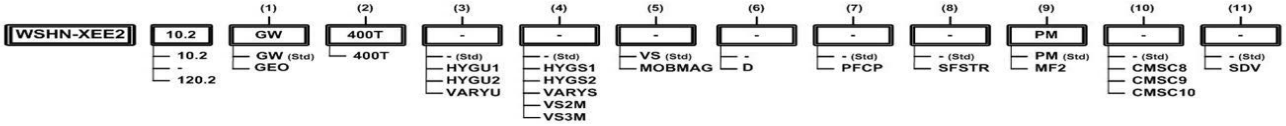
Unit with Partial energy recovery option

- **Production of chilled or hot water**
- **Free production of hot water from partial energy recovery**





Unit configuration



(1) Version
GW - Groundwater version (standard)
GEO - Version for Geothermal application

(2) Voltage
Supply voltage 400/3/50

(3) User side hydronic unit
Refer to the diagrams of the hydronic assembly reported

(4) Source side hydronic unit
Refer to the diagrams of the hydronic assembly reported

(5) Larger units
VS - Standard units
MOBMAG - Larger units

(6) Partial recovery device
(-) not required (standard)
D - Partial energy recovery (only for sizes from 10.2 to 90.2)

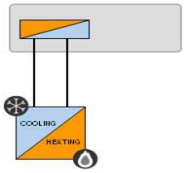
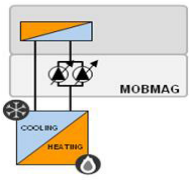
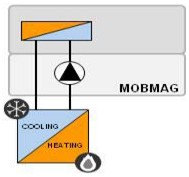
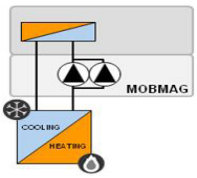
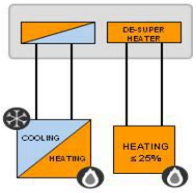
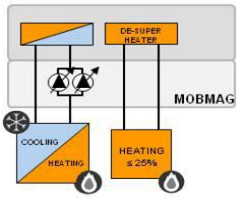
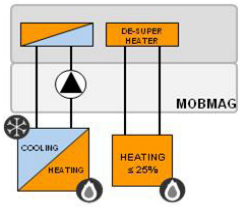
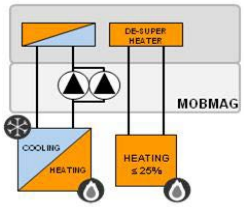
(7) Power capacitors
(-) not required (standard)
PFCP - Power factor correction capacitors (cosfi > 0.9)

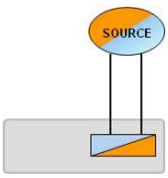
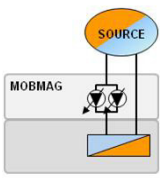
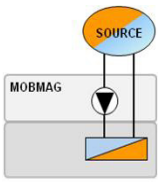
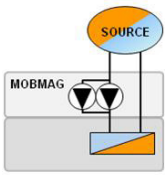
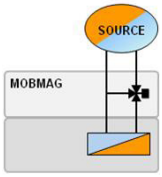
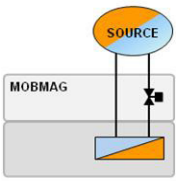
(8) Soft starter
(-) not required (standard)
SFSTR - Disposal for inrush current reduction (in the range between 10.2 and 80.2)

(9) Phase monitor
PM - Phase monitor (standard)
MF2 - Multi-function phase monitor

(10) Communication modules
(-) not required (standard)
CMSC8 - Serial communication module for BACnet supervisor
CMSC9 - Serial communication module for Modbus supervisor
CMSC10 - Serial communication module for LonWorks supervisor

(11) Cutoff valve
(-) not required (standard)
SDV - Cutoff valve on compressor supply and return (only for sizes from 10.2 to 80.2)

Functions	Diagram hydronic assemblies - User side			
2 PIPE SYSTEM Hot or chilled water production for installation	Standard unit (Std) 	Unit with VARYFLOW + (VARYU) 	Unit with one ON/OFF pump (HYGU1) 	Unit with two ON/OFF pumps (HYGU2) 
2 PIPE SYSTEM + PARTIAL RECOVERY Hot or chilled water production for installation - Hot water free production from total recovery	Unit with partial recovery (D) 	Unit with partial recovery and VARYFLOW + (D+VARYP) 	Unit with partial recovery and ON/OFF pump (D+HYG1) 	Unit with partial recovery and two ON/OFF pumps (D+HYG2) 

Functions	Diagram hydronic assemblies - Source side					
2 PIPE SYSTEM	Standard unit (Std) 	Unit with VARYFLOW + (VARYS) 	Unit with one ON/OFF pump (HYGS1) 	Unit with one ON/OFF pump (HYGS2) 	Unit with 3-way modulating valve (VS3M) 	Unit with 2-way modulating valve (VS2M) 

Accessories separately supplied			
• **SPCX** - Set point compensation with outside temperature probe • **RCTX** - Remote control	• **BACX** - BACnet serial communication module • **CMMBX** - Serial communication module to supervisor (Modbus) • **CMSLWX** - LonWorks serial communication module	• **VS2MX** - Source side 2-way modulating valve • **VS3MX** - Source side 3-way modulating valve • **VACSUX** - Utility side DHW switching valve	• **AVIBX** - Antivibration supports • **IFWX** - Steel mesh strainer on water side

General technical data

Groundwater version

Size			10.2	12.2	14.2	16.2	19.2	22.2	27.2	30.2	35.2	40.2	43.2	45.2	50.2	55.2	60.2	70.2	80.2	90.2	100.2	120.2
Radiant panels																						
Heating																						
Heating capacity (EN14511:2013)	1		35,0	41,1	49,1	58,0	68,8	81,4	94,8	107	120	141	152	162	183	200	223	258	286	321	351	421
Total power input (EN14511:2013)	2		6,58	7,77	9,47	11,1	13,1	16,2	17,7	20,6	23,6	27,0	29,9	32,8	34,7	38,5	43,7	49,1	55,7	63,1	68,9	82,7
COP (EN 14511:2013)	3		5,32	5,29	5,18	5,23	5,27	5,02	5,36	5,19	5,10	5,21	5,10	4,93	5,28	5,21	5,11	5,25	5,13	5,10	5,10	5,10
ErP Space Heating Energy Class - AVERAGE Climate - W35	12		A+++	A+++	A+++	A+++		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SCOP - AVERAGE Climate - W35	13		5,80	5,69	5,44	5,45	5,47	4,85	5,97	5,82	5,67	5,84	5,64	5,68	5,78	5,68	5,55	5,63	5,45	5,48	5,76	5,61
Cooling																						
Cooling capacity (EN14511:2013)	6	kW	40,3	47,1	56,1	66,6	79,1	92,6	108	121	135	162	179	189	212	229	155	295	325	360	393	468
Total power input (EN14511:2013)	2	kW	6,59	8,15	10,1	11,7	13,7	16,7	18,5	21,4	25,2	28,5	32,3	34,2	37,2	40,9	46,7	53,6	61,6	66,2	72,9	86,9
EER (EN 14511:2013)	7		6,12	5,78	5,58	5,68	5,76	5,55	5,84	5,66	5,35	5,70	5,52	5,52	5,69	5,60	5,46	5,51	5,27	5,43	5,39	5,38
Terminal units																						
Heating																						
Heating capacity (EN14511:2013)	4		34,4	40,4	48,0	56,8	67,0	79,5	93,8	107	119	139	151	163	178	195	218	252	280	314	343	408
Total power input (EN14511:2013)	2		8,18	9,65	11,6	13,4	15,7	19,1	21,4	24,7	28,3	32,3	36,0	38,4	41,3	45,7	51,9	58,0	65,5	75,3	82,5	100
COP (EN 14511:2013)	3		4,20	4,19	4,15	4,25	4,27	4,15	4,38	4,32	4,21	4,30	4,18	4,24	4,32	4,27	4,20	4,34	4,27	4,17	4,16	4,07
Cooling																						
Cooling capacity (EN14511:2013)	8		29,2	34,4	40,7	48,4	57,7	67,6	82,0	91,8	102	120	131	138	155	168	187	217	240	265	292	347
Total power input (EN14511:2013)	2		6,40	7,50	9,10	10,6	12,5	15,4	17,5	20,5	23,6	26,8	29,9	31,7	34,2	37,7	42,6	48,2	54,5	61,4	67,8	81,7
EER (EN 14511:2013)	7		4,57	4,58	4,47	4,56	4,62	4,38	4,68	4,49	4,32	4,47	4,38	4,37	4,52	4,46	4,38	4,50	4,40	4,31	4,31	4,25
SEER	13		5,29	5,22	4,55	4,59	4,79	4,71	5,14	4,95	5,07	5,15	4,95	5,25	5,16	5,02	4,89	5,08	4,78	4,93	4,96	4,84
Radiators																						
Heating																						
Heating capacity (EN14511:2013)	5		31,7	37,6	44,6	52,4	61,6	73,2	88,3	99,4	112	132	145	154	166	181	202	233	259	291	314	375
Total power input (EN14511:2013)	2		10,3	12,2	14,4	16,5	19,4	23,0	26,3	29,8	34,7	39,4	44,3	47,0	50,7	55,8	63,3	70,2	78,6	92,5	103	127
COP (EN 14511:2013)	3		3,08	3,09	3,10	3,17	3,18	3,18	3,35	3,33	3,24	3,35	3,26	3,27	3,27	3,24	3,19	3,32	3,29	3,15	3,05	2,96
ErP Space Heating Energy Class - AVERAGE Climate - W55	12		A+++	A+++	A+++	A+++	A+++	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SCOP - AVERAGE Climate - W55	13		4,55	4,51	4,41	4,35	4,36	4,40	4,83	4,73	4,60	4,69	4,60	4,67	4,71	4,64	4,61	4,69	4,65	4,59	4,67	4,52
Compressor																						
Type of compressors			Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
No. of compressors		No	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Std Capacity control steps		No	3	3	2	3	3	3	3	2	3	3	3	3	3	3	2	3	2	3	3	2
Oil charge		l	3,00	3,00	3,00	6,00	6,00	6,00	7,00	7,00	8,00	10,0	12,0	11,0	11,0	13,0	13,0	13,0	13,0	13,0	13,0	13,0
Refrigerant charge		kg	3,5	3,6	3,8	6,5	6,5	6,7	16	14	15	18	18	18	21	21	25	28	29	30	35	35
Refrigeration circuits		No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Internal exchanger																						
Type of internal exchanger	9		PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE
No. of internal exchangers		No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water flow-rate (User Side)	8	l/s	1,40	1,70	2,00	2,30	2,80	3,30	3,90	4,40	4,90	5,70	6,30	6,60	7,40	8,10	9,00	10,4	11,5	12,7	14,4	16,7
External exchanger																						
Type of external exchanger	9		PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE
No. of external exchangers		No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water flow rate (Source Side)	8	l/s	1,70	2,00	2,40	2,80	3,30	4,00	4,70	5,40	6,00	7,00	7,70	8,10	9,00	9,80	10,9	12,6	14,0	15,6	17,6	20,5
Connections																						
Water fittings (Standard units)			1"1/4	1"1/4	1"1/4	1"1/4	1"1/4	1"1/4	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	3"	3"
Water fittings (Large units)			2"	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	4"	4"
Water circuit																						
Maximum water side pressure	10	MPa	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Min. installation water contents	11	l	236	227	357	380	364	334	578	795	757	758	960	716	938	1239	1622	1600	2082	1379	1924	3023
Power supply																						
Standard power supply		V	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50

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. Data referred to the following conditions: Internal exchanger water 30/35 °C. External exchanger water 10/7 °C. Performance data calculated with reference to EN14511:2013
2. The total power draw is calculated by adding the compressor's power draw + the draw required to overcome the internal service and source side pressure drops + the control circuit power draw
3. COP (EN 14511:2013) heating performance coefficient. Ratio between delivered heating capacity and power input in compliance with EN 14511:2013
4. Data referred to the following conditions: Internal exchanger water 40/45 °C. External exchanger water 10/7 °C. Performance data calculated with reference to EN14511:2013
5. Data referred to the following conditions: Internal exchanger water 50/55 °C. External exchanger water 10/7 °C. Performance data calculated with reference to EN14511:2013
6. Data referred to the following conditions: Internal exchanger water 23/18 °C. External exchanger water 30/35 °C. Performance data calculated with reference to EN14511:2013
7. EER (EN 14511:2013) cooling performance coefficient. Ratio between delivered cooling capacity and power input in compliance with EN 14511:2013
8. Data referred to the following conditions: Internal exchanger water 12/7°C. External exchanger water 30/35 °C. Performance data calculated with reference to EN14511:2013
9. PHE = plate exchanger
10. Conditions for the circuit on the utility side and the circuit on the source side. In configurations with hydronic units, the maximum pressure on the water side is 600 kPa.
11. Seasonal Space Heating Energy Efficiency Class according to Commission delegated Regulation (EU) No 811/2013. W = Water outlet temperature (°C)
12. The minimum system water content calculated value does not consider the internal exchanger water content. With applications or low medium requested loads, the minimum installation water volume is obtained doubling the indicated value
13. Data calculated according to the EN 14825:2016 Regulation

General technical data

Geothermic version

Size			10.2	12.2	14.2	16.2	19.2	22.2	27.2	30.2	35.2	40.2	43.2	45.2	50.2	55.2	60.2	70.2	80.2	90.2	100.2	120.2
Radiant panels																						
Heating																						
Heating capacity (EN14511:2013)	1		27,8	32,6	37,9	45,3	54,3	63,4	75,3	85,1	95,7	111	121	129	141	156	173	196	218	247	266	312
Total power input (EN14511:2013)	2		6,47	7,55	8,83	10,5	12,4	14,8	16,8	19,4	22,2	25,6	28,2	30,0	32,5	35,9	40,3	45,3	50,7	59,2	64,3	78,4
COP (EN 14511:2013)	3		4,30	4,32	4,30	4,31	4,37	4,30	4,49	4,39	4,31	4,33	4,30	4,31	4,34	4,33	4,30	4,34	4,31	4,17	4,14	3,98
Cooling																						
Cooling capacity (EN14511:2013)	6		37,8	43,7	50,8	61,3	76,4	87,9	106	119	135	156	172	183	202	221	247	281	310	357	399	467
Total power input (EN14511:2013)	2		7,31	9,08	11,2	12,8	14,3	17,5	18,3	21,1	25,1	28,6	32,1	33,4	37,3	40,7	46,2	53,4	61,4	68,4	75,8	91,0
EER (EN 14511:2013)	7		5,17	4,82	4,55	4,78	5,34	5,02	5,79	5,63	5,40	5,45	5,37	5,49	5,42	5,42	5,33	5,26	5,04	5,22	5,26	5,12
Terminal units																						
Heating																						
Heating capacity (EN14511:2013)	4		27,4	32,2	37,5	44,7	53,1	62,3	73,5	83,0	93,4	108	119	127	138	153	170	194	214	244	263	309
Total power input (EN14511:2013)	2		8,30	9,60	11,0	13,1	15,4	18,3	20,6	23,4	27,1	31,0	34,4	36,6	39,6	43,9	49,7	55,2	61,6	72,6	78,6	96,4
COP (EN 14511:2013)	3		3,29	3,36	3,40	3,41	3,46	3,40	3,57	3,54	3,45	3,50	3,44	3,47	3,49	3,48	3,42	3,51	3,48	3,36	3,34	3,21
Cooling																						
Cooling capacity (EN14511:2013)	8	kW	28,5	33,2	38,2	45,8	57,0	65,6	80,8	90,9	103	119	130	142	153	167	187	213	237	264	296	343
Total power input (EN14511:2013)	2	kW	7,00	8,30	10,1	11,6	13,0	16,1	17,5	20,3	23,5	26,9	29,8	31,4	34,5	37,6	42,6	48,5	55,0	62,8	69,4	84,2
EER (EN 14511:2013)	7		4,06	3,98	3,78	3,96	4,39	4,09	4,63	4,48	4,36	4,41	4,37	4,52	4,44	4,45	4,39	4,39	4,33	4,22	4,27	4,08
Radiators																						
Heating																						
Heating capacity (EN14511:2013)	5	kW	25,7	30,5	35,3	42,0	49,6	58,7	68,3	77,9	87,7	101	111	120	130	144	162	183	202	228	245	288
Total power input (EN14511:2013)	2	kW	10,5	12,2	14,0	16,5	19,2	22,5	25,8	29,1	33,7	38,2	42,7	45,4	49,3	54,3	61,7	67,9	75,1	90,5	98,0	122
COP (EN 14511:2013)	3		2,44	2,51	2,52	2,55	2,58	2,61	2,64	2,68	2,60	2,65	2,61	2,65	2,65	2,65	2,63	2,70	2,70	2,51	2,50	2,36
Compressor																						
Type of compressors			Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
No. of compressors		No	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Std Capacity control steps		No	3	3	2	3	3	3	3	2	3	3	3	3	3	3	2	3	2	3	3	2
Oil charge		l	3,00	3,00	3,00	6,00	6,00	6,00	7,00	7,00	8,00	10,0	12,0	11,0	11,0	13,0	13,0	13,0	13,0	13,0	13,0	13,0
Refrigerant charge		kg	3,5	3,6	3,9	6,6	6,7	6,8	16	14	17	19	19	19	24	25	28	32	33	30	35	35
Refrigeration circuits		No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Internal exchanger																						
Type of internal exchanger	9		PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE
No. of internal exchangers		No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water flow-rate (User Side)	8	l/s	1,40	1,60	1,80	2,20	2,70	3,20	3,90	4,40	5,10	5,70	6,30	6,80	7,50	8,30	9,00	10,2	11,4	12,6	14,2	16,5
External exchanger																						
Type of external exchanger	9		PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE
No. of external exchanger		No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water flow rate (Source Side)	8	l/s	1,80	2,10	2,50	2,90	3,60	4,10	5,0	5,7	6,4	7,4	8,2	8,9	9,6	10,5	11,7	13,4	14,9	16,6	18,7	21,8
Connections																						
Water fittings (Standard units)			1’1/4	1’1/4	1’1/4	1’1/4	1’1/4	1’1/4	2’1/2	2’1/2	2’1/2	2’1/2	2’1/2	2’1/2	2’1/2	2’1/2	2’1/2	2’1/2	2’1/2	2’1/2	3’	3’
Water fittings (Large units)			2’	2’	2’	2’	2’	2’	3’	3’	3’	3’	3’	3’	3’	3’	3’	3’	3’	3’	4’	4’
Power supply																						
Standard power supply		V	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50

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. Data referred to the following conditions: Internal exchanger water 30/35 °C. External exchanger water 0/-3 °C. Operation with 30% source side mixture of water and propylene glycol. Performance data calculated with reference to EN14511:2013
2. The total power draw is calculated by adding the compressor's power draw + the draw required to overcome the internal service and source side pressure drops + the control circuit power draw
3. COP (EN 14511:2013) heating performance coefficient. Ratio between delivered heating capacity and power input in compliance with EN 14511:2013
4. Data referred to the following conditions: Internal exchanger water 40/45°C. External exchanger water 0/-3 °C. Operation with 30% source side mixture of water and propylene glycol. Performance data calculated with reference to EN14511:2013
5. Data referred to the following conditions: Internal exchanger water 50/55°C. External exchanger water 0/-3 °C. Operation with 30% source side mixture of water and propylene glycol. Performance data calculated with reference to EN14511:2013
6. Data referred to the following conditions: Internal exchanger water 23/18 °C. External exchanger water 30/35 °C. Operation with 30% source side mixture of water and propylene glycol. Performance data calculated with reference to EN14511:2013
7. EER (EN 14511:2013) cooling performance coefficient. Ratio between delivered cooling capacity and power input in compliance with EN 14511:2013
8. Data referred to the following conditions: Internal exchanger water 12/7°C. External exchanger water 30/35 °C. Operation with 30% source side mixture of water and propylene glycol. Performance data calculated with reference to EN14511:2013
9. PHE = plate exchanger

Electrical data

Supply voltage 400/3/50

Size			10.2	12.2	14.2	16.2	19.2	22.2	27.2	30.2	35.2	40.2	43.2	45.2	50.2	55.2	60.2	70.2	80.2	90.2	100.2	120.2
F.L.A. - Full load current at max admissible conditions																						
F.L.A. - Total		A	19,9	23,8	28,9	31,5	36,4	44,9	51,8	60,3	66,8	74,9	81,4	89,6	96,1	104	119	133	148	173	188	228
F.L.I. - Full load power input at max admissible conditions																						
F.L.I. - Total		kW	11,9	14,0	16,8	19,5	22,4	26,3	30,2	34,1	39,6	44,6	50,2	53,1	58,7	63,7	72,2	81,0	90,0	106	116	140
M.I.C. Maximum inrush current																						
M.I.C. - Value		A	73,7	111	116	126	133	189	196	204	256	302	309	340	347	355	370	468	482	443	458	499
M.I.C. with soft start accessory		A	44,9	65,2	70,3	76,2	80,0	111	118	126	154	180	187	201	208	216	230	284	299	-	-	-

Electrical data refer to standard units; according to the installed accessories, the data can suffer some variations.
Power supply: 400/3/50 Hz. Voltage variation: max. +/-10%
Voltage unbalance between phases: max 2 %
For non standard voltage please contact Clivet technical office
Units are in compliance with the europeans law CEI EN 60204 and CEI EN 60335

Sound levels

Size	Sound power level (dB)								Sound power level	Sound pressure level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
10.2	78	70	62	52	52	43	41	40	60	44
12.2	78	69	62	56	52	44	43	38	60	44
14.2	78	67	61	57	54	46	44	39	60	45
16.2	78	71	66	63	53	49	46	41	64	49
19.2	78	73	67	63	55	51	47	42	65	49
22.2	78	73	65	62	55	52	47	42	64	49
27.2	78	73	66	62	56	54	49	44	64	49
30.2	78	74	63	60	56	54	48	44	64	49
35.2	81	83	80	67	61	61	52	45	74	58
40.2	81	79	80	67	65	63	55	50	74	58
43.2	81	83	83	69	66	65	56	49	77	60
45.2	81	78	80	69	66	62	55	48	74	58
50.2	81	83	83	70	67	64	56	47	77	60
55.2	81	80	83	70	68	65	57	50	77	60
60.2	81	80	83	71	69	65	57	50	77	61
70.2	82	80	85	73	72	68	60	51	79	63
80.2	82	80	85	73	74	70	61	52	80	63
90.2	83	81	86	74	75	71	62	53	81	64
100.2	83	81	86	74	75	71	62	53	81	64
120.2	84	82	87	75	76	72	63	54	82	65

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:
Entering / leaving exchanger water temperature user side 12/7°C
Entering / leaving exchanger water temperature source side 30/35°C

Admissible water flow rates

Min. (Qmin) and max. (Qmax) water flow-rates admissibles for the correct unit operation.

SIZE			10.2	12.2	14.2	16.2	19.2	22.2	27.2	30.2	35.2	40.2	43.2	45.2	50.2	55.2	60.2	70.2	80.2	90.2	100.2	120.2
User side	Qmin	[l/s]	0,8	0,8	0,8	1,0	1,1	1,1	1,8	1,8	1,8	2,4	2,4	2,4	2,9	2,9	2,9	3,8	3,8	5,3	9,5	10,5
	Qmax	[l/s]	4,2	4,2	4,3	4,8	4,9	5,1	8,8	8,8	9,3	11,4	11,9	12,2	14,4	15	15,4	18,3	19,0	23,5	28,0	29,0
Source side	Qmin	[l/s]	0,8	0,8	0,8	1,0	1,1	1,1	2,2	2,2	2,2	2,9	2,9	2,9	3,6	3,6	3,6	4,3	4,3	5,3	9,5	10,5
	Qmax	[l/s]	4,2	4,2	4,3	4,8	4,9	5,1	11	11,5	11,5	14,4	14,7	15	17,7	18,0	18,5	21,3	21,7	23,0	28,0	30,0

Correction factors for glycol use

% ethylene glycol by weight		5%	10%	15%	20%	25%	30%	35%	40%
Freezing temperature	°C	-2,0	-3,9	-6,5	-8,9	-11,8	-15,6	-19,0	-23,4
Safety temperature	°C	3,0	1,0	-1,0	-4,0	-6,0	-10,0	-14,0	-19,0
INTERNAL exchanger chiller power factor	–	0,995	0,990	0,985	0,981	0,977	0,974	0,971	0,968
INTERNAL exchanger chiller power factor	–	0,997	0,993	0,990	0,988	0,986	0,984	0,982	1,124
INTERNAL exchanger glycol solution flow factor	–	1,003	1,010	1,020	1,033	1,050	1,072	1,095	1,124
INTERNAL exchanger pressure drop factor	–	1,029	1,060	1,090	1,118	1,149	1,182	1,211	1,243
EXTERNAL exchanger chiller power factor	–	0,999	0,997	0,995	0,992	0,989	0,986	0,983	0,979
EXTERNAL exchanger compressor power draw factor	–	1,003	1,006	1,009	1,031	1,043	1,056	1,071	1,088
EXTERNAL exchanger glycol solution Flow-rate factor	–	1,004	1,011	1,020	1,031	1,043	1,056	1,071	1,088
EXTERNAL exchanger pressure drop factor	–	1,027	1,062	1,103	1,149	1,200	1,256	1,318	1,387

Fouling Correction Factors

	Internal exchanger		External exchanger	
m^2 °C/W	F1	FK1	F1	FK1
0,44 x 10^(-4)	1,00	1,00	1,00	1,00
0,88 x 10^(-4)	0,97	0,99	0,97	1,08
1,76 x 10^(-4)	0,94	0,98	0,92	1,05

F1 = Cooling capacity correction factors
FK1 = Compressor power input correction factor

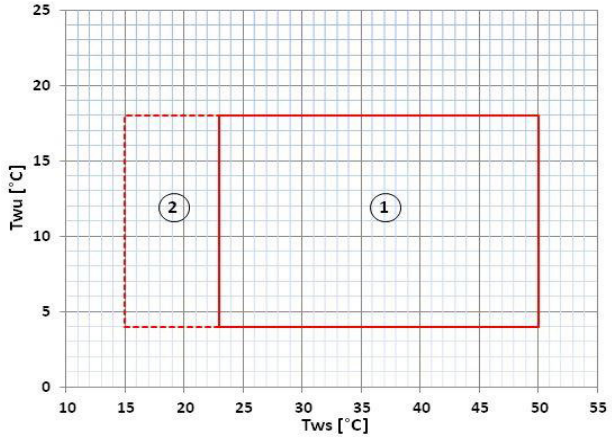
Overload and control device calibrations

		Intervention	Reset	Value
High pressure switch (gas side)	kPa	4050	3300	–
Low pressure switch (gas side)	kPa	450	600	–
Low pressure switch (gas side) (GEO)	bar	200	350	–
Antifreeze protection	°C	4	6,0	–
high pressure safety valve (gas side)	kPa	–	–	4500
Low pressure safety valve (gas side)	kPa	–	–	3000
Max no. of compressor starts per hour (gas side)	No	–	–	10
Differential pressure switch (water side)	[kPa]	3	5	-
Max. pressure without hydronic assembly (water side)	[kPa]	-	-	1000
Max. pressure with hydronic assembly (water side)	[kPa]	-	-	600
Safety valve calibration (water side) (1)	[kPa]	-	-	600

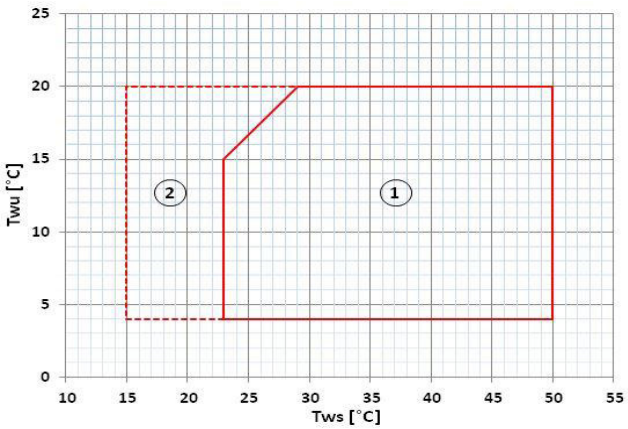
(1) Available only with hydronic assembly option

Operating Range (Cooling)

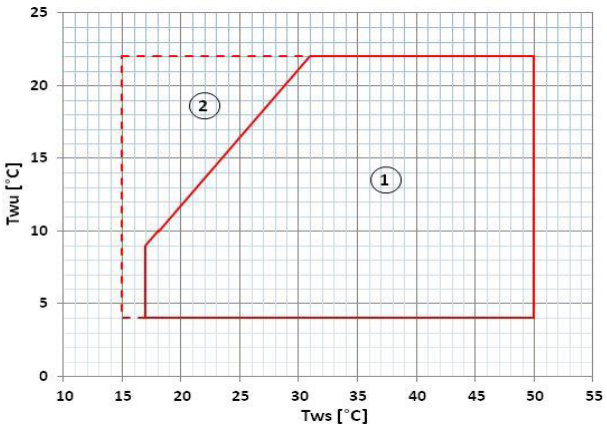
Size 10.2 - 12.2 - 14.2



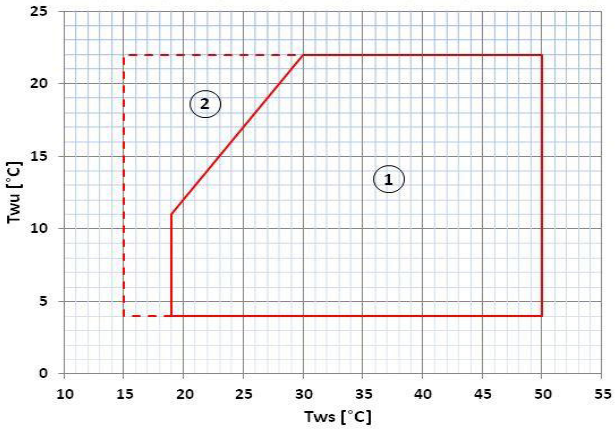
Size 16.2



Size 19.2-22.2-27.2-30.2-35.2-40.2-45.2



Sizes 43.2-50.2-55.2-60.2-70.2-80.2-90.2-100.2-120.2

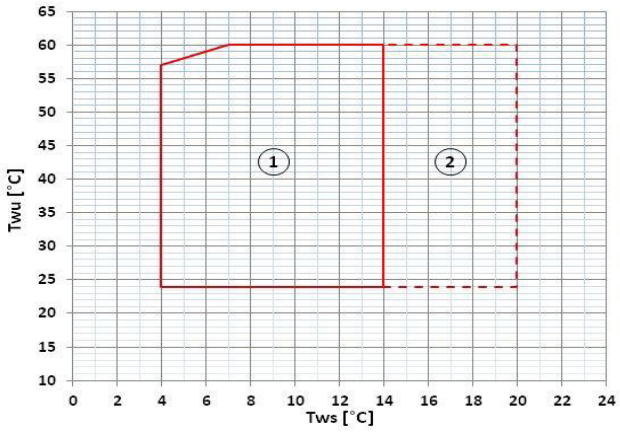


Twu [°C] = Leaving water temperature user side
Tws [°C] = Leaving water temperature source side
The limits refer to DT=5 °C on both the user and source sides

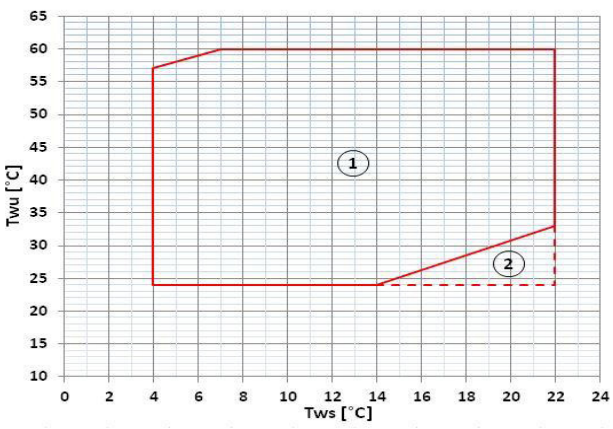
1. Normal operating range
2. Operating range with modulating valve on source side in regulation mode (optional configurations)

Operating Range (Heating) - Groundwater

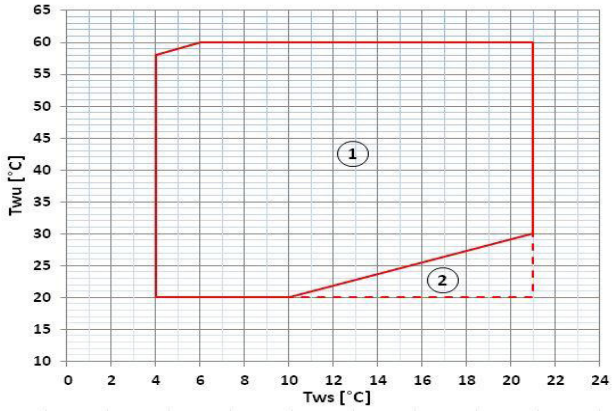
Size 10.2 - 12.2 - 14.2



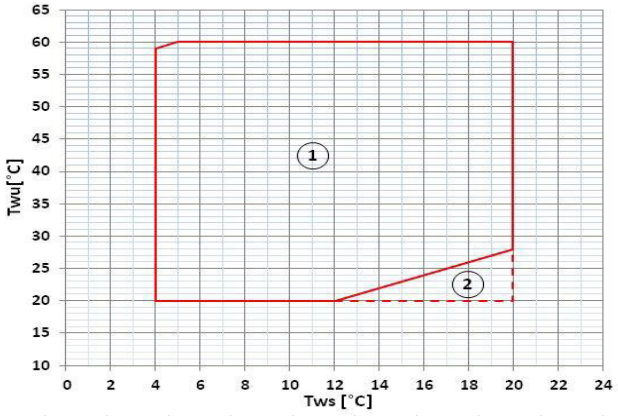
Size 16.2



Size 19.2-22.2-27.2-30.2-35.2-40.2-45.2



Sizes 43.2-50.2-55.2-60.2-70.2-80.2-90.2-100.2-120.2

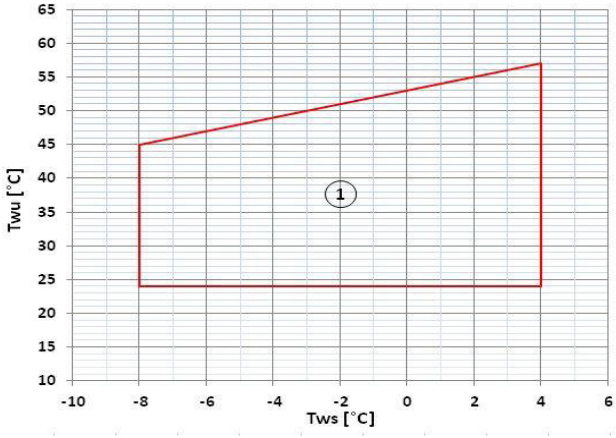


Twu [°C] = Leaving water temperature user side
Tws [°C] = Leaving water temperature source side
The limits refer to DT=5 °C on both the user and source sides

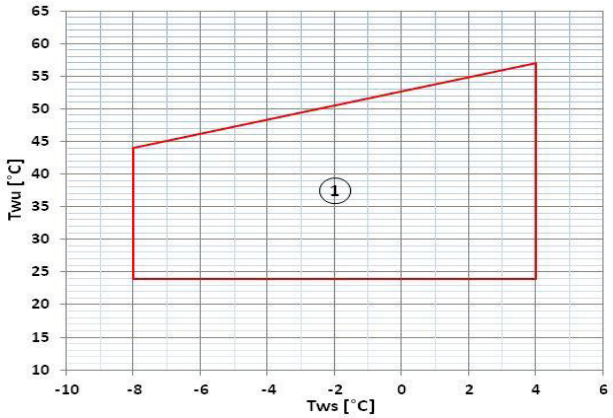
1. Normal operating range
2. Operating range with modulating valve on source side in regulation mode (optional configurations)

Operating Range (Heating) - Geothermal

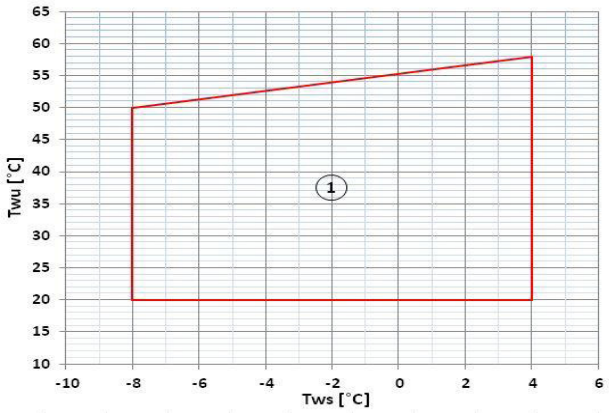
Size 10.2 - 12.2 - 14.2



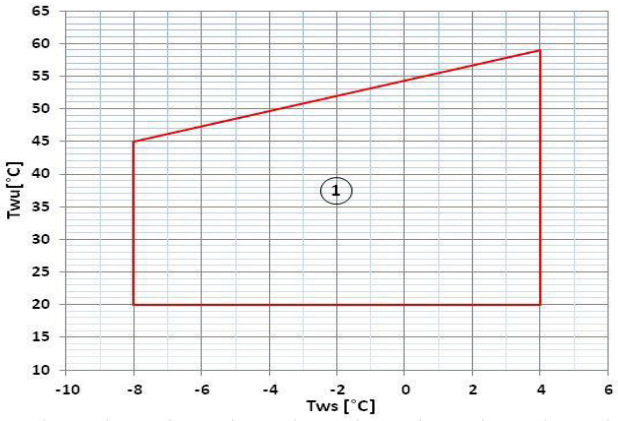
Size 16.2



Size 19.2-22.2-27.2-30.2-35.2-40.2-45.2



Sizes 43.2-50.2-55.2-60.2-70.2-80.2-90.2-100.2-120.2



Twu [°C] = Leaving water temperature user side
Tws [°C] = Leaving water temperature source side
The limits refer to DT=5 °C on both the user and source sides

1. Operating range where it is obligatory the use of water and glycol mixture depending on the outlet water temperature from the heat exchanger source side

Standard unit technical specifications

Compressor

Hermetic Scroll compressors with orbiting spiral, equipped with motor protective device for overtemperatures, overcurrents and excessive temperatures of the supply gas. They are mounted on rubber antivibration mounts and comes with a full oil charge. The compressors come with a thermal and acoustic insulation jacket. An automatic oil heater prevents the oil from being diluted by the refrigerant when the compressor stops. The compressors are connected in TANDEM on a single refrigerating circuit and have a biphasic oil equalisation.

Structure

Supporting structure made with zinc-magnesium sheet metal that ensures excellent mechanical features and high long-term resistance against corrosion.

Panelling

External panelling in zinc-magnesium sheet, prepainted RAL 9003, clad internally with heatproof and soundproof material. The panels are easy to remove when access to the internal components is required.

User side exchanger

Direct expansion heat exchanger with braze welded stainless steel INOX AISI 316 plates and complete with external thermal/anti-condensation insulation.

The exchanger has Victaulic hydraulic connections.

Source side exchanger

Direct expansion heat exchanger with braze welded stainless steel INOX AISI 316 plates and complete with external thermal/anti-condensation insulation.

The exchanger has Victaulic hydraulic connections.

Refrigeration circuit

Refrigeration circuit with:

- anti-acid dehydrator filter
- liquid flow and moisture indicator
- electronic expansion valve
- inversion valve of the 4-way cycle
- safety high pressure switch
- low pressure transducer
- high pressure transducer
- high pressure safety valve
- low pressure safety valve
- refrigerant charge

Water circuit

User side

- victaulic connection joints
- differential pressure switch, water side
- drain cock (with hydronic units)
- minimum circuit charge pressure switch (with hydronic units)
- safety valve (with hydronic units)

Source side

- victaulic connection joints
- differential pressure switch, water side
- drain cock (with hydronic units)
- minimum circuit charge pressure switch (with hydronic units)
- safety valve (with hydronic units)

Electrical panel

The capacity section includes:

- main door lock isolator switch
- isolating transformer for auxiliary circuit power supply
- compressor overload protection (in the range between 10.2 and 80.2)
- compressor protection fuse (in the range between 90.2 and 120.2)
- compressor control contactor
- double winding on compressor for reduction of inrush current (in the range between 90.2 and 120.2)

The control section includes:

- interface terminal with graphic display
- display of the set values, the error codes and the parameter index
- keys for ON/OFF control, cool and heat operating modes, alarm reset
- proportional-integral water temperature control
- daily, weekly programmer of temperature set-point and unit on/off
- set-point compensation with 0-10 V signal
- unit switching on management by local or remote (serial)
- antifreeze protection water side
- compressor overload protection and timer
- prealarm function for water antifreeze and high refrigerant gas pressure
- self-diagnosis system with immediate display of the fault code
- automatic rotation control for compressor starts
- compressor operating hour display
- Input for remote ON/OFF control
- potential-free contact for summer / winter change
- dry contacts to control the cumulative alarm signal remotely
- inlet for demand limit (power input limitation according to a 0÷10V external signal)
- double setpoint enabling
- potential-free contacts for compressor status
- phase monitor
- ECOSHARE function for the automatic management of a group of units
- 0÷10V signal output and potential-free contact for auxiliary heater
- enabling of DHW preparation in relation to remote consent
- numeration of electrical panel cables
- designed for natural cooling management (provided by the customer)
- configuration for single on/off pump or service and source side modulating valve

Accessories

- IFWX - Steel mesh strainer on the water side
- SPCX - Set point compensation with outdoor air temperature probe
- VS2MX - Source side 2-way modulating valve
- VS3MX - Source side 3-way modulating valve
- VACSUX - Utility side DHW switching valve
- CMMBX - Serial communication module to supervisor (Modbus)
- CMSLWX - LonWorks serial communication module
- BACX - BACnet serial communication module
- AVIBX - Anti-vibration mount supports
- RCTX - Remote control

Electronic control

Description of step start-up control

The electronic control allows to manage the unit depending on the requested load.

The compressor power steps are activated to maximise efficiency from the lowest to the highest setting.

Main controls

Leaving water temperature control with PID algorithm: it keeps the leaving mean temperature to a set value.

- Auto-adaptive switching on differential: guarantees the compressors minimum operating time in systems with low water content.
- Condensation control based on pressure
- Pre-alarms at automatic reset: in case of alarm it is allowed a certain number of restarts before the definitive lock.
- Compressor operating hour calculation
- Compressor start calculation
- Control and continuous management of the compressor operating conditions to guarantee the unit operating also in extreme conditions
- Water temperature check (when used) to avoid the pipe freezing
- Alarm log
- Autostart after voltage drop
- Local or remote control

Unit status display

By the user interface is possible to display:

- Unit operating mode and status
- Leaving/entering water temperature
- Chiller circuit temperatures and pressures
- Signalling of alarms and anomalies in progress.

Probe, transducer and parameter display

A user interface dedicated section allows the maintenance or technical assistance personnel to control the unit operating stata.

This section is accessible only by specialized personnel.

Management of more units in cascade (ECOSHARE)

It allows the management of several units hydraulically connected up to 1 master and 6 slave maximum.

Units must be of the same type: all reversible heat pumps, or all cool only, or all heat only.

Sizes can be different.

The communication among the units is via a BUS serial cable allowing:

- Supply water set-point setting of the slave units
- Setting of logics that increase the system energy efficiency
- Unit operating hours balancing
- Unit management in case of damage (only on slave unit)
- Hydronic assembly switch-off management of units not used

Remote control (RCTX)

The remote control allows the full control of all unit functions from remote position.

It can be easily installed on the wall and has the same aspect and functions of the user interface on the unit.

Natural Cooling functions

Enabling the Natural Cooling functions, the unit is able to independently manage a system for cold production using source water in the event the temperature conditions of the fluid are favorable.

In this case, the source is managed as if it were the first unit available capacity step and can be used to cover the 100% of the cooling load or also, in integration to the compressors, to cover a part of the cold demand by resetting or reducing the compressor power input.

The Natural Cooling installation should include the following additional components (not supplied by Clivet):

1) Natural Cooling water/water exchanger (SCNC in the main scheme): this exchanger shall be suitably dimensioned according to the fluid temperature, user and source side, and according to the pressure drop of the remaining part of the installation and to the unit available static pressure if pumps are not built-in.

2) Two 3-way on/off or equivalent valves (VNCS and VNCU in the main scheme): one on the source circuit and one on the user circuit. Also these have to be suitably dimensioned according to the expected flow rates.

For the correct operation of the Natural Cooling function, the set point control must be set on supply (parameter 436 Tiporeg).

In the installation set up phase it will be necessary to remotely the probe on the source input water upstream of the switching valve source side (VNCS).

The unit can be selected with or without hydronic assemblies user and source side: the system must be able to absorb/manage the flow rate/head variations due to the heater change after the Natural Cooling exchanger insertion and exclusion.

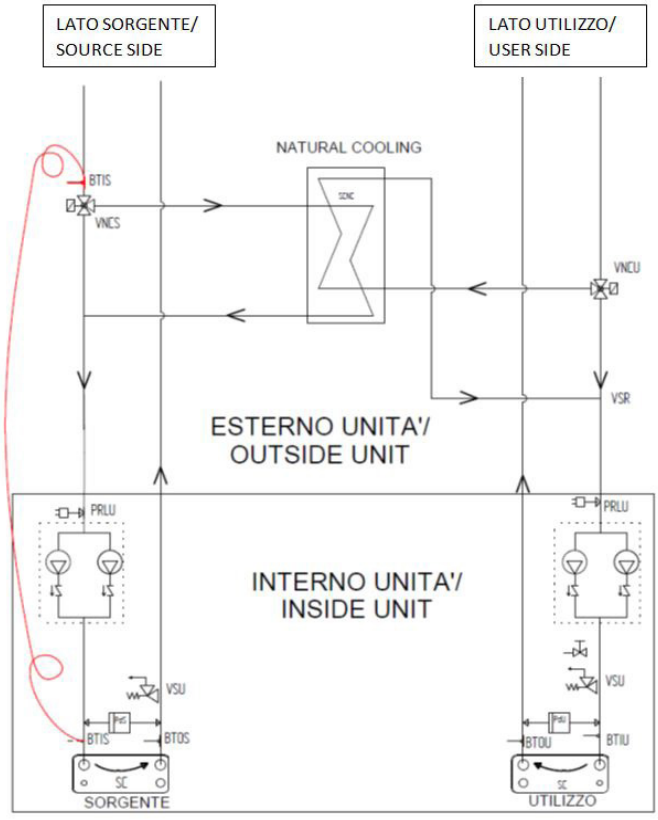
The unit control provides an on/off signal to enable the Natural Cooling by switching the valves.

The Natural Cooling is enabled if the two following conditions are satisfied:

1) the entering water temperature, source side, must be lower than the cooling set point plus a delta defined by parameter 365 DeltaNC (the value can be positive or negative) [Tws_in < (Set_cooling + DeltaNC)]

2) the entering water temperature, user side, must be higher than the entering water temperature, source side, plus a delta defined by parameter 366 IsteresiStopNC (the value can be only positive) [Tws_in < (Twu_in + IsteresiStopNC)]

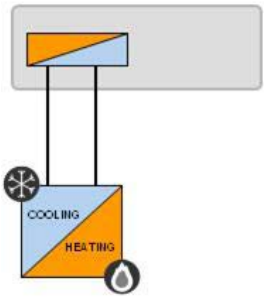
If one of these two conditions is not satisfied the Natural Cooling is disabled.



PDU Differential pressure switch, user side
PDS Differential pressure switch, source side
PRLU Installaton load pressure switch adjusted at 0.5 bar
SC Plate heat exchanger
VSU Safety valve adjusted at 6 bar (only if pumps or valves are present)
VSR Exhaust valve
BTIS Entering temperature probe, source side (to remotely)
BTOS Leaving temperature probe, source side
BTIU Entering temperature probe, user side
BTOU Leaving temperature probe, user side
VNCS Natural Cooling valve, source side (provided by the Customer)
VNCU Natural Cooling valve, user side (provided by the Customer)
SCNC Natural Cooling exchanger (provided by the Customer)

User side hydronic unit configurations

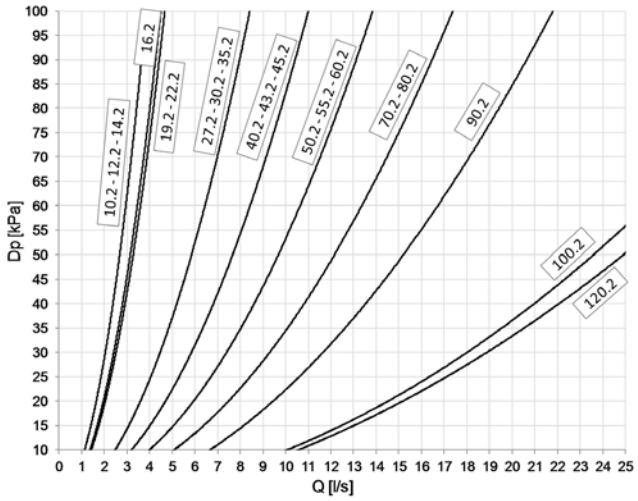
Standard unit (-)



Configuration without hydronic assembly, equipped with components as described on the water diagram key.

All water fittings are Victaulic type. It is possible to control an external pump by an on/off or 0-10V signal.

User side exchanger pressure drop curves



The pressure drops on the water side are calculated by considering an average water temperature at 7°C.
Q = Water flow rate[l/s]
DP = Pressure drops [kPa]

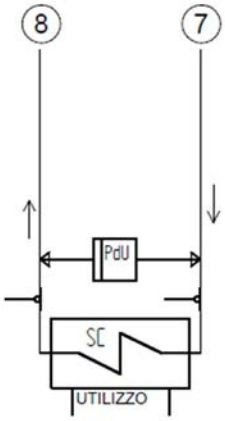
To the user side exchanger pressure drops must be added the pressure drops of the steel mesh mechanical filter that must be placed on the water input line. This device is essential to the unit's proper operation, and is available as accessory (IFWX).

Admissible water flow rates

Min. (Qmin) and max. (Qmax) water flow-rates admissibles for the correct unit operation.

SIZE			10.2	12.2	14.2	16.2	19.2	22.2	27.2	30.2	35.2	40.2	43.2	45.2	50.2	55.2	60.2	70.2	80.2	90.2	100.2	120.2
User side	Qmin	[l/s]	0,8	0,8	0,8	1	1,1	1,1	1,8	1,8	1,8	2,4	2,4	2,4	2,9	2,9	2,9	3,8	3,8	5,3	9,5	10,5
	Qmax	[l/s]	4,2	4,2	4,3	4,8	4,9	5,1	8,8	8,8	9,3	11,4	11,9	12,2	14,4	15	15,4	18,3	19	23,5	28	29

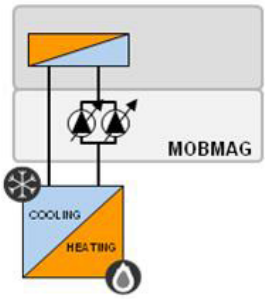
User side water diagram



7 = User side inlet
8 = User side outlet
PDU = User side differential pressure switch
SC = Plate heat exchangers

User side hydronic unit configurations

Unit with VARYFLOW + (VARYU)

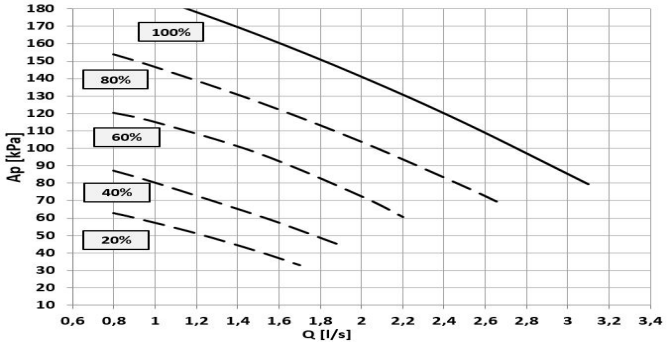


Configuration with 2 centrifugal electric pumps arranged in parallel and controlled by inverter, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

The electric pumps are equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

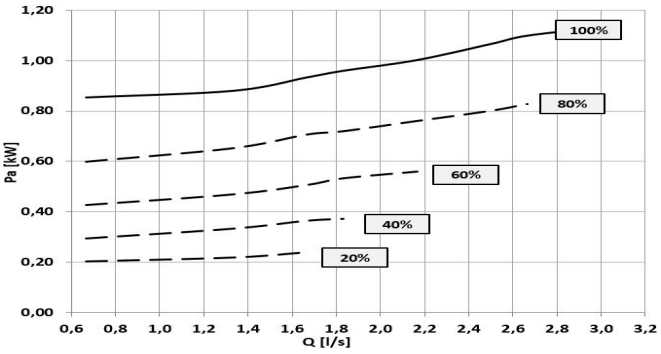
The control, modulates the water flow-rate keeping constant the delta T. If the water temperature is in critical conditions, it allows to extend the unit operating ranges guaranteeing its operating, automatically reducing the water flow-rate. In the event of one of the two pumps is temporarily unavailable, it guarantees about the 80% of the nominal flow-rate.

Available pressure (Size 10.2 - 12.2 - 14.2)



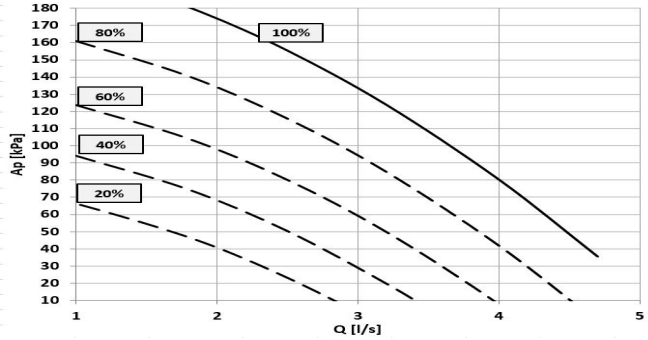
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 10.2 - 12.2 - 14.2)



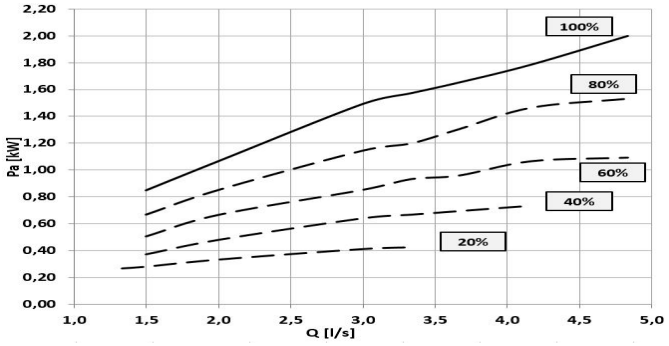
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Size 16.2)



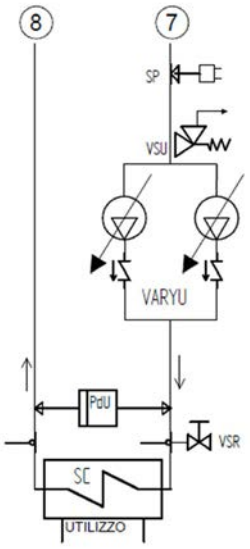
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 16.2)



Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

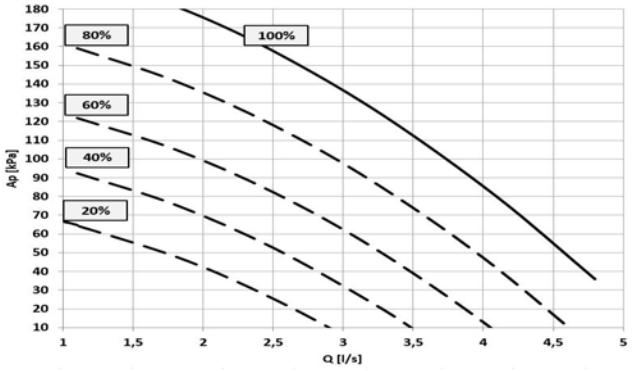
User side water diagram



7 = User side inlet
8 = User side outlet
SP = Circuit charging pressure switch, calibrated to 0.7 bar
VSU = Safety valve calibrated to 6 bar
VARYU = VARYFLOW + user side hydronic units
PDU = User side differential pressure switch
VSR = Relief valve
SC = Plate heat exchangers

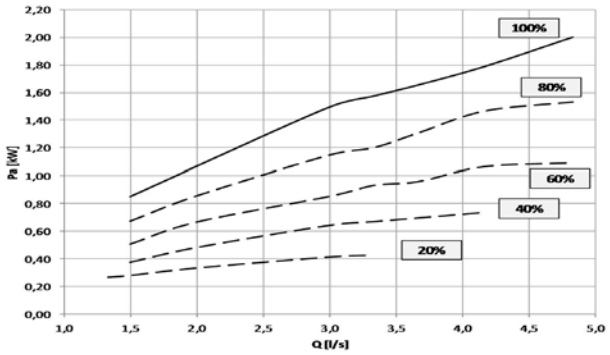
Unit with VARYFLOW + (VARYU)

Available pressure (Gr. 19.2 - 22.2)



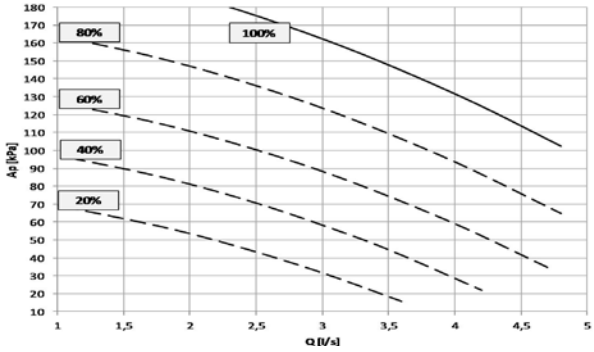
Q = Water flow rate [l/s] - Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 19.2 - 22.2)



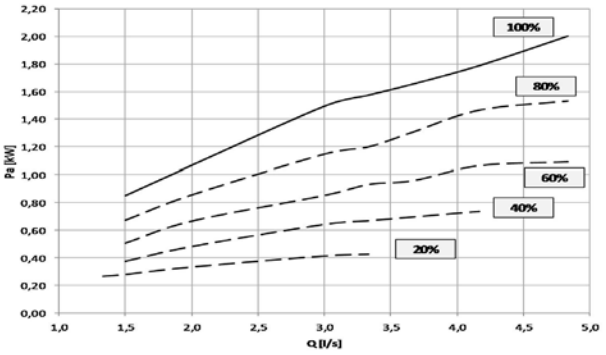
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 27.2)



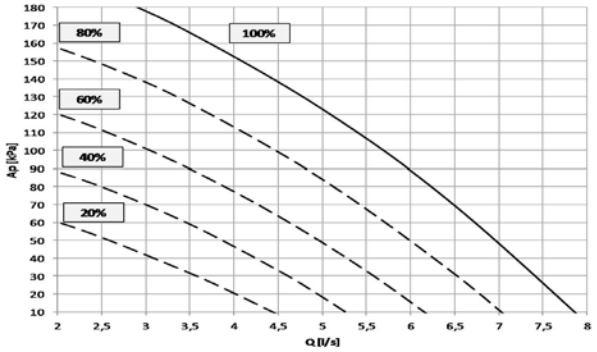
Q = Water flow rate [l/s] - Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 27.2)



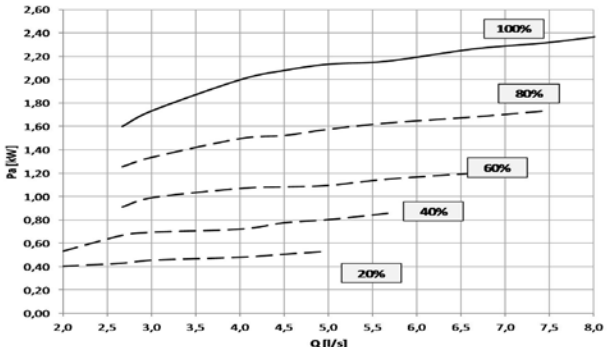
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 30.2 - 35.2)



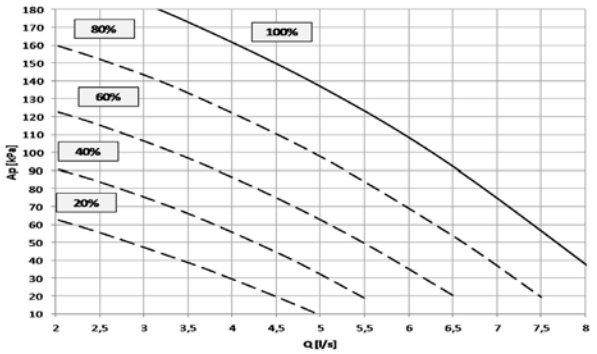
Q = Water flow rate [l/s] - Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 30.2 - 35.2)



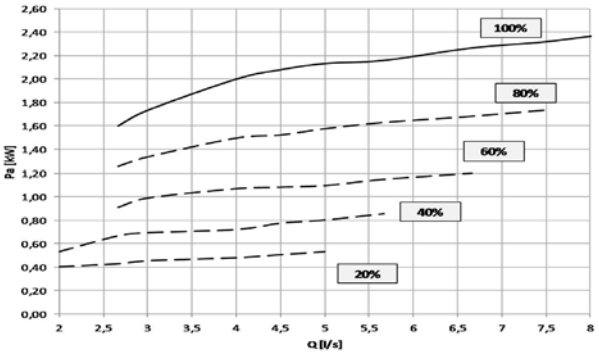
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 40.2)



Q = Water flow rate [l/s] - Ap = Pressure head, available to the unit fittings [kPa]

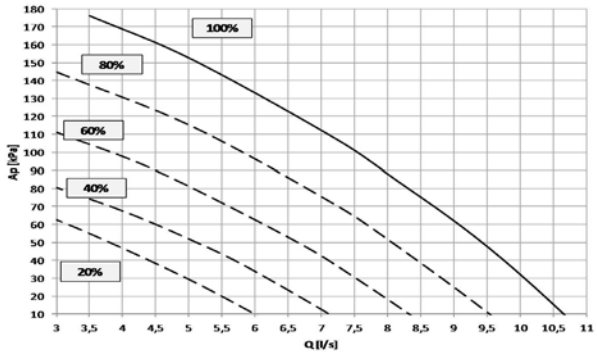
Pump absorption curves (Gr. 40.2)



Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

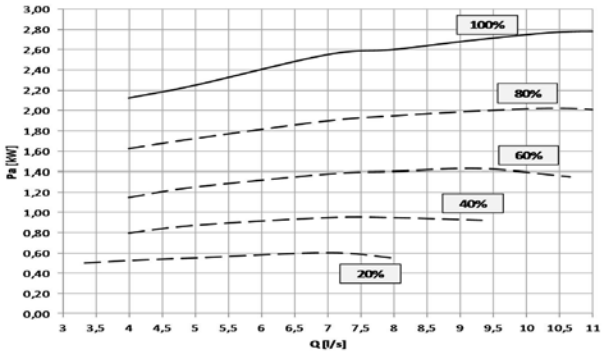
Unit with VARYFLOW + (VARYU)

Available pressure (Gr. 43.2 - 45.2)



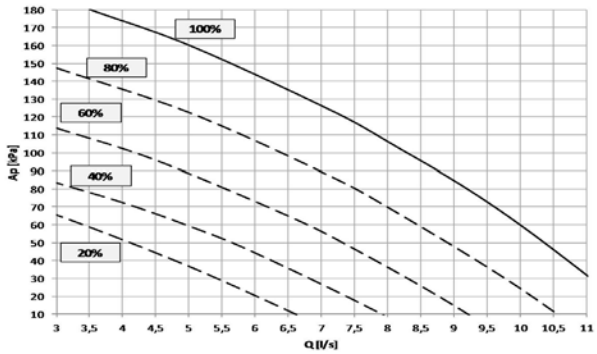
Q = Water flow rate [l/s] - Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 43.2 - 45.2)



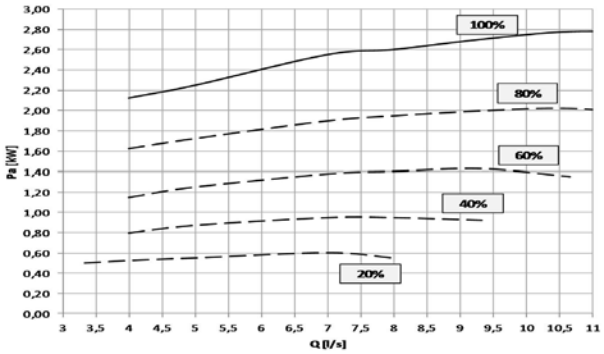
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 50.2 - 55.2)



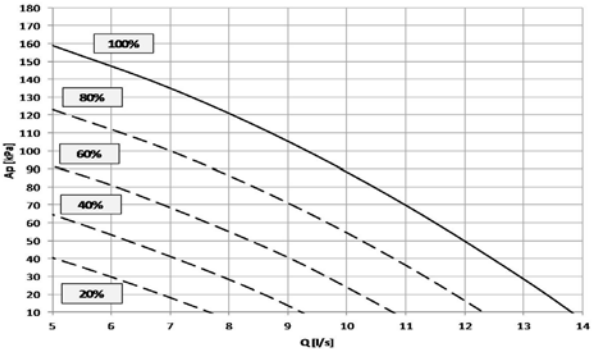
Q = Water flow rate [l/s] - Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 50.2 - 55.2)



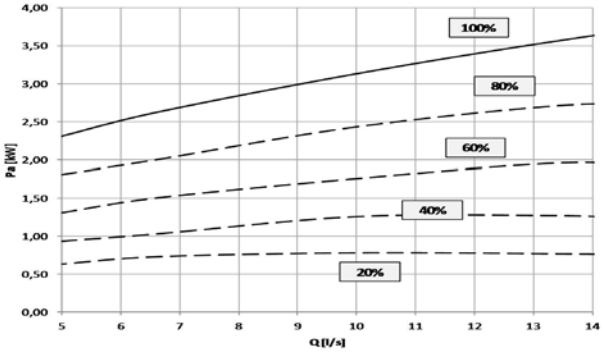
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 60.2)



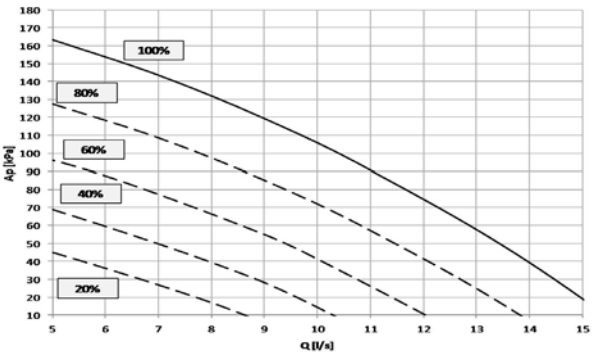
Q = Water flow rate [l/s] - Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 60.2)



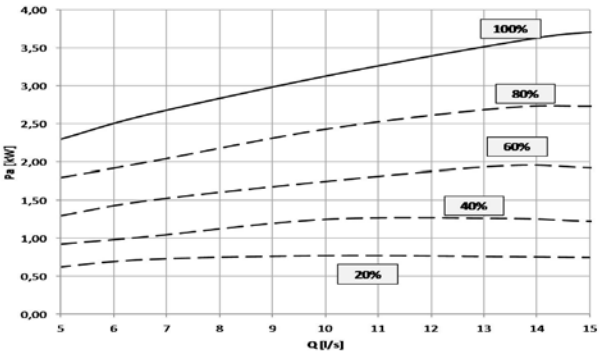
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure(Gr. 70.2 - 80.2)



Q = Water flow rate [l/s] - Ap = Pressure head, available to the unit fittings [kPa]

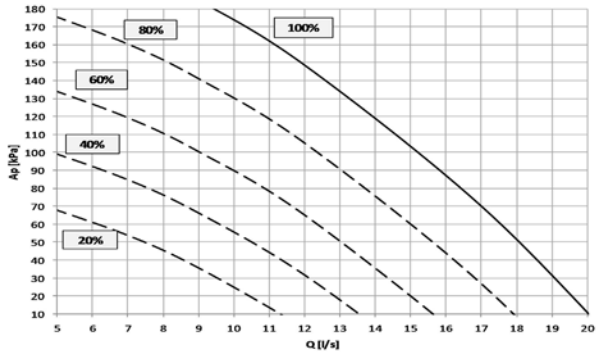
Pump absorption curves (Gr. 70.2 - 80.2)



Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

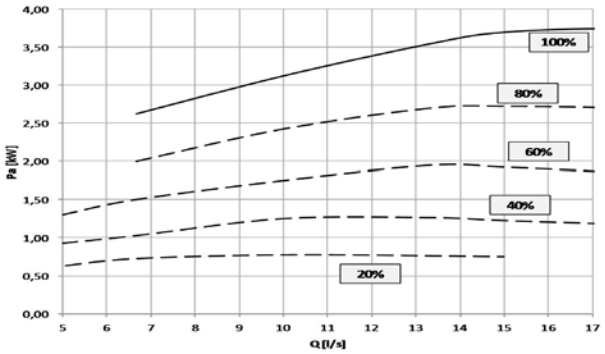
Unit with VARYFLOW + (VARYU)

Available pressure (Gr. 90.2)



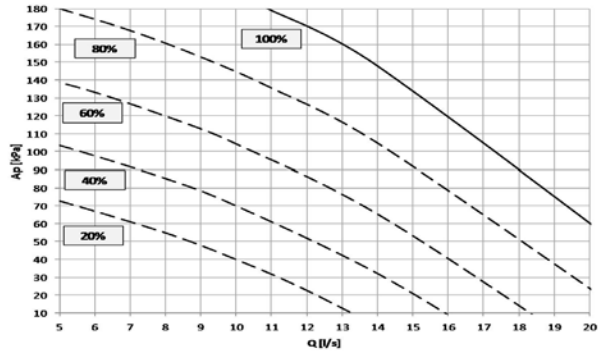
Q = Water flow rate [l/s] - Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 90.2)



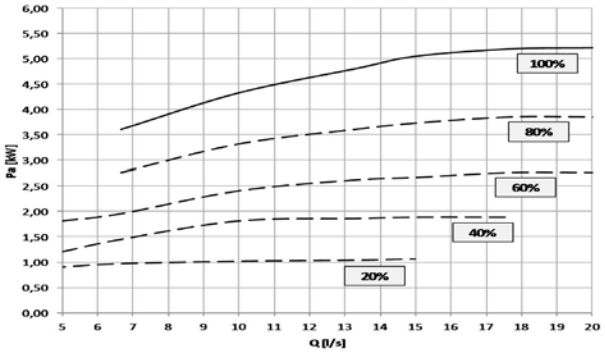
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 100.2)



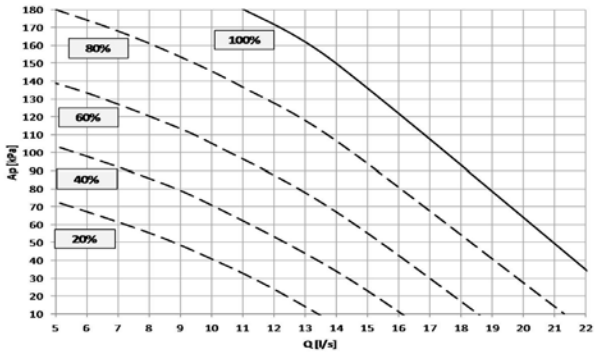
Q = Water flow rate [l/s] - Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 100.2)



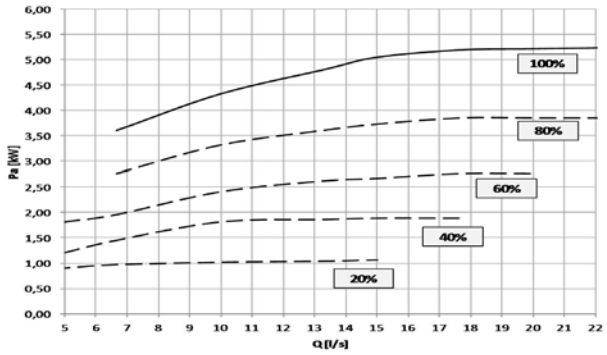
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 120.2)



Q = Water flow rate [l/s] - Ap = Pressure head, available to the unit fittings [kPa]

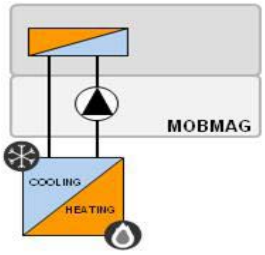
Pump absorption curves (Gr. 120.2)



Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

User side hydronic unit configurations

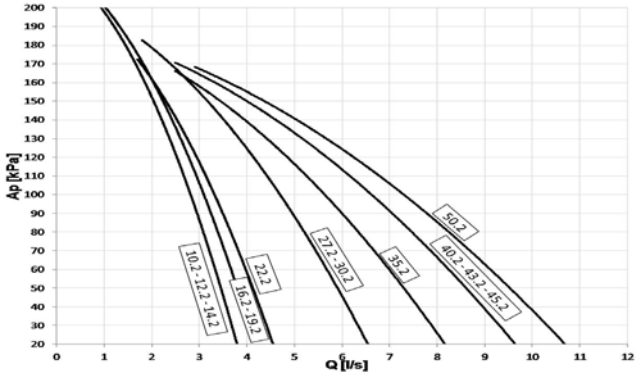
Unit with one ON/OFF pump (HYGU1)



Configuration with 1 centrifugal electric pump, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

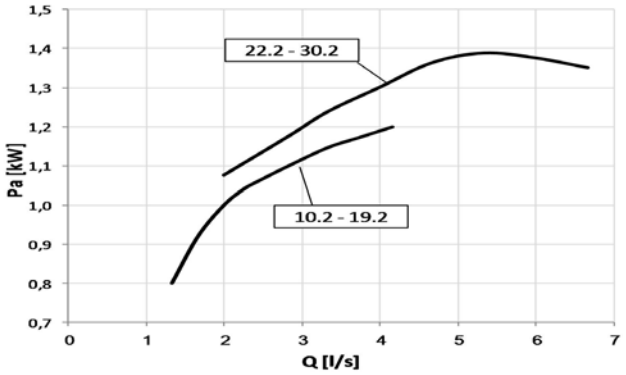
The electric pump is equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

ON/OFF pump available head (Size 10.2 - 50.2)



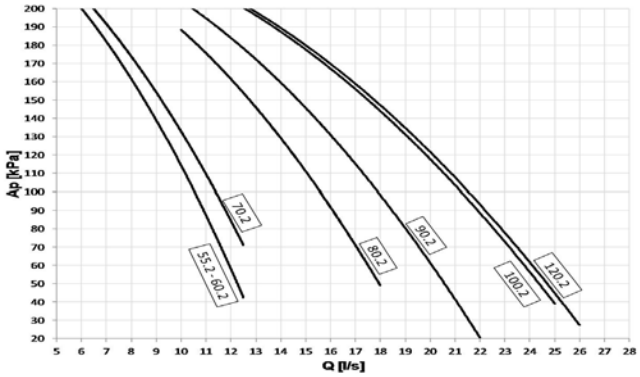
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

ON/OFF pump absorption curves (Size 10.2 - 30.2)



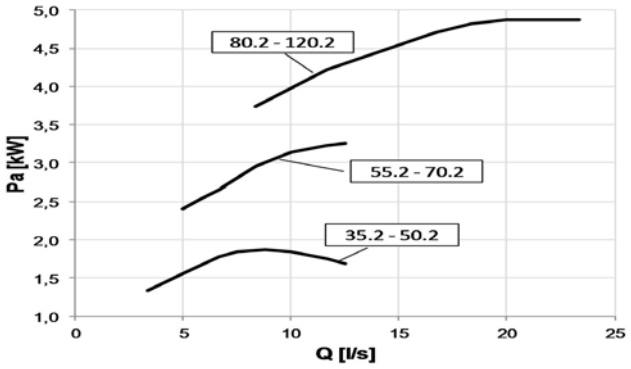
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

ON/OFF pump available head (Size 55.2 - 120.2)



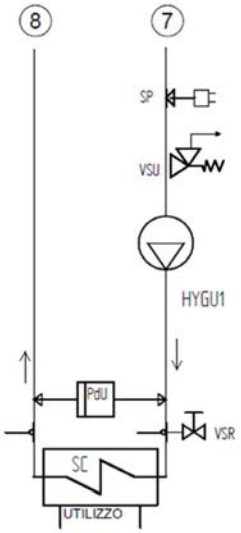
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

ON/OFF pump absorption curves (Size 35.2 - 120.2)



Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

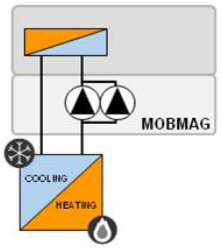
User side water diagram



7 = User side inlet
8 = User side outlet
SP = Circuit charging pressure switch, calibrated to 0.7 bar
VSU = Safety valve calibrated to 6 bar
HYGU1 = User side hydronic units with 1 ON/OFF pump
PDU = User side differential pressure switch
VSR = Relief valve
SC = Plate heat exchangers

User side hydronic unit configurations

Unit with two ON/OFF pumps (HYGU2)

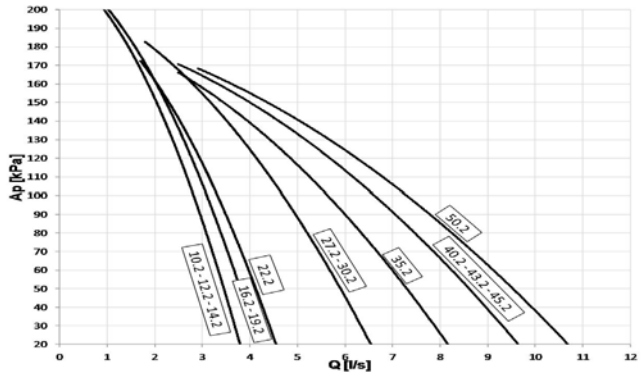


Configuration with 2 centrifugal electric pumps, 1 stand-by, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

The electric pumps are equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

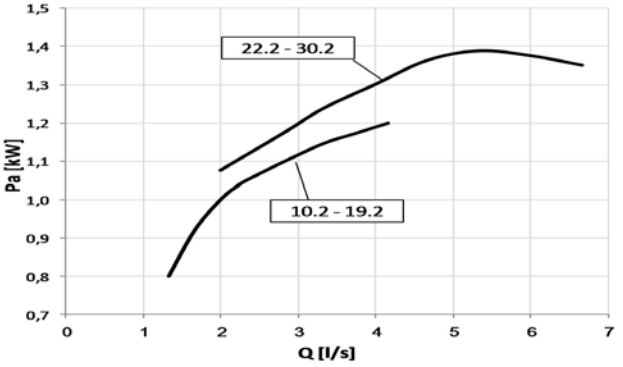
The control balances the operating hours and in case of failure it is signaled and the stand-by pump is automatically activated.

ON/OFF pump available head (Size 10.2 - 50.2)



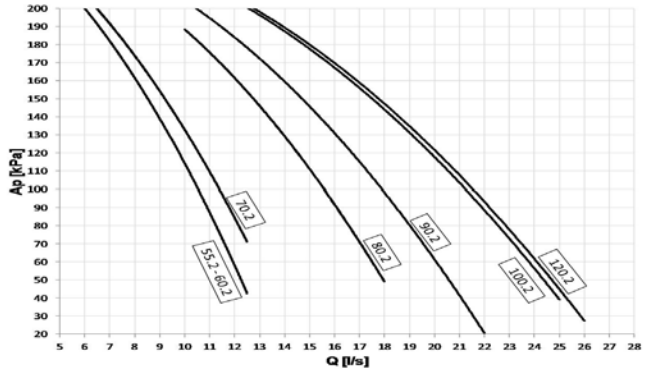
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

ON/OFF pump absorption curves (Size 10.2 - 30.2)



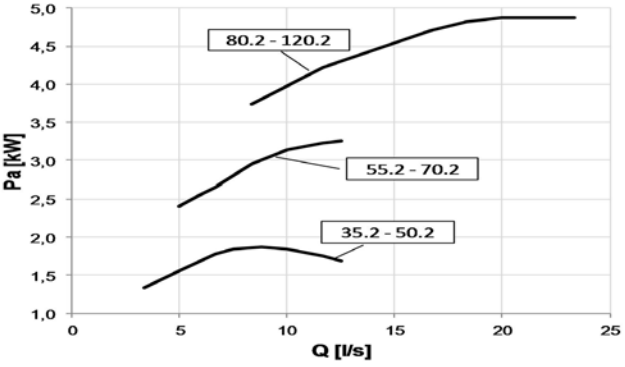
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

ON/OFF pump available head (Size 55.2 - 120.2)



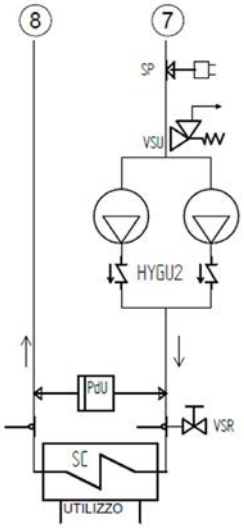
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

ON/OFF pump absorption curves (Size 35.2 - 120.2)



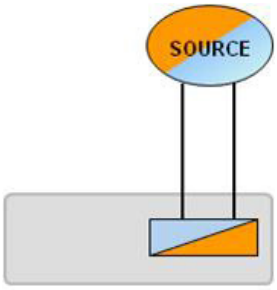
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

User side water diagram



7 = User side inlet
8 = User side outlet
SP = Circuit charging pressure switch, calibrated to 0.7 bar
VSU = Safety valve calibrated to 6 bar
HYGU2 = User side hydronic units with 2 ON/OFF pumps
PDU = User side differential pressure switch
VSR = Relief valve
SC = Plate heat exchangers

Source side hydronic unit configurations

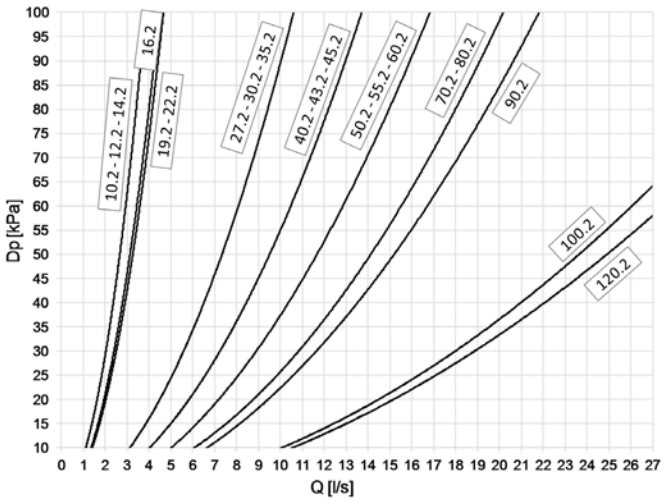


Standard unit (-)

Configuration without hydronic assembly, equipped with components as described on the water diagram key.

All water fittings are Victaulic type. It is possible to control an external pump by an on/off or 0-10V signal.

Source side exchanger pressure drop curves for groundwater applications



The pressure drops on the water side are calculated by considering an average water temperature at 7°C.

Q = Water flow rate [l/s]
DP = Pressure drops [kPa]

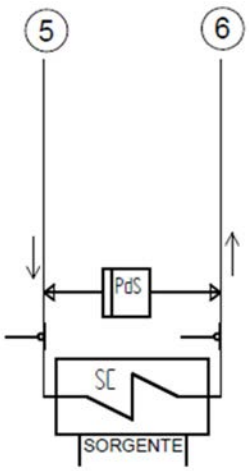
To the source side exchanger pressure drop must be added the pressure drop of the steel mesh mechanical filter that must be placed on the water input line. This device is essential to the unit's proper operation, and is available as accessory IFWX.

Admissible water flow for groundwater applications

Min. (Qmin) and max. (Qmax) water flow-rates admissibles for the correct unit operation.

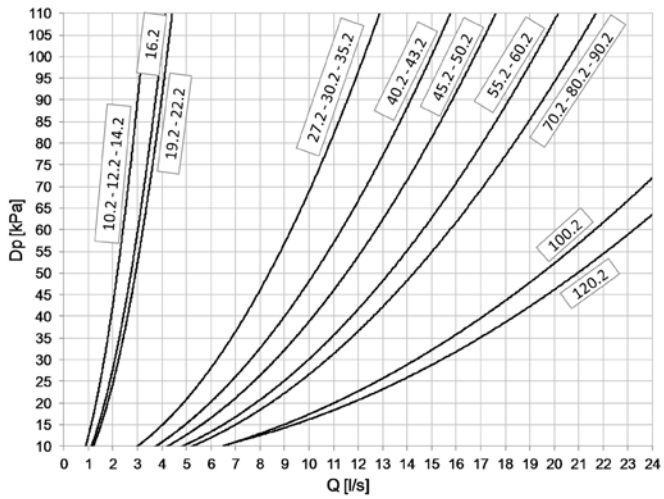
Size		10.2	12.2	14.2	16.2	19.2	22.2	27.2	30.2	35.2	40.2	43.2	45.2	50.2	55.2	60.2	70.2	80.2	90.2	100.2	120.2
Source side	Qmin	0,8	0,8	0,8	1,0	1,1	1,1	2,2	2,2	2,2	2,9	2,9	2,9	3,6	3,6	3,6	4,3	4,3	5,3	9,5	10,5
	Qmax	4,2	4,2	4,3	4,8	4,9	5,1	11,0	11,5	11,5	14,4	14,7	15,0	17,7	18,0	18,5	21,3	21,7	23,0	28,0	30,0

Source side water diagram



5 = Source side inlet
6 = Source side outlet
PDS = Source side differential pressure switch
SC = Plate heat exchangers

Source side exchanger pressure drop curves for geothermal applications



The pressure drops on the water side are calculated by considering an average water temperature at 0°C and 30% glycol.

Q = water flow-rate [l/s]
DP = Pressure drops [kPa]

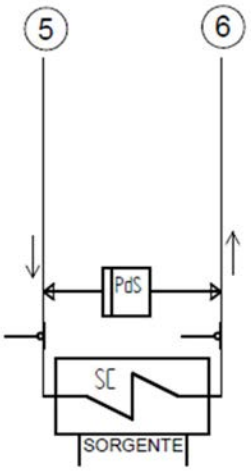
To the source side exchanger pressure drop must be added the pressure drop of the steel mesh mechanical filter that must be placed on the water input line. This device is essential to the unit's proper operation, and is available as accessory IFWX.

Admissible water flows for geothermal applications

Min. (Qmin) and max. (Qmax) water flow-rates admissibles for the correct unit operation.

SIZE			10.2	12.2	14.2	16.2	19.2	22.2	27.2	30.2	35.2	40.2	43.2	45.2	50.2	55.2	60.2	70.2	80.2	90.2	100.2	120.2
Source side	Qmin	[l/s]	0,8	0,8	0,8	1,0	1,1	1,1	2,4	2,4	2,4	3,0	3,0	3,6	3,6	4,5	4,5	5,4	5,4	5,4	8,0	9,0
	Qmax	[l/s]	3,6	3,6	3,6	4,4	4,6	4,6	13,5	13,5	13,5	16,5	16,5	18,5	18,5	21,0	21,0	23,0	23,0	23,0	28,0	30,0

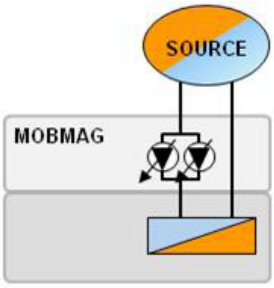
Source side water diagram



5 = Source side inlet
6 = Source side outlet
PDS = Source side differential pressure switch
SC = Plate heat exchangers

Source side hydronic unit configurations

Unit with VARYFLOW + (VARYS)

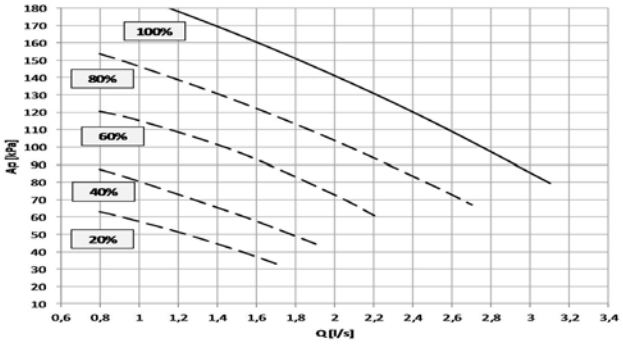


Configuration with 2 centrifugal electric pumps arranged in parallel and controlled by inverter, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

The electric pumps are equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

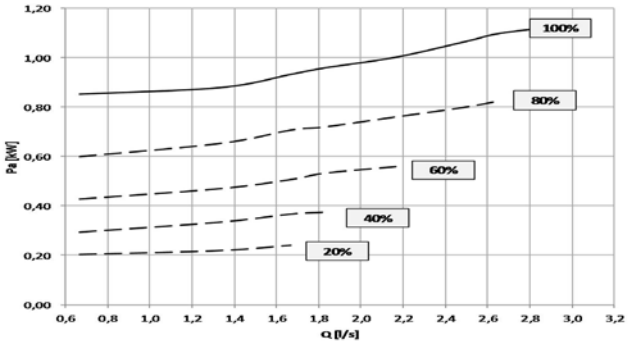
The control, modulates the water flow-rate keeping constant the delta T. If the water temperature is in critical conditions, it allows to extend the unit operating ranges guaranteeing its operating, automatically reducing the water flow-rate. In the event of one of the two pumps is temporarily unavailable, it guarantees about the 80% of the nominal flow-rate.

Available pressure (Size 10.2 - 12.2)



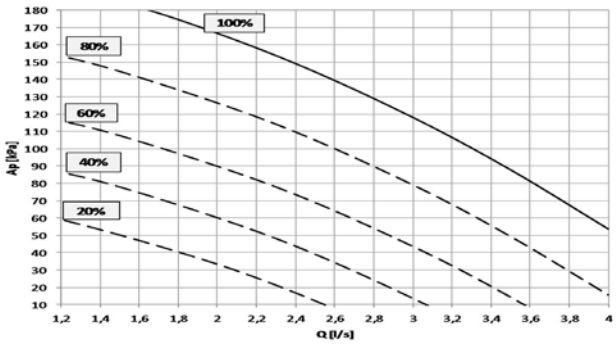
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 10.2 - 12.2)



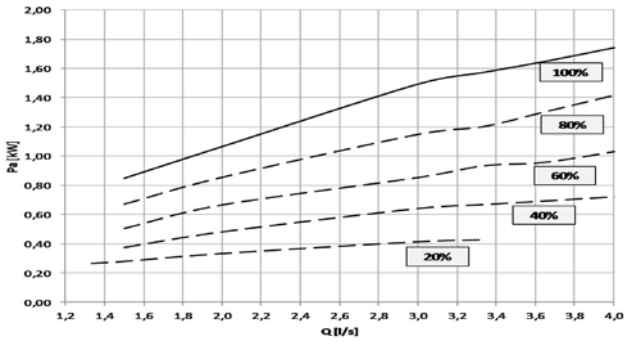
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Size 14.2)



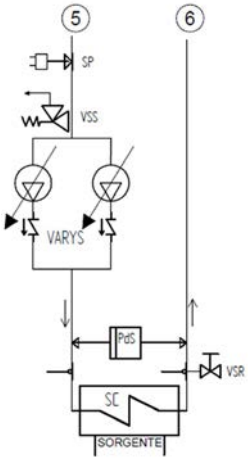
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 14.2)



Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

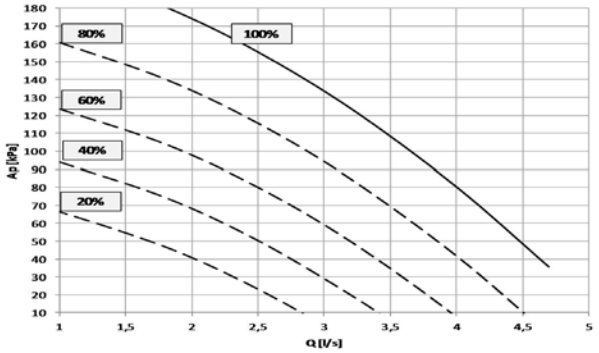
Source side water diagram



5 = Source side inlet
6 = Source side outlet
SP = Circuit charging pressure switch, calibrated to 0.7 bar
VSS = Safety valve calibrated to 6 bar
VARYS = VARYFLOW+ source side hydronic unit
PDS = Source side differential pressure switch
VSR = Relief valve
SC = Plate heat exchangers

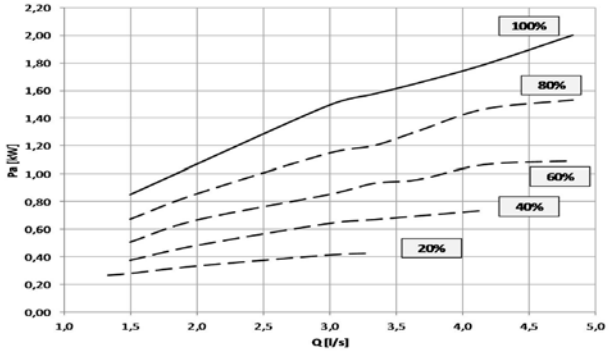
Unit with VARYFLOW + (VARYS)

Available pressure (Gr. 16.2)



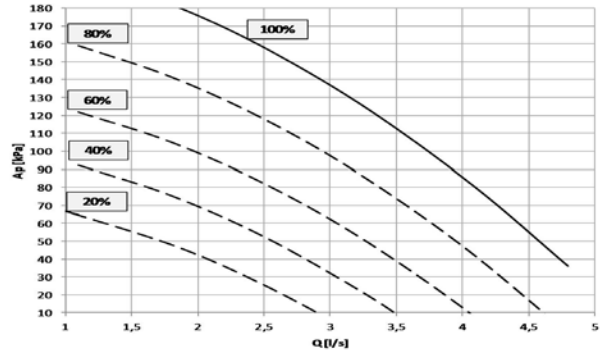
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 16.2)



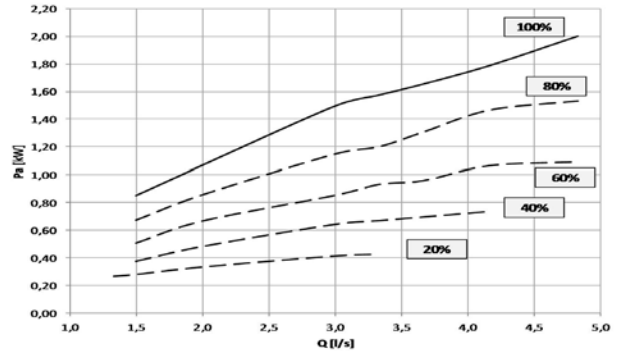
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 19.2 - 22.2)



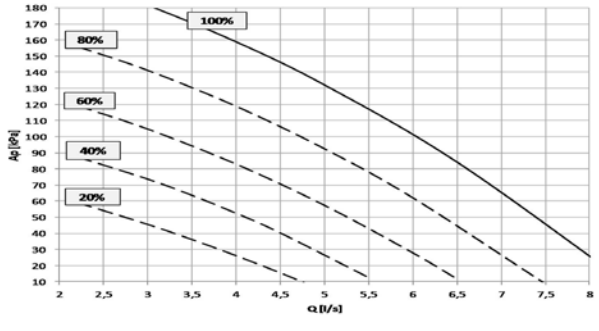
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 19.2 - 22.2)



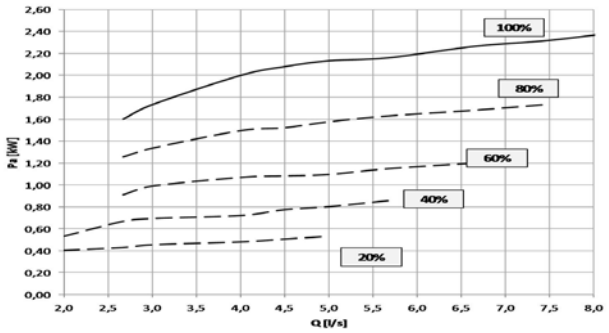
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 27.2 - 30.2)



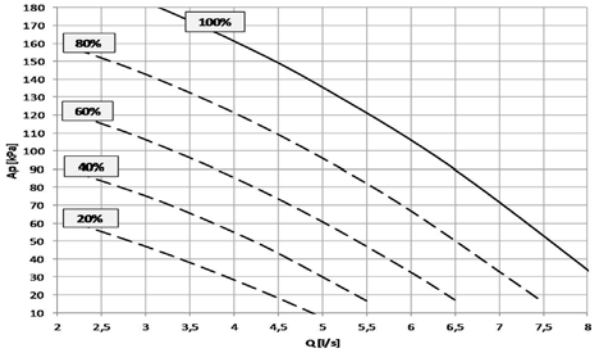
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 27.2 - 30.2)



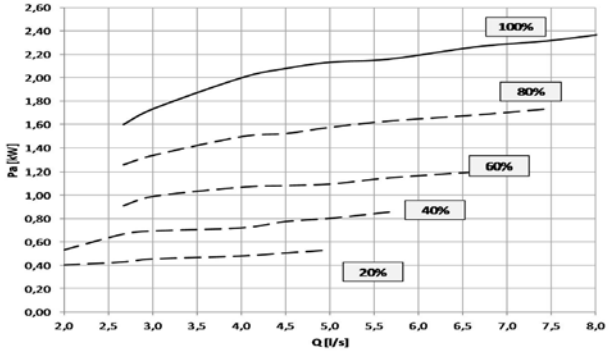
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 35.2)



Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

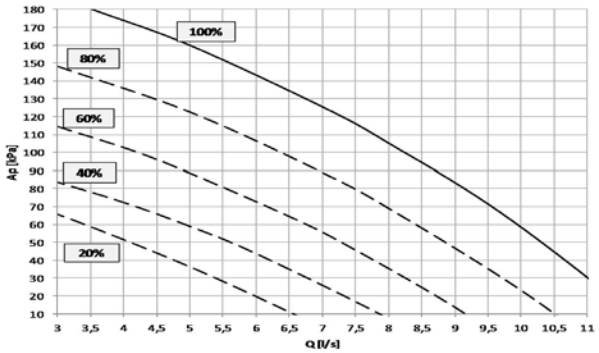
Pump absorption curves (Gr. 35.2)



Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

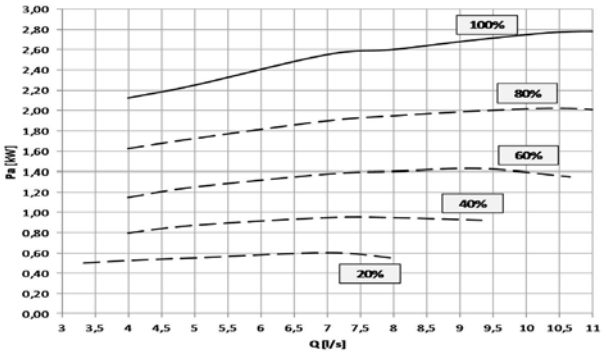
Unit with VARYFLOW + (VARYS)

Available pressure (Gr. 40.2 - 43.2 - 45.2)



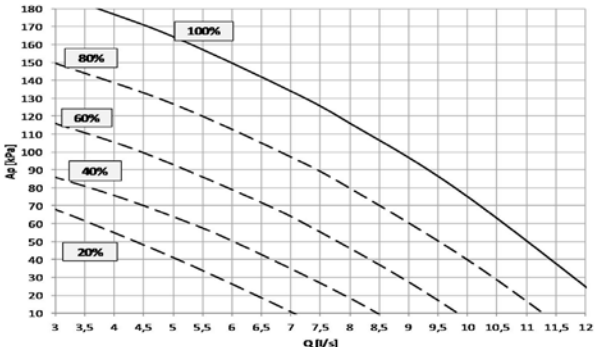
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 40.2 - 43.2 - 45.2)



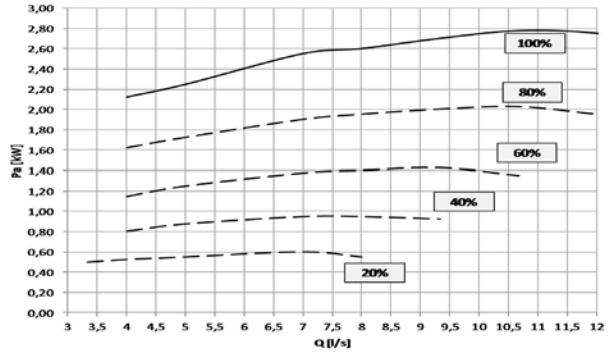
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 50.2)



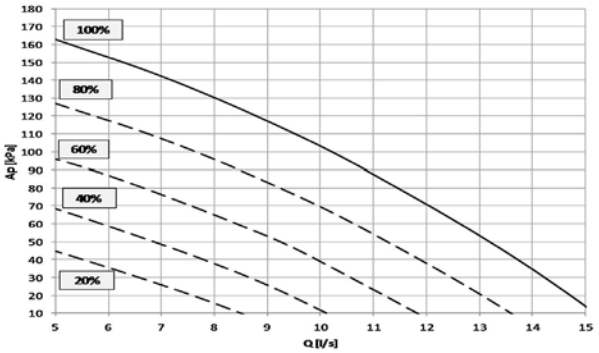
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 50.2)



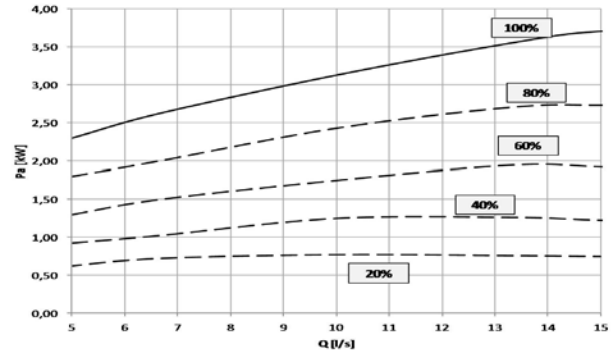
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 55.2 - 60.2)



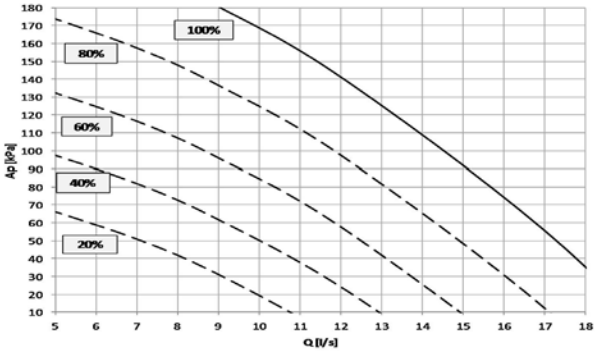
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 55.2 - 60.2)



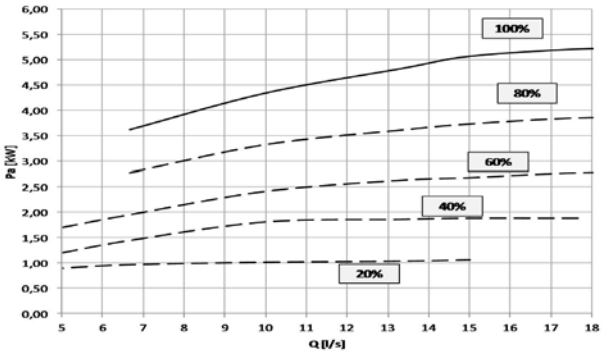
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 70.2 - 80.2)



Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

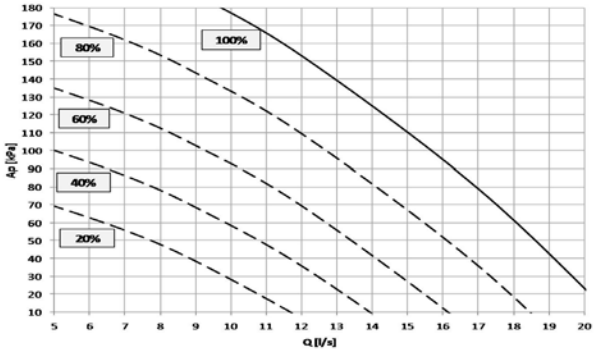
Pump absorption curves (Gr. 70.2 - 80.2)



Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

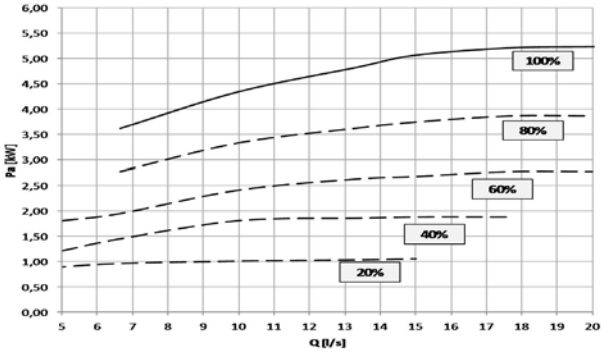
Unit with VARYFLOW + (VARYS)

Available pressure (Gr. 90.2)



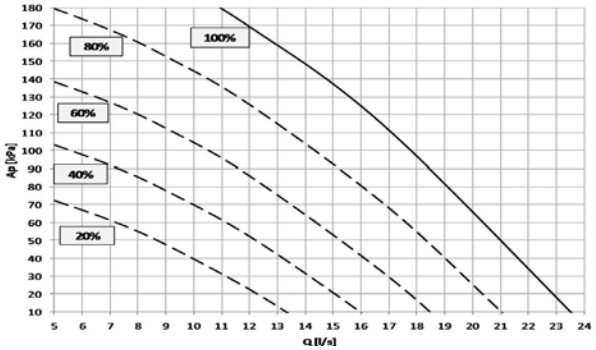
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 90.2)



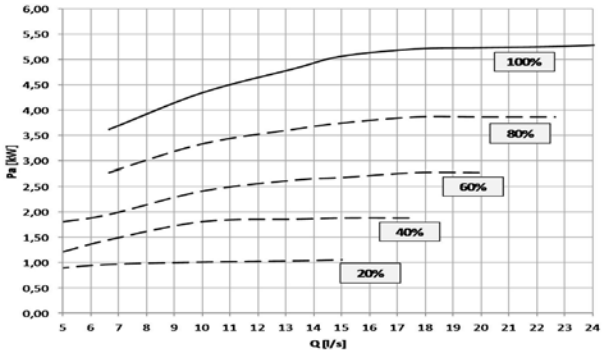
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 100.2)



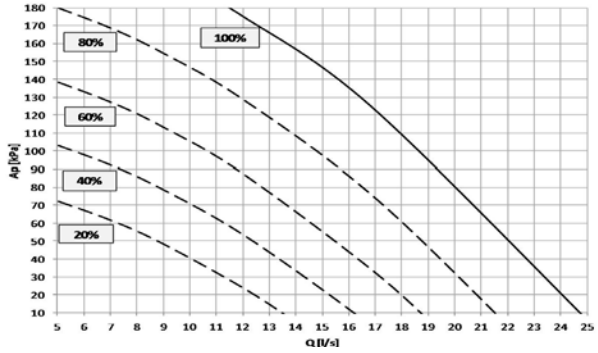
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Gr. 100.2)



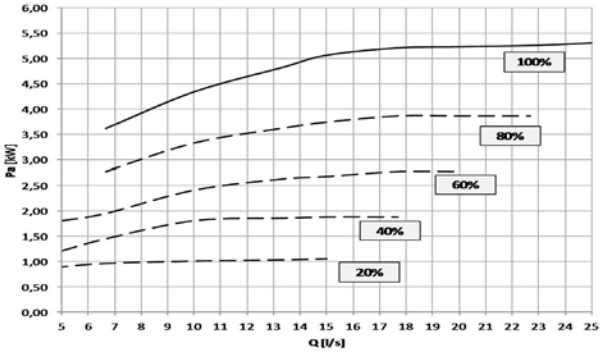
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Gr. 120.2)



Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

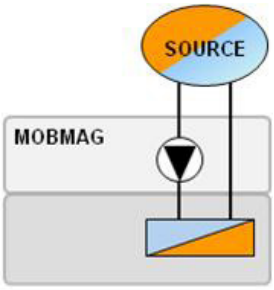
Pump absorption curves(Gr. 120.2)



Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Source side hydronic unit configurations

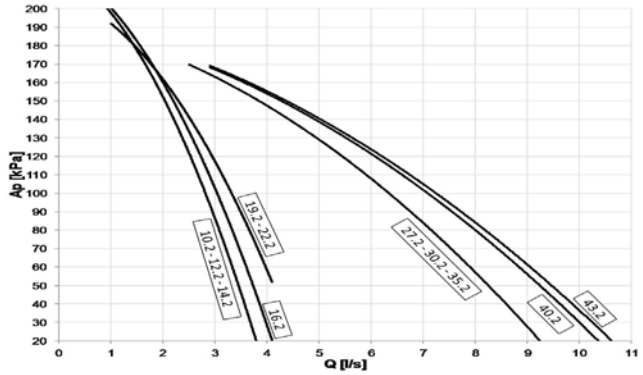
Unit with one ON/OFF pump (HYGS1)



Configuration with 1 centrifugal electric pump, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

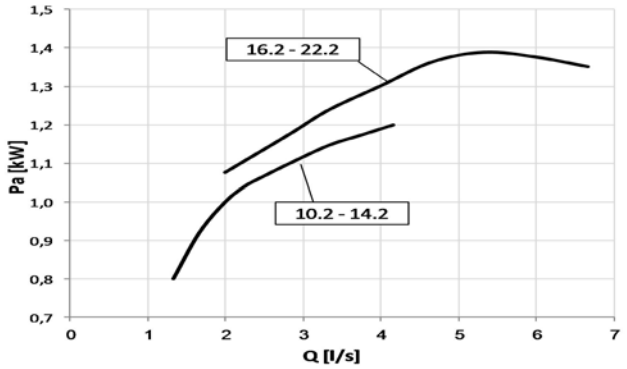
The electric pump is equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

Available pressure (Size 10.2 - 43.2)



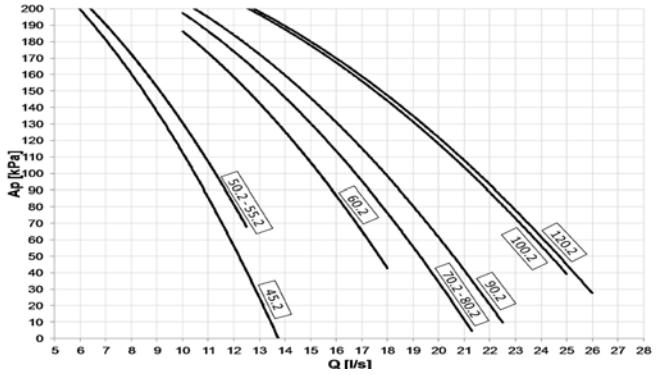
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 10.2 - 22.2)



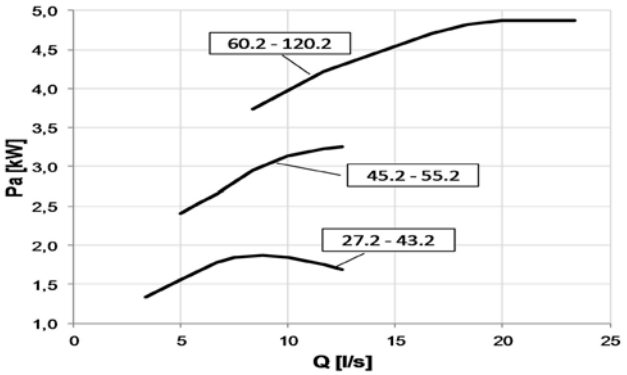
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Size 45.2 - 120.2)



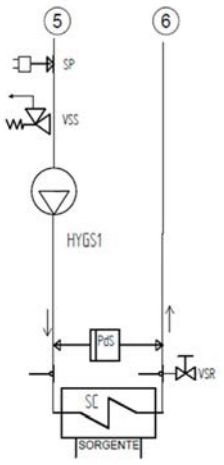
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 27.2 - 120.2)



Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

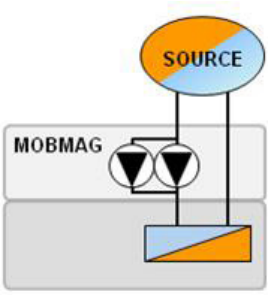
Source side water diagram



5 = Source side inlet
6 = Source side outlet
SP = Circuit charging pressure switch, calibrated to 0.7 bar
VSS = Safety valve calibrated to 6 bar
HYGS1 = Source side hydronic units with 1 ON/OFF pump
PDS = Source side differential pressure switch
VSR = Relief valve
SC = Plate heat exchangers

Source side hydronic unit configurations

Unit with two ON/OFF pumps (HYGS2)

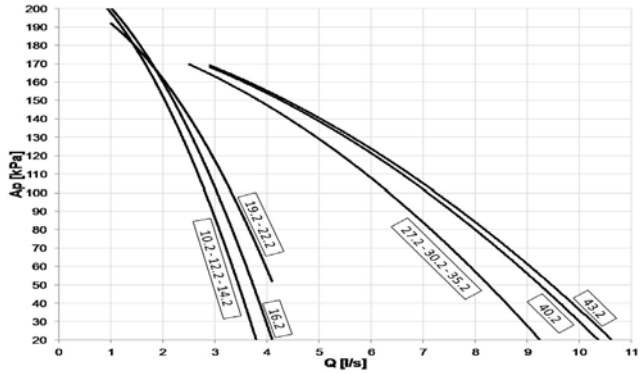


Configuration with 2 centrifugal electric pumps, 1 stand-by, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

The electric pumps are equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

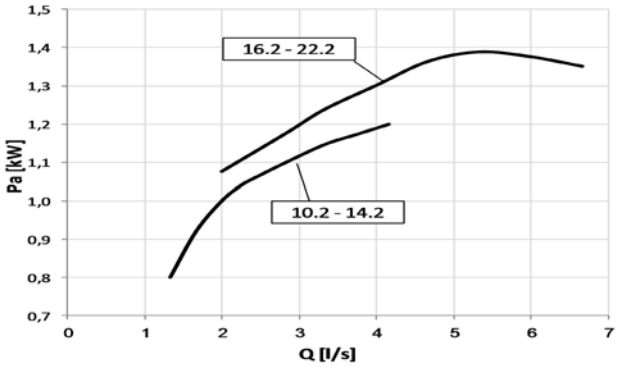
The control balances the operating hours and in case of failure it is signaled and the stand-by pump is automatically activated.

Available pressure (Size 10.2 - 43.2)



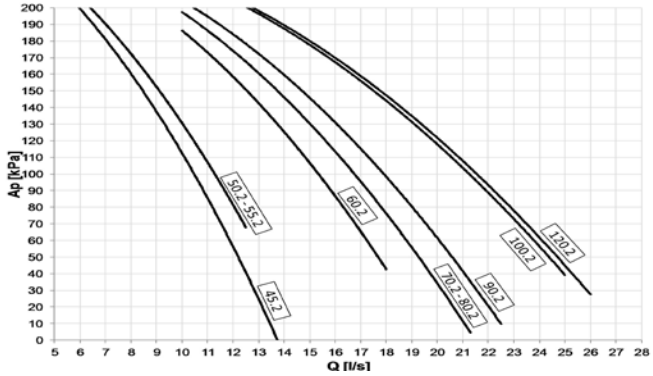
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 10.2 - 22.2)



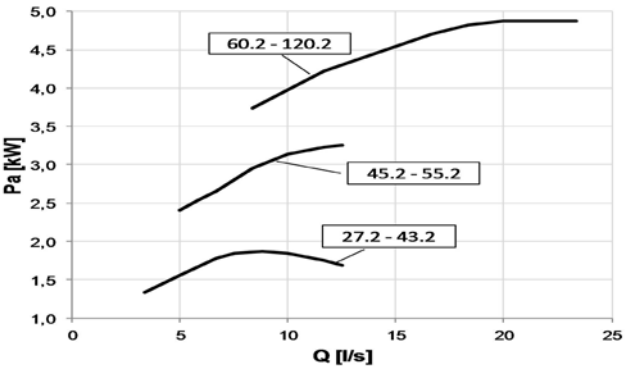
Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

Available pressure (Size 45.2 - 120.2)



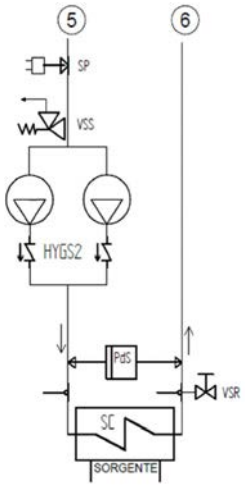
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 27.2 - 120.2)



Q = Water flow rate [l/s] Pa = Electrical power draw [kW]

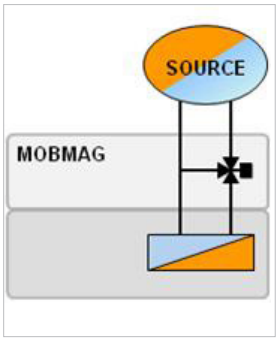
Source side water diagram



5 = Source side inlet
6 = Source side outlet
SP = Circuit charging pressure switch, calibrated to 0.7 bar
VSS = Safety valve calibrated to 6 bar
HYGS2 = Source side hydronic units with 2 ON/OFF pumps
PDS = Source side differential pressure switch
VSR = Relief valve
SC = Plate heat exchangers

Source side hydronic unit configurations

Unit with 3-way modulating valve (VS3M)



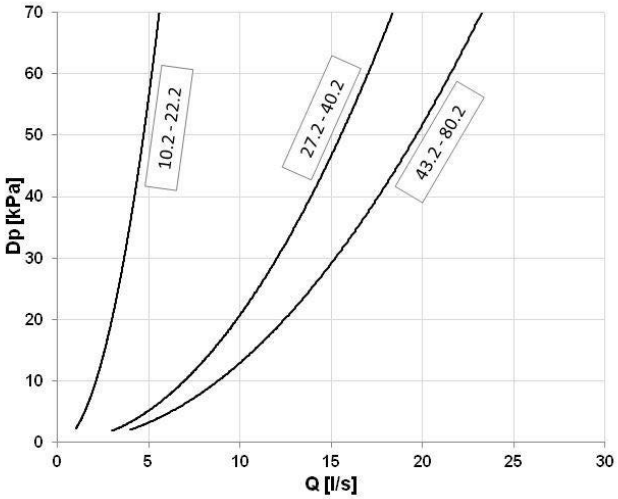
Configuration with 1 source side 3-way modulating valve and components as described on the water diagram key. All water fittings are Victaulic type.

The 3-way modulating valve putting in communication the input and the output of the exchanger source side, acts as by-pass reducing the water flow rate inside the exchanger, while maintaining a constant unit outlet flow.

The valve modulation is managed by a 0-10V signal generated by the unit electronic control.

Option available only for the size from 10.2 to 80.2.

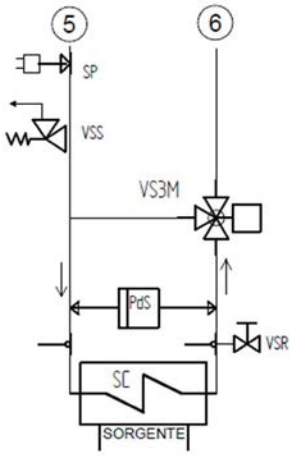
Source side 3-way modulating valve pressure drops



The pressure drops on the water side are calculated by considering an average water temperature at 7°C.

Q = Water flow rate [l/s]
DP = Pressure drops [kPa]

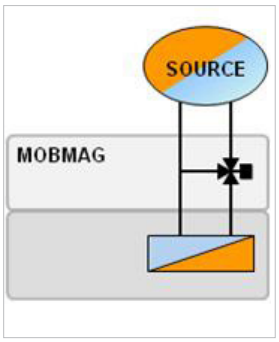
Source side water diagram



5 = Source side inlet
6 = Source side outlet
SP = Circuit charging pressure switch, calibrated to 0.7 bar
VSS = Safety valve calibrated to 6 bar
VS3M = Source side 3-way modulating valve
PDS = Source side differential pressure switch
SC = Plate heat exchangers

Source side hydronic unit configurations

Unit with 2-way modulating valve (VS2M)

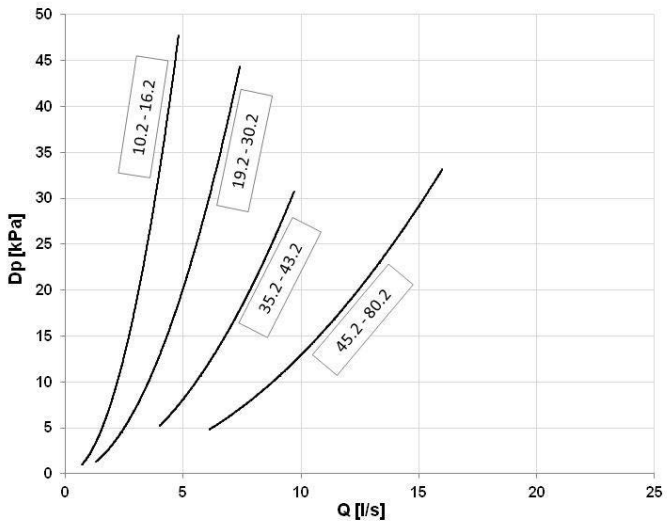


Configuration with 1 source side 2-way modulating valve and components as described on the water diagram key. All water fittings are Victaulic type.

The 2-way modulating valve, installed at the outlet of the exchanger on the source side, modulates the water flow rate via a 0-10V signal generated by the unit's electronic control.

Option available only for the size from 10.2 to 80.2.

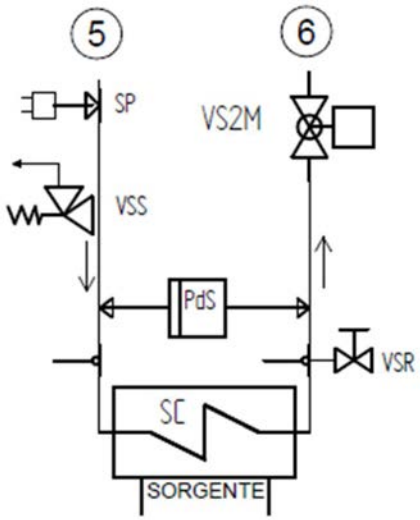
Source side 2-way modulating valve pressure drops



The pressure drops on the water side are calculated by considering an average water temperature at 7°C.

Q = Water flow rate [l/s]
DP = Pressure drops [kPa]

Source side water diagram



5 = Source side inlet
6 = Source side outlet
SP = Circuit charging pressure switch, calibrated to 0.7 bar
VSS = Safety valve calibrated to 6 bar
VS2M = Source side 2-way modulating valve
PDS = Source side differential pressure switch
SC = Plate heat exchangers

Configurations - Partial energy recovery (D)

Configuration with one recovery side brazed stainless steel (316 AISI) plate exchanger, and components per the legend of the enclosed plumbing circuit diagram. All water fittings are Victaulic type.

A configuration which enables the production of hot water free-of-charge while operating in the cooling mode, thanks to the partial recovery of condensation heat that would otherwise be rejected to the external heat source. It is possible to recovery about 20% of the unit rejected heating capacity equal to the sum of the cooling capacity and the compressor power input.

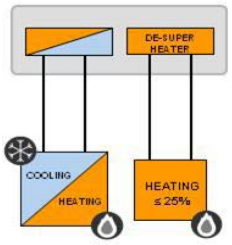
The partial recovery device is considered to be operating when it is powered by the water flow which is to be heated. This condition improves the unit performance, since it reduces the condensation temperature: in nominal conditions the cooling capacity increases indicatively by 3.2% and the power input of the compressors is reduced by 3.6%.

If cold water production is not requested, the unit can not produce hot water. The heating capacity request is made by the digital contact enabling, that activates the pump recovery side (outside the unit).

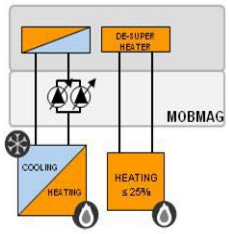
Option available only for the size from 10.2 to 90.2.

The partial energy recovery option (D) can be matched to the hydronic assemblies user side indicated in the previous pages according to the diagrams below.

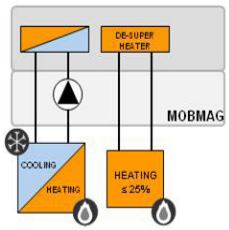
D



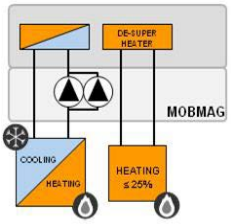
D+VARYP



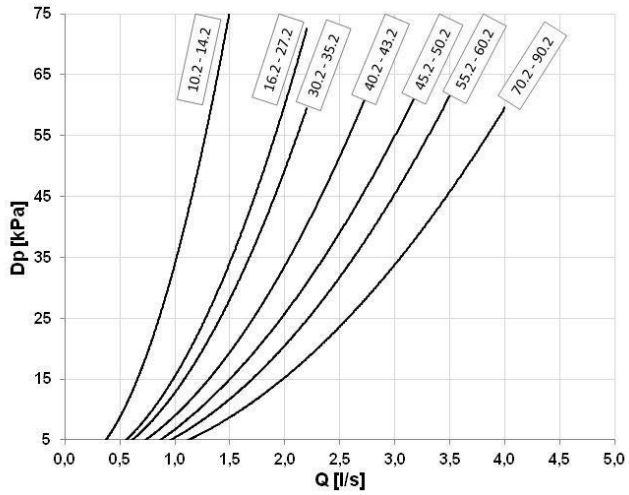
D+HYG1



D+HYG2



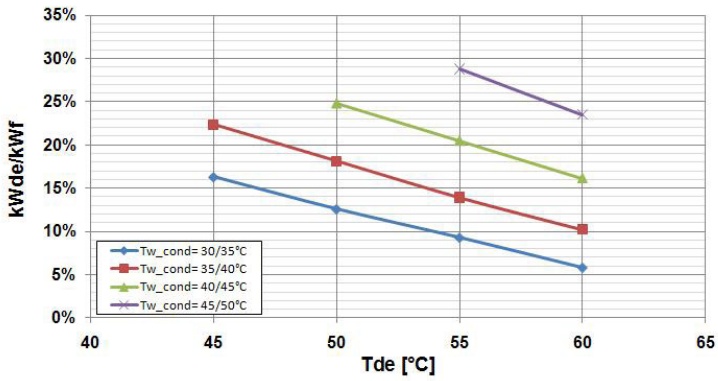
Partial energy recovery pressure drop curves



The pressure drops on the water side are calculated by considering an average water temperature at 7°C.

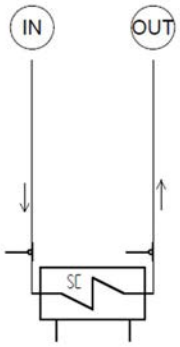
Q = Water flow rate [l/s]
DP = Pressure drops [kPa]

Partial recovery heating capacity



kWde/kWf = Heat recovered/Cooling capacity [%]
Tde [°C] = Heat recovering device outlet water temperature (ΔT = 5°C)
Leaving exchanger water temperature user side = 7°C

Water diagram



IN = Recovery side inlet
OUT = Recovery side outlet
SC = Plate heat exchangers

Built-in configuration options

MOBMAG - Larger units

The large cabinet configuration is selected automatically when any hydronic assembly (user or source side) or valve (2-/3-way modulating valve) is selected.

To facilitate the handling, the Large cabinet structure has been revised, the position of components has been changed, and therefore the operations of disassembly are simplified, saving 50% of the time. The instructions for disassembly are reported in detail in the installation and operating manual

PFCP - Power factor correction capacitors (cosfi > 0.9)

The component is necessary to lower the phase difference between current and voltage in the electromagnetic components of the unit (e.g. asynchronous motors). The component allows to put the cosfi power factor to values on average higher than 0.9, reducing the network reactive power. This often leads to an economic benefit which the energy provider grants to the final user.

SFSTR - Disposal for inrush current reduction

Electronic device that automatically and gradually starts the compressors, thereby reducing the current peak generated in star-triangle start-ups and therefore reduces the mechanical stress on the motor and the electrodynamic stress on the power cables and on the mains.

Option available only for the size from 10.2 to 80.2.

For size from 90.2 to 120.2 the starting current check is standard. The function is guaranteed by the presence in the motor of the compressor of larger size of a double winding. This solution allows to start the compressor in two stages, obtaining two peaks of reduced current, spaced apart from one another.

MF2 - Multi-function phase monitor

The multifunction phase monitor controls all phases and their sequence, checks for voltage anomalies (+/–10%), and automatically restores operation of the unit as soon as the power supply returns to normal.

This control allows to:

- protect the internal components of the unit, which are powered by an abnormal voltage, may operate incorrectly or break;
- quickly identify, among the alarms of the unit's components, the real cause of the malfunction due to the sudden change in voltage.

SDV - Cutoff valve on compressor supply and return

This option makes it possible to be isolated and substituted without discharging the refrigerant from within the refrigeration circuit. This means that the extraordinary maintenance activities are facilitated.

Option available only for the size from 10.2 to 80.2.

CMSC8 - Serial communication module for BACnet supervisor

Allows the serial connection to supervision systems, by using BACnet as communication protocol. It allows the access to the entire list of operation variables, controls and alarms. With this accessory, every unit can communicate with the main supervision systems.

The device is installed and wired built-in the unit.

The configuration and management activities for the BACnet networks are the responsibility of the client.

The total length of each serial line do not exceed 1000 meters and the line must be connected in bus typology (in/out)

CMSC9 - Serial communication module for Modbus supervisor

This enables the serial connection of the supervision system, using Modbus as the communication protocol. It enables access to the complete list of operational variables, commands and alarms. Using this accessory every unit can dialogue with the main supervision systems.

The device is installed and wired built-in the unit.

The total length of each serial line do not exceed 1000 meters and the line must be connected in bus typology (in/out)

CMSC10 - Serial communication module for LonWorks supervisor

This enables the serial connection of the supervision system which uses the LonWorks communication protocol. It enables access to a list of operating variables, commands and alarms which comply with the Echelon® standard.

The device is installed and wired built-in the unit.

The configuration and management activities for the LonWorks networks are the responsibility of the client.

LonWorks technology uses the LonTalk® protocol for communicating between the network nodes. Contact the service supplier for further information.

Accessories separately supplied

RCTX - Remote control

This option allows to have full control over all the unit functions from a remote position.

It can be easily installed on the wall and has the same aspect and functions of the user interface on the unit.

All device functions can be repeated with a normal portable PC connected to the unit with an Ethernet cable and equipped with an internet navigation browser.

The device should be installed on the wall using suitable plugs, electrically hooked up and connected to the unit (installation and wiring are the responsibility of the Customer). Max. remote distance 350 m without auxiliary supply.

Data and power supply serial connection cable n.1 twisted and shielded pair. Diameter of the individual conductor 0.8 mm.

BACX - BACnet serial communication module

Allows the serial connection to supervision systems by using BACnet-IP as a communication protocol. It allows the access to the entire list of operating variables, controls and alarms. With this accessory every unit can communicate with the main supervision systems.

The configuration and management activities for the BACnet networks are the responsibility of the client.

The total length of each serial line do not exceed 1000 meters and the line must be connected in bus typology (in/out)

CMMBX - Serial communication module to supervisor (Modbus)

This enables the serial connection of the supervision system, using Modbus as the communication protocol. It enables access to the complete list of operational variables, commands and alarms. Using this accessory every unit can dialogue with the main supervision systems.

The total length of each serial line do not exceed 1000 meters and the line must be connected in bus typology (in/out)

CMSLWX - LonWorks serial communication module

This enables the serial connection of the supervision system which uses the LonWorks communication protocol. It enables access to a list of operating variables, commands and alarms which comply with the Echelon® standard.

The configuration and management activities for the LonWorks networks are the responsibility of the client.

LonWorks technology uses the LonTalk® protocol for communicating between the network nodes. Contact the service supplier for further information.

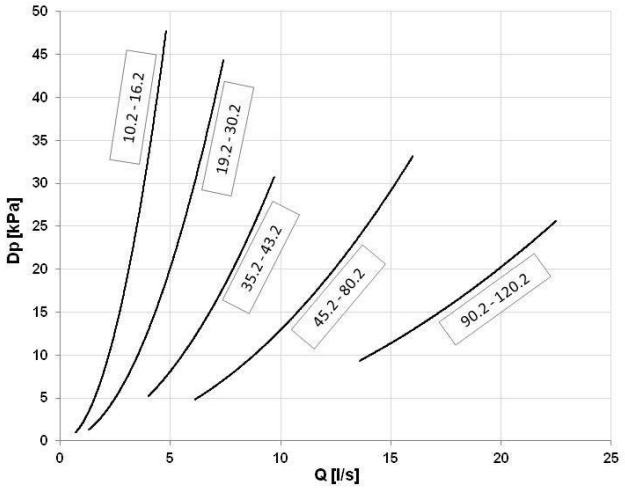
SPCX - Set-point compensation with outdoor air temperature probe

The setpoint compensation with air probe changes the calibration of the setpoint in relation to the temperature of the outside air and this reduces energy costs. The probe is connected to the unit's main control module and the maximum length of the connection cable is 20 meters. The sensor must not be influenced by factors that might affect its reading (for instance direct sunlight,contact with external heat sources, etc.) and therefore must be placed in a sheltered place.

VS2MX - Source side 2-way modulating valve

The 2-way source side modulating valve, installed on the source side exchanger outlet, modulates the flow of water in response to a 0-10 V signal from the unit's controller.

2-way modulating valve pressure drops



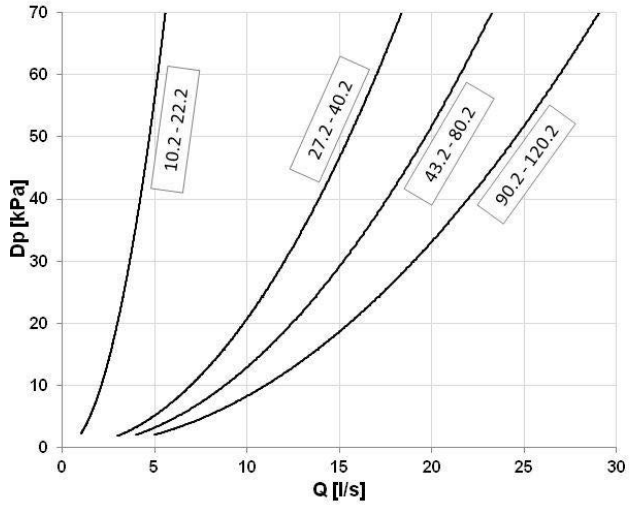
Q = Water flow rate [l/s]
DP = Pressure drops [kPa]

VS3MX - Source side 3-way modulating valve

The 3-way modulating valve connects the source side exchanger inlet and output, thus bypassing the exchanger and reducing the flow of water inside it, while keeping the machine's delivery flow constant.

The valve modulation is managed by a 0-10V signal generated by the unit electronic control.

3-way modulating valve pressure drops



Q = Water flow rate [l/s]
DP = Pressure drops [kPa]

AVIBX - Anti-vibration mount supports

The rubber antivibration mounts are attached in special housing on the support frame and serve to smooth the vibrations produced by the unit thus reducing the noise transmitted to the support structure.

VACSUX - User side DHW switching valve

The utility side DHW switching valve is also supplied as a separate accessory.
The DHW is called by the closure of the potential-free contact present in the unit electric panel.In heating, the control regulates the 3-way valve commutation because it deviates the flow-rate from installation to DHW storage tank, changes the installation set into the DHW one, thermoregulates and activates or deactivates the compressors depending on the distance from the DHW set. In cooling, the control switches off the compressors due to the mode changing, regulates the 3-way valve commutation and starts the compressors after the safety time owed to on/off.

For sizes from 10.2 to 22.2 the DHW switching valve is 2".

For sizes from 27.2 to 40.2 the DHW switching valve is 2"1/2.

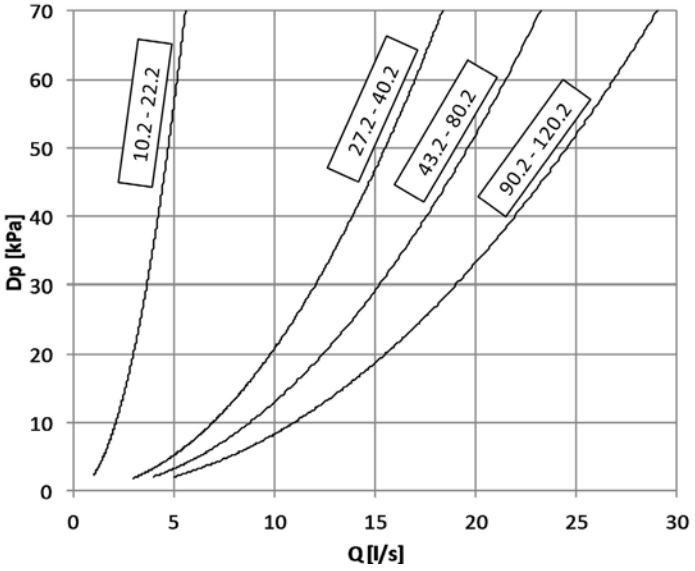
For sizes from 43.2 to 80.2 the DHW switching valve is 3".

For sizes from 90.2 to 120.2 the DHW switching valve is 4".

The DHW switching valve has a IP 40 protection degree.

It is therefore compulsory that client provides a protection for the external liquid valve.

DHW switching valve pressure drops



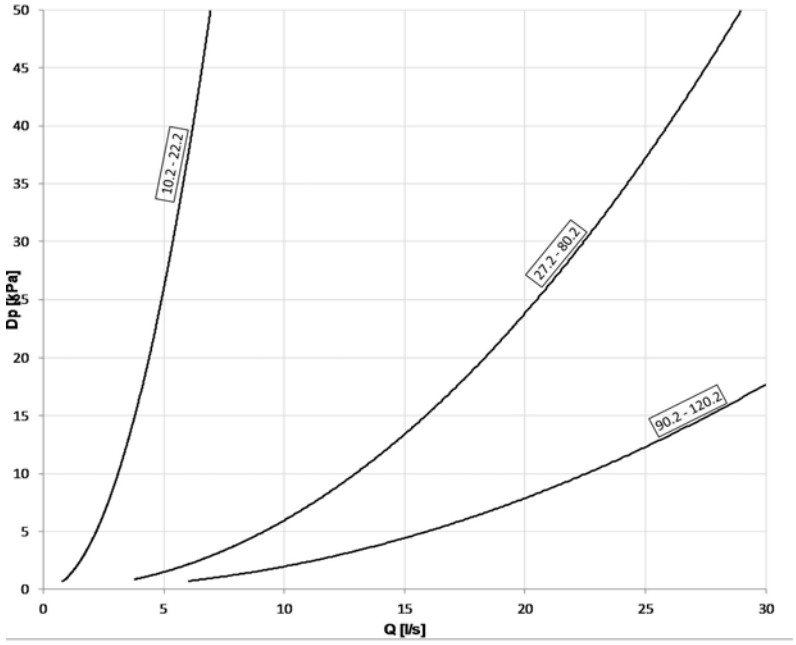
Q = Water flow rate [l/s]
DP = Pressure drops [kPa]

IFWX - Steel mesh strainer water side

The device prevents any impurity in the water circuit from soiling the exchanger. The stainless steel mesh mechanical strainer must be placed on the water inlet line. It needs to be easy to remove for periodical maintenance and cleaning operations. It can be used on the user and source side.

Check for the presence of the required hydraulic shut-off valves in the system, in order to undertake periodical maintenance.

Pressure drops of steel mesh strainer water side



Q = Water flow rate [l/s]
DP = Pressure drops [kPa]

Performance in Heating - Groundwater version

Size 10.2 -40.2

Size	To °C	Source side water outlet temperature (°C)											
		5		7		10		12		15		17	
		kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe
10.2	30	33,0	5,45	35,0	5,42	37,9	5,38	40,1	5,35	43,6*	5,32*	46,2*	5,29*
	35	32,9	6,17	34,8	6,14	37,7	6,11	39,8	6,09	43,2*	6,07*	45,6*	6,06*
	45	32,4	7,83	34,2	7,79	36,9	7,74	38,9	7,71	42,0*	7,66*	44,3*	7,64*
	55	30,0	10,1	31,6	10,0	33,9	9,92	35,7	9,86	38,4*	9,77*	40,4*	9,72*
	60	-	-	30,7	11,4	33,1	11,3	34,7	11,2	37,4*	11,1*	39,3*	11,0*
12.2	30	38,8	6,29	4,2	6,31	44,7	6,34	47,3	6,37	51,4*	6,43*	54,5*	6,49*
	35	38,7	7,14	40,9	7,17	44,4	7,22	46,9	7,26	50,8*	7,34*	53,7*	7,41*
	45	38,0	9,09	40,2	9,10	43,3	9,13	45,7	9,15	49,3*	9,21*	52,1*	9,25*
	55	35,5	11,8	37,4	11,8	40,1	11,7	42,2	11,7	45,4*	11,7*	47,8*	11,7*
	60	-	-	36,7	13,4	39,4	13,4	41,3	13,3	44,4*	13,3*	46,8*	13,3*
14.2	30	46,3	7,54	49,2	7,60	53,5	7,69	56,5	7,77	61,5*	7,90*	65,0*	7,99*
	35	46,1	8,56	48,8	8,62	53,0	8,73	56,0	8,81	60,7*	8,94*	64,2*	9,04*
	45	45,2	10,8	47,8	10,8	51,6	10,9	54,5	11,0	59,0*	11,1*	62,3*	11,1*
	55	42,1	13,8	44,3	13,8	47,7	13,8	50,2	13,9	54,1*	13,9*	57,0*	14,0*
	60	-	-	43,6	15,6	46,6	15,2	49,3	15,6	53,2*	15,7*	56,1*	15,7*
16.2	30	54,9	8,99	58,6	9,28	64,2	9,80	67,5	9,38	73,2	9,28	77,4	9,38
	35	54,4	10,1	57,7	10,1	62,8	10,2	66,3	10,3	72,1	10,5	76,1	10,6
	45	53,4	12,5	56,4	12,5	61,2	12,6	64,4	12,6	69,6	12,8	73,4	12,9
	55	49,5	15,9	52,2	15,9	56,2	15,9	59,2	15,9	63,6	15,9	66,8	16,0
	60	-	-	51,0	18,1	54,9	18,0	57,7	18,0	62,1	18,0	65,3	18,0
19.2	30	65,1	10,4	68,9	10,4	75,0	10,5	79,4	10,7	86,5	10,8	91,3	10,9
	35	64,6	11,6	68,3	11,6	74,2	11,7	78,3	11,9	85,2	12,1	89,9	12,2
	45	63,1	14,5	66,6	14,6	72,0	14,6	75,9	14,8	82,3	14,9	86,6	15,0
	55	58,1	18,6	61,2	18,6	65,8	18,5	69,3	18,8	74,6	18,8	78,4	18,8
	60	56,4	21,1	59,5	21,1	64,1	21,0	67,3	21,3	72,5	21,3	76,1	21,3
22.2	30	76,9	12,8	81,3	12,8	88,3	12,7	93,2	12,7	101	12,6	106	12,5
	35	76,4	14,3	80,8	14,4	87,7	14,5	92,4	14,6	100	14,6	106	14,6
	45	74,8	17,5	78,9	17,6	85,4	17,7	90,1	17,8	97,5	18,0	103	18,1
	55	69,1	21,7	72,7	21,8	78,1	21,9	82,1	22,0	88,6	22,2	92,8	22,3
	60	67,4	24,5	71,0	24,5	76,2	24,6	80,2	24,6	86,2	24,7	90,8	24,8
27.2	30	89,8	14,7	94,5	14,7	102	14,7	107	14,7	115	14,6	121	14,6
	35	89,1	16,7	94,4	16,7	101	16,8	106	16,8	114	16,9	120	16,9
	45	88,5	20,5	93,4	20,5	100	20,6	105	20,7	113	20,8	117	20,9
	55	83,9	25,6	87,9	25,6	93,9	25,8	97,8	25,9	104	25,9	109	26,1
	60	82,4	28,7	85,6	28,8	92,1	28,9	95,4	29,0	102	29,1	107	29,2
30.2	30	102	17,0	106	17,0	115	16,9	121	16,8	130	16,6	136	16,4
	35	101	19,3	106	19,4	115	19,5	120	19,5	129	19,5	136	19,5
	45	101	23,4	106	23,5	114	23,8	119	23,9	127	24,1	134	24,2
	55	95,3	28,8	99,0	28,9	106	29,2	110	29.3	118	29,6	124	29,8
	60	-	-	98,7	32,3	106	32,5	109	32,6	117	32,8	122	33,0
35.2	30	114	19,6	120	19,7	129	19,7	136	19,8	148	19,9	156	19,9
	35	114	22,1	119	22,2	129	22,4	135	22,6	146	22,8	154	22,9
	45	113	26,8	119	27,0	128	27,2	134	27,3	144	27,6	150	27,7
	55	107	33,4	112	33,6	119	33,8	125	34,0	134	34.3	139	34,5
	60	-	-	112	37,8	120	38,0	124	38,1	132	38,3	139	38,6
40.2	30	134	22,5	140	22,5	151	22,6	159	22,7	171	22,7	179	22,8
	35	133	25,4	140	25,6	150	25,8	157	25,9	170	26,1	179	26,3
	45	133	30,8	138	31,0	148	31,2	155	31,4	167	31,7	175	31,9
	55	126	38,1	132	38,3	139	38,6	145	38,8	154	39,0	163	39,3
	60	-	-	130	42,8	139	43,0	144	43,1	153	43,3	160	43,5

kWt = Heating capacity (kW)
kWe = Total Electrical power absorbed (compressor + Auxiliary Circuit)(kW)
To = Water outlet temperature user side (°C)
The performances are referred to DeltaT=5°C on both the user and source sides
* Performance with modulating valve or control inverter pump source side (optional configurations)

Performance in Heating - Groundwater version

Size 43.2 -120.2

Size	To °C	Source side water outlet temperature (°C)											
		5		7		10		12		15		17	
		kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe
43.2	30	144	25,1	152	25,2	164	25,5	174	25,6	188	25,9	198	26,2
	35	144	28,2	151	28,4	163	28,7	171	28,9	186	29,3	195	29,6
	45	143	34,2	150	34,4	161	34,7	169	34,9	182	35,3	190	35,5
	55	136	42,8	144	43,0	152	43,3	158	43,5	169	43,8	176	44,0
	60	137	48,1	143	48,3	153	48,6	160	48,6	169	48,9	178	49,1
45.2	30	155	26,4	163	26,5	177	26,7	185	26,8	201	27,0	211	27,0
	35	155	29,9	161	30,1	176	30,4	182	30,6	198	30,9	209	31,1
	45	153	36,3	162	36,6	173	36,9	180	37,1	193	37,5	204	37,8
	55	147	45,3	153	45,5	163	45,9	169	46,1	181	46,4	189	46,8
	60	-	-	152	50,9	160	50,6	169	51,3	181	51,7	190	52,1
50.2	30	175	29,0	185	29,2	201	29,6	213	29,8	232	30,2	244	30,5
	35	173	32,5	182	32,8	198	33,2	208	33,5	227	34,0	239	34,3
	45	168	39,3	178	39,6	192	39,9	202	40,2	218	40,7	230	41,1
	55	158	49,1	165	49,4	177	49,7	185	49,9	200	50,4	209	50,8
	60	156	55,4	163	55,5	176	55,8	184	56,0	198	56,5	209	56,8
55.2	30	191	31,9	202	32,1	219	32,5	232	32,7	252	33,2	266	33,5
	35	188	35,9	199	36,2	215	36,6	228	36,9	247	37,4	261	37,8
	45	184	43,5	194	43,7	209	44,1	221	44,4	239	44,9	251	45,2
	55	172	54,0	180	54,3	193	54,6	202	54,9	218	55,4	229	55,7
	60	171	60,5	179	60,7	191	61,1	201	61,3	217	61,7	227	62,0
60.2	30	213	35,8	226	36,1	244	36,5	259	36,8	282	37,3	298	37,7
	35	210	40,5	222	40,7	241	41,2	254	41,6	276	42,2	291	42,6
	45	206	49,1	217	49,3	235	49,8	247	50,1	267	50,7	281	51,1
	55	192	61,2	201	61,5	216	61,9	227	62,2	244	62,8	255	63,3
	60	192	68,6	201	68,9	216	69,3	225	69,5	243	70,1	256	70,6
70.2	30	245	40,8	259	41,2	283	41,9	299	42,5	325	43,4	342	44,0
	35	243	45,6	257	46,0	279	46,7	294	47,3	319	48,1	336	48,7
	45	238	55,0	251	55,4	271	55,9	285	56,4	308	57,1	324	57,7
	55	221	67,9	232	68,3	249	68,9	262	69,3	281	70,0	296	70,6
	60	219	75,7	230	76,1	246	76,7	258	77,2	277	77,9	293	78,5
80.2	30	272	45,8	288	46,4	314	47,4	332	48,2	359	49,4	379	50,3
	35	269	51,2	284	51,8	309	52,7	326	53,5	353	54,6	372	55,5
	45	265	61,5	278	62,1	301	62,9	317	63,5	342	64,4	359	65,2
	55	246	75,6	258	76,1	277	77,0	290	77,6	312	78,5	327	79,2
	60	243	84,0	256	84,6	275	85,5	287	86,0	309	87,0	326	87,7
90.2	30	305	53,3	323	53,7	350	54,2	369	54,7	399	55,3	421	55,8
	35	303	58,7	320	59,1	347	59,7	365	60,2	396	60,9	417	61,4
	45	296	71,3	313	71,7	338	72,2	355	72,6	383	73,4	402	73,9
	55	275	89,6	290	89,9	311	90,3	325	90,6	349	91,2	366	91,6
	60	274	101	288	101	307	102	322	102	345	102	362	102
100.2	30	336	60,3	356	60,9	382	61,7	405	62,5	439	63,6	462	64,4
	35	331	65,7	350	66,3	376	67,1	398	67,8	430	68,9	453	69,7
	45	324	79,7	342	80,3	364	80,9	385	81,5	415	82,5	436	83,1
	55	300	99,5	316	100	335	100	352	101	378	102	397	102
	60	299	112	315	112	334	112	352	113	378	114	397	114
120.2	30	402	72,3	426	72,9	458	73,6	484	74,1	523	75,0	550	75,6
	35	397	79,1	420	79,7	451	80,5	476	81,1	514	82,0	541	82,7
	45	385	96,6	407	97,1	435	97,6	456	98,1	492	99,0	516	99,5
	55	357	122	377	122	399	123	418	123	450	123	470	124
	60	358	138	377	138	400	139	414	133	450	139	473	139

kWt = Heating capacity (kW)
kWe = Total Electrical power absorbed (compressor + Auxiliary Circuit)(kW)
To = Water outlet temperature user side (°C)
The performances are referred to DeltaT=5°C on both the user and source sides

Performances in cooling - Geothermal version

Size 10.2 - 27.2

Size	To °C	Source side water outlet temperature (°C)									
		30		35		40		45		50	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
10.2	5	27,9	5,97	26,8	6,68	25,3	7,5	23,3	8,47	20,9	9,61
	7	29,9	5,96	28,6	6,67	27,0	7,49	25,0	8,45	22,6	9,57
	10	32,3	5,95	31,0	6,66	29,4	7,47	27,1	8,42	24,5	9,52
	12	33,9	5,95	32,6	6,67	30,7	7,46	28,5	8,42	25,8	9,49
	15	36,7	5,95	35,3	6,67	33,4	7,46	30,9	8,39	28,2	9,46
	18	39,7	6,01	38,0	6,74	36,0	7,54	33,3	8,47	30,3	9,55
12.2	5	32,6	6,97	31,1	7,81	29,4	8,77	27,1	9,97	24,5	11,3
	7	34,8	7,02	33,3	7,86	31,4	8,82	29	10,0	26,3	11,4
	10	37,7	7,09	36,0	7,93	34,0	8,9	31,5	10,1	28,5	11,4
	12	39,4	7,15	37,7	8,0	35,7	8,96	32,9	10,1	30,0	11,4
	15	42,6	7,26	40,8	8,09	38,5	9,06	35,8	10,2	32,6	11,5
	18	46,0	7,46	44,0	8,31	41,7	9,27	38,4	10,4	35,3	11,7
14.2	5	37,6	8,42	35,9	9,39	33,4	10,6	31,0	11,9	28,1	13,4
	7	40,1	8,50	38,4	9,48	36,1	10,6	33,3	12,0	30,2	13,5
	10	43,5	8,63	41,6	9,60	39,2	10,8	36	12,1	32,8	13,6
	12	45,4	8,74	43,6	9,71	41,0	10,8	37,9	12,2	34,4	13,7
	15	49,4	8,91	47,3	9,86	44,6	11,0	41,1	12,3	37,6	13,9
	18	53,4	9,18	51,2	10,1	48,4	11,3	44,5	12,6	40,7	14,1
16.2	5	45,1	9,76	43,1	10,8	40,5	12,0	37,3	13,4	33,6	15,2
	7	48,1	9,96	46,0	10,9	43,3	12,1	40,0	13,5	36,2	15,2
	10	52,6	10,1	50,3	11,0	47,5	12,2	43,7	13,6	39,6	15,3
	12	54,9	10,2	52,4	11,1	49,5	12,3	45,8	13,7	41,5	15,4
	15	59,7	10,3	57,0	11,3	53,8	12,5	49,6	13,9	45,1	15,5
	18	64,6	10,6	61,7	11,6	58,1	12,8	53,6	14,2	48,8	15,9
19.2	5	55,6	10,9	53,8	11,8	50,9	13,2	47,3	14,8	42,8	16,7
	7	59,6	11,0	57,5	11,9	54,6	13,3	50,9	14,8	46,1	16,7
	10	64,9	11,1	62,8	12,0	59,6	13,3	55,5	14,9	50,4	16,7
	12	67,8	11,2	65,7	12,1	62,3	13,4	58	14,9	52,9	16,8
	15	74	11,3	71,6	12,2	68,0	13,5	63,5	15,0	57,9	16,8
	18	80,0	11,6	77,4	12,5	73,6	13,8	68,6	15,3	62,7	17,1
22.2	5	64,2	13,3	62,1	14,5	58,9	16,0	54,9	17,7	50,0	19,8
	7	68,6	13,4	66,4	14,6	63	16,1	58,7	17,9	53,6	19,8
	10	74,8	13,4	72,5	14,7	68,8	16,3	64,3	18,0	58,6	20,0
	12	78,0	13,4	75,6	14,8	71,9	16,4	67,1	18,1	61,5	20,1
	15	85,0	13,4	82,3	14,9	78,3	16,5	73,1	18,3	67,1	20,3
	18	92,1	13,5	89,1	15,1	84,9	16,8	79,2	18,7	72,7	20,7
27.2	5	78,5	15,2	75,7	16,7	71,6	18,6	66,6	20,6	60,5	23,0
	7	84,0	15,2	81,1	16,8	76,8	18,7	71,5	20,7	64,9	23,1
	10	90,2	15,3	87,0	16,9	82,5	18,8	76,8	20,9	69,9	23,2
	12	93,2	15,3	89,8	16,9	85,2	18,8	79,4	21,0	72,3	23,3
	15	102	15,3	98,0	17,0	93,1	19,0	86,8	21,1	79,4	23,5
	18	110	15,3	106	17,1	101	19,1	94,4	21,3	86,3	23,7

kWf = Cooling capacity (kW)
kWe = Total Electrical power absorbed (compressor + Auxiliary Circuit)(kW)
To = Water outlet temperature user side (°C)
The performances are referred to DeltaT=5°C on both the user and source sides
Data refer to operation with a mix of water and propylene glycol at 30% on the source side

Performances in cooling - Groundwater version

Size 30.2 - 60.2

Size	To °C	Source side water outlet temperature (°C)									
		30		35		40		45		50	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
30.2	5	91,0	17,0	87,3	19,6	84,5	21,3	79,7	24,0	73,8	26,1
	7	96,9	16,9	92,2	19,7	89,6	21,5	83,3	24,1	77,7	26,2
	10	103	16,9	98,5	19,8	95,5	21,6	89,2	24,3	83,1	26,4
	12	108	17,0	103	20,0	99,9	21,9	92,7	24,7	87,6	26,8
	15	118	16,8	112	20,1	109	22,0	102	24,9	95,7	27,1
	18	127	16,5	122	20,1	117	22,1	109	25,1	102	27,3
35.2	5	99,8	20,1	96,0	22,4	92,7	24,4	87,8	27,5	82,5	30,1
	7	106	20,2	102	22,6	99,4	24,5	92,4	27,6	86,6	30,2
	10	115	20,3	110	22,8	106	24,7	99,0	27,9	92,9	30,4
	12	120	20,6	115	23,2	112	25,2	104	28,3	97,5	30,9
	15	131	20,7	127	23,4	122	25,4	113	28,6	106	31,2
	18	141	20,7	136	23,5	130	25,6	121	28,9	115	31,5
40.2	5	118	22,5	112	25,6	107	27,9	99,5	31,3	91,1	35,1
	7	127	22,5	120	25,8	116	28,1	107	31,6	97,9	35,3
	10	138	22,7	131	26,1	126	28,3	116	31,8	107	35,6
	12	145	23,0	138	26,4	132	28,7	122	32,3	112	36,1
	15	159	23,1	151	26,6	145	29,0	134	32,6	123	36,4
	18	173	23,1	163	26,8	157	29,2	145	32,8	133	36,7
43.2	5	129	25,1	122	28,5	117	31,0	108	34,9	99,2	39,3
	7	140	25,3	131	28,7	126	31,2	116	35,1	107	39,5
	10	152	25,6	143	29,1	138	31,5	127	35,4	116	39,8
	12	160	26,1	151	29,6	145	32,0	134	36,0	122	40,4
	15	176	26,5	166	30,0	159	32,3	146	36,3	135	40,8
	18	190	26,8	180	30,3	172	32,7	159	36,6	147	41,1
45.2	5	137	26,4	130	30,2	124	32,8	115	37,0	105	41,5
	7	147	26,6	139	30,4	134	33,0	123	37,2	113	41,8
	10	161	26,8	152	30,7	146	33,3	135	37,5	124	42,2
	12	169	27,2	160	31,2	153	33,9	141	38,1	130	42,8
	15	185	27,4	175	31,6	168	34,2	155	38,6	142	43,2
	18	201	27,5	190	31,9	182	34,6	168	39,0	155	43,7
50.2	5	154	28,9	145	32,7	138	35,6	129	40,1	118	45,1
	7	165	29,2	155	33,0	149	35,9	138	40,3	126	45,3
	10	179	29,5	169	33,4	162	36,2	149	40,7	137	45,7
	12	189	30,1	178	34,1	170	36,8	158	41,4	145	46,4
	15	208	30,6	196	34,5	188	37,3	173	41,8	159	46,9
	18	226	31,0	213	35,0	204	37,8	188	42,3	173	47,5
55.2	5	167	31,8	158	36,0	151	39,2	140	44,0	128	49,4
	7	178	32,0	169	36,3	161	39,4	150	44,3	137	49,7
	10	194	32,4	183	36,7	176	39,8	162	44,7	149	50,1
	12	205	33,0	193	37,3	186	40,4	171	45,4	158	50,8
	15	224	33,5	212	37,8	204	40,9	189	45,9	174	51,3
	18	244	33,9	230	38,3	221	41,3	205	46,3	188	51,9
60.2	5	185	35,7	175	40,6	167	44,1	155	49,7	143	55,9
	7	197	36,0	187	40,9	179	44,4	166	50,0	152	56,2
	10	216	36,4	203	41,2	196	44,7	181	50,4	166	56,6
	12	227	37,1	215	42,0	206	45,5	191	51,2	176	57,5
	15	250	37,7	236	42,7	227	46,1	209	51,8	192	58,1
	18	271	38,2	256	43,3	246	46,6	228	52,4	209	58,8

kWf = Cooling capacity (kW)
kWe = Total Electrical power absorbed (compressor + Auxiliary Circuit)(kW)
To = Water outlet temperature user side (°C)
The performances are referred to DeltaT=5°C on both the user and source sides

Performances in cooling - Groundwater version

Size 70.2 - 120.2

Size	To °C	Source side water outlet temperature (°C)									
		30		35		40		45		50	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
70.2	5	215	40,8	204	46,0	194	50,0	180	56,0	165	62,6
	7	230	41,3	218	46,4	209	50,4	193	56,5	177	63,1
	10	259	42,3	246	47,5	236	51,3	218	57,4	201	64,1
	12	264	43,0	250	48,2	239	52,0	221	58,2	203	64,9
	15	294	44,1	279	49,3	268	53,0	247	59,2	227	65,9
	18	314	44,9	297	50,1	284	53,7	262	59,9	241	66,6
80.2	5	239	46	226	51,7	217	56,1	199	62,9	183	70,1
	7	254	46,6	241	52,3	231	56,7	213	63,4	196	70,7
	10	284	47,8	269	53,6	259	57,8	242	64,6	223	72,0
	12	292	48,8	276	54,6	265	58,7	245	65,5	224	72,9
	15	325	50,4	307	56,0	296	60,0	274	66,8	251	74,1
	18	346	51,5	327	57,1	315	61,0	290	67,7	266	75,0
90.2	5	260	53,3	250	58,7	236	64,9	220	72,0	201	81,3
	7	278	53,7	266	59,1	253	65,3	237	72,4	216	81,6
	10	302	54,2	290	59,7	276	65,8	258	73,0	236	82,1
	12	318	54,7	305	60,2	291	66,2	271	73,4	248	82,4
	15	348	55,3	335	60,9	319	66,9	297	74,1	273	83,1
	18	376	56,0	362	61,7	345	67,6	322	74,8	295	83,8
100.2	5	286	59,8	274	65,7	260	72,1	243	79,7	221	89,6
	7	306	60,4	293	66,3	279	72,7	261	80,3	237	90,1
	10	329	61,3	315	67,1	300	73,5	279	80,9	255	90,7
	12	346	62,1	334	67,8	317	74,1	296	81,5	270	91,2
	15	378	63,2	364	69,0	346	75,2	324	82,5	296	92,1
	18	410	64,3	395	70,1	375	76,3	351	83,4	322	93,0
120.2	5	338	71,9	325	79,1	309	87,0	288	96,6	261	109
	7	362	72,4	348	79,7	332	87,5	309	97,1	281	110
	10	390	73,2	375	80,5	357	88,2	333	97,6	303	110
	12	410	73,8	396	81,1	376	88,8	350	98,1	319	111
	15	451	74,7	433	82,0	412	89,7	384	98,9	351	111
	18	491	75,6	471	83,0	449	90,6	419	99,7	383	112

kWf = Cooling capacity (kW)
kWe = Total Electrical power absorbed (compressor + Auxiliary Circuit)(kW)
To = Water outlet temperature user side (°C)
The performances are referred to DeltaT=5°C on both the user and source sides

Performance in Heating - Geothermal version

Size 10.2 - 40.2

Size	To °C	External exchanger water outlet temperature (°C)											
		-6		-3		-1		0		1		3	
		kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe
10.2	30	25.6	5.58	28.0	5.54	29.6	5.51	30.5	5.50	31.4	5.48	33.1	5.45
	35	25.4	6.28	27.7	6.24	29.3	6.21	30.2	6.20	31.0	6.19	32.7	6.16
	45	25.1	8.11	27.3	8.03	28.8	7.98	29.6	7.96	30.4	7.93	32.0	7.89
	50	24.2	9.31	26.4	9.21	27.9	9.14	28.6	9.12	29.4	9.09	30.9	9.02
	55	–	–	–	–	–	–	–	–	–	–	–	–
12.2	30	30.0	6.24	32.8	6.25	34.7	6.25	35.8	6.26	36.8	6.27	38.9	6.28
	35	29.8	7.04	32.4	7.07	34.3	7.08	35.3	7.09	36.3	7.10	38.3	7.12
	45	29.6	9.18	32.0	9.16	33.8	9.15	34.7	9.15	35.6	9.15	37.5	9.14
	50	28.7	10.6	31.2	10.6	32.9	10.5	33.8	10.5	34.6	10.5	36.4	10.5
	55	–	–	–	–	–	–	–	–	–	–	–	–
14.2	30	35.0	7.34	38.3	7.39	40.5	7.42	41.7	7.44	43.0	7.46	45.4	7.51
	35	34.7	8.29	37.7	8.36	39.9	8.40	41.2	8.43	42.3	8.45	44.8	8.51
	45	34.3	10.7	37.3	10.7	39.3	10.8	40.4	10.8	41.5	10.8	43.7	10.8
	50	33.3	12.2	36.4	12.2	38.2	12.3	39.3	12.3	40.3	12.3	42.5	12.3
	55	–	–	–	–	–	–	–	–	–	–	–	–
16.2	30	41.6	8.83	45.6	8.84	48.2	8.84	49.8	8.85	51.2	8.86	54.3	8.88
	35	41.3	9.83	45.1	9.85	47.6	9.86	49.0	9.87	50.4	9.89	53.3	9.92
	45	40.9	12.5	44.4	12.4	46.8	12.4	48.1	12.4	49.3	12.4	52.0	12.4
	50	39.7	14.3	43.1	14.2	45.4	14.2	46.6	14.2	47.8	14.2	50.3	14.1
	55	–	–	–	–	–	–	–	–	–	–	–	–
19.2	30	49.9	10.2	54.6	10.3	57.9	10.3	59.6	10.3	61.4	10.3	64.9	10.3
	35	49.5	11.4	54.0	11.5	57.1	11.5	58.7	11.5	60.4	11.5	64.0	11.6
	45	48.6	14.5	52.8	14.5	55.7	14.5	57.5	14.5	59.0	14.5	62.1	14.5
	50	47.1	16.6	51.1	16.5	53.8	16.5	55.4	16.5	56.9	16.5	59.8	16.5
	55	–	–	–	–	–	–	–	–	–	–	–	–
22.2	30	58.3	12.4	63.6	12.5	67.1	12.5	69.1	12.6	71.2	12.6	75.1	12.6
	35	57.6	13.7	62.9	13.9	66.4	14.0	68.1	14.0	70.4	14.0	74.3	14.1
	45	56.8	17.1	61.9	17.1	65.1	17.2	66.8	17.3	68.6	17.3	72.5	17.4
	50	55.5	19.4	60.1	19.4	63.2	19.4	64.7	19.5	66.5	19.5	70.0	19.6
	55	–	–	–	–	–	–	–	–	–	–	–	–
27.2	30	69.6	14.4	75.8	14.5	80.2	14.6	82.7	14.6	85.1	14.6	90.2	14.6
	35	68.7	16.0	75.1	16.2	79.2	16.3	81.7	16.3	83.9	16.4	88.8	16.5
	45	67.2	19.9	73.2	20.0	77.3	20.1	79.4	20.2	81.5	20.3	86.0	20.4
	50	65.1	22.6	70.7	22.7	74.6	22.8	76.5	22.8	78.5	22.9	82.7	23.0
	55	-	-	68.1	25.3	71.9	25.4	73.6	25.4	75.5	25.5	79.4	25.5
30.2	30	78.5	16.6	85.7	16.7	90.6	16.8	93.2	16.9	96.1	16.9	102	16.9
	35	77.7	18.4	84.7	18.6	89.5	18.8	92.1	18.9	94.6	19.0	100	19.1
	45	76.0	22.5	82.7	22.8	87.2	22.9	89.8	23.0	92.3	23.1	97.1	23.3
	50	73.7	25.4	80.1	25.6	84.3	25.7	86.6	25.8	88.9	25.9	93.5	26.1
	55	-	-	77.5	28.5	81.5	28.6	83.5	28.6	85.5	28.7	89.8	28.8
35.2	30	88.2	19.1	96.7	19.2	102	19.4	105	19.4	109	19.5	116	19.5
	35	87.2	21.2	95.3	21.5	101	21.6	104	21.7	107	21.8	113	22.0
	45	85.5	26.0	93.0	26.3	98.0	26.4	101	26.5	104	26.6	110	26.9
	50	83.0	29.5	90.3	29.7	95.1	29.8	97.7	29.9	100	30.0	106	30.2
	55	-	-	-	-	92.3	33.3	94.4	33.3	97.1	33.4	102	33.6
40.2	30	102	21.9	111	22.1	118	22.2	122	22.2	125	22.3	133	22.4
	35	101	24.2	110	24.5	116	24.7	120	24.8	123	24.9	130	25.0
	45	99.2	29.7	108	30.0	114	30.2	117	30.3	120	30.4	126	30.6
	50	96.1	33.5	104	33.7	110	33.9	113	34.0	116	34.1	122	34.3
	55	-	-	-	-	106	37.5	109	37.7	112	37.7	117	37.9

kWt = Heating capacity (kW)
kWe = Total Electrical power absorbed (compressor + Auxiliary Circuit)(kW)
To = Water outlet temperature user side (°C)
The performances are referred to DeltaT=5°C on both the user and source sides
Data refer to operation with a mix of water and propylene glycol at 30% on the source side

Performance in Heating - Geothermal version

Size 43.2 - 120.2

Size	To °C	Source side water outlet temperature (°C)											
		-6		-3		-1		0		1		3	
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
43.2	30	112	24,4	123	24,6	130	24,7	133	24,8	138	24,8	146	25,0
	35	110	27,1	121	27,3	127	27,5	131	27,6	135	27,7	143	27,9
	45	109	33,2	118	33,5	124	33,7	128	33,8	132	33,9	139	34,1
	50	-	-	115	37,7	121	37,9	124	38,0	128	38,2	134	38,4
	55	-	-	-	-	-	-	-	-	123	42,4	130	42,6
45.2	30	120	25,6	131	25,8	138	26	143	26	147	26,1	156	26,3
	35	118	28,5	129	28,9	136	29,1	140	29,2	145	29,4	153	29,6
	45	117	35,3	127	35,5	133	35,7	137	35,8	141	36,0	148	36,2
	50	114	40,0	123	40,1	129	40,2	133	40,3	136	40,5	143	40,7
	55	-	-	-	-	126	44,8	129	44,9	132	45,0	138	45,2
50.2	30	130	28,0	142	28,2	151	28,4	156	28,5	160	28,6	170	28,8
	35	128	31,0	140	31,3	148	31,5	153	31,6	158	31,7	167	32
	45	126	38,3	138	38,5	145	38,7	149	38,8	153	38,9	162	39,1
	50	-	-	134	43,4	141	43,6	145	43,7	149	43,8	156	44
	55	-	-	-	-	-	-	-	-	144	48,7	151	48,9
55.2	30	143	30,8	157	31,1	167	31,3	172	31,4	177	31,5	188	31,7
	35	142	34,3	155	34,7	164	34,9	169	35,0	174	35,2	185	35,3
	45	140	42,4	152	42,7	160	42,9	165	43,0	170	43,2	179	43,4
	50	-	-	148	48,0	156	48,2	160	48,3	164	48,4	173	48,7
	55	-	-	-	-	-	-	-	-	159	53,7	167	54,0
60.2	30	159	34,5	175	34,8	185	35,0	191	35,2	197	35,3	209	35,6
	35	158	38,7	172	39,1	183	39,3	188	39,5	194	39,7	205	40,0
	45	157	48,1	169	48,3	179	48,4	184	48,6	188	48,7	199	49,0
	50	-	-	165	54,5	174	54,6	179	54,7	183	54,9	193	55,1
	55	-	-	-	-	169	60,8	173	60,9	178	61,0	186	61,2
70.2	30	181	38,7	198	39,2	210	39,5	216	39,7	223	39,9	237	40,3
	35	179	43,0	196	43,6	207	44,0	214	44,2	220	44,4	232	44,9
	45	177	53,0	193	53,5	203	53,9	209	54,1	215	54,3	226	54,7
	50	-	-	188	60,1	197	60,4	203	60,6	208	60,8	219	61,2
	55	-	-	-	-	192	66,9	197	67,2	201	67,4	211	67,8
80.2	30	201	43,0	220	43,6	233	44,1	240	44,4	247	44,6	263	45,2
	35	199	47,9	217	48,7	230	49,2	236	49,5	243	49,8	258	50,5
	45	197	58,8	213	59,6	226	60,2	232	60,4	238	60,7	251	61,4
	50	-	-	208	66,6	219	67,2	225	67,5	230	67,8	243	68,4
	55	-	-	-	-	212	74,2	217	74,6	223	74,9	234	75,5
90.2	30	228	51,0	248	51,4	262	51,7	269	51,9	277	52,1	294	52,4
	35	226	56,2	246	56,7	260	57,0	266	57,2	274	57,4	290	57,7
	45	224	70,0	243	70,3	255	70,5	261	70,6	268	70,7	283	71,0
	50	-	-	236	79,7	248	79,8	254	79,9	260	80,0	274	80,3
	55	-	-	-	-	241	89,1	246	89,2	252	89,3	265	89,5
100.2	30	245	55,8	267	56,4	282	56,8	289	57,0	298	57,3	315	57,8
	35	244	61,5	265	62,1	279	62,6	286	62,8	294	63,0	312	63,6
	45	242	76,1	262	76,7	275	77,1	282	77,3	289	77,5	306	78
	50	-	-	254	86,6	267	87,0	273	87,2	280	87,4	295	87,8
	55	-	-	-	-	259	96,9	265	97,1	272	97,3	285	97,7
120.2	30	289	67,9	313	68,5	330	68,9	340	69,1	348	69,3	368	69,7
	35	288	74,9	311	75,6	328	76,0	337	76,3	345	76,5	366	77,0
	45	286	93,4	308	93,9	325	94,3	332	94,5	340	94,7	359	95,1
	50	-	-	299	107	314	107	322	107	330	108	347	108
	55	-	-	-	-	304	120	311	120	320	121	335	121

kWt = Heating capacity (kW)
kWe = Total Electrical power absorbed (compressor + Auxiliary Circuit) (kW)
To = Water outlet temperature user side (°C)
The performances are referred to DeltaT=5°C on both the user and source sides
Data refer to operation with a mix of water and propylene glycol at 30% on the source side

Performances in cooling - Groundwater version

Size 10.2 - 27.2

Size	To °C	Source side water outlet temperature (°C)									
		30		35		40		45		50	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
10.2	5	28,,6	5,41	27,4	6,15	25,9	6,99	24,1	7,87	21,8	9,01
	7	30,7	5,38	29,4	6,12	27,8	6,96	26	7,84	23,5	8,96
	10	33,4	5,34	32,1	6,09	30,4	6,92	28,4	7,78	25,8	8,88
	12	35,4	5,37	33,9	6,14	32,1	6,97	30,1	7,83	27,4	8,93
	15	38,9	5,33	37,2	6,12	35,4	6,94	33,2	7,79	30,4	8,86
	18	42,4	5,3	40,5	6,11	38,5	6,92	36,2	7,75	33,1	8,81
12.2	5	33,8	6,24	32,3	7,1	30,5	8,08	28,5	9,12	25,9	10,5
	7	36,2	6,26	34,6	7,13	32,7	8,1	30,5	9,14	27,8	10,5
	10	39,4	6,29	37,7	7,18	35,7	8,14	33,3	9,16	30,5	10,5
	12	41,6	6,38	39,7	7,30	37,7	8,26	35,3	9,28	32,3	10,6
	15	45,7	6,44	43,6	7,38	41,4	8,32	38,9	9,33	35,7	10,6
	18	49,7	6,52	47,4	7,49	45,1	8,42	42,4	9,41	38,9	10,7
14.2	5	40,2	7,48	38,4	8,51	36,2	9,63	33,7	10,8	30,7	12,3
	7	43,0	7,53	41	8,58	38,9	9,69	36,2	10,9	33,0	12,4
	10	47,0	7,63	44,8	8,68	42,4	9,77	39,6	11,0	36,2	12,4
	12	49,5	7,78	47,3	8,85	44,8	9,94	41,9	11,1	38,4	12,6
	15	54,5	7,91	51,9	8,99	49,4	10,0	46,3	11,2	42,5	12,7
	18	59,1	8,05	56,5	9,13	53,8	10,2	50,5	11,3	46,5	12,8
16.2	5	47,6	8,9	45,5	9,98	43,0	11,2	40,3	12,5	36,6	14,2
	7	51,0	9,16	48,8	10,0	46,2	11,2	43,2	12,5	39,4	14,2
	10	55,8	9,28	53,3	10,1	50,5	11,3	47,4	12,6	43,3	14,2
	12	58,9	9,45	56,3	10,3	53,3	11,5	50,1	12,8	45,8	14,4
	15	64,9	9,28	61,8	10,5	58,6	11,6	55,0	12,9	50,4	14,5
	18	70,5	9,43	67,0	10,7	63,6	11,8	59,7	13,1	54,8	14,6
19.2	5	56,6	10,5	54,4	11,6	51,4	13,0	47,9	14,6	43,5	16,4
	7	60,6	10,6	58,1	11,7	55,1	13,1	51,4	14,6	46,7	16,5
	10	66,2	10,7	63,5	11,8	60,2	13,1	56,2	14,7	51,2	16,5
	12	69,8	10,8	67,0	12,0	63,5	13,3	59,3	14,9	54,3	16,7
	15	76,7	11,0	73,6	12,1	69,9	13,4	65,5	14,9	60,0	16,7
	18	83,0	11,2	79,7	12,3	75,8	13,6	70,8	15,1	64,9	16,8
22.2	5	66,4	12,8	63,8	14,2	60,4	15,8	56,5	17,5	51,7	19,5
	7	71,1	12,8	68,2	14,3	64,6	15,9	60,5	17,6	55,5	19,6
	10	77,6	12,8	74,5	14,4	70,6	16,1	66,1	17,8	60,6	19,7
	12	81,7	12,9	78,5	14,6	74,4	16,3	69,9	18,1	64,0	20,0
	15	90,0	12,8	86,4	14,7	82,1	16,4	77,0	18,2	70,6	20,2
	18	97,2	12,7	93,4	14,7	88,9	16,5	83,4	18,4	76,7	20,4
27.2	5	80,9	15,0	78,5	16,8	74,8	18,5	70,0	20,9	65,6	23,0
	7	85,5	15,0	82,3	16,9	79,3	18,6	74,4	21,0	69,6	23,1
	10	91,6	15,0	88,1	17,0	85,0	18,7	79,6	21,1	74,4	23,2
	12	95,5	15,2	92,3	17,3	88,7	18,9	82,7	21,4	77,8	23,5
	15	105	15,2	101	17,3	96,9	19,0	90,2	21,6	84,8	23,6
	18	112	15,2	108	17,4	105	19,1	97,2	21,7	91,5	23,8

kWf = Cooling capacity (kW)
kWe = Total Electrical power absorbed (compressor + Auxiliary Circuit)(kW)
To = Water outlet temperature user side (°C)
The performances are referred to DeltaT=5°C on both the user and source sides

Performance in Cooling - Geothermal version

Size 30.2 - 60.2

Size	To °C	Source side water outlet temperature (°C)									
		30		35		40		45		50	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
30.2	5	88,3	17,6	85,2	19,4	80,8	21,4	75,1	23,6	68,6	26,1
	7	94,6	17,6	91,3	19,5	86,6	21,6	80,6	23,8	73,5	26,3
	10	101	17,6	97,6	19,6	92,7	21,8	86,4	24,1	78,9	26,5
	12	105	17,5	101	19,7	96,0	21,9	89,5	24,2	81,8	26,7
	15	114	17,4	110	19,7	105	22,0	97,7	24,5	89,4	27,0
	18	124	17,1	120	19,6	114	22,1	106	24,6	97,2	27,3
35.2	5	100	20,4	96,2	22,3	91,0	24,6	84,4	27,2	77,2	30,2
	7	107	20,5	103	22,5	97,8	24,7	90,8	27,4	82,4	30,3
	10	116	20,7	111	22,7	105	25,0	97,8	27,6	89,3	30,6
	12	120	20,7	115	22,8	109	25,1	101	27,8	92,3	30,8
	15	130	20,8	125	23,0	119	25,4	110	28,1	101	31,1
	18	142	20,9	136	23,2	129	25,6	120	28,4	110	31,5
40.2	5	115	23,1	111	25,5	105	28,1	97,4	31,1	88,9	34,7
	7	124	23,2	119	25,6	113	28,3	105	31,3	96,0	34,9
	10	134	23,3	128	25,9	122	28,5	113	31,5	103	35,1
	12	138	23,4	132	26,0	126	28,7	117	31,7	107	35,3
	15	151	23,6	145	26,2	137	28,9	128	32,0	117	35,6
	18	163	23,9	157	26,6	149	29,4	139	32,6	129	36,1
43.2	5	127	25,8	121	28,3	115	31,2	107	34,6	97,6	38,8
	7	137	26,1	131	28,6	124	31,5	115	34,9	105	39,0
	10	148	26,3	141	28,9	134	31,7	124	35,1	114	39,3
	12	153	26,6	146	29,1	138	31,9	128	35,3	118	39,5
	15	167	27,0	160	29,5	151	32,3	141	35,7	129	39,8
	18	181	27,6	173	30,1	164	33,0	153	36,3	141	40,5
45.2	5	135	27,0	129	29,8	123	32,9	114	36,4	104	40,7
	7	146	27,2	140	30,0	132	33,1	123	36,6	113	41
	10	157	27,4	151	30,3	143	33,4	133	36,9	122	41,3
	12	163	27,6	156	30,5	148	33,6	138	37,1	126	41,5
	15	177	27,8	170	30,8	161	34	150	37,6	138	41,9
	18	192	28,0	185	31,1	175	34,3	163	38,0	150	42,3
50.2	5	149	29,9	142	32,9	135	36,2	125	40,1	115	45,1
	7	161	30,2	154	33,2	145	36,5	135	40,4	123	45,4
	10	173	30,6	166	33,5	157	36,8	145	40,7	133	45,6
	12	179	30,8	171	33,7	162	37,0	150	40,9	137	45,8
	15	195	31,3	187	34,2	177	37,5	164	41,4	151	46,3
	18	212	31,8	203	34,8	192	38,1	179	41,9	164	46,8
55.2	5	163	32,6	156	35,8	148	39,5	138	43,8	126	49
	7	176	32,9	168	36,1	159	39,8	149	44,0	136	49,3
	10	189	33,3	181	36,5	172	40,1	160	44,3	147	49,6
	12	195	33,5	187	36,8	177	40,3	165	44,6	151	49,8
	15	213	34,0	204	37,3	194	40,8	181	45,1	165	50,3
	18	232	34,5	222	37,7	211	41,3	196	45,5	180	50,7
60.2	5	183	36,7	175	40,4	165	44,5	154	49,3	141	55,3
	7	196	37,0	188	40,8	178	44,8	166	49,7	152	55,7
	10	212	37,5	203	41,1	192	45,2	179	50,1	164	56,1
	12	219	37,8	210	41,4	199	45,5	185	50,3	169	56,3
	15	239	38,4	228	42,1	217	46,1	202	50,9	185	56,8
	18	259	39,4	248	43,1	235	47,2	219	52,0	201	58,1

kWf = Cooling capacity (kW)
kWe = Total Electrical power absorbed (compressor + Auxiliary Circuit)(kW)
To = Water outlet temperature user side (°C)
The performances are referred to DeltaT=5°C on both the user and source sides
Data refer to operation with a mix of water and propylene glycol at 30% on the source side

Performance in Cooling - Geothermal version

Size 70.2 - 120.2

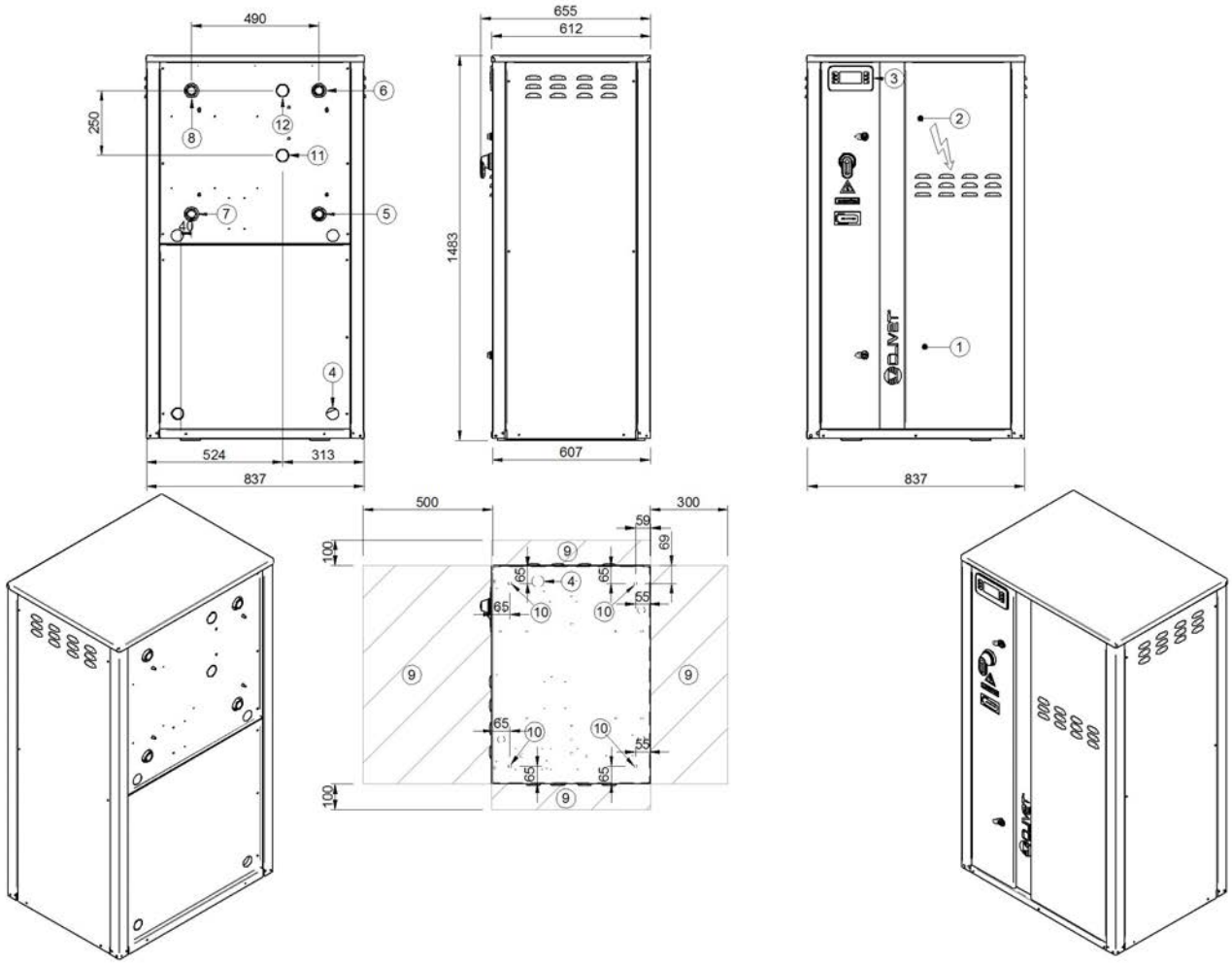
Size	To °C	Source side water outlet temperature (°C)									
		30		35		40		45		50	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
70.2	5	208	41,9	200	45,9	190	50,5	177	55,8	162	62,4
	7	224	42,4	214	46,4	203	51,0	190	56,3	173	62,8
	10	242	43,1	231	47,1	220	51,6	204	56,9	187	63,4
	12	248	43,8	238	47,5	226	51,9	211	57,3	193	63,8
	15	271	44,6	260	48,4	247	52,8	229	58,1	210	64,5
	18	294	46,1	282	49,9	268	54,3	250	59,6	229	66,0
80.2	5	232	47,2	222	51,7	211	56,7	196	62,6	179	69,7
	7	248	47,9	238	52,4	226	57,4	210	63,3	193	70,3
	10	268	48,9	257	53,3	244	58,2	227	64,0	208	71,1
	12	277	49,5	265	53,9	251	58,7	234	64,5	214	71,5
	15	300	50,9	287	55,0	273	59,8	255	65,6	234	72,5
	18	325	52,8	312	56,9	296	61,7	276	67,4	254	74,3
90.2	5	258	53,9	248	59,4	235	65,5	218	72,9	198	82,3
	7	276	54,3	265	59,8	251	65,9	233	73,3	213	82,6
	10	300	55,0	288	60,4	274	66,5	254	73,8	233	83,0
	12	316	55,5	304	60,9	288	66,9	267	74,2	245	83,3
	15	343	56,2	330	61,6	312	67,7	291	74,9	267	83,9
	18	374	57,5	359	63,1	341	69,2	318	76,4	291	85,5
100.2	5	290	60,3	278	66,2	265	73,0	247	81,0	226	90,9
	7	310	61,0	297	66,8	282	73,6	263	81,5	241	91,4
	10	336	61,9	323	67,8	307	74,5	288	82,4	264	92,2
	12	351	62,6	339	68,5	321	75,1	299	82,9	275	92,6
	15	384	63,7	369	69,5	353	76,1	327	83,9	301	93,5
	18	418	64,8	401	70,8	383	77,1	356	84,9	328	94,4
120.2	5	337	72,7	324	80,0	308	88,6	286	98,6	261	112
	7	358	73,2	345	80,7	328	89,0	304	99,1	279	112
	10	394	73,9	378	81,5	361	89,8	335	99,8	308	112
	12	412	74,5	396	82,2	376	90,2	349	100	320	113
	15	449	75,4	432	83,0	410	91,1	382	101	351	114
	18	490	76,3	470	84,0	447	92,1	416	102	382	114

kWf = Cooling capacity (kW)
kWe = Total Electrical power absorbed (compressor + Auxiliary Circuit)(kW)
To = Water outlet temperature user side (°C)
The performances are referred to DeltaT=5°C on both the user and source sides
Data refer to operation with a mix of water and propylene glycol at 30% on the source side

Dimensional - Standard version without hydronic unit

Size 10.2 - 22.2

DAA8U10 2_22 2 STD REV01



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (1" 1/4 GAS)
6) Source side water supply (1" 1/4 GAS)
7) User side water return (1" 1/4 GAS)
8) User side water supply (1" 1/4 GAS)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Partial recovery water return (1" 1/4 Victaulic) (optional)
12) Partial recovery water supply (1" 1/4 Victaulic) (optional)

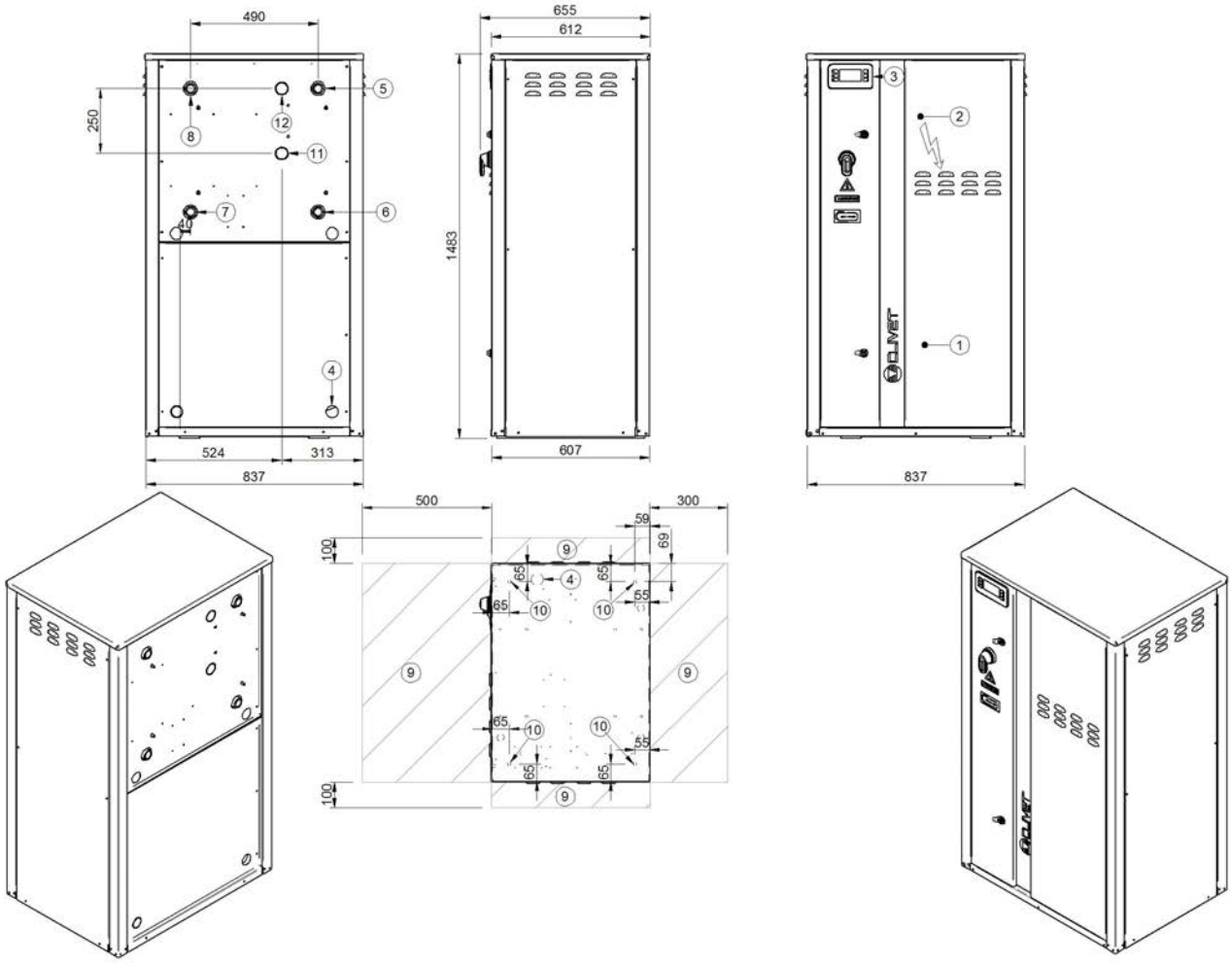
Size		10.2	12.2	14.2	16.2	19.2	22.2
Length	mm	837	837	837	837	837	837
Height	mm	1483	1483	1483	1483	1483	1483
Depth	mm	607	607	607	607	607	607
Operating weight	kg	223	223	229	290	309	322
Shipping weight	kg	214	214	220	273	288	306

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

Dimensional - Geothermic version without hydronic unit

Size 10.2 - 22.2

DAA8U10 2_22 2 STD_GEO REV01



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (1" 1/4 GAS)
6) Source side water supply (1" 1/4 GAS)
7) User side water return (1" 1/4 GAS)
8) User side water supply (1" 1/4 GAS)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Partial recovery water return (1" 1/4 GAS) (optional)
12) Partial recovery water supply (1" 1/4 GAS) (optional)

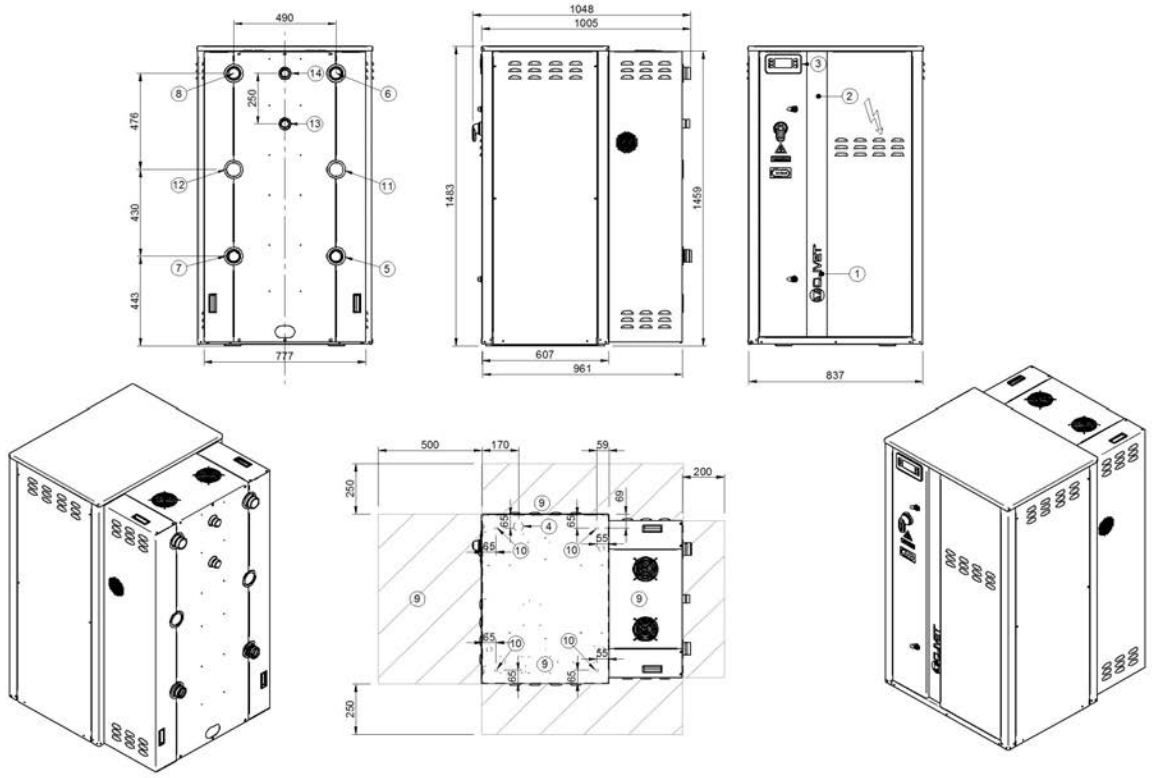
Size		10.2	12.2	14.2	16.2	19.2	22.2
Length	mm	837	837	837	837	837	837
Height	mm	1483	1483	1483	1483	1483	1483
Depth	mm	607	607	607	607	607	607
Operating weight	kg	223	223	229	290	309	322
Shipping weight	kg	214	214	220	273	288	306

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

Dimensional - Version with hydronic unit option and oversize enclosure (MOBMAG)

Sizes 10.2 - 22.2

DAA8U10 2_22 2 MAG REV01



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (2" Victaulic)
6) Source side water supply (2" Victaulic)
7) User side water return (2" Victaulic)
8) User side water supply (2" Victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Source side water return without pumps (2" Victaulic)
12) User side water return without pumps (2" Victaulic)
13) Partial recovery water supply (1" 1/4 Victaulic) (optional)
14) Partial recovery water return (1" 1/4 Victaulic) (optional)

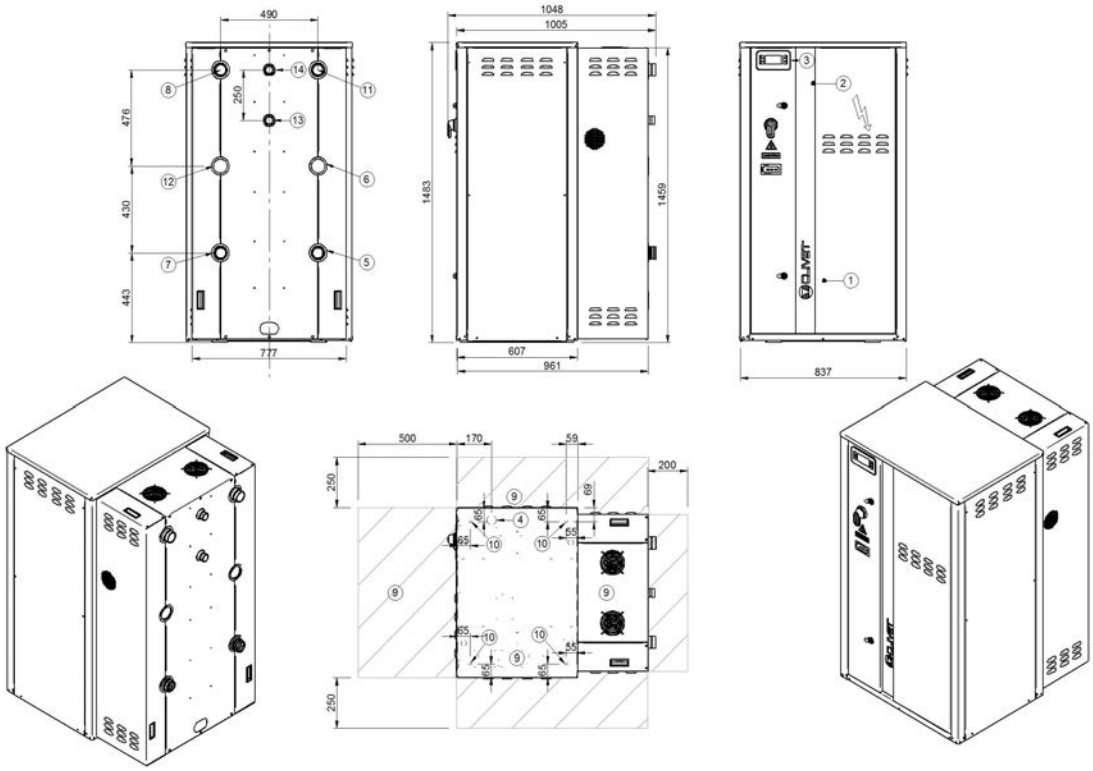
Size		10.2	12.2	14.2	16.2	19.2	22.2
Length	mm	837	837	837	837	837	837
Height	mm	1483	1483	1483	1483	1483	1483
Depth	mm	961	961	961	961	961	961
Operating weight	kg	296	296	305	366	386	399
Shipping weight	kg	276	276	285	338	353	371

The weights refer to the unit equipped with the following options: user side hydronic unit VARYFLOW+ (VARYC), source side hydronic unit VARYFLOW+ (VARYH), oversize enclosure (MOBMAG)
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional - Geothermic version with hydronic unit option and oversize enclosure (MOBMAG)

Sizes 10.2 - 22.2

DAA8U10 2_22 2 MAG GEO REV01



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (2"Victaulic)
6) Source side water supply (2"Victaulic)
7) User side water return (2"Victaulic)
8) User side water supply (2"Victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Source side water return without pumps (2"Victaulic)
12) User side water return without pumps (2"Victaulic)
13) Partial recovery water supply (1" 1/4 Victaulic) (optional)
14) Partial recovery water return (1" 1/4 Victaulic) (optional)

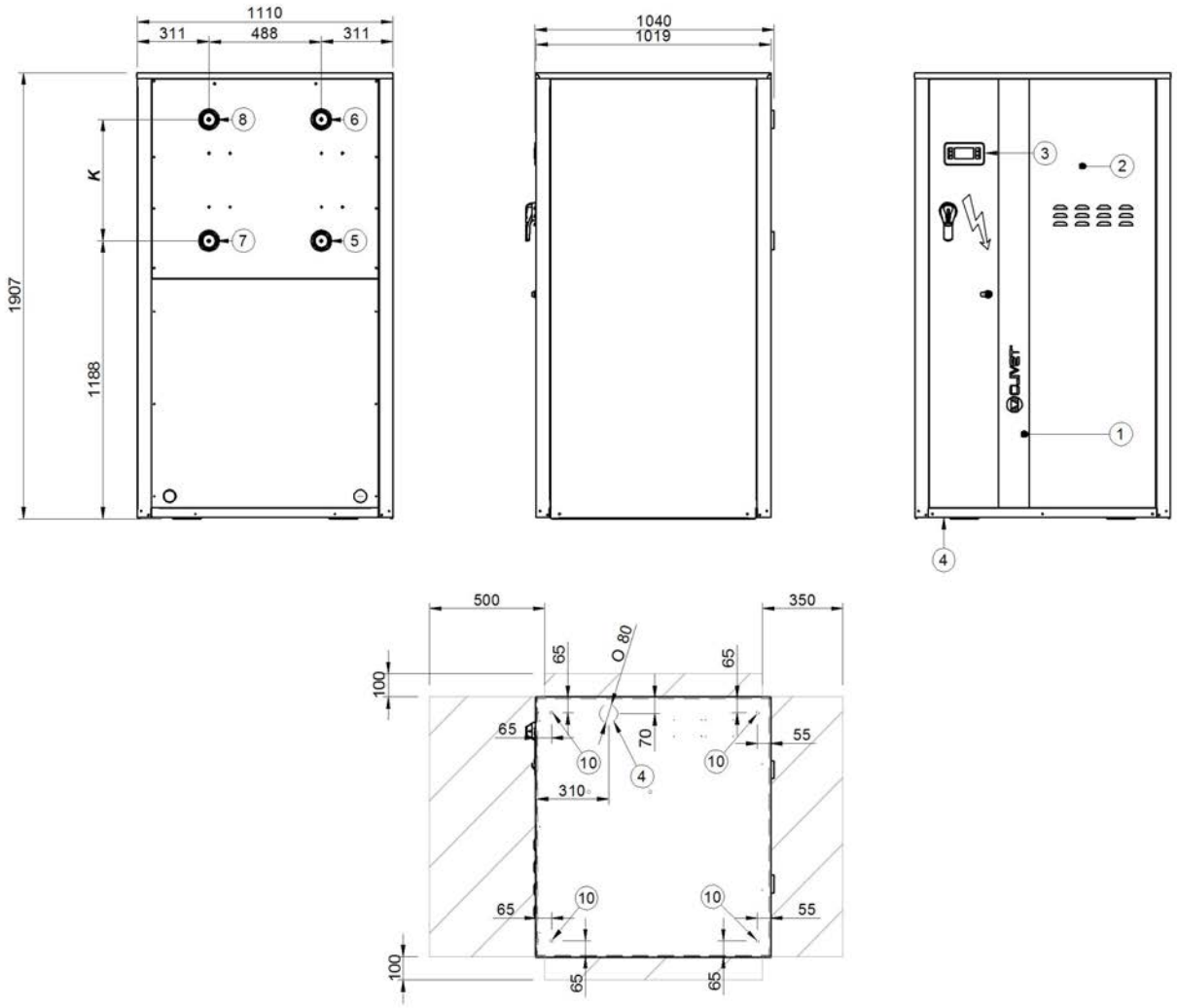
Size		10.2	12.2	14.2	16.2	19.2	22.2
Length	mm	837	837	837	837	837	837
Height	mm	1483	1483	1483	1483	1483	1483
Depth	mm	961	961	961	961	961	961
Operating weight	kg	296	296	305	366	386	399
Shipping weight	kg	276	276	285	338	353	371

The weights refer to the unit equipped with the following options: user side hydronic unit VARYFLOW+ (VARYC), source side hydronic unit VARYFLOW+ (VARYH), oversize enclosure (MOBMAG)
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional - Standard version without hydronic unit

Sizes 27.2 - 60.2

DAA8U27 2_60 2 STD REV01



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (2" 1/2 victaulic)
6) Source side water supply (2" 1/2 victaulic)
7) User side water return (2" 1/2 victaulic)
8) User side water supply (2" 1/2 victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Partial recovery water return (2" 1/2 victaulic) (optional)
12) Partial recovery water supply (2" 1/2 victaulic) (optional)

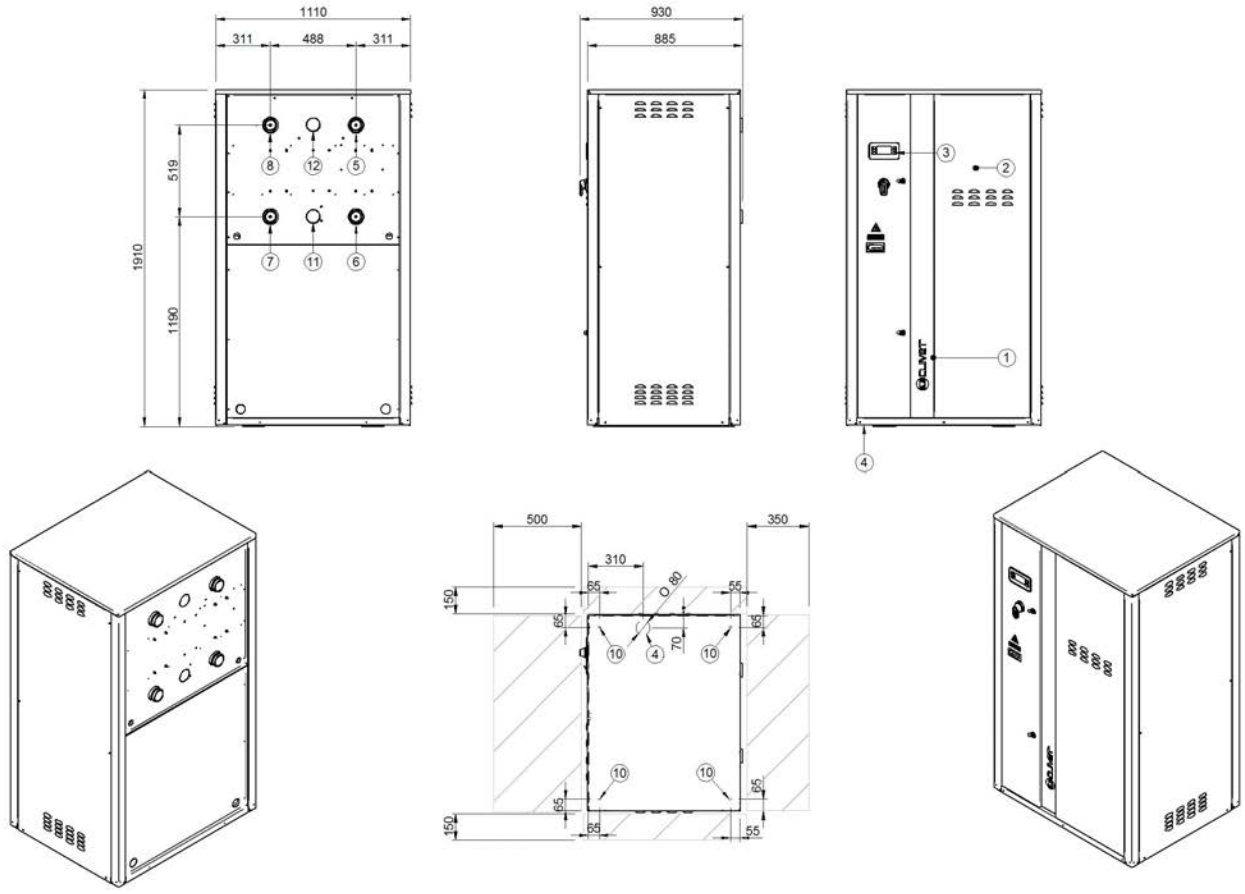
Size		27.2	30.2	35.2	40.2	43.2	45.2	50.2	55.2	60.2
Length	mm	1110	1110	1110	1110	1110	1110	1110	1110	1110
Height	mm	1910	1910	1910	1910	1910	1910	1910	1910	1910
Depth	mm	885	885	885	885	885	885	885	885	885
Operating weight	kg	441	444	519	580	646	581	698	728	743
Shipping weight	kg	436	439	514	568	634	569	677	707	727

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

Dimensional - Geothermic version without hydronic unit

Sizes 27.2 - 50.2

DAA8U27 2_50 2 STD_GEO REV00



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (2" 1/2 victaulic)
6) Source side water supply (2" 1/2 victaulic)
7) User side water return (2" 1/2 victaulic)
8) User side water supply (2" 1/2 victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Partial recovery water return (2" 1/2 victaulic) (optional)
12) Partial recovery water supply (2" 1/2 victaulic) (optional)

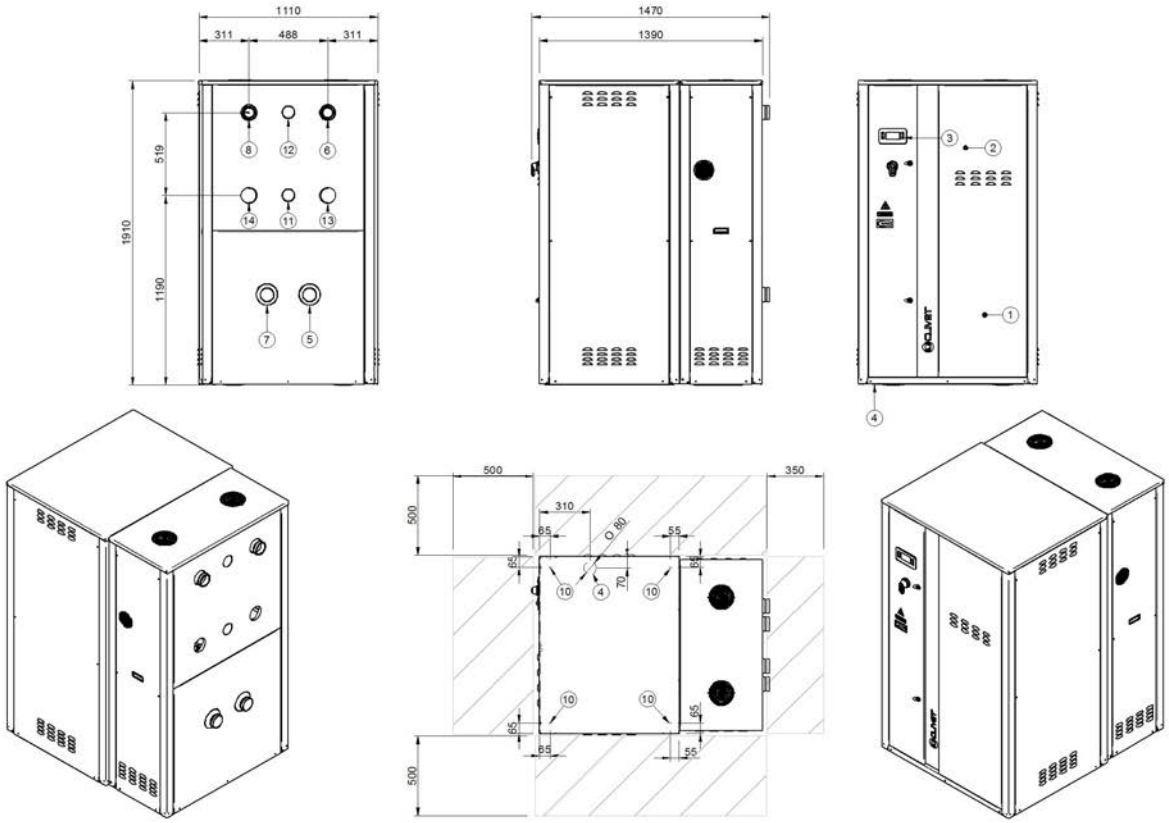
Size		27.2	30.2	35.2	40.2	43.2	45.2	50.2
Length	mm	1110	1110	1110	1110	1110	1110	1110
Height	mm	1910	1910	1910	1910	1910	1910	1910
Depth	mm	885	885	885	885	885	885	885
Operating weight	kg	460	463	538	602	668	616	715
Shipping weight	kg	451	454	529	585	651	596	690

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

Dimensional - Version with hydronic unit option and oversize enclosure (MOBMAG)

Sizes 27.2 - 60.2

DAA8U27 2_60 2 MAG REV01



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (3"Victaulic)
6) Source side water supply (3"Victaulic)
7) User side water return (3"Victaulic)
8) User side water supply (3"Victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Partial recovery water return (2"Victaulic) (optional)
12) Partial recovery water supply (2"Victaulic) (optional)
13)Source side water return without pumps (3"Victaulic)
14) User side water return without pumps (3"Victaulic)

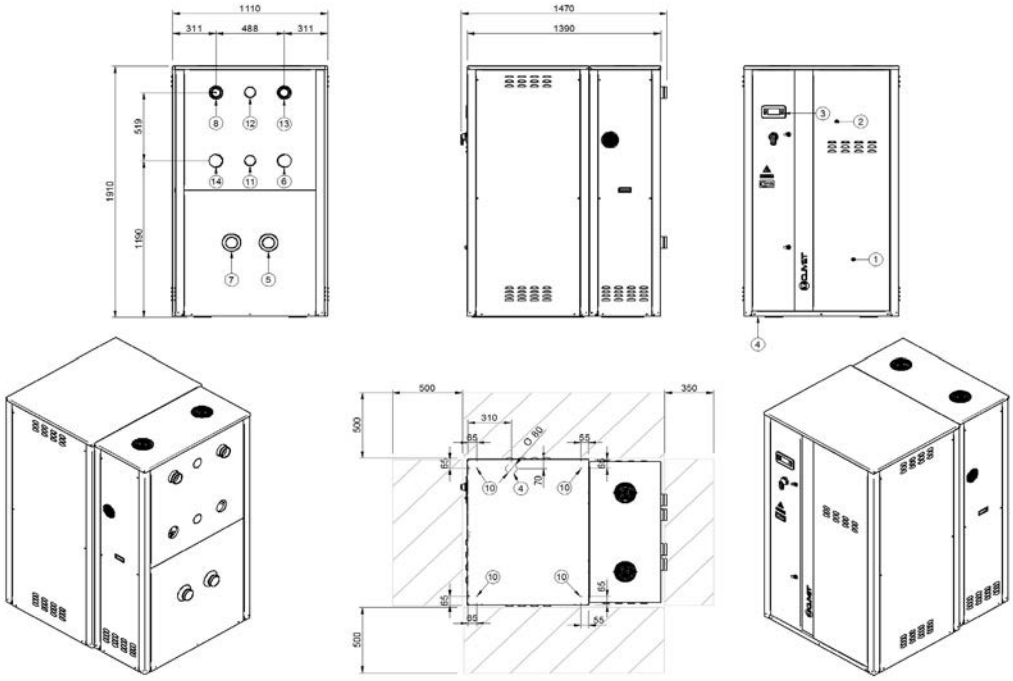
Size		27.2	30.2	35.2	40.2	43.2	45.2	50.2	55.2	60.2
Length	mm	1110	1110	1110	1110	1110	1110	1110	1110	1110
Height	mm	1910	1910	1910	1910	1910	1910	1910	1910	1910
Depth	mm	1390	1390	1390	1390	1390	1390	1390	1390	1390
Operating weight	kg	587	590	665	734	817	752	868	906	921
Shipping weight	kg	552	555	630	692	759	694	802	840	860

The weights refer to the unit equipped with the following options: user side hydronic unit VARYFLOW+ (VARYC), source side hydronic unit VARYFLOW+ (VARYH), oversize enclosure (MOBMAG)
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional - Geothermic version with hydronic unit option and oversize enclosure (MOBMAG)

Sizes 27.2 - 50.2

DAA8U27 2_50 2 MAG_GEO REV01



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (3"Victaulic)
6) Source side water supply (3"Victaulic)
7) User side water return (3"Victaulic)
8) User side water supply (3"Victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Partial recovery water return (2"Victaulic) (optional)
12) Partial recovery water supply (2"Victaulic) (optional)
13) Source side water return without pumps (3"Victaulic)
14) User side water return without pumps (3"Victaulic)

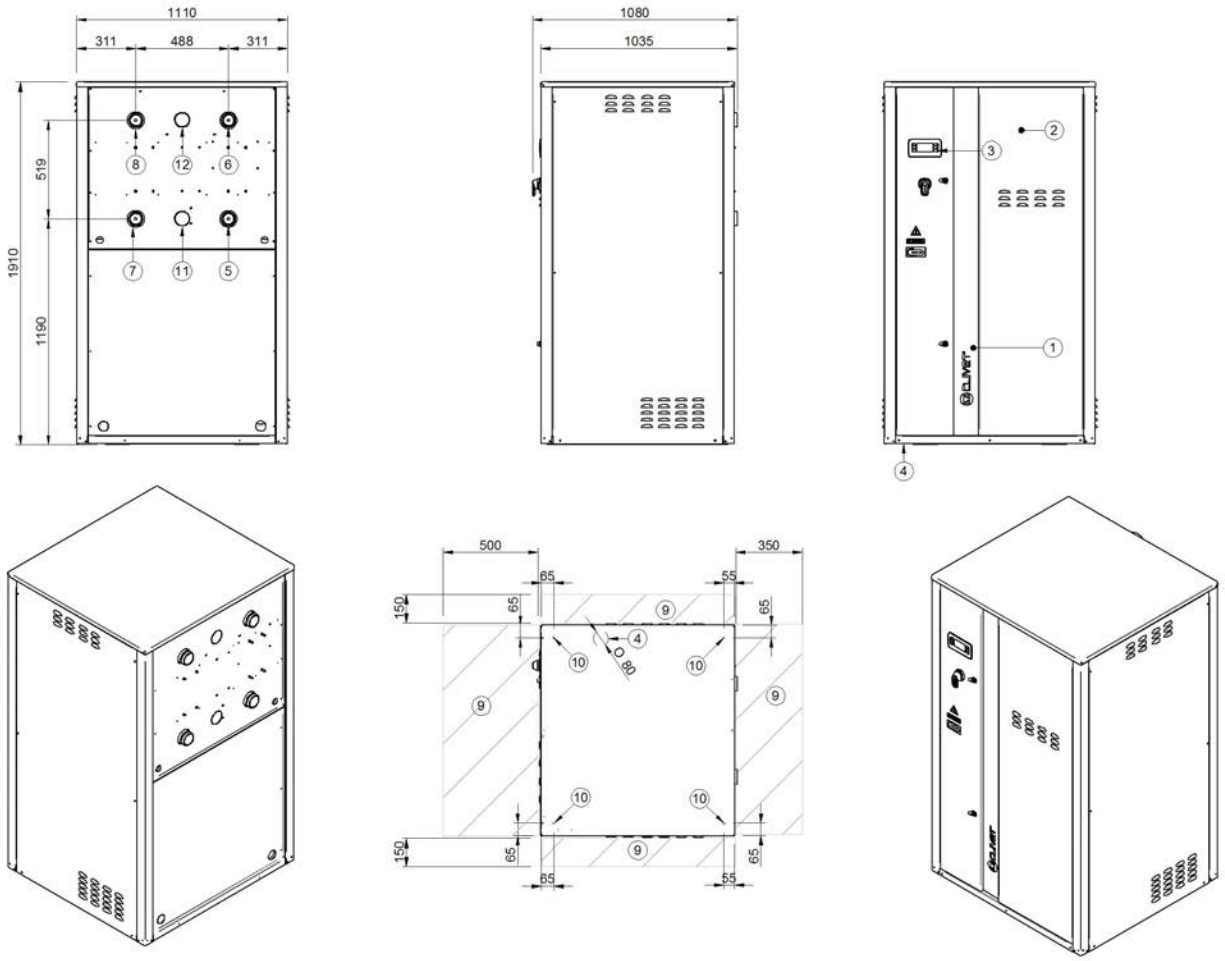
Size		27.2	30.2	35.2	40.2	43.2	45.2	50.2
Length	mm	1110	1110	1110	1110	1110	1110	1110
Height	mm	1910	1910	1910	1910	1910	1910	1910
Depth	mm	1390	1390	1390	1390	1390	1390	1390
Operating weight	kg	606	609	684	756	838	787	885
Shipping weight	kg	567	570	645	709	776	721	815

The weights refer to the unit equipped with the following options: user side hydronic unit VARYFLOW+ (VARYC), source side hydronic unit VARYFLOW+ (VARYH), oversize enclosure (MOBMAG)
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional - Standard version without hydronic unit

Sizes 70.2 - 90.2

DAA8U70 2_90 2 STD REV00



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (2" 1/2 Victaulic)
6) Source side water supply (2" 1/2 Victaulic)
7) User side water return (2" 1/2 Victaulic)
8) User side water supply (2" 1/2 Victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Partial recovery water return (2" 1/2 Victaulic) (optional)
12) Partial recovery water supply (2" 1/2 Victaulic) (optional)

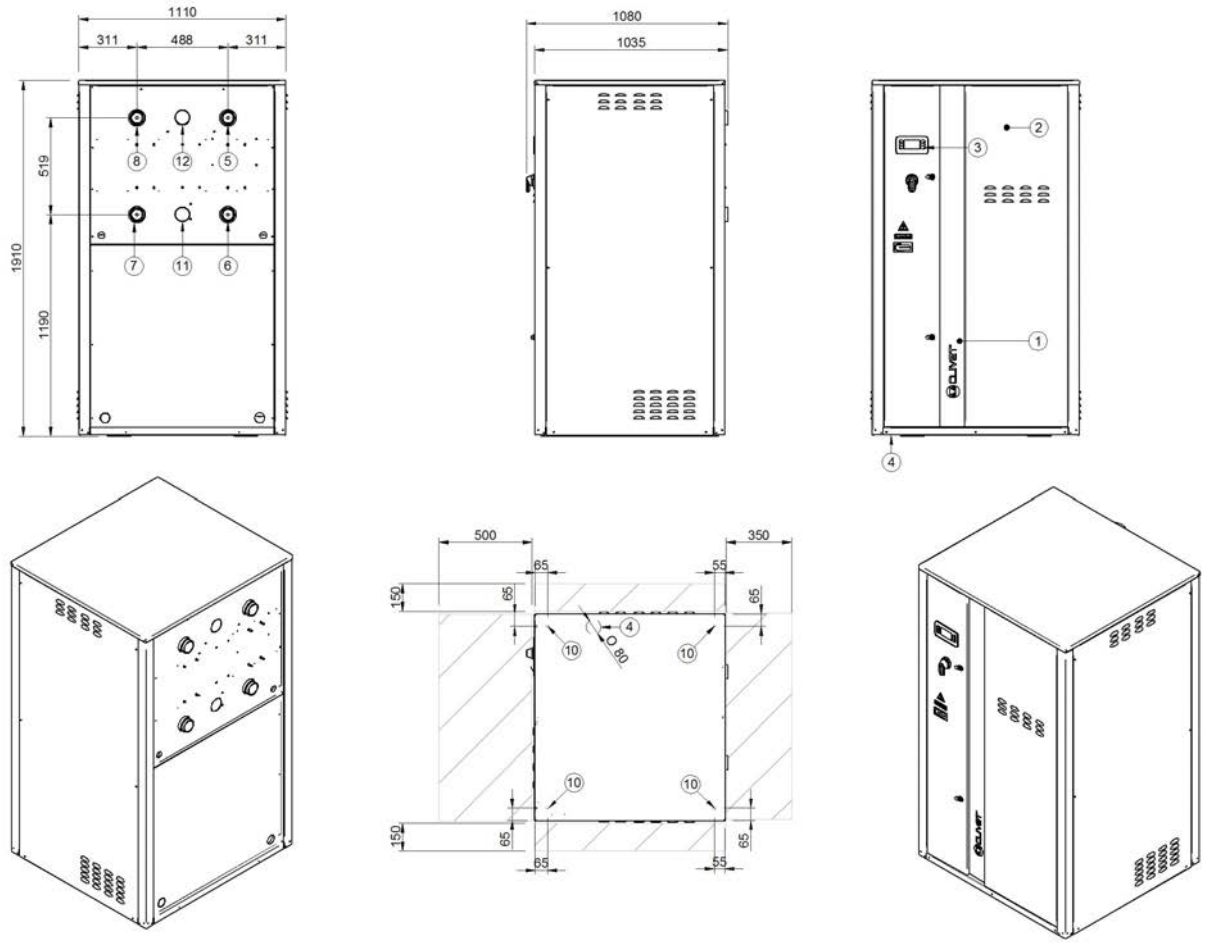
Size		70.2	80.2	90.2
Length	mm	1110	1110	1110
Height	mm	1910	1910	1910
Depth	mm	1035	1035	1035
Operating weight	kg	808	820	917
Shipping weight	kg	780	792	885

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

Dimensional - Geothermic version without hydronic unit

Size 55.2 - 90.2

DAA8U55 2_90 2 STD_GEO REV00



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (2" 1/2 Victaulic)
6) Source side water supply (2" 1/2 Victaulic)
7) User side water return (2" 1/2 Victaulic)
8) User side water supply (2" 1/2 Victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Partial recovery water return (2" 1/2 Victaulic) (optional)
12) Partial recovery water supply (2" 1/2 Victaulic) (optional)

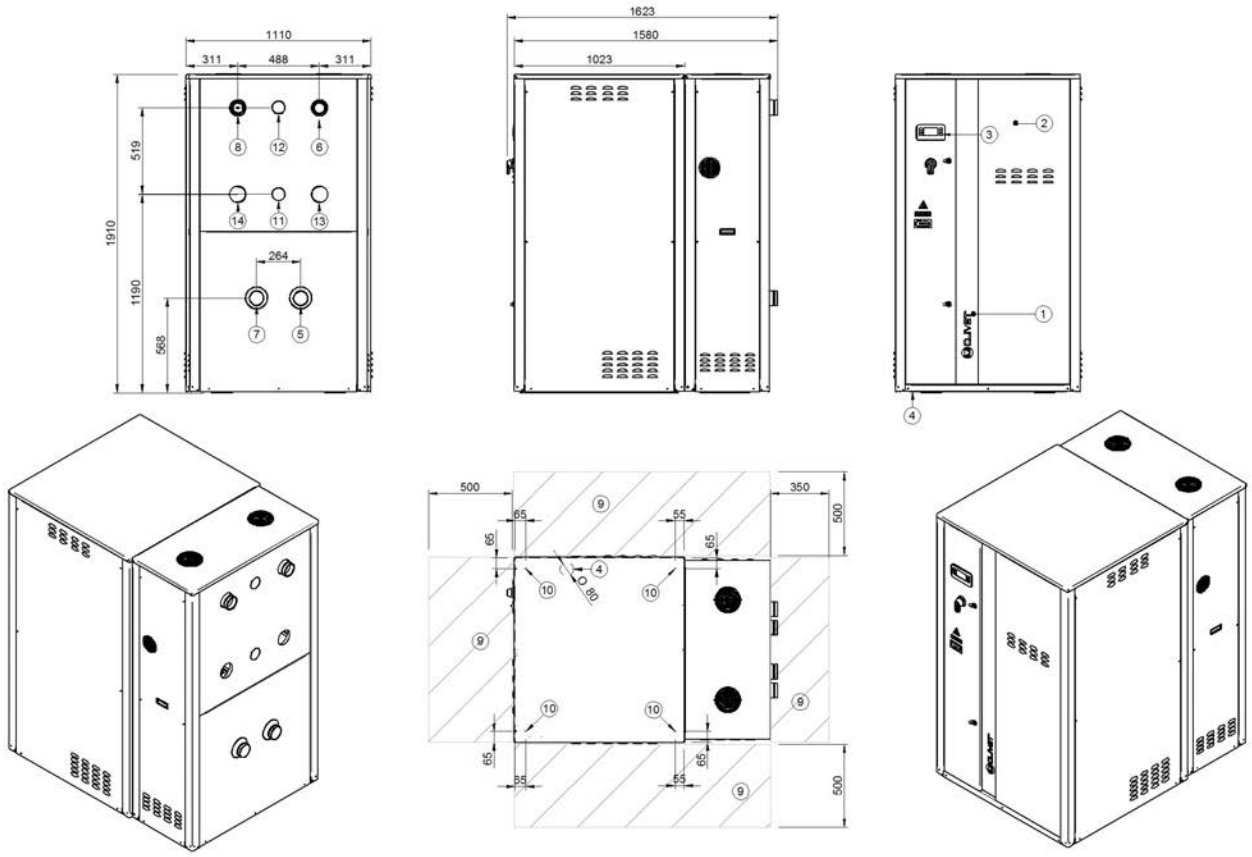
Size		55.2	60.2	70.2	80.2	90.2
Length	mm	1110	1110	1110	1110	1110
Height	mm	1910	1910	1910	1910	1910
Depth	mm	1035	1035	1035	1035	1035
Operating weight	kg	768	783	840	852	940
Shipping weight	kg	738	758	805	817	903

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

Dimensional - Version with hydronic unit option and oversize enclosure (MOBMAG)

Size 70.2 - 90.2

DAA8U70 2_90 2 MAG REV00



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (3"Victaulic)
6) Source side water supply (3"Victaulic)
7) User side water return (3"Victaulic)
8) User side water supply (3"Victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Partial recovery water return (2"Victaulic) (optional)
12) Partial recovery water supply (2"Victaulic) (optional)
13) Source side water return without pumps (3"Victaulic)
14) User side water return without pumps (3"Victaulic)

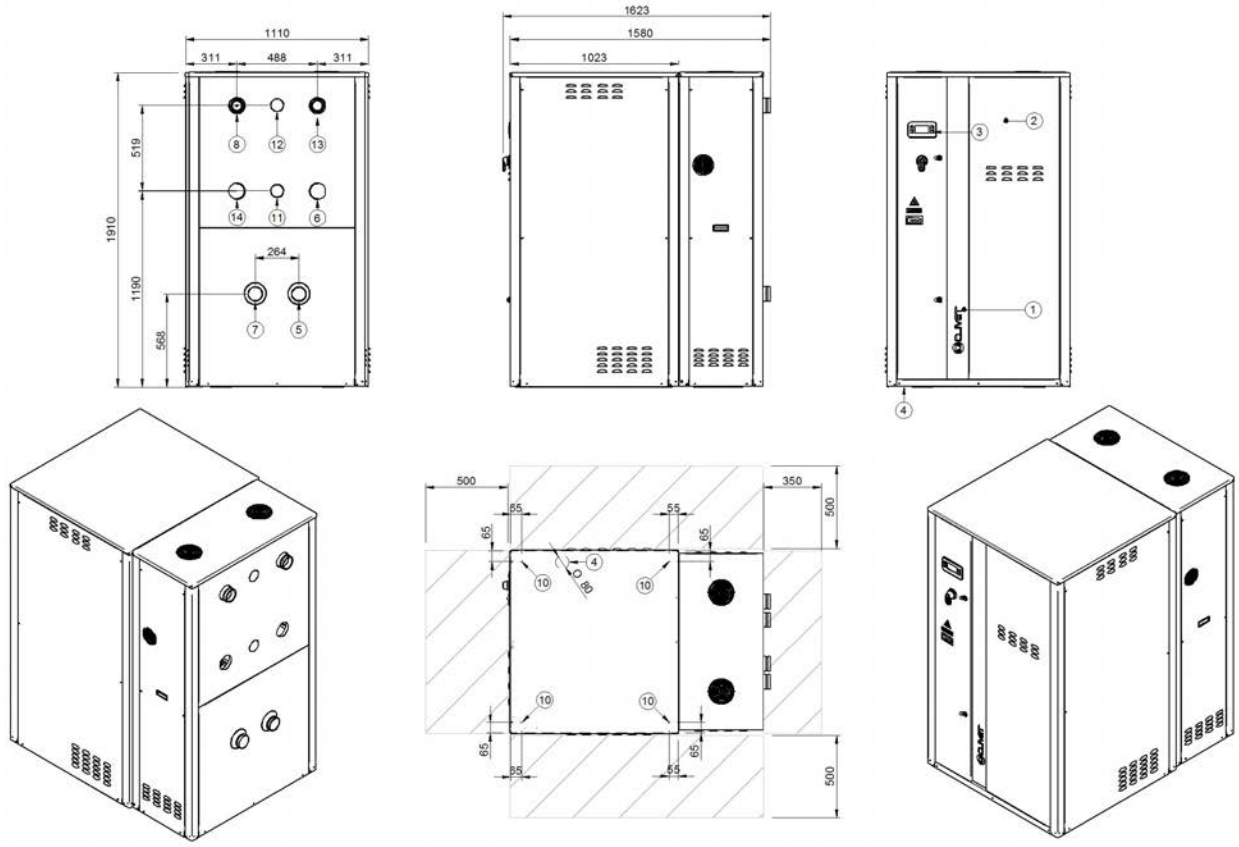
Size		70.2	80.2	90.2
Length	mm	1110	1110	1110
Height	mm	1910	1910	1910
Depth	mm	1580	1580	1580
Operating weight	kg	992	1004	1130
Shipping weight	kg	919	931	1027

The weights refer to the unit equipped with the following options: user side hydronic unit VARYFLOW+ (VARYC), source side hydronic unit VARYFLOW+ (VARYH), oversize enclosure (MOBMAG)
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional - Geothermic version with hydronic unit option and oversize enclosure (MOBMAG)

Size 55.2 - 90.2

DAA8U55 2_90 2 MAG_GEO REV00



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (3"Victaulic)
6) Source side water supply (3"Victaulic)
7) User side water return (3"Victaulic)
8) User side water supply (3"Victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Partial recovery water return (2" victaulic) (optional)
12) Partial recovery water supply (2" victaulic) (optional)
13) Source side water return without pumps (3"Victaulic)
14) User side water return without pumps (3"Victaulic)

Size		55.2	60.2	70.2	80.2	90.2
Length	mm	1110	1110	1110	1110	1110
Height	mm	1910	1910	1910	1910	1910
Depth	mm	1580	1580	1580	1580	1580
Operating weight	kg	946	961	1024	1036	1152
Shipping weight	kg	871	891	944	956	1045

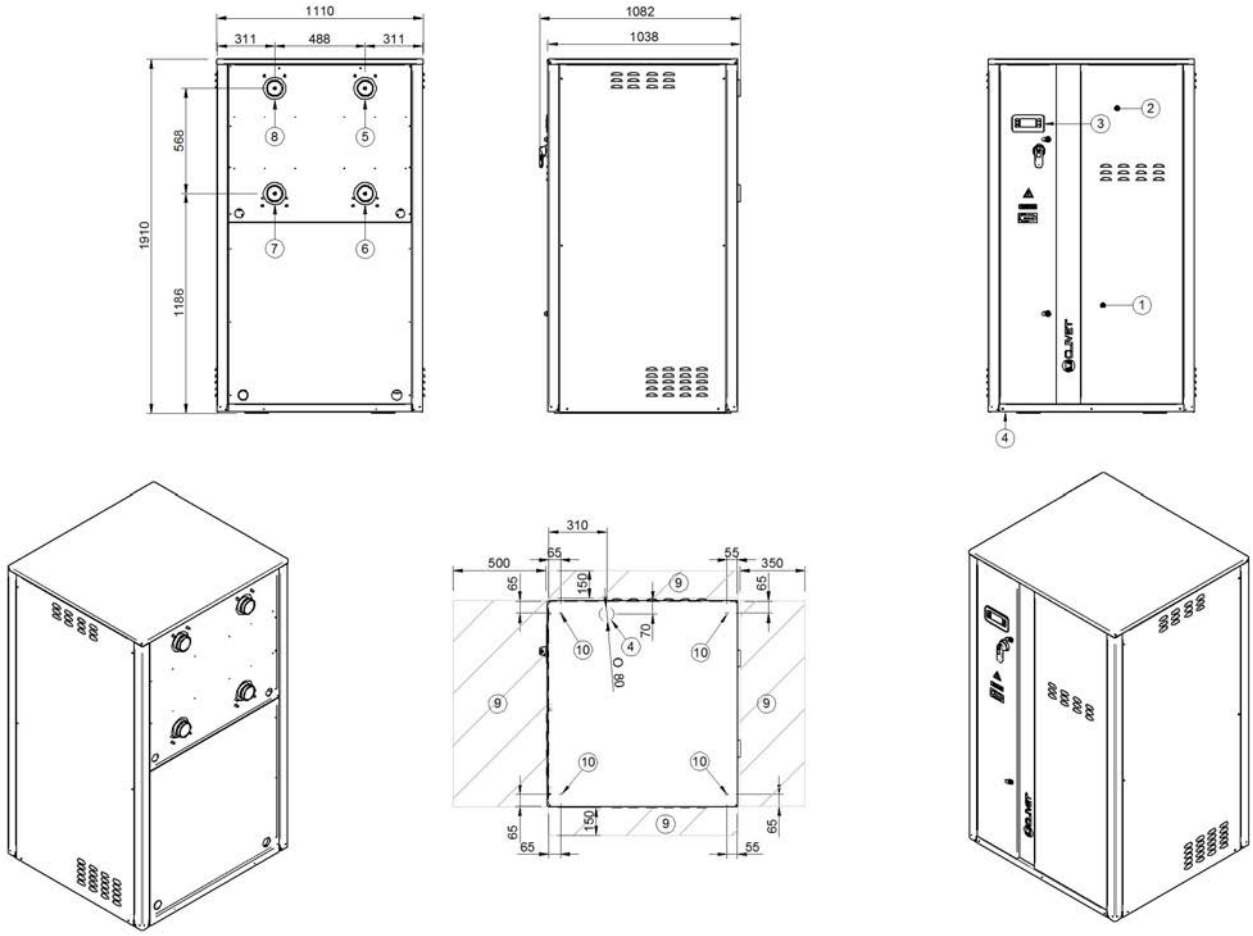
The weights refer to the unit equipped with the following options: user side hydronic unit VARYFLOW+ (VARYC), source side hydronic unit VARYFLOW+ (VARYH), oversize enclosure (MOBMAG)

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

Dimensional - Standard version without hydronic unit

Size 100.2 - 120.2

DAA8U100 2_120 2 STD REV00



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (3"Victaulic)
6) Source side water supply (3"Victaulic)
7) User side water return (3"Victaulic)
8) User side water supply (3"Victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5

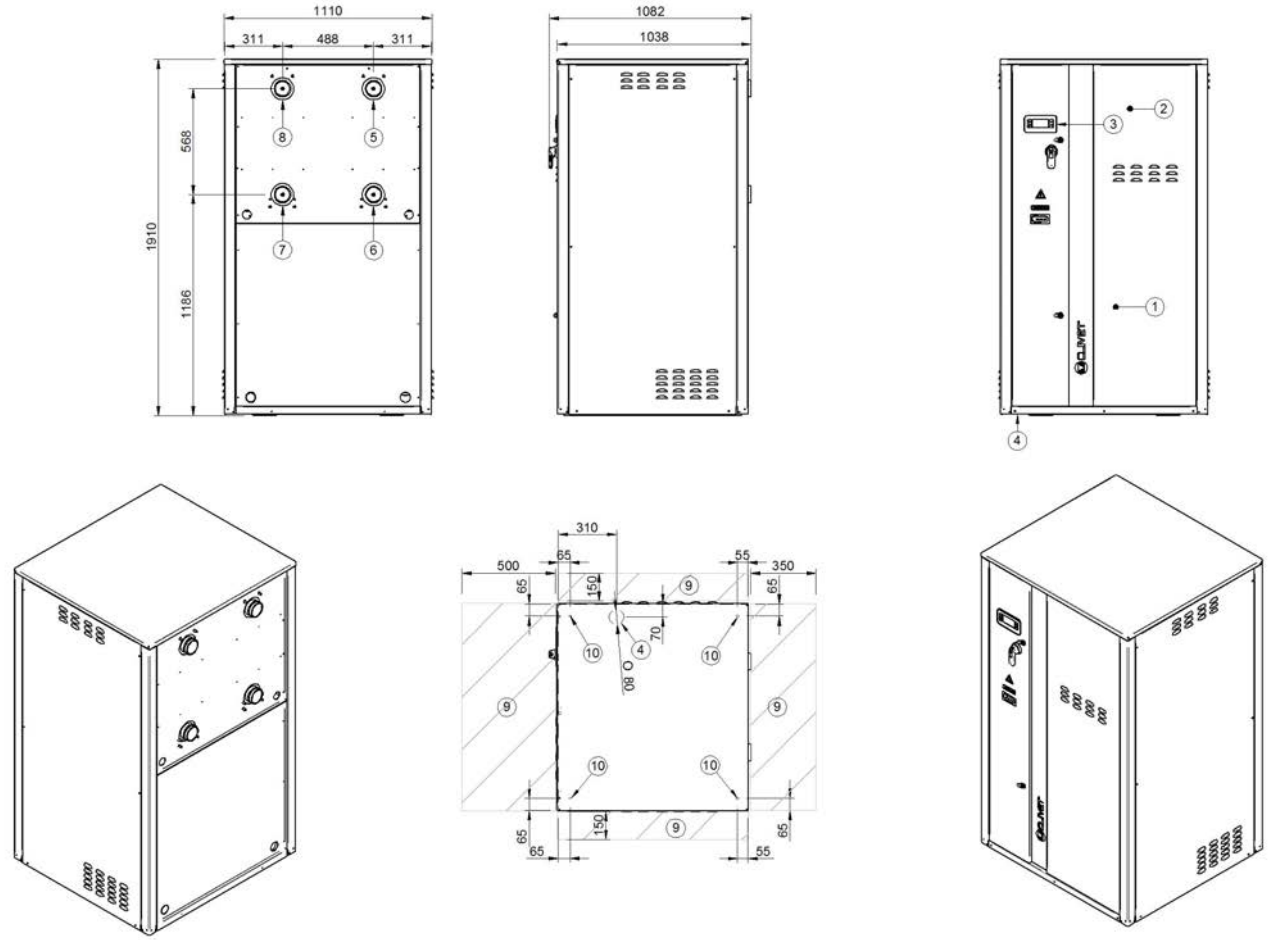
Size		100.2	120.2
Length	mm	1110	1110
Height	mm	1910	1910
Depth	mm	1038	1038
Operating weight	kg	1119	1265
Shipping weight	kg	1040	1176

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

Dimensional - Geothermic version without hydronic unit

Size 100.2 - 120.2

DAA8U100 2_120 2 STD_GEO REV00



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (3"Victaulic)
6) Source side water supply (3"Victaulic)
7) User side water return (3"Victaulic)
8) User side water supply (3"Victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5

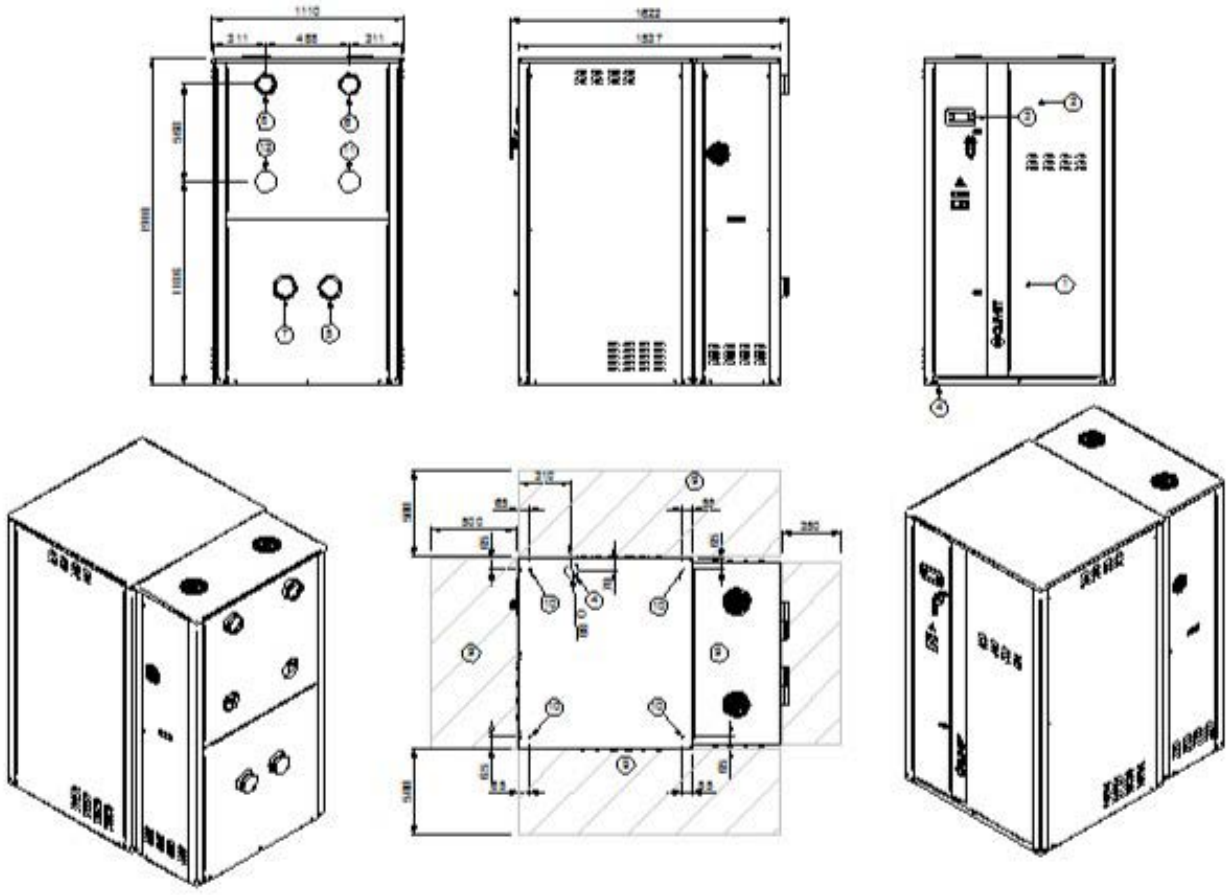
Size		100.2	120.2
Length	mm	1110	1110
Height	mm	1910	1910
Depth	mm	1038	1038
Operating weight	kg	1119	1265
Shipping weight	kg	1040	1176

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

Dimensional - Version with hydronic unit option and oversize enclosure (MOBMAG)

Size 100.2 - 120.2

DAA8U100 2_120 2 MAG REV00
DATA/DATE 07/03/2019



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (4"Victaulic)
6) Source side water supply (4"Victaulic)
7) User side water return (4"Victaulic)
8) User side water supply (4"Victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Source side water return without pumps (4"Victaulic)
12) User side water return without pumps (4"Victaulic)

Size		100.2	120.2
Length	mm	1110	1110
Height	mm	1910	1910
Depth	mm	1537	1537
Operating weight	kg	1335	1482
Shipping weight	kg	1186	1322

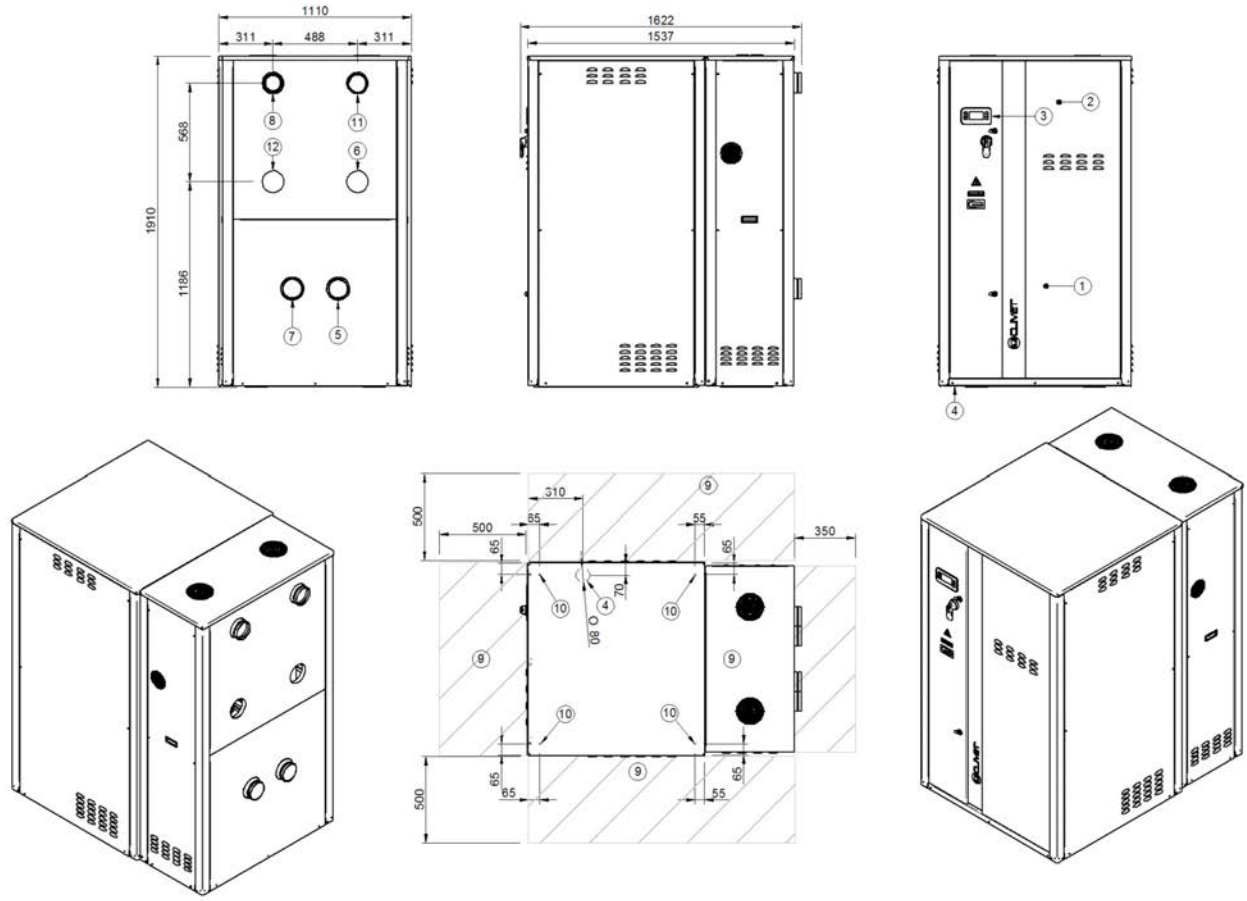
The weights refer to the unit equipped with the following options: user side hydronic unit VARYFLOW+ (VARYC), source side hydronic unit VARYFLOW+ (VARYH), oversize enclosure (MOBMAG)

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

Dimensional - Geothermic version with hydronic unit option and oversize enclosure (MOBMAG)

Size 100.2 - 120.2

DAA8U100 2_120 2 MAG_GEO REV00
DATA/DATE 07/03/2019



1) Compressor compartment
2) Electrical panel
3) Unit control keypad
4) Power input
5) Source side water return (4"Victaulic)
6) Source side water supply (4"Victaulic)
7) User side water return (4"Victaulic)
8) User side water supply (4"Victaulic)
9) Functional spaces
10) Vibration damper mounts Ø 12,5
11) Source side water return without pumps (4"Victaulic)
12) User side water return without pumps (4"Victaulic)

Size		100.2	120.2
Length	mm	1110	1110
Height	mm	1910	1910
Depth	mm	1537	1537
Operating weight	kg	1335	1482
Shipping weight	kg	1186	1322

The weights refer to the unit equipped with the following options: user side hydronic unit VARYFLOW+ (VARYC), source side hydronic unit VARYFLOW+ (VARYH), oversize enclosure (MOBMAG)

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

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