

ELFOEnergy Ground Medium² - Multifunction

Water cooled heat pump with simultaneous hot / cold water production
for indoor installation

WSHN-XEE2 MF 10.2 - 120.2 RANGE

Nominal heating capacity **(W10/W45)** from 34 kW to 408 kW

Nominal cooling capacity **(W35/W7)** from 30 kW to 345 kW



- ▶ **CHILLED AND HOT WATER PRODUCED AT THE SAME TIME**
- ▶ **PRE-ASSEMBLED CONTROL UNIT**
- ▶ **APPLICATION VERSATILITY**
- ▶ **HIGH EFFICIENCY**



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

	Small and Medium Commercial		Large Commercial and Industry	
	ELFOEnergy Ground		SPINchiller¹ Multi Scroll Technology	
Capacities (A35/W7)	6 ÷ 35 kW		210 ÷ 730 kW	
ErP compliance (heat pumps only)				
Products				
Chillers	WSH-EE	WSH-XEE2	WSH-XSC3	WDH-SL3 (OCO)
Heat pumps with inversion on the water circuit	WSH-EE (CH)	WSH-XEE2	WSH-XSC3	WDH-SL3 (CH)
Heat pumps with inversion on the refrigeration circuit	WSHN-EE	WSHN-XEE2	WSHN-XSC3	
Multi-function heat pump		WSHN-XEE2 MF	WSHN-XSC3 MF	

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 different types 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 Medium², three solutions to satisfy different installation requirements

GROUND MEDIUM² - MULTIFUNCTION WSHN-XEE2 MF:

- Reversible-cycle heat pump
- Chilled and hot water produced at the same time



GROUND MEDIUM² - HEAT PUMP WSHN-XEE2:

- Reversible-cycle heat pump



GROUND MEDIUM² - COOLING ONLY or HEATING ONLY WSH-XEE2:

- Simultaneous production of hot and chilled water
- Partial energy recovery



Many applications require heating and cooling simultaneous production

Simultaneous opposite loads is a very frequent situation in many applications.

Large size buildings, different exposures and insulations and different purpose spaces make recurring simultaneous the request of heating and cooling.

Many different technical solutions could be used at this purpose. Clivet believes since ever that solution differentiation is the key for success and consequently present diversified solutions for answering to only apparently similar demands.



Traditional way

The solution very common in the past is the independent production of heating and cooling thermal energy and transferring them to different ambient.

Thermal energy production thanks to one or many boilers and cooling power production with chillers is one possible solution. Low efficiency of such kind system is well known, indeed during the periods where cooling and heating are simultaneously required, cooling energy production rejects a large quantity of thermal energy to a source and this is the working principle of a standard chiller, energy that could be used instead, supporting for example other thermal energy sources or as total replacement.



Enhanced hydronic system

Clivet, since ever pioneer of innovative solutions proposes Enhanced hydronic system as optimal solution for 90% of applications where simultaneous opposite loads are present.

Building blocks are:

- Magnum or SPINChiller heat pump
- Primary Energy decentralized system Zephir
- ELFOspace fancoils



Thanks to a proper primary air design and using Clivet products around 30% annual energy saving is achievable and with a more competitive capital investment*.

MULTIFUNCTION Option

Hydronic multifunction units, able to produce hot water and chilled water simultaneously and independently is the optimal solution for some industrial applications or where the four pipe air conditioning system is required.

Heat pump product family called MULTIFUNCTION (MF) is the Clivet answer.

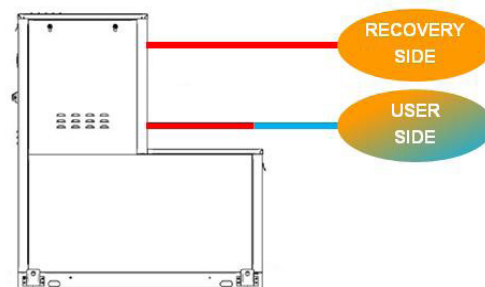
*Dedicated documented.

MULTIFUNCTION by CLIVET

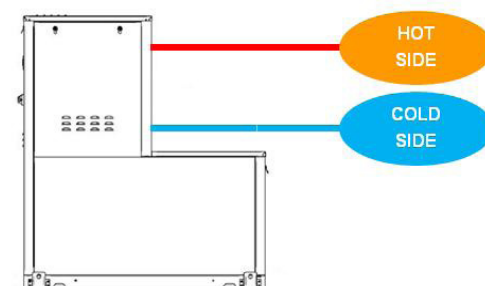
ELFOEnergy Ground Medium² MF is the new water-cooled heat pump product for the simultaneous production of hot and cold water.

Configuration available:

- **2T:** supply water for two pipe systems;
 - produce chilled water or hot water to the system;
 - supply hot water using the total recovery device for domestic hot water tanks, pre or post heating simultaneously with chilled water production;



- **4T:** supply water for four pipe systems;
 - produce chilled water and hot water to the system simultaneously and independently.



360° of efficiency

During a whole year and during the same day heating and cooling demand hugely vary with hot-cool combinations very unstable, function of many factors, among others: latitude and altitude of installation, building features and functionalities of different ambient.

Unit will mainly work in simultaneous heating-cooling mode with varying combinations over the time.

Clivet unit distinguishes for this working mode offering the best efficiency performance thanks to used solutions.

Refrigerant scheme allows both the partial and the total recovery mode for the MULTIFUNCTION heat exchanger according to thermal energy required.

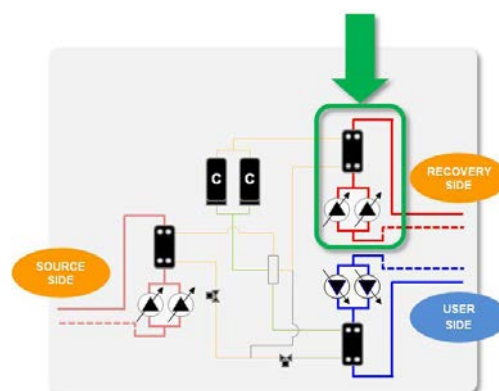
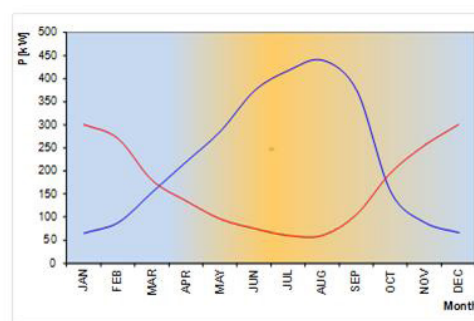
Completely automatic set-up and system control logic adjusts the mode according the most efficient performance.

During a whole year more than half of energy provided is produced during unbalanced capacity demand where MULTIFUNCTION offer the best performances.

Using the heat exchanger as a partial recovery device drives to an higher efficiency of 5% compared to solutions not using this working mode.

Real benefits in terms of efficiency and reliability:

- Few mode switches, reset where thermal capacity is less than 25% of cooling capacity;
- Improved reliability thanks to modulation and without on-off switches;
- Precise set-up thanks to modulation with less mode switches;
- Additional 3% savings on annual energy consumption comparing to standard multifunction units.



ELFOEnergy Ground Medium² - Multifunction

High energy efficiency in the annual cycle

The ELFOEnergy Ground Medium² MF technology is 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 high performance at partial loads of ELFOEnergy Ground Medium² MF makes it much more competitive and efficient compared to conventional solutions. Consequently, it reduces annual electricity consumption and increases the building's value.

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 control steps. This way, only the necessary energy is supplied.
- Efficiency increase that can exceed 50% of the operation with part load, thanks to the larger thermal exchange surfaces available.

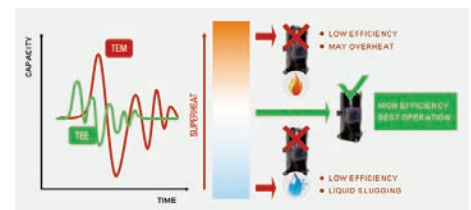


Example referred size 45.2 at conditions:
W35/W7 cooling only, W10/W35 heating only

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.

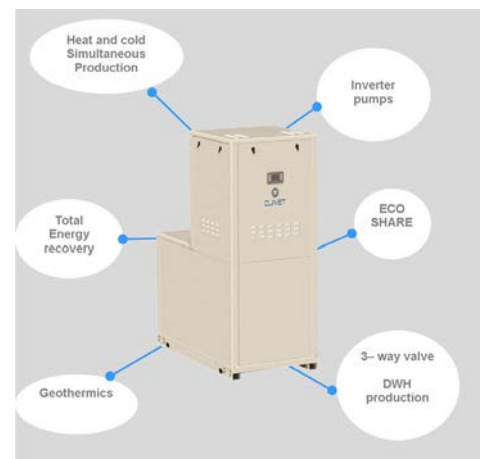
There is also an additional increase in efficiency in comparison to traditional thermostatic mechanical valves (TEM) and a longer compressor life.



Pre-assembled control unit

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

Is suited to all types of room heaters, fancoil units, radiant systems and radiators.

Multiple configurations available:

- **Groundwater version and closed loop Geothermal version**
- **User and recovery side hydronic assemblies** with VARYFLOW+
- **3-way valve** for domestic hot water preparation on the recovery side
- **Source side hydronic assemblies** with VARYFLOW+ or, alternatively, 2-way modulating valve or 3-way modulating valve

Water flow-rate continuous modulation (optional)

ELFOEnergy Ground Medium² MF allows for adopting various **hydraulic assemblies on the user side, source side and recovery side**.

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

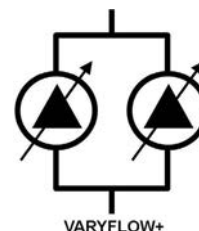
The **VARYFLOW + modulating pumping unit** made up of two pumps in parallel controlled by inverter, allows a precise water flow-rate modulation reducing notably the consumptions and at the same time it guarantees its functionality also in case of temporary unavailability of one of the two pumps, guaranteeing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

The water flow-rate 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 hydraulic assemblies are also available:

- **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.



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 is equipped with a backlit graphic display and a multifunction access keyboard. The multilevel menu is protected by different passwords according to the type of user.



Remote control

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

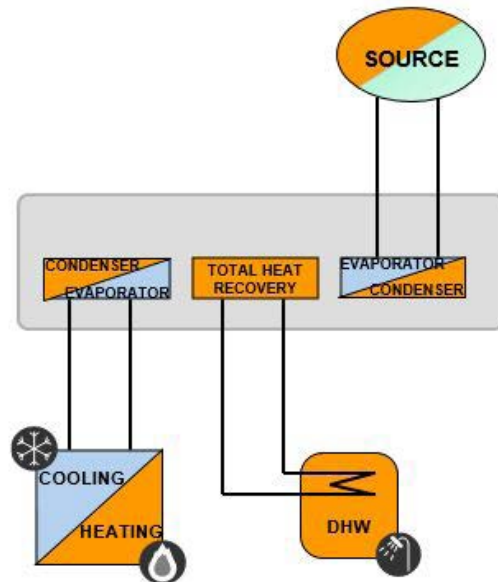
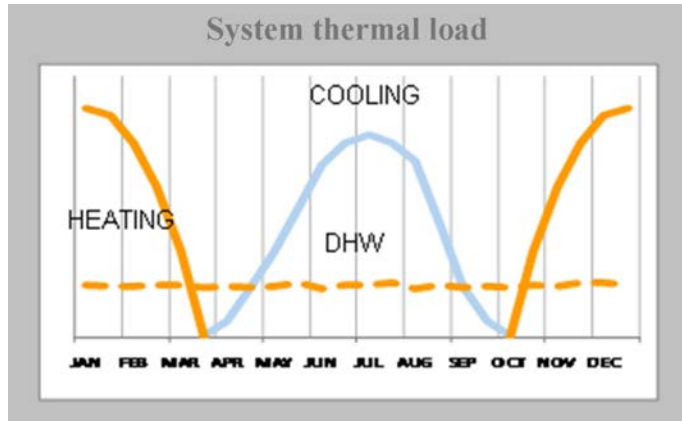
Thanks to the different available communication devices, the unit is able to exchange information with the main supervision systems by serial connections.



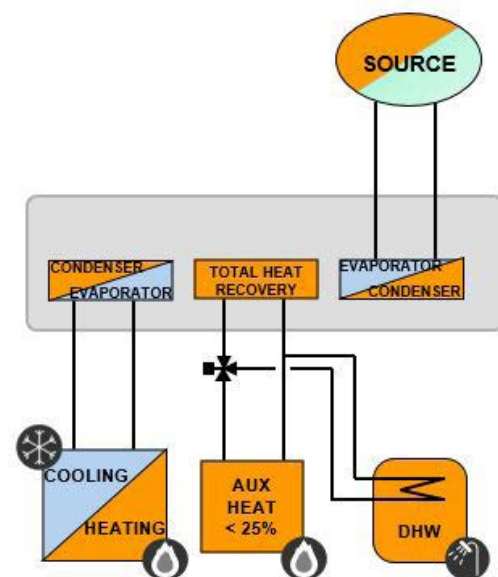
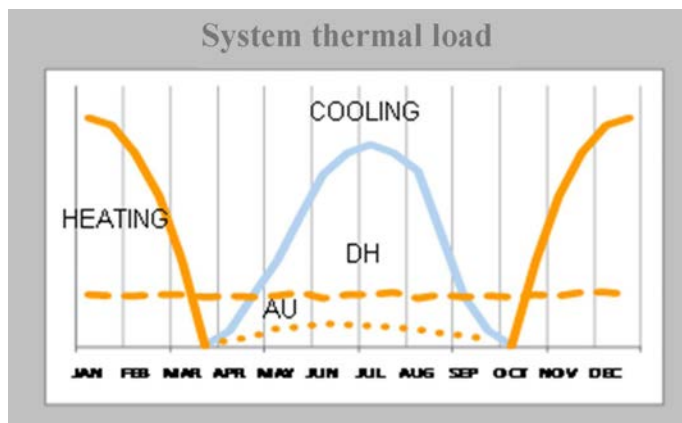
ELFOEnergy Ground Medium² - Multifunction

System solutions for reversible 2-pipe systems

- Production of chilled or hot water on the user side
- Production of hot water on the recovery side (Free in summer)



- Production of chilled or hot water on the user side
- Production of hot water on the recovery side (Free in summer)
- Priority hot water production with 3-way valve

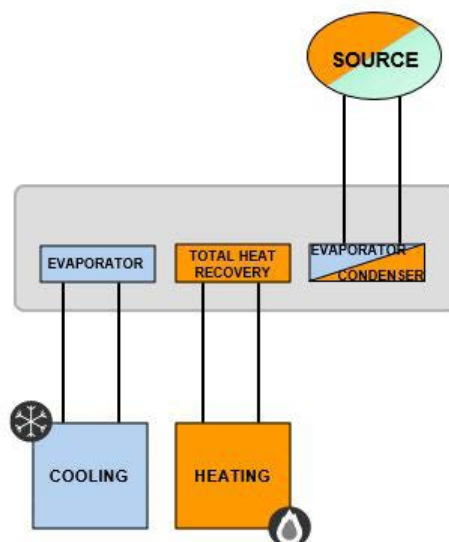
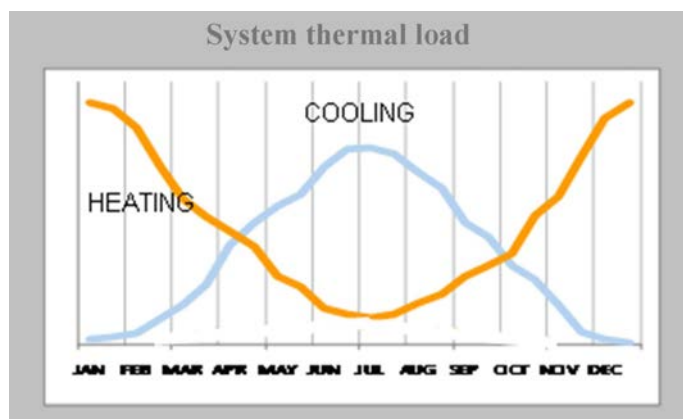


System solutions for systems with 4 pipes

- Chilled and hot water produced at the same time

Utility side = Cold side

Recovery side = Hot side

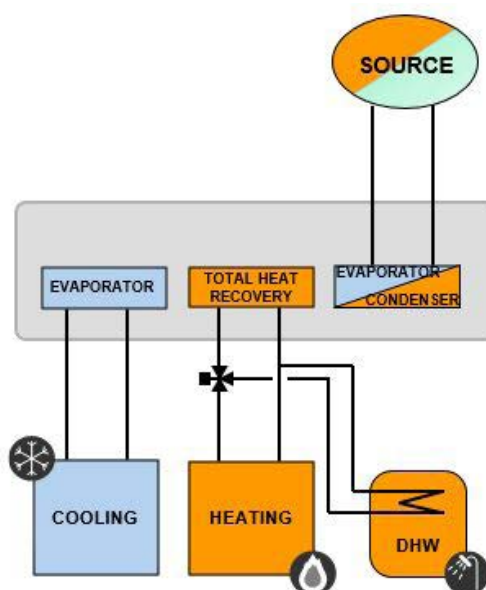
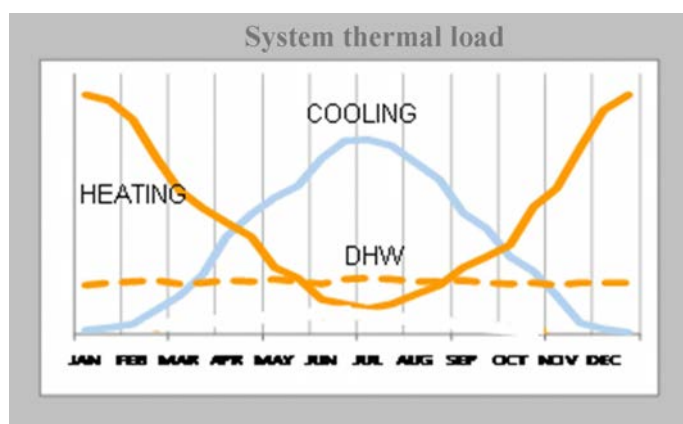


- Chilled and hot water produced at the same time

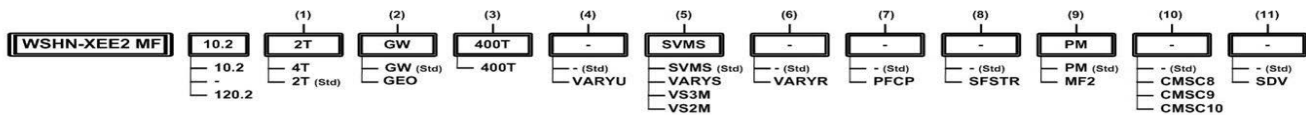
Utility side = Cold side

Recovery side = Hot side

- Priority production of domestic hot water, with 3-way valve recovery side



Unit configuration: 2-pipe system



(1) Functionalities

2T - Unit for reversible 2-pipe system (standard)

4T - Unit for standard four-pipe system

(2) Version

GW - Groundwater version (standard)

GEO - Version for Geothermal application

(3) Voltage

Supply voltage 400/3/50

(4) User side hydronic assemblies

Refer to the diagrams of the hydronic assembly reported

(5) Source side hydronic assemblies

Refer to the diagrams of the hydronic assembly reported

(6) Recovery side hydronic assemblies

Refer to the diagrams of the hydronic assembly reported

(7) Power factor correction capacitors

(-) not required (standard)

PFCP - Power factor correction capacitors (cosfi>0.9)

(8) Soft starter

(-) not required (standard)

SFSTR - Disposal for inrush current reduction (only for size from 10.2 to 80.2)

(9) Phase monitor

PM - Phase monitor (standard)

MF2 - Multi-function phase monitor

(10) Communication modules

(-) not required (standard)

CMSC8 - Serial communication module to BACnet supervisor

CMSC9 - Serial communication module to Modbus supervisor

CMSC10 - Serial communication module to LonWorks supervisor

(11) Cutoff valve

(-) not required (standard)

SDV - Cutoff valve on compressor supply and return (only for size from 10.2 to 80.2)

Functionalities	Diagram hydronic assemblies			
2 PIPE SYSTEM USER SIDE AND RECOVERY SIDE	Standard unit (Std)	Unit with VARYFLOW+ user side (VARYU)	Unit with VARYFLOW+ recovery side (VARYR)	Unit with VARYFLOW+ user side and recovery side (VARYU+VARYR)
2 PIPE SYSTEM SOURCE SIDE	Standard unit (SVMS)	Unit with VARYFLOW+ (VARYU)	Unit with 3-way modulating valve (VS3M)	Unit with 2-way modulating valve (VS2M)

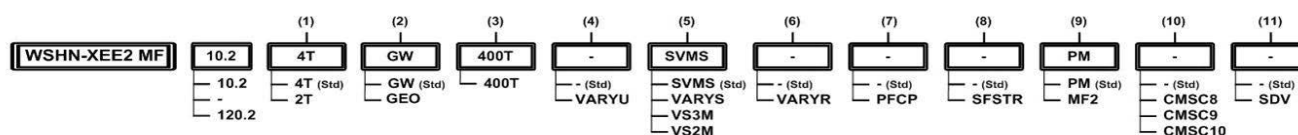
Accessories separately supplied

- SPCX - Set point compensation with outdoor air 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 - VACSX - Total recovery side DWH switching valve	- AVIBX - Anti-vibration mount support - IFWX - Steel mesh strainer on the water side
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NB: The unit configuration for system with 2 pipes always requires a flow-rate control device on the source side.

If the unit is chosen without hydronic assembly on the source side supplied by Clivet (SVMS), the customer must equip the system with a flow-rate control device on the source side and connect it to the unit.

Unit configurations: 4-pipe system



(1) Functionalities

4T - Unit for standard four-pipe system (standard)

2T - Unit for reversible 2-pipe system

(2) Version

GW - Groundwater version (standard)

GEO - Version for Geothermal application

(3) Voltage

Supply voltage 400/3/50

(4) User side hydronic assemblies

Refer to the diagrams of the hydronic assembly reported

(5) Source side hydronic assemblies

Refer to the diagrams of the hydronic assembly reported

(6) Recovery side hydronic assemblies

Refer to the diagrams of the hydronic assembly reported

(7) Power factor correction capacitors

(-) not required (standard)

PFCP - Power factor correction capacitors (cosφ>0.9)

(8) Soft starter

(-) not required (standard)

SFSTR - Disposal for inrush current reduction (only for size from 10.2 to 80.2)

(9) Phase monitor

PM - Phase monitor (standard)

MF2 - Multi-function phase monitor

(10) Communication modules

(-) not required (standard)

CMSC8 - Serial communication module to BACnet supervisor

CMSC9 - Serial communication module to Modbus supervisor

CMSC10 - Serial communication module to LonWorks supervisor

(11) Cutoff valve

(-) not required (standard)

SDV - Cutoff valve on compressor supply and return

Functionalities	Diagram hydronic assemblies			
4 PIPE SYSTEM HOT SIDE AND COLD SIDE	Standard unit (Std)	Unit with VARYFLOW+ cold side (VARYU)	Unit with VARYFLOW+ hot side (VARYR)	Unit with VARYFLOW+ cold side and hot side (VARYU+VARYR)
4 PIPE SYSTEM SOURCE SIDE	Standard unit (SVMS)	Unit with VARYFLOW+ (VARYU)	Unit with 3-way modulating valve (VS3M)	Unit with 2-way modulating valve (VS2M)
Accessories separately supplied				
- SPCX - Set point compensation with outdoor air 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 - VACSRX - Total recovery side DWH switching valve - AVIBX - Anti-vibration mount supports - IFWX - Steel mesh strainer on the water side

NB: The unit configuration for system with 2 pipes always requires a flow-rate control device on the source side.

If the unit is chosen without hydronic assembly on the source side supplied by Clivet (SVMS), the customer must equip the system with a flow-rate control device on the source side and connect it to the unit.

Configuration for 2-system and 4-pipe system

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
Cooling 100% - Heating 0%																						
Cooling capacity	1	kW	29,9	34,4	41,4	48,2	57,4	66,5	81,3	91,6	105	120	131	142	155	167	190	215	242	271	296	345
Total power input	2	kW	6,25	7,34	8,84	10,3	12,0	14,8	17,2	19,7	22,9	26,0	29,0	30,7	33,3	36,8	41,5	47,0	53,3	60,1	68,1	81,8
EER at full load	3		4,78	4,69	4,68	4,68	4,78	4,49	4,73	4,65	4,60	4,61	4,53	4,63	4,64	4,54	4,59	4,56	4,53	4,52	4,34	4,22
SEER	10		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
Water flow-rate internal exchanger/cold	1	l/s	1,43	1,64	1,98	2,30	2,74	3,18	3,88	4,38	5,03	5,72	6,28	6,78	7,39	7,98	9,09	10,2	11,5	13,0	14,1	16,5
Water flow-rate external exchanger	1	l/s	1,73	1,99	2,40	2,80	3,32	3,88	4,71	5,32	6,13	6,97	7,66	8,25	8,98	9,74	11,1	12,5	14,1	15,8	17,4	20,4
Cooling 0% - Heating 100%																						
Heating capacity	4	kW	34,3	40,3	48,0	56,6	66,8	79,2	93,7	106	119	139	152	163	179	195	218	252	279	314	343	408
Total power input	2	kW	7,72	9,02	10,7	12,4	14,5	17,4	20,3	23,3	26,8	30,7	34,1	36,3	39,2	43,3	48,9	54,9	61,5	71,1	79,6	96,2
COP at full load	5		4,44	4,47	4,49	4,56	4,61	4,55	4,62	4,57	4,46	4,51	4,44	4,48	4,56	4,50	4,45	4,59	4,53	4,42	4,31	4,25
ErP Space Heating Energy Class - AVERAGE Climate - W35	9		A+++	A+++	A+++	A+++	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ErP Space Heating Energy Class - AVERAGE Climate - W55	9		A+++	A+++	A+++	A+++	A+++	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SCOP - AVERAGE Climate - W35	10		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
SCOP - AVERAGE Climate - W55	10		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
Water flow-rate recovery exchanger/hot	4	l/s	1,64	1,93	2,29	2,70	3,19	3,78	4,48	5,08	5,70	6,62	7,24	7,77	8,53	9,30	10,4	12,0	13,3	15,0	16,4	19,5
Water flow-rate external exchanger	4	l/s	2,12	2,49	2,97	3,52	4,16	4,92	5,84	6,62	7,37	8,58	9,35	10,1	11,1	12,1	13,4	15,7	17,3	19,4	21,0	24,9
Cooling 100% - Heating 100%																						
Cooling capacity	6	kW	27,2	31,3	37,4	43,9	52,1	61,2	73,8	83,0	95,2	108	118	128	140	151	174	195	219	248	267	314
Heating capacity	6	kW	35,0	40,4	48,3	56,4	66,7	78,8	94,4	107	123	139	153	165	179	195	223	251	282	321	347	411
Total power input	2	kW	7,75	9,12	10,9	12,5	14,6	17,6	20,6	23,8	27,3	31,1	34,5	36,7	39,7	43,9	49,1	55,8	63	72,1	80,4	96,8
Overall efficiency	7		8,03	7,86	7,86	8,02	8,14	7,95	8,16	7,98	7,97	7,95	7,86	7,97	8,03	7,88	8,10	7,99	7,96	7,89	7,63	7,48
Water flow-rate internal exchanger/cold	6	l/s	1,30	1,49	1,79	2,10	2,49	2,92	3,52	3,97	4,55	5,16	5,66	6,11	6,67	7,22	8,33	9,32	10,5	11,9	12,7	15,0
Water flow-rate recovery exchanger/hot	6	l/s	1,67	1,93	2,31	2,69	3,19	3,76	4,51	5,10	5,85	6,65	7,31	7,86	8,57	9,32	10,7	12,0	13,5	15,3	16,6	19,6
Compressor																						
Type of compressors			Scroll																			
Refrigerant			R-410A																			
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 (C1)		l	3,0	3,0	3,0	6,0	6,0	6,0	7,0	7,0	8,0	10,1	11,5	11,0	11,0	13,1	12,6	12,6	13,0	13,0	13,0	
Refrigeration circuits		No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Refrigerant charge (C1)		Kg	6,0	6,0	7,8	11	12	15	16	18	22	26	29	30	31	34	32	43	40	40	55	55
Coolside exchanger																						
Type of exchanger	8		PHE																			
No. of exchangers		No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water content		l	3,2	3,2	4,3	4,3	5,9	5,9	7,2	7,2	9,8	9,8	9,8	13,2	13,2	13,2	17,2	17,2	23,0	23,0	33,8	33,8
Heating side exchanger																						
Type of exchanger	8		PHE																			
No. of exchangers		No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water content		l	4,7	4,7	4,7	6,8	7,8	7,8	10,6	10,6	10,6	14,2	14,2	14,2	18,6	18,6	18,6	25,0	25,0	27,0	42,8	47,3
Source side exchanger																						
Type of exchanger			PHE																			
No. of exchangers		No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water content		l	4,7	4,7	4,7	6,8	7,8	7,8	9,8	9,8	9,8	13,2	13,2	13,2	17,2	17,2	17,2	23,0	23,0	27,0	42,8	47,3
Connections																						
Water fittings			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"	3"	3"	3"	3"	3"	3"	3"	3"	4"	4"
Water circuit																						
Maximum water side pressure		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
Power supply																						
Standard power supply			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)

- Data referred to the following conditions: User side exchanger water = 12/7 °C. Supply side exchanger water = 30/35 °C
- The total power input is derived by adding the compressor power input + power input of the auxiliary electric circuit
- Full-load EER, cooling efficiency coefficient. Ratio between the cooling capacity delivered and the total power input.
- Data referred to the following conditions:
 - for system with 2 pipes (system heating): user side exchanger water 40/45 °C. Source side exchanger water 10/7 °C.
 - for system with 2 pipes (heating demand side recovery without cooling system side): recovery side exchanger

- water 40/45 °C. source side exchanger water 10/7 °C.
- 3) for system with 4 pipes: recovery side exchanger water 40/45 °C. Source side exchanger water 10/7 °C.
- Full-load COP, heating efficiency coefficient. Ratio between the heating capacity delivered and the total power input.
- Data referred to the following conditions: user side exchanger water 12/7 °C. Source side exchanger water 40/45 °C.
- Overall efficiency. Calculated as (cooling capacity delivered + heating capacity delivered)/(total power input).
- PHE = plate exchanger
- Seasonal Space Heating Energy Efficiency Class according to Commission delegated Regulation (EU) No 811/2013. W = Water outlet temperature (°C)
- Data calculated according to the EN 14825:2016 Regulation

Configuration for 2-system and 4-pipe system

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
Cooling 100% - Heating 0%																					
Cooling capacity	1 kW	30,3	35,3	40,7	48,8	61,0	70,4	86,0	96,8	109	126	139	148	163	178	199	227	252	281	315	366
Total power input	2 kW	6,87	8,10	9,76	11,2	12,3	15,0	17,3	20,1	23,2	26,4	29,5	30,9	34,2	37,2	42,0	47,8	54,0	61,6	68,8	83,1
EER at full load	3	4,41	4,36	4,17	4,36	4,96	4,69	4,97	4,82	4,71	4,78	4,71	4,80	4,77	4,79	4,75	4,74	4,67	4,56	4,58	4,40
Water flow-rate internal exchanger/cold	1 l/s	1,45	1,69	1,94	2,33	2,91	3,36	4,11	4,62	5,22	6,02	6,64	7,09	7,80	8,51	9,52	10,8	12,1	13,4	15,0	17,5
Water flow-rate external exchanger	1 l/s	1,90	2,22	2,58	3,07	3,75	4,37	5,29	5,99	6,78	7,81	8,63	9,18	10,1	11,0	12,4	14,1	15,7	17,5	19,6	23,0
Cooling 0% - Heating 100%																					
Heating capacity	4 kW	27,4	32,1	37,4	44,5	53,0	62,1	73,4	82,9	93,3	108	118	127	138	153	170	194	214	244	263	309
Total power input	2 kW	7,96	9,08	10,6	12,3	14,4	16,9	19,8	22,6	26,1	29,7	33,2	35,2	38,2	42,3	47,9	53,0	59,1	69,7	76,0	93,1
COP at full load	5	3,44	3,54	3,53	3,62	3,68	3,67	3,71	3,67	3,57	3,65	3,57	3,62	3,62	3,61	3,54	3,65	3,61	3,50	3,46	3,32
Water flow-rate recovery exchanger/hot	4 l/s	1,31	1,53	1,79	2,13	2,53	2,97	3,51	3,96	4,46	5,17	5,66	6,09	6,61	7,29	8,10	9,25	10,2	11,6	12,6	14,8
Water flow-rate external exchanger	4 l/s	1,66	1,97	2,29	2,75	3,30	3,86	4,58	5,15	5,74	6,71	7,27	7,87	8,55	9,41	10,4	12,0	13,2	14,9	15,9	18,4
Cooling 100% - Heating 100%																					
Cooling capacity	6 kW	27,2	31,3	37,4	43,9	52,1	61,2	73,8	83,0	95,2	108	118	128	140	151	174	195	219	248	267	314
Heating capacity	6 kW	35,0	40,4	48,3	56,4	66,7	78,8	94,4	107	123	139	153	165	179	195	223	251	282	321	347	411
Total power input	2 kW	7,75	9,12	10,9	12,5	14,6	17,6	20,6	23,8	27,3	31,1	34,5	36,7	39,7	43,9	49,1	55,8	63	72,1	80,4	96,8
Overall efficiency	7	8,03	7,86	7,86	8,02	8,14	7,95	8,16	7,98	7,97	7,95	7,86	7,97	8,03	7,88	8,10	7,99	7,96	7,89	7,63	7,48
Water flow-rate internal exchanger/cold	6 l/s	1,30	1,49	1,79	2,10	2,49	2,92	3,52	3,97	4,55	5,16	5,66	6,11	6,67	7,22	8,33	9,32	10,5	11,9	12,7	15,0
Water flow-rate recovery exchanger/hot	6 l/s	1,67	1,93	2,31	2,69	3,19	3,76	4,51	5,10	5,85	6,65	7,31	7,86	8,57	9,32	10,7	12,0	13,5	15,3	16,6	19,6
Compressor																					
Type of compressors																					
Refrigerant																					
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 (C1)	l	3,0	3,0	3,0	6,0	6,0	6,0	7,0	7,0	8,0	10,1	11,5	11,0	11,0	13,1	12,6	12,6	13,0	13,0	13,0	13,0
Refrigeration circuits	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Refrigerant charge (C1)	Kg	6,0	6,0	7,8	11	12	15	16	18	22	26	29	30	31	34	38	43	44	48	50	52
Coolside exchanger																					
Type of exchanger	8																				
No. of exchangers	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water content	l	3,2	3,2	4,3	4,3	5,9	5,9	7,2	7,2	9,8	9,8	9,8	13,2	13,2	13,2	17,2	17,2	23,0	23,0	33,8	33,8
Heating side exchanger																					
Type of exchanger	8																				
No. of exchangers	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water content	l	4,7	4,7	4,7	6,8	7,8	7,8	10,6	10,6	10,6	14,2	14,2	14,2	18,6	18,6	18,6	25,0	25,0	27,0	42,8	47,3
Source side exchanger																					
Type of exchanger	8																				
No. of exchangers	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water content	l	4,70	4,70	4,70	6,80	7,80	7,80	14,0	14,0	14,0	18,0	18,0	21,0	21,0	26,0	26,0	30,0	30,0	30,0	42,8	47,3
Connections																					
Water fittings	9	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"	3"	3"	3"	3"	3"	3"	3"	3"	4"	4"
Water circuit																					
Maximum water side pressure	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
Power supply																					
Standard power supply			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: User side exchanger water = 12/7 °C. Supply side exchanger water = 30/35 °C

2. The total power input is derived by adding the compressor power input + power input of the auxiliary electric circuit

3. Full-load EER, cooling efficiency coefficient. Ratio between the cooling capacity delivered and the total power input.

4. Data referred to the following conditions:

1) for system with 2 pipes (system heating): user side exchanger water 40/45 °C. Source side exchanger water 10/7 °C.

2) for system with 2 pipes (heating demand side recovery without cooling system side): recovery side exchanger water 40/45 °C. Source side exchanger water 10/7 °C.

3) for system with 4 pipes: recovery side exchanger water 40/45 °C. Source side exchanger water 10/7 °C.

5. Full-load COP, heating efficiency coefficient. Ratio between the heating capacity delivered and the total power input.

6. Data referred to the following conditions: user side exchanger water 12/7 °C. Source side exchanger water 40/45 °C.

7. Overall efficiency. Calculated as (cooling capacity delivered + heating capacity delivered)/(total power input).

8. PHE = plate exchanger

Configuration for 2-system and 4-pipe system

Electrical data

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	n.a.	n.a.	n.a.

Electrical data refer to standard units; according to the installed accessories, the data can suffer light 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 european 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:

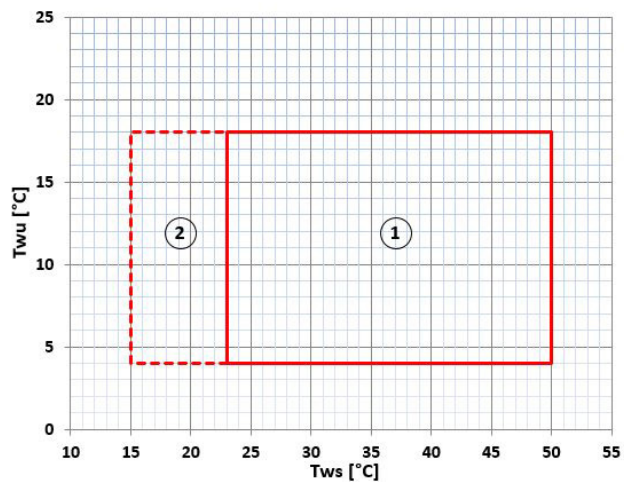
entering / leaving exchanger water temperature user side 12/7°C

entering / leaving exchanger water temperature source side 30/35°C

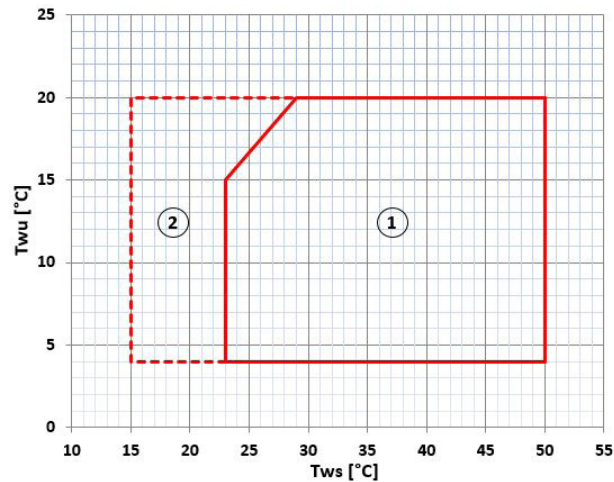
Configuration for 2-pipe system and 4-pipe system

Operating range - Cooling

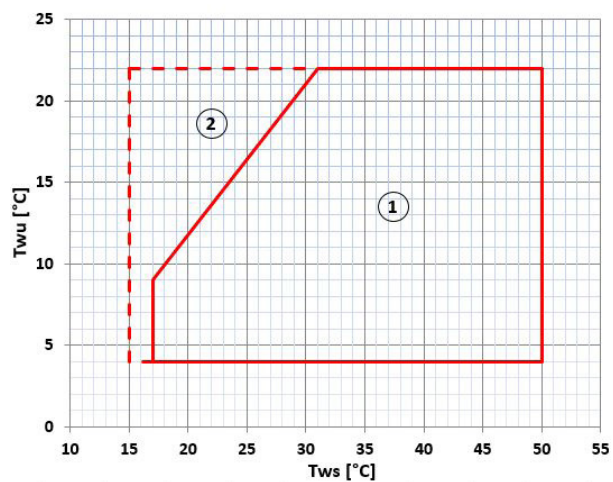
Size 10.2 - 12.2 - 14.2



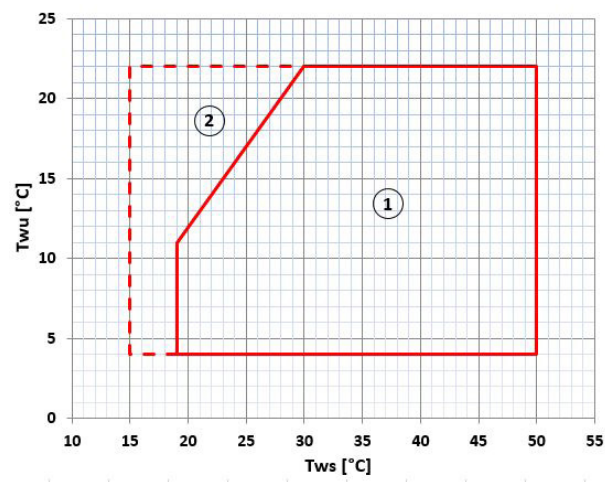
Size 16.2



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



T_{wu} [°C] = leaving water temperature user side

T_{ws} [°C] = leaving water temperature source side

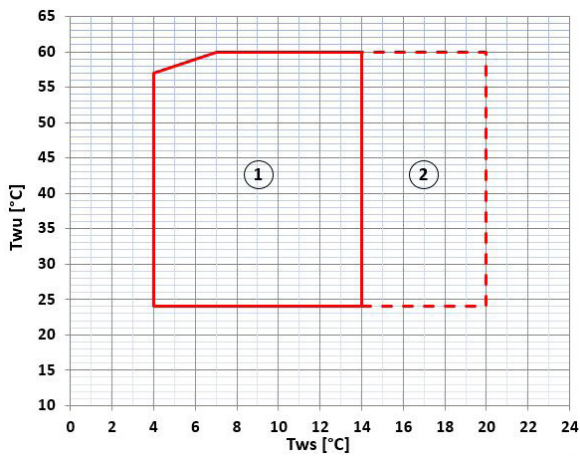
The limits refer to $DT=5$ °C on both the service and source sides

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

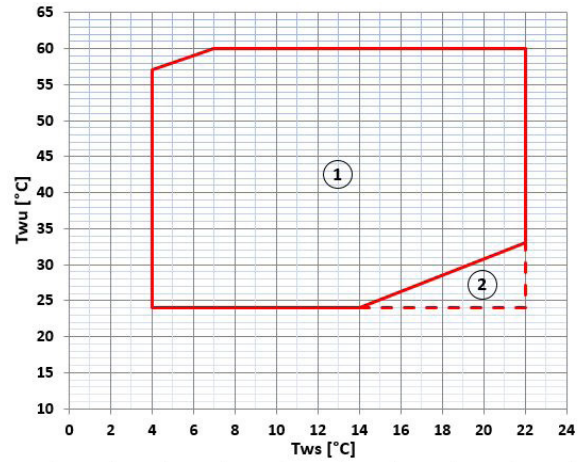
Configuration for 2-pipe system and 4-pipe system

Operating range - Heating - Groundwater

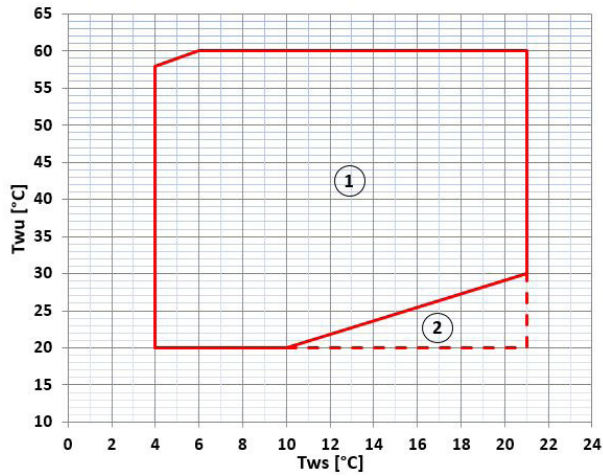
Size 10.2 - 12.2 - 14.2



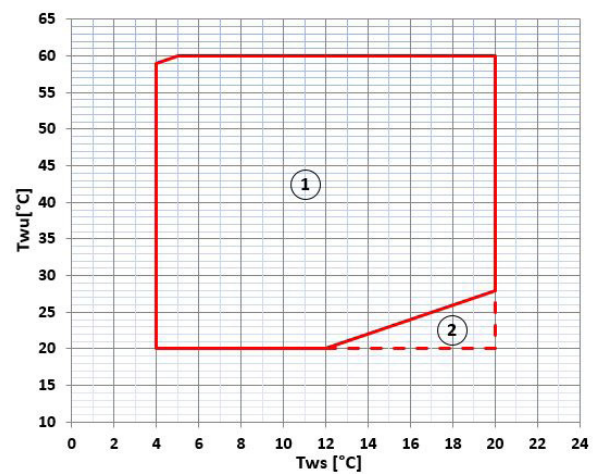
Size 16.2



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



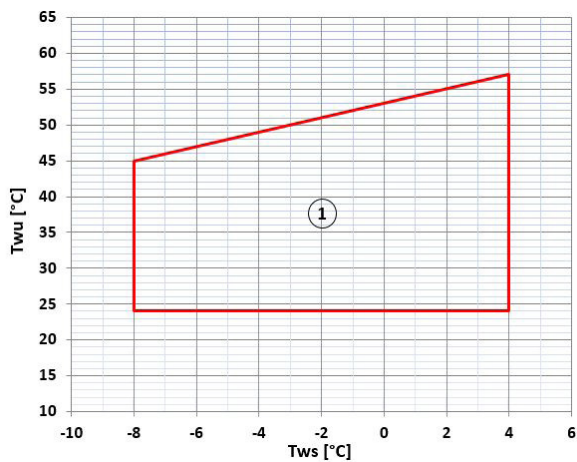
T_{wu} [°C] = leaving water temperature user side
 T_{ws} [°C] = leaving water temperature source side
 The limits refer to $DT=5$ °C on both the service and source sides

1. Normal operating range
2. 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

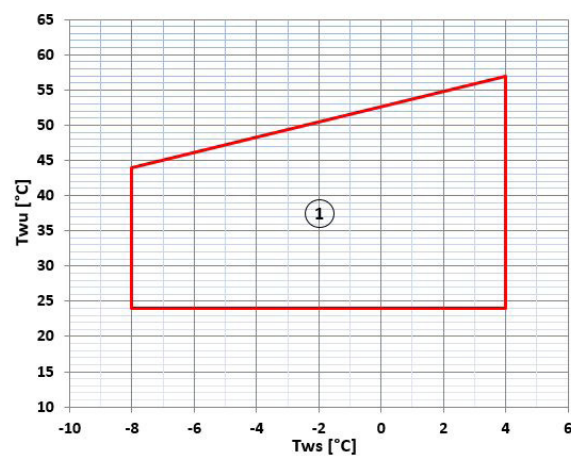
Configuration for 2-pipe system and 4-pipe system

Operating range - Heating - Geothermal

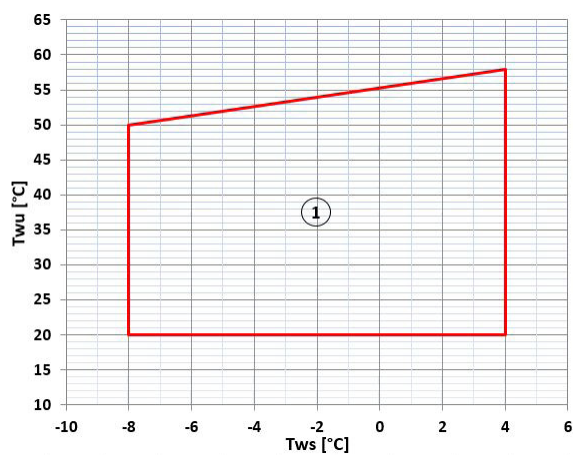
Size 10.2 - 12.2 - 14.2



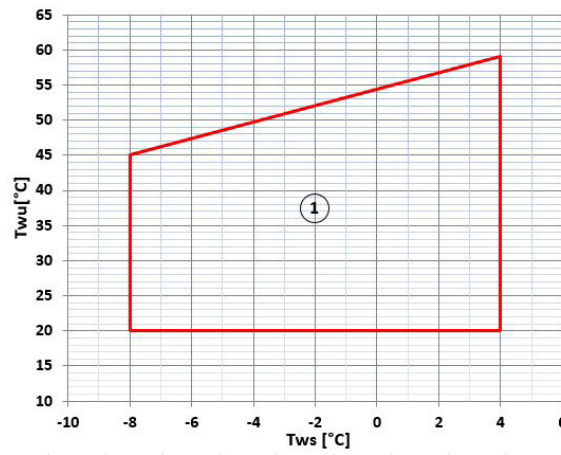
Size 16.2



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



T_{wu} [°C] = leaving water temperature user side

T_{ws} [°C] = leaving water temperature source side

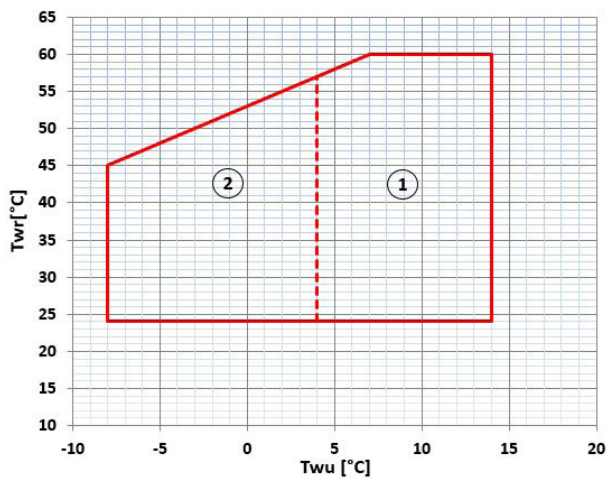
The limits refer to $\Delta T=5$ °C on both the service and source sides

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

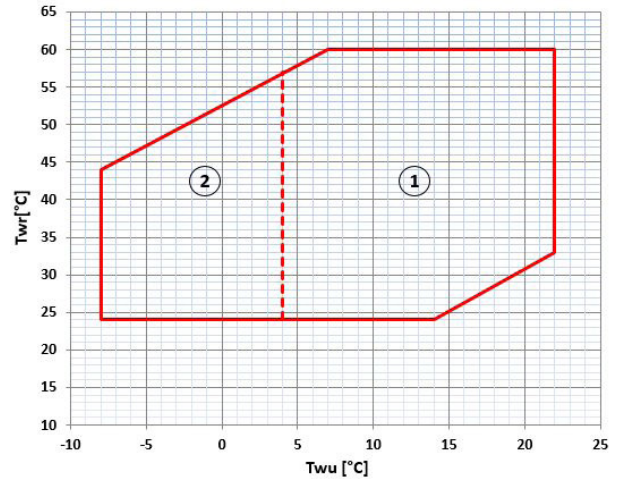
Configuration for 2-pipe system and 4-pipe system

Operating range - Cooling 100% - Heating 100%

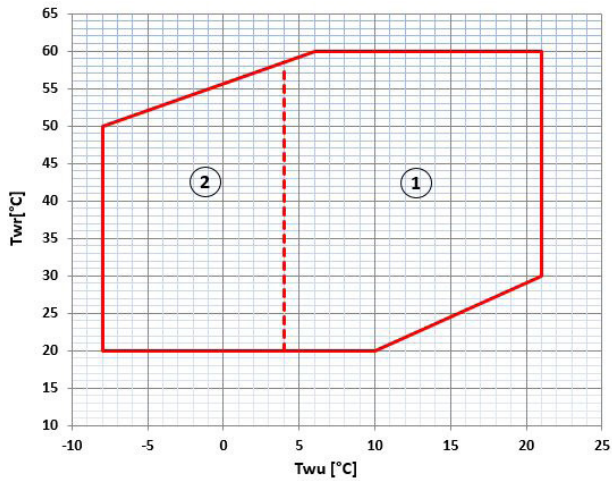
Size 10.2 - 12.2 - 14.2



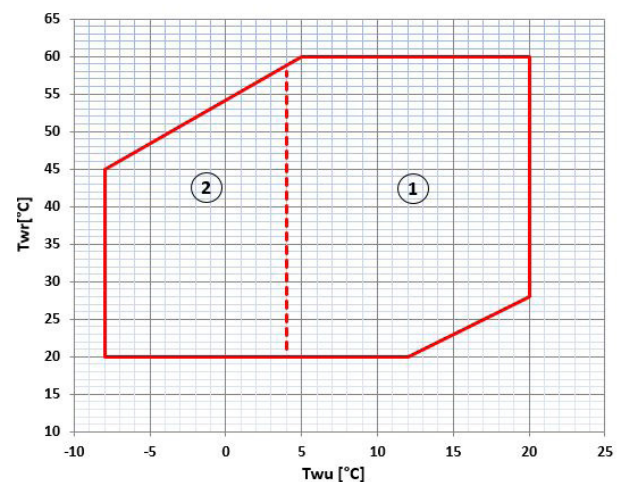
Size 16.2



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 $\Delta T = 5^\circ\text{C}$ on both the service and source sides

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

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

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 INTERNO	—	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 INTERNO	—	1,029	1,060	1,090	1,118	1,149	1,182	1,211	1,243
EXTERNAL exchanger chiller power factor ESTERNO	—	0,999	0,997	0,995	0,992	0,989	0,986	0,983	0,979
EXTERNAL exchanger compressor power draw factor ESTERNO	—	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 ESTERNO	—	1,027	1,062	1,103	1,149	1,200	1,256	1,318	1,387

Overload and control device calibrations

		Open	Closed	Value
High pressure switch (gas side)	[kPa]	4050	3300	—
Low pressure alarm (gas side)	[kPa]	450	600	—
Antifreeze protection	[°C]	4,0	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

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

Outer panelling made of painted zinc-magnesium sheet metal RAL 9001 internally lined with heat insulation and soundproofing material. Each panel can be easily removed to give full access to internal components.

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.

Exchanger recovery side

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 valves
- 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 (only with hydronic assembly option)
- minimum circuit charge pressure switch (only with hydronic assembly option)
- safety valve (only with hydronic assembly option)

Source side

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

Recovery side

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

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
- configuration for single on/off pump or service and source side modulating valve

Accessories

- IFWX - Steel mesh strainer on 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
- 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
- VACSXR - Total recovery side DHW switching valve

Operation and use conditions

Room temperature	Operating unit	Unit in stand-by*	Unit in storage
>50°C	NOT POSSIBLE	NOT POSSIBLE	NOT POSSIBLE
35° < t < 50°C	√ standard unit √ not compatible with Clivet integrated pumping device	√ standard unit	√ standard unit
0°C < t < 35°C	√ standard unit	√ standard unit	√ standard unit
-10°C < t < 0°C	√ glycol in an appropriate percentage (1)	√ glycol in an appropriate percentage (1)	√ glycol in an appropriate percentage (1)
< -10°C	NOT POSSIBLE	NOT POSSIBLE	NOT POSSIBLE

* consider the unit powered electrically, with active control on pumping units. It is recommended to set a set-point value lower than standard (eco mode)

1. Operating range where the water pumping unit must be powered and always active, or with a periodical activation of the outdoor temperature operating pump to guarantee the correct unit operation.

At the unit start-up the water temperature or water with glycol must be inside the operating range indicated in the "Operating range" graph.
To know the water freezing temperature on varying the glycol percentage refer to the specific 'Correction factors for glycol use' table.

Source and user side minimum system water content

For a proper functioning of the unit a minimum water content has to be provided to the system, using the formula:

$$\begin{aligned} \text{Minimum water content [l]} &= 6 \times \text{kWf (air conditioning application)} \\ &= 10 \times \text{kWf (application with low loads required)} \end{aligned}$$

kWf = Nominal cooling capacity unit



Volume calculated does not consider internal heat exchanger (evaporator) water content.

Electronic control

Description of step start-up control

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

The compressor 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
- Refrigeration 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

RCTX - Remote control

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.

2-pipe unit operating range

To ensure correct operation of the unit, the latter must be equipped with a flow-rate control device on the source side.

The thermoregulation is performed only on the water return temperature, to ensure the unit's stability and maximum efficiency.

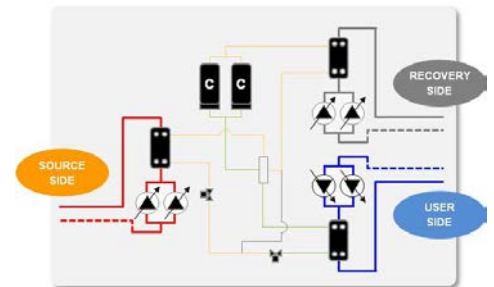
The unit is capable of producing chilled or hot water on the user side and, thanks to the total recovery heat exchanger, is able to produce domestic hot water for free simultaneously during summer mode operation and winter mode operation.

In order to limit the supply temperature variation at the capacity changing, it is necessary to select the hydronic assembly Varyflow+ user and/or recovery side with which it is possible to vary the water flow rate at part load getting closer to the desired Δt .

Example of how the unit operates

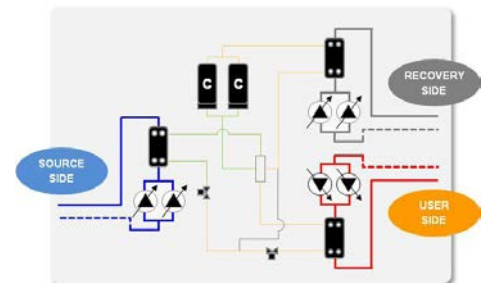
- System cooling only:**

In this condition, all the cooling capacity is released to the user side of the heat exchanger and maintenance of the user side set point is ensured through the modulation of the capacity steps. All the heating capacity is dispersed on the source exchanger.



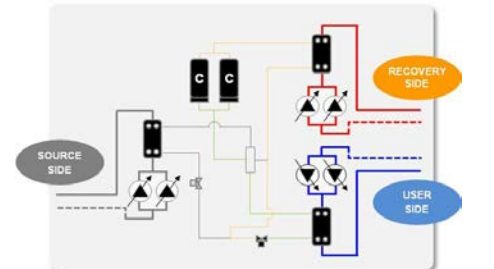
- System heating only:**

In this condition all the heating capacity is released to the user side of the heat exchanger and maintenance of the user side set point is ensured through the modulation of the capacity steps. All the cooling capacity is dispersed on the source exchanger.



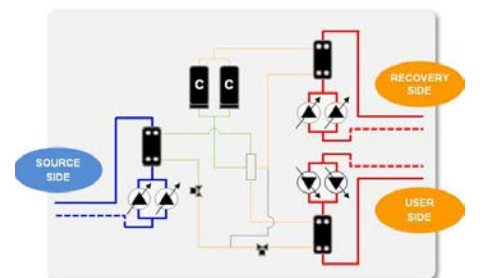
- System cooling requirements and free production of domestic hot water:**

In this condition, all the cooling capacity is released to the user side of the heat exchanger while all the heating capacity is released to the recovery side of the heat exchanger. The capacity steps are modulated so as to guarantee a constant set point on the priority side chosen by the user. In this condition, the overall efficiency of the unit, defined as (cooling capacity for use + heating capacity for recovery)/(total power input) is very high.



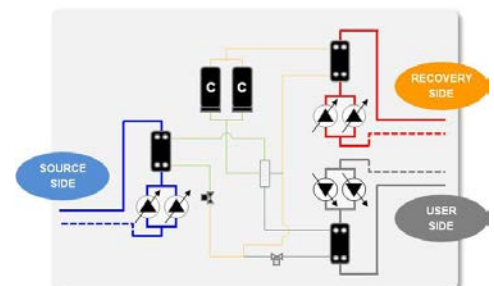
- System heating requirements and production of domestic hot water:**

In this condition, the heat is released at the same time to the user side and the recovery side of the heat exchanger. The total heating capacity that can be provided to the two points of use cannot exceed 100% of the unit's nominal heating capacity. The unit will manage the capacity steps considering both loads and through modulation of the flow-rate it will initially satisfy the primary point of use, reserving the residual capacity for the secondary point of use. All the cooling capacity is dispersed on the source exchanger.



- Requirement for the production of domestic hot water only:**

In this condition all the heating capacity is released to the recovery side of the heat exchanger and the load requirements are met through the modulation of the capacity steps. All the cooling capacity is dispersed on the source exchanger.



4-pipe unit operating range

To ensure correct operation of the unit, the latter must be equipped with a flow-rate control device on the source side.

The thermoregulation is performed only on the water return temperature, to ensure the unit's stability and maximum efficiency.

The unit is capable of producing chilled or hot water at the same time throughout the year. Chilled water is only produced on the user side (cold side), while hot water is only produced on the recovery side (hot side).

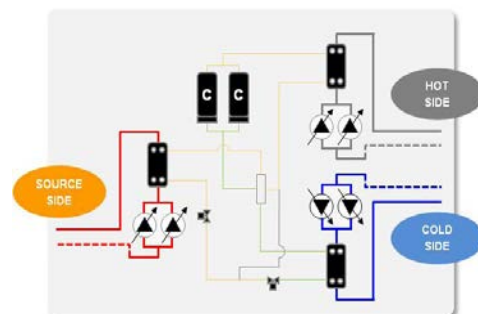
By equipping the unit with a DHW switching valve (VACSRX, accessory supplied separately), it is possible to prioritise domestic hot water production over system side heating requirements.

In order to limit the supply temperature variation at the capacity changing, it is necessary to select the hydronic assembly Varyflow+ user and/or recovery side with which it is possible to vary the water flow rate at part load getting closer to the desired Δt .

Example of how the unit operates

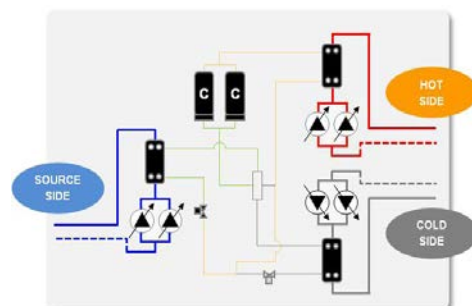
- Cooling requirement 100%, Heating requirement 0%:**

In this condition, all the cooling capacity is released to the cold side of the heat exchanger and maintenance of the cold side set point is ensured through the modulation of the capacity steps. All the heating capacity is dispersed on the source exchanger. The pump control on the hot side may be activated or deactivated based on a schedule to keep water temperature under control.



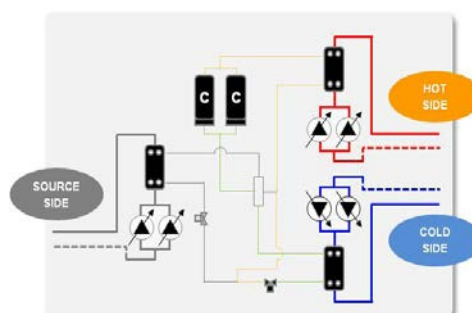
- Cooling requirement 0%, Heating requirement 100%:**

In this condition all the heating capacity is released to the hot side of the heat exchanger and maintenance of the hot side set point is ensured through the modulation of the capacity steps. All the cooling capacity is dispersed on the source exchanger. Cooling capacity is not released on the cold side: the cold side pump control may be kept activated at a minimum or it may be activated and deactivated based on a regular schedule to keep water temperature under control.



- Cooling requirement 100%, Heating requirement 100%:**

In this condition all the cooling capacity is released to the cold side of the heat exchanger, while all the heating capacity is released to the hot side of the heat exchanger. The modulation of the capacity steps is managed so as to guarantee the same hot side/cold side set point in relation to the operating mode used (hot side control in winter operation, cold side control in summer operation). In this condition, the overall efficiency of the unit, defined as (cooling capacity for cold operation + heating capacity for recovery)/(total power input) is very high.

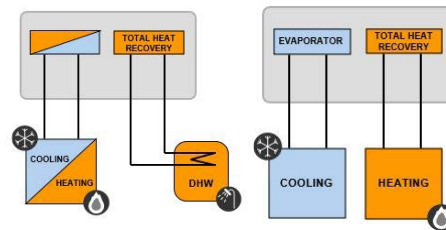


User side and recovery side (2/4-pipe)

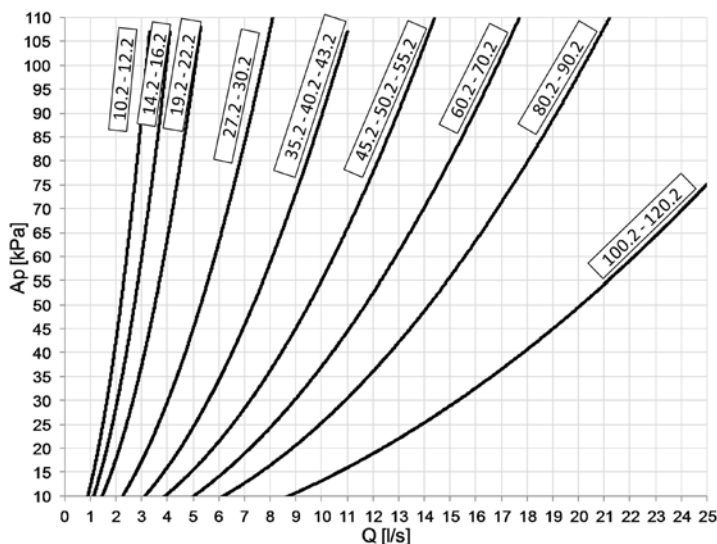
Configuration: Standard unit (STD)

Configuration without hydronic assembly on the user side and recover side, but equipped with components as listed on the key of the enclosed plumbing circuit diagram.

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 (2 pipe), cooling side exchanger (4 pipe)



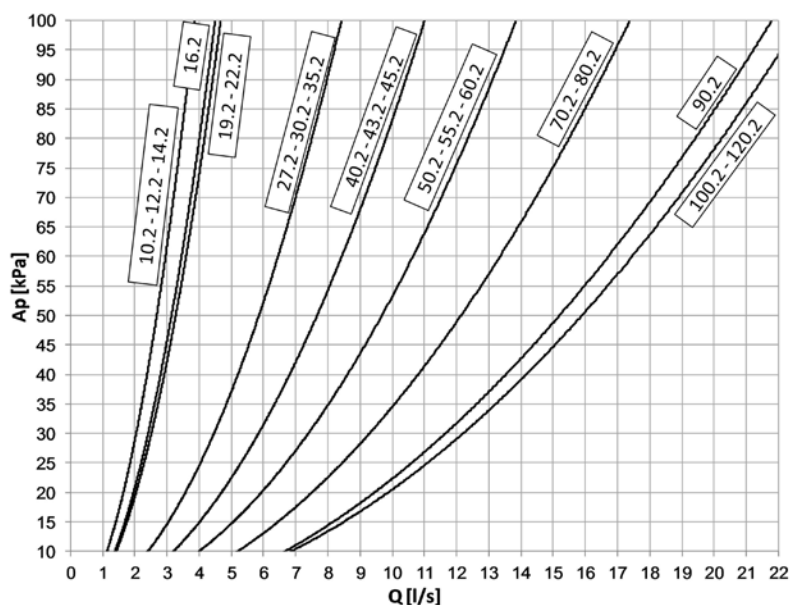
The pressure drops on the water side are calculated by considering an average water temperature at 7°C.

Q = Water flow rate [l/s]

DP = Pressure drops [kPa]

To the internal exchanger pressure drops must be added the pressure drops of the steel mesh mechanical filter that must be placed on the water input line. It is a device compulsory for the correct unit operation, and it is available as Clivet option (IFWX).

Recovery side exchanger pressure drop curves (2 pipe), heating side exchanger (4 pipe)



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]

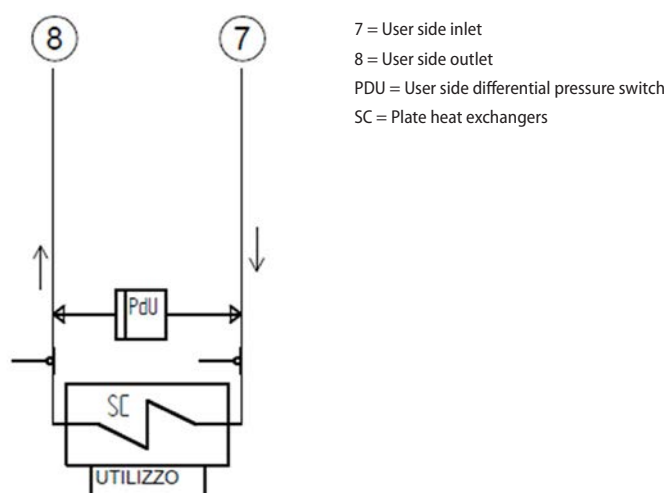
To the internal exchanger pressure drops must be added the pressure drops of the steel mesh mechanical filter that must be placed on the water input line. It is a device compulsory for the correct unit operation, and it is available as Clivet option (IFWX).

Admissible water flow rates

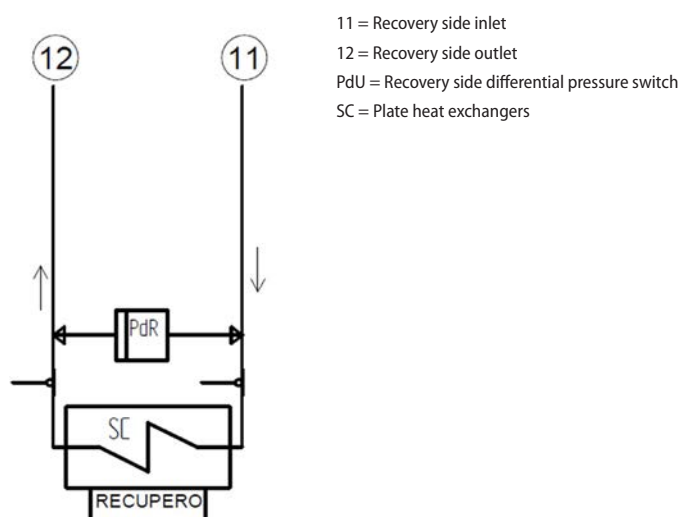
Admissible minimum (Qmin) and maximum (Qmax) water flow rates for the correct unit operation. They are referred to the unit in standard configuration without Clivet integrated hydronic assemblies user and/or recovery side.

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
Recovery side (2 pipe) or Heating side (4 pipe)	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	7,0	7,0
	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	15,0	15,4	18,3	19,0	22,0	22,5	22,5
User side (2 tubi) or Cooling side (4 tubi)	Qmin	[l/s]	0,8	0,8	0,8	1,0	1,1	1,1	1,9	1,9	2,6	2,6	2,6	3,5	3,5	3,5	4,5	4,5	5,0	5,0	8,5	8,5
	Qmax	[l/s]	3,5	3,5	4,3	4,4	4,9	5,1	8,5	8,5	11,5	11,5	11,5	14,5	14,5	15	18	18,5	21,5	22,0	27,0	27,0

User side water diagram (2 pipe), cooling side (4 pipe)



Recovery side water diagram (2 pipe), heating side (4 pipe)



User side and recovery side (2/4-pipe)

Configuration: Units with VARYFLOW + (VARYU or VARYR or VARYU + VARYR)

Multiple hydronic configurations are available:

- VARYFLOW+ only user side (VARYU)
- VARYFLOW+ only recovery side (VARYR)
- VARYFLOW+ for the user side and recovery side (VARYU + VARYR)

The VARYFLOW+ option includes 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.

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

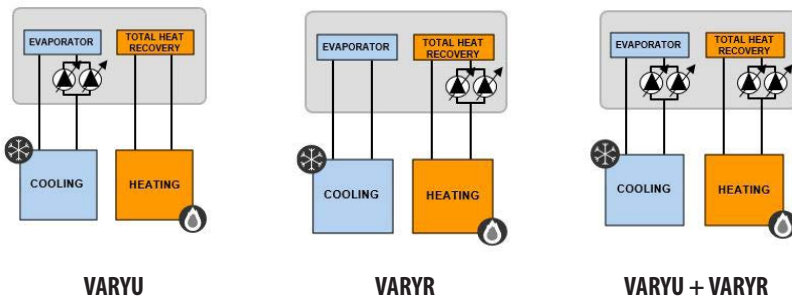
The control, modulates the water flow-rate keeping constant the delta T.

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.

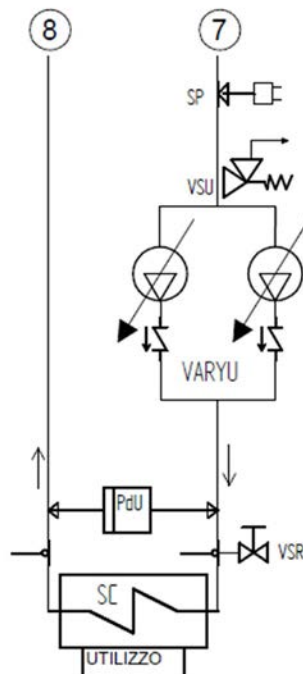
The available pressure and absorption graphs are the same for VARYFLOW+ on the user side and the recovery side.

Selecting the Varyflow+ hydronic assembly, the maximum and minimum flow rate limits vary as indicated in the following graphs according to the corresponding size.

The limits indicated in the admissible water flow rate table are larger and can be achieved with specific hydronic assemblies provided by the Customer.

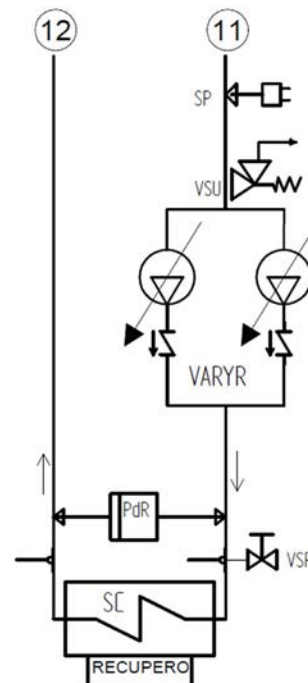


User side water diagram



- 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

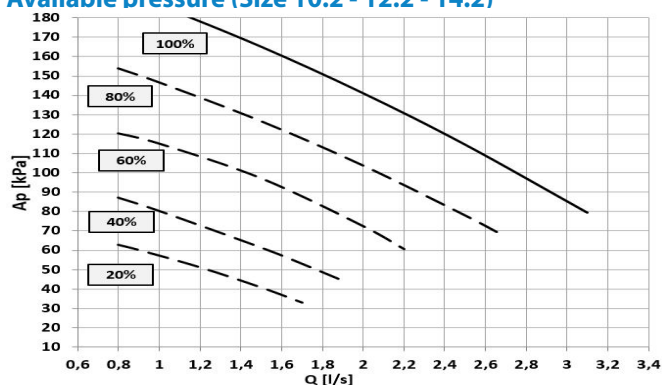
Recovery side water diagram



- 11 = Recovery side inlet
 12 = Recovery side outlet
 SP = Circuit charging pressure switch, calibrated to 0.7 bar
 VSU = Safety valve calibrated to 6 bar
 VARYR = VARYFLOW + recovery side hydronic units
 PDU = Recovery side differential pressure switch
 VSR = Relief valve
 SC = Plate heat exchangers

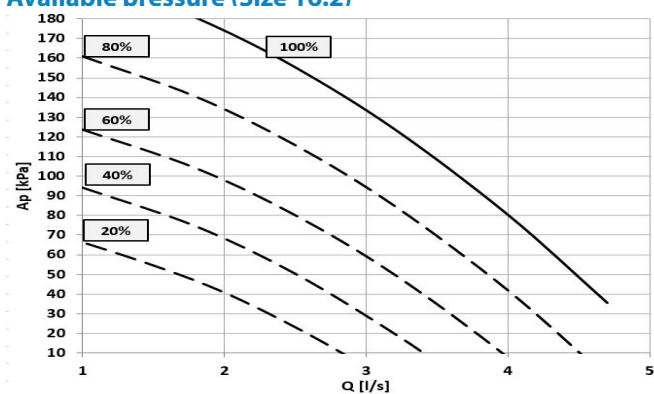
Configuration: Unit with VARYFLOW+ (VARYU or VARYR or VARYU + VARYR)

Available pressure (Size 10.2 - 12.2 - 14.2)



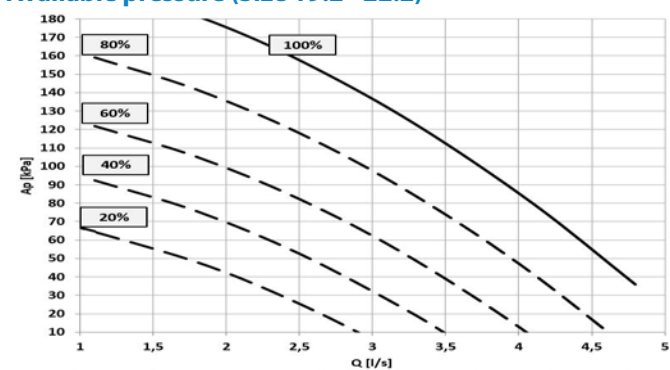
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Available pressure (Size 16.2)



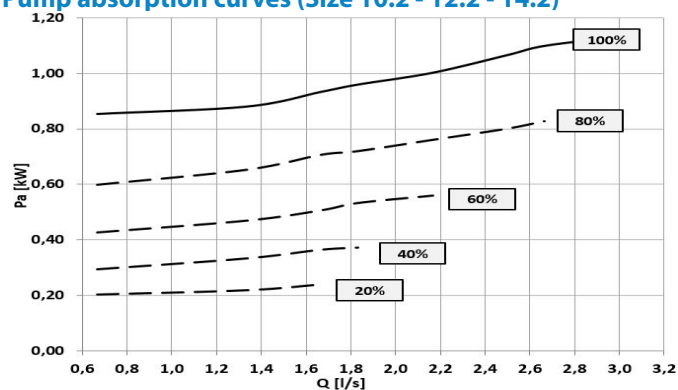
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Available pressure (Size 19.2 - 22.2)



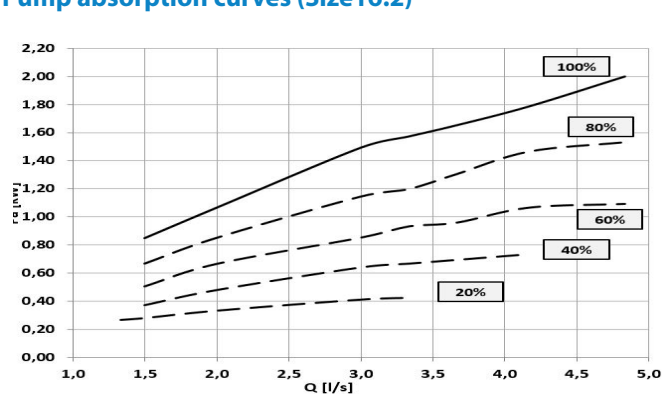
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 10.2 - 12.2 - 14.2)



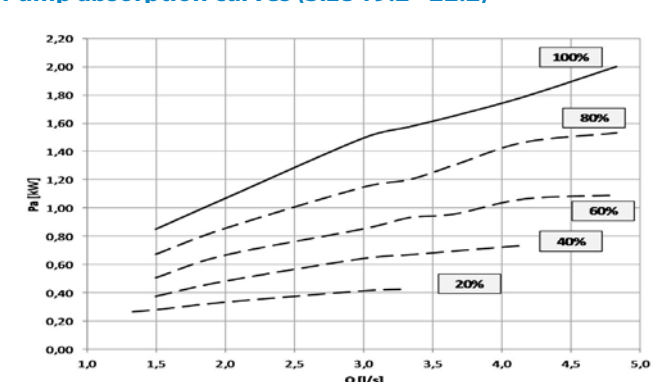
Q = Water flow rate [l/s] Pa = Electrical power input [kW]

Pump absorption curves (Size 16.2)



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

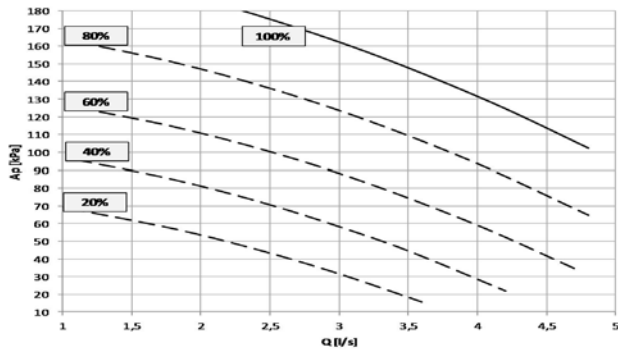
Pump absorption curves (Size 19.2 - 22.2)



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

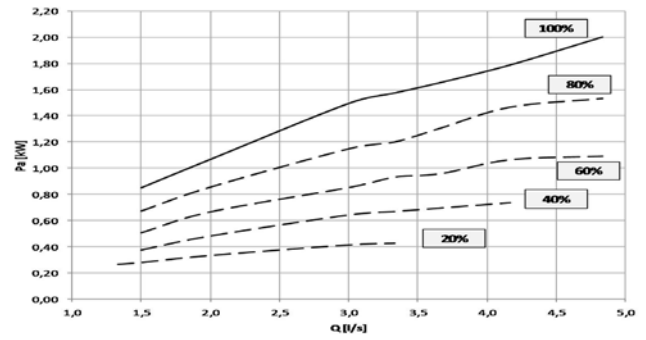
Configuration: Unit with VARYFLOW+ (VARYU or VARYR or VARYU + VARYR)

Available pressure (Size 27.2)



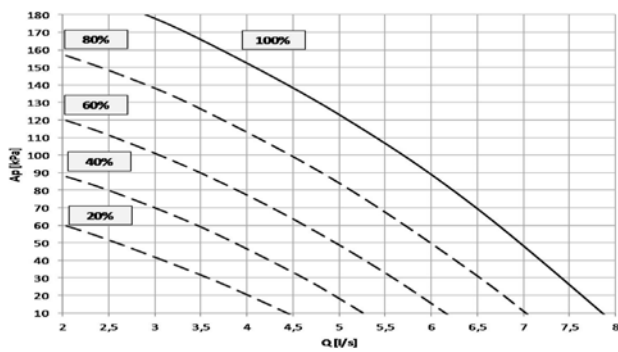
Q = Water flow rate [l/s] A_p = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 27.2)



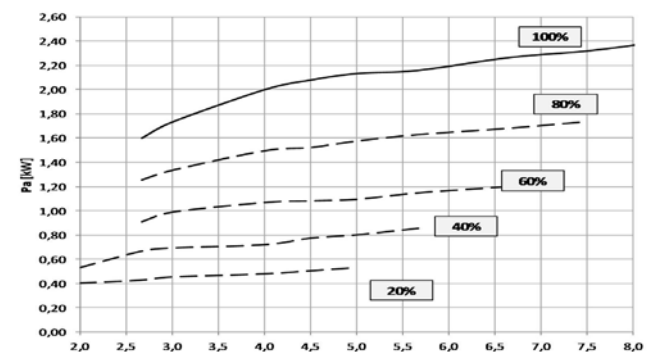
Q = Water flow rate [l/s] P_a = Electrical power input [kW]

Available pressure (Size 30.2 - 35.2)



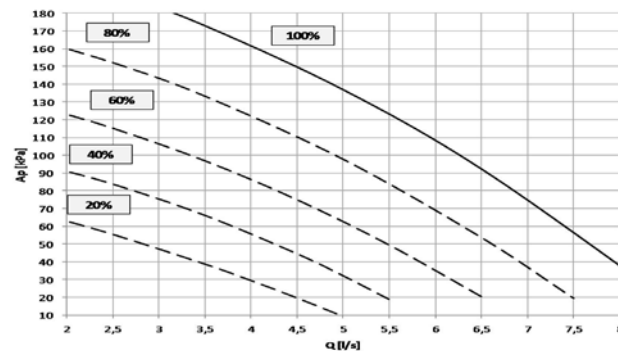
Q = Water flow rate [l/s] A_p = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 30.2 - 35.2)



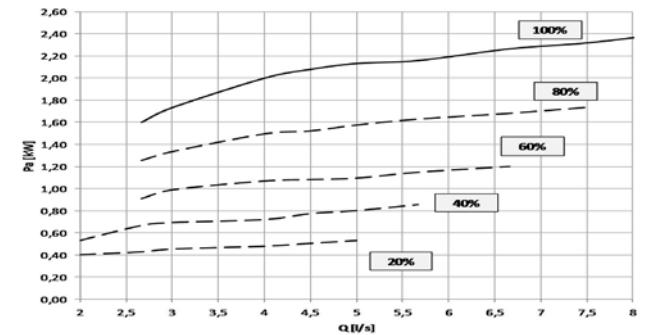
Q = Water flow rate [l/s] P_a = Electrical power input [kW]

Available pressure (Size 40.2)



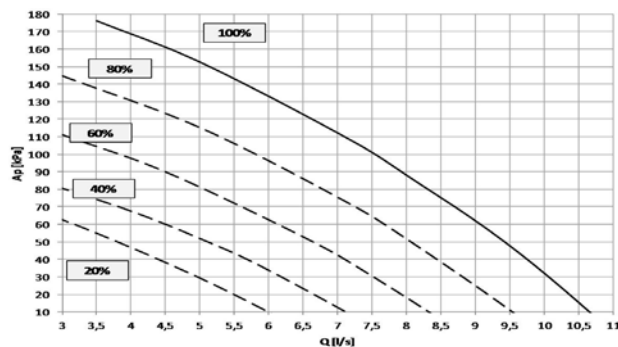
Q = Water flow rate [l/s] A_p = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 40.2)



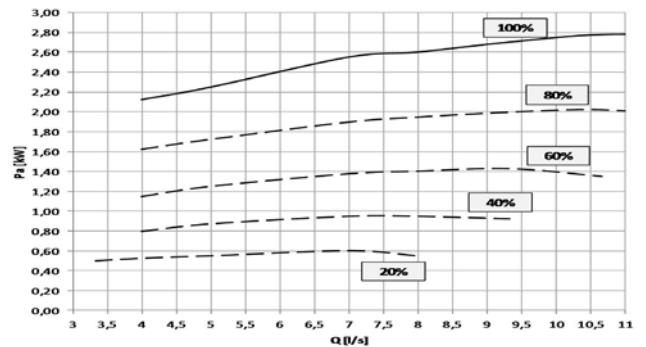
Q = Water flow rate [l/s] P_a = Electrical power input [kW]

Available pressure (Size 43.2 - 45.2)



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

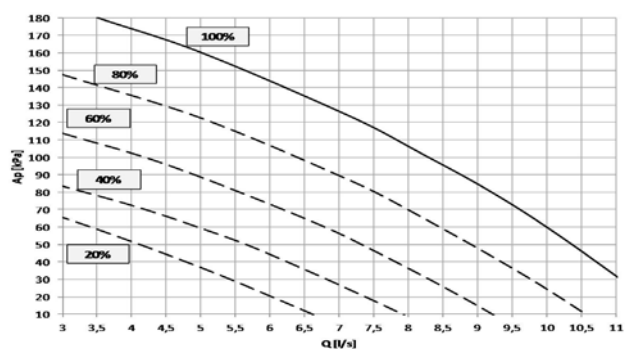
Pump absorption curves (Size 43.2 - 45.2)



Q = Water flow rate [l/s] P_a = Electrical power input [kW]

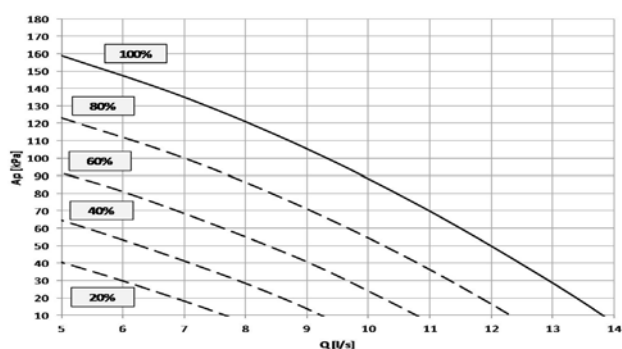
Configuration: Unit with VARYFLOW+ (VARYU or VARYR or VARYU + VARYR)

Available pressure (Size 50.2 - 55.2)



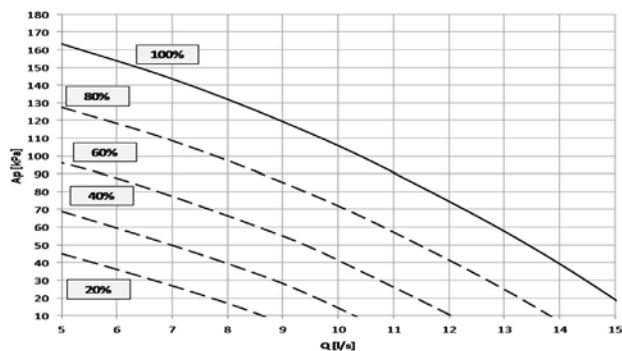
Q = Water flow rate [l/s] A_p = Pressure head, available to the unit fittings [kPa]

Available pressure (Size 60.2)



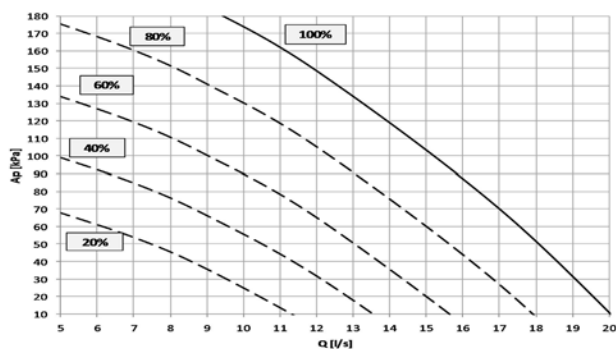
Q = Water flow rate [l/s] A_p = Pressure head, available to the unit fittings [kPa]

Available pressure (Size 70.2 - 80.2)



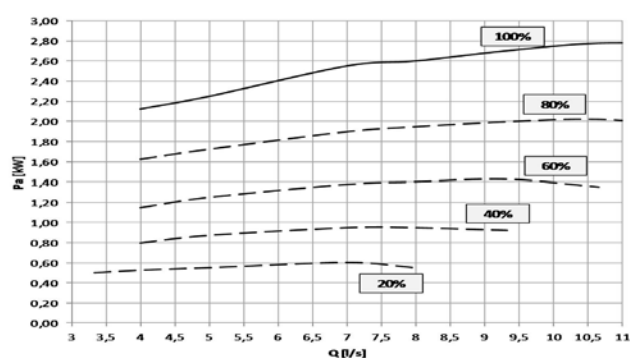
Q = Water flow rate [l/s] A_p = Pressure head, available to the unit fittings [kPa]

Available pressure (Size 90.2)



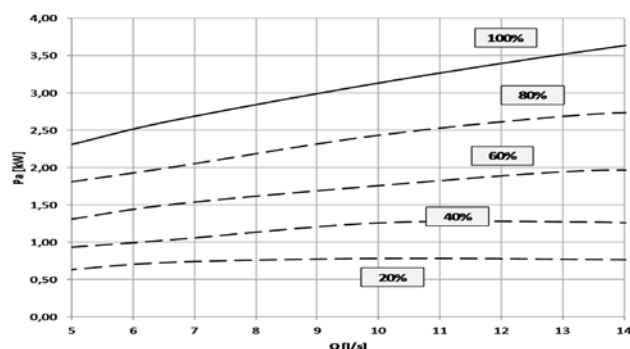
Q = Water flow rate [l/s] A_p = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 50.2 - 55.2)



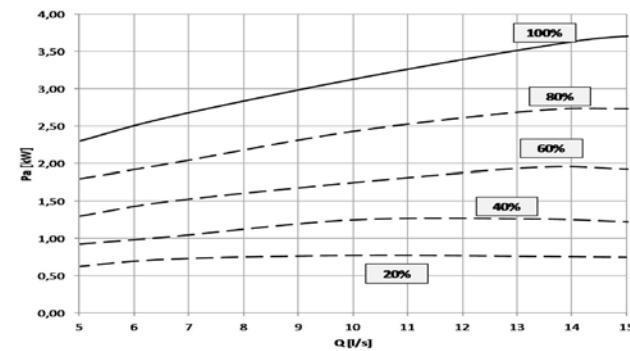
Q = Water flow rate [l/s] P_a = Electrical power input [kW]

Pump absorption curves (Size 60.2)



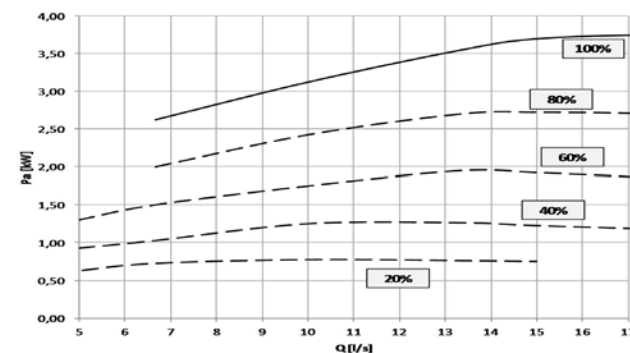
Q = Water flow rate [l/s] P_a = Electrical power input [kW]

Pump absorption curves (Size 70.2 - 80.2)



Q = Water flow rate [l/s] P_a = Electrical power input [kW]

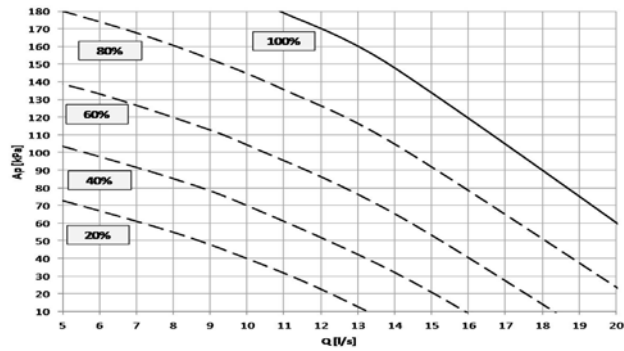
Pump absorption curves (Size 90.2)



Q = Water flow rate [l/s] P_a = Electrical power input [kW]

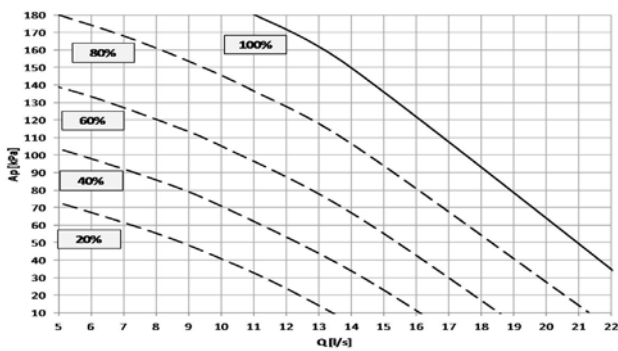
Configuration: Unit with VARYFLOW+ (VARYU or VARYR or VARYU + VARYR)

Available pressure (Size 100.2)



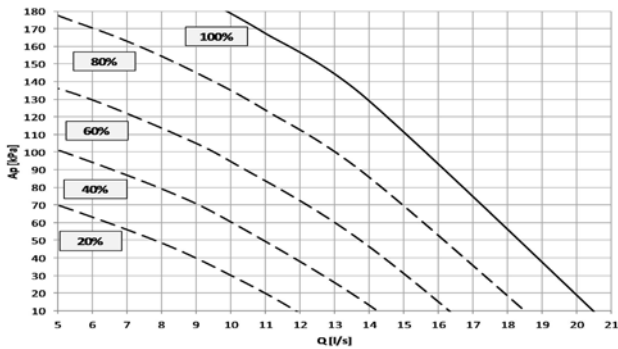
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Available pressure (Size 120.2)



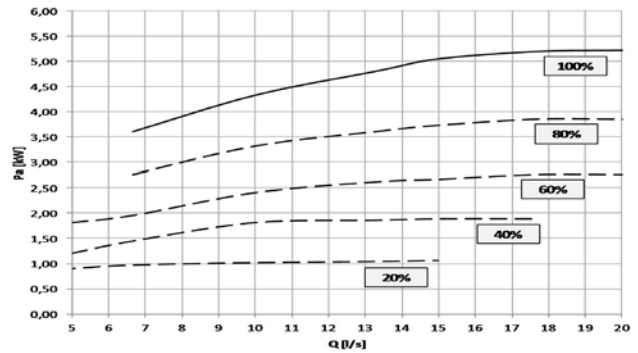
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Recovery available pressure (Size 100.2 - 120.2)



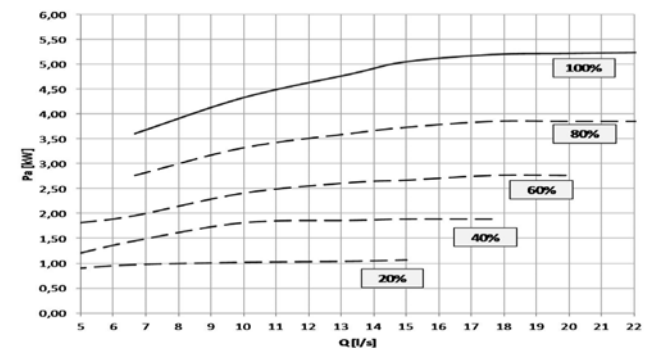
Q = Water flow rate [l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 100.2)



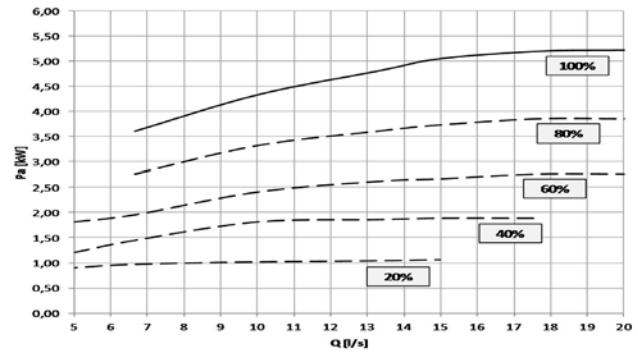
Q = Water flow rate [l/s] Pa = Electrical power input [kW]

Pump absorption curves (Size 120.2)



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

Recovery pump absorption curves (Size 100.2 - 120.2)



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

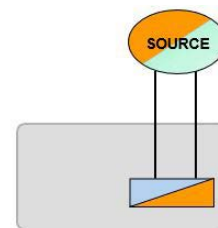
Source side (2/4-pipe)

Configuration: Standard unit (SVMS)

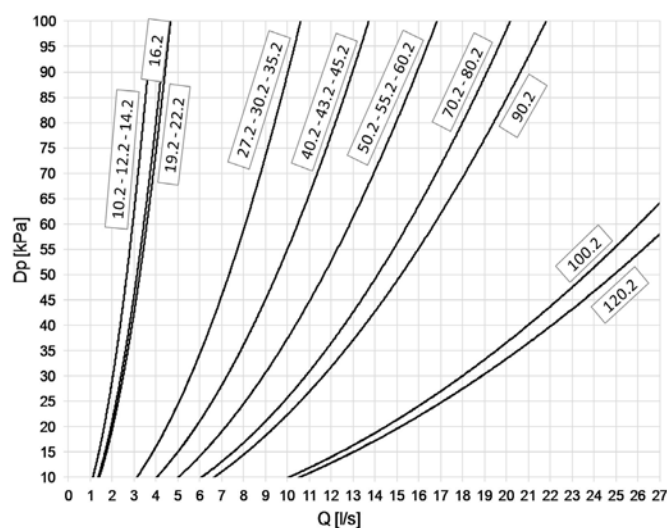
Configuration without hydronic assembly on the user side, but equipped with components as listed on the key of the enclosed plumbing circuit diagram.

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

To ensure correct operation of the unit, the customer must equip the system with a flow-rate control device on the source side and connect it to the unit.



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]

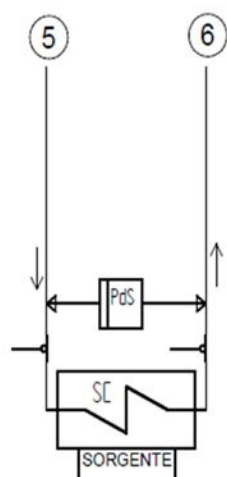
To the user side exchanger pressure drops must be added the pressure drops of the steel mesh mechanical filter that must be placed on the water input line. This device is essential to the unit's proper operation, and is available as accessory (IFWX).

Admissible water flows for groundwater applications

Admissible minimum (Q_{min}) and maximum (Q_{max}) water flow rates for a correct unit operation. They are referred to the unit in standard configuration without Clivet integrated hydronic assemblies source side

	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	Q_{min} [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
	Q_{max} [l/s]	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	22,0	28,0	30,0

Source side water diagram



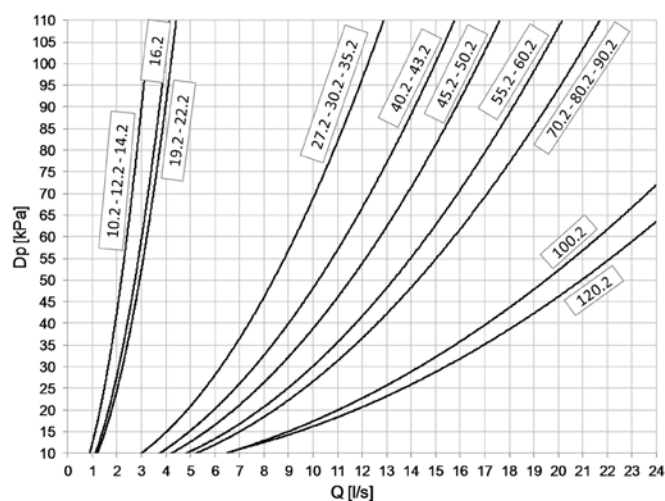
5 = Source side inlet

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]

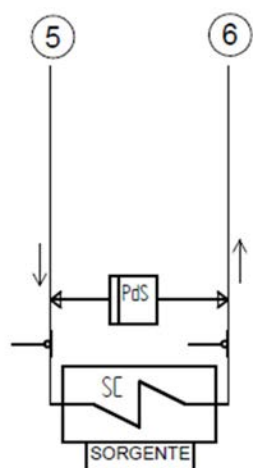
To the source side exchanger pressure drop must be added the pressure drop of the steel mesh mechanical filter that must be placed on the water input line. This device is essential to the unit's proper operation, and is available as accessory IFWX.

Admissible water flows for geothermal applications

Min. (Qmin) and max. (Qmax) water flow-rates admissible 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

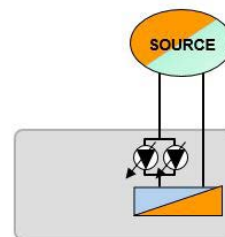
Source sides (2/4-pipe)

Configuration: 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.

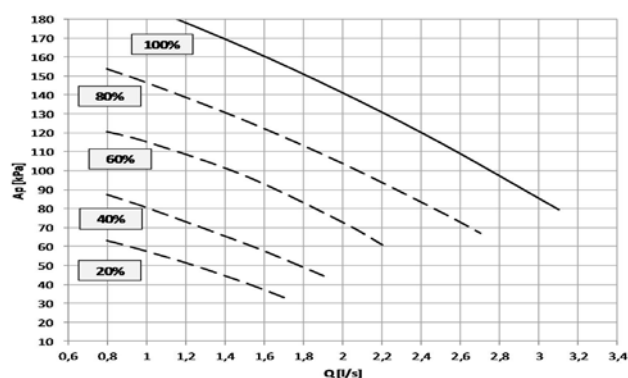
The control, modulates the water flow-rate keeping constant the delta T. If the water temperature is in critical conditions, it allows to extend the unit operating ranges guaranteeing its operating, automatically reducing the water flow-rate. In the event of one of the two pumps is temporarily unavailable,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



⚠ Selecting the Varyflow+ hydronic assembly, the minimum and maximum flow rate limits vary as indicated in the following graphs according to The corresponding size

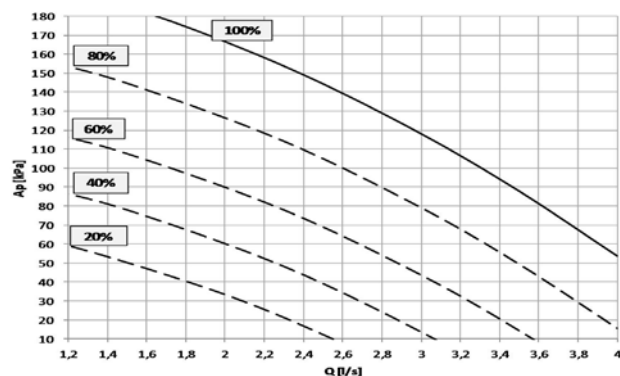
⚠ The limits indicated in the admissible water flow rate table are larger and can be achieved with specific hydronic assemblies provided by the Customer.

Available pressure (Size 10.2 - 12.2)



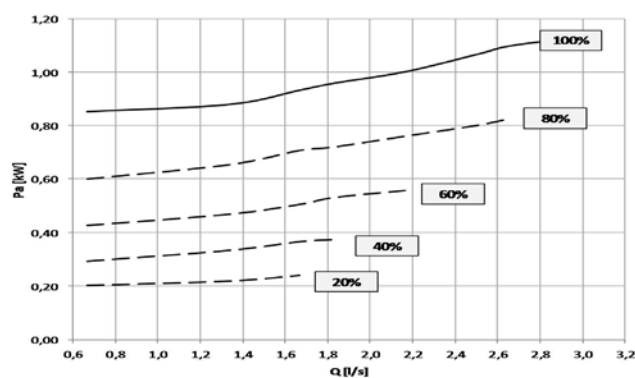
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

Available pressure (Size 14.2)



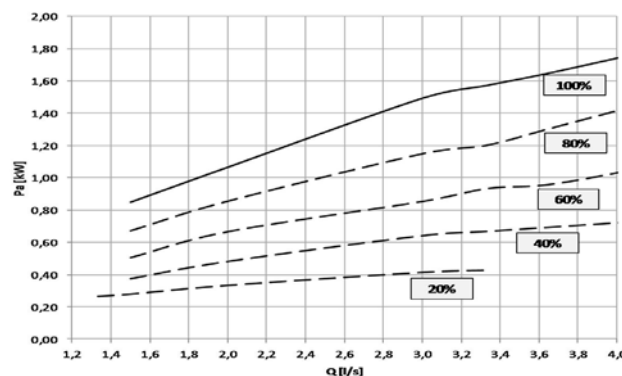
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 10.2 - 12.2)



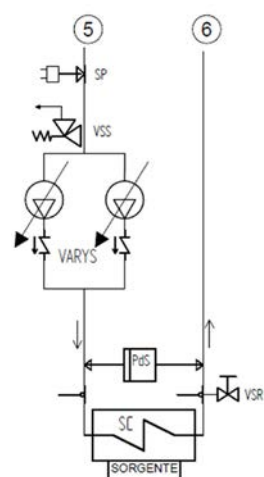
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

Pump absorption curves (Size 14.2)



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

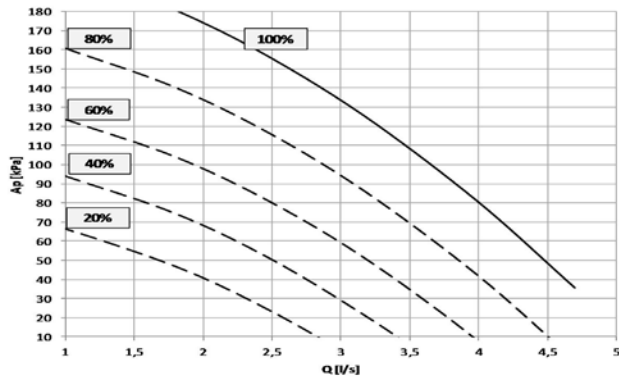
Source side water diagram



- 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

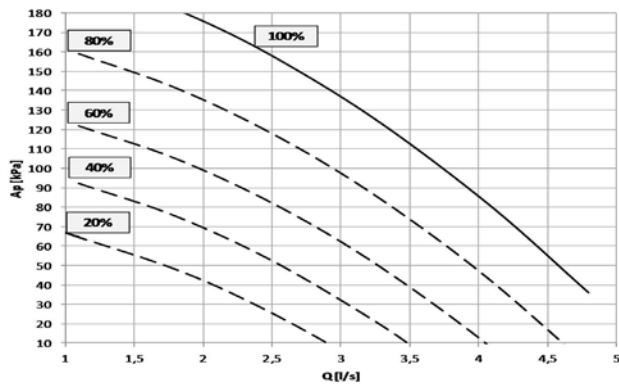
Configuration: Unit with VARYFLOW + (VARYS)

Available pressure (Size 16.2)



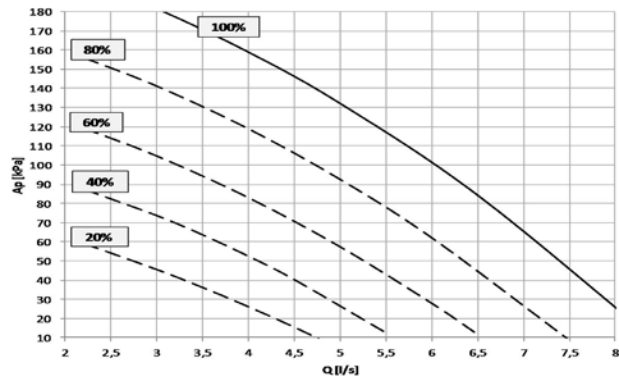
Q = Water flow rate [l/s] A_p = Pressure head, available to the unit fittings [kPa]

Available pressure (Size 19.2 - 22.2)



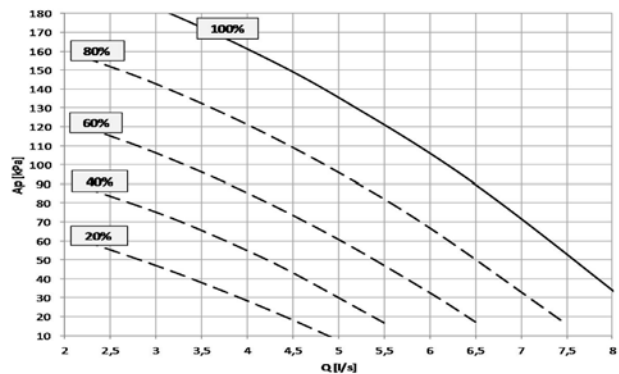
Q = Water flow rate [l/s] A_p = Pressure head, available to the unit fittings [kPa]

Available pressure (Size 27.2 - 30.2)



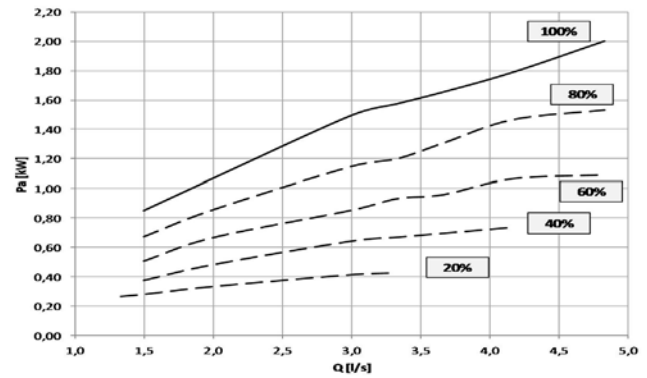
Q = Water flow rate [l/s] A_p = Pressure head, available to the unit fittings [kPa]

Available pressure (Size 35.2)



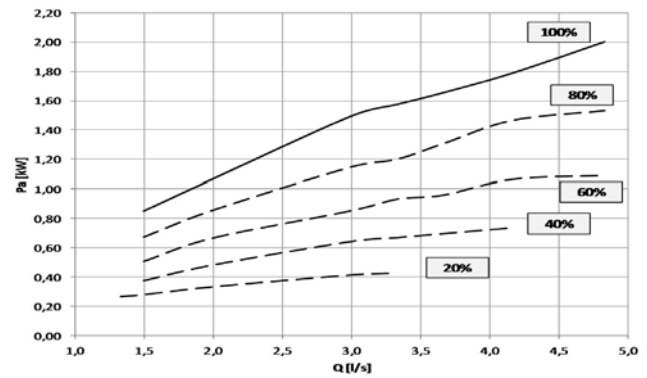
Q = Water flow rate [l/s] A_p = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 16.2)



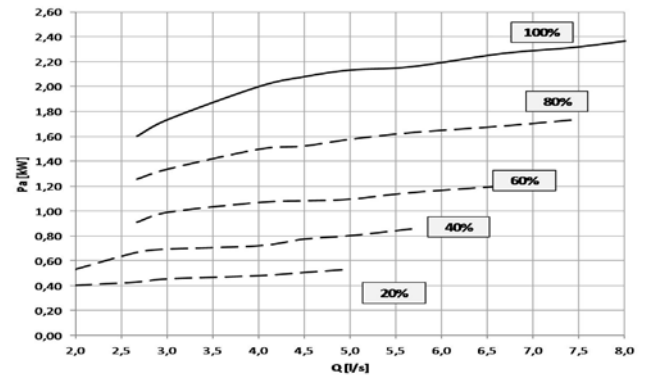
Q = Water flow rate [l/s] P_a = Electrical power input [kW]

Pump absorption curves (Size 19.2 - 22.2)



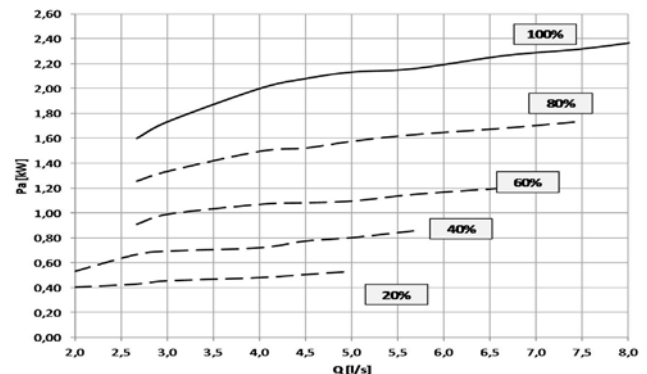
Q = Water flow rate [l/s] P_a = Electrical power input [kW]

Pump absorption curves (Size 27.2 - 30.2)



Q = Water flow rate [l/s] P_a = Electrical power input [kW]

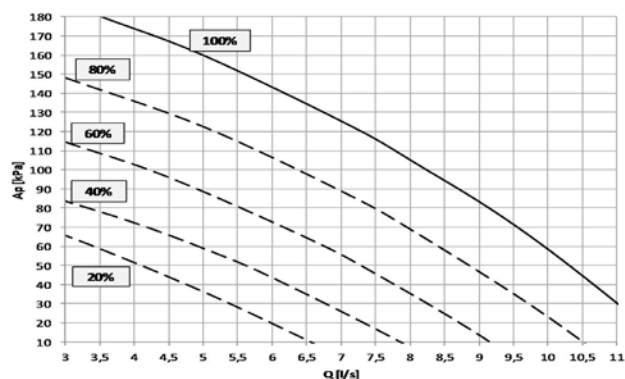
Pump absorption curves (Size 35.2)



Q = Water flow rate [l/s] P_a = Electrical power input [kW]

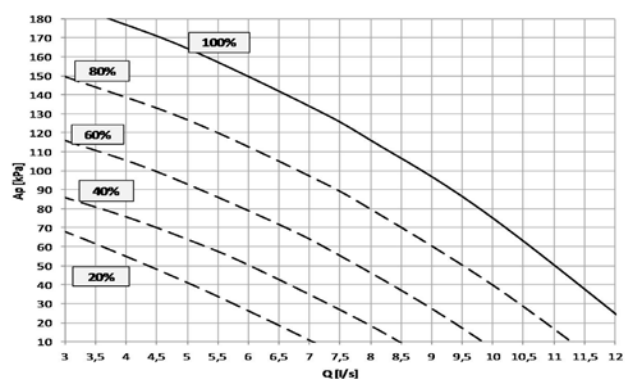
Configuration: Unit with VARYFLOW + (VARYS)

Available pressure (Size 40.2 - 43.2 - 45.2)



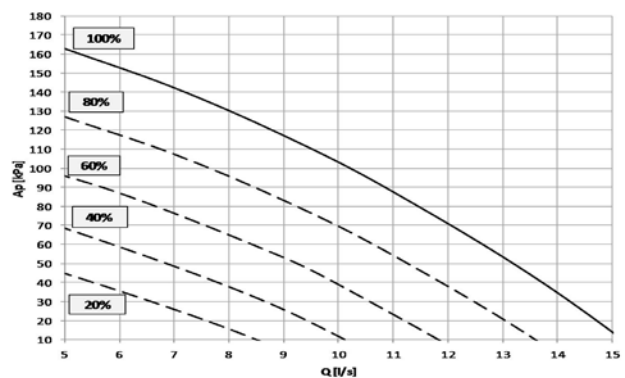
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

Available pressure (Size 50.2)



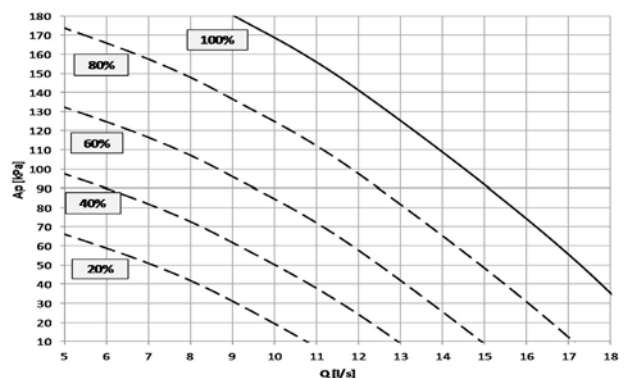
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

Available pressure (Size 55.2 - 60.2)



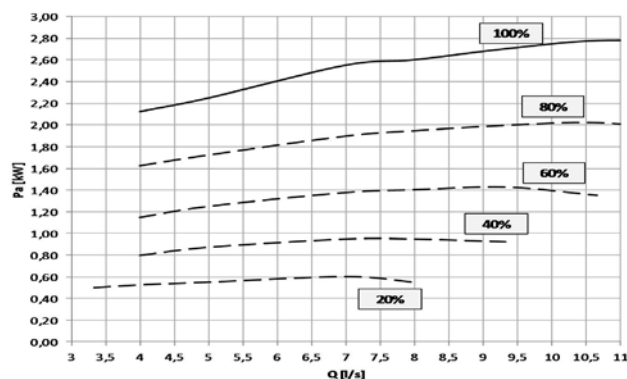
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

Available pressure (Size 70.2 - 80.2)



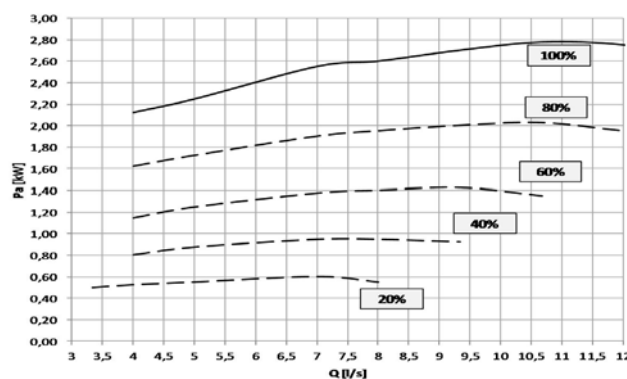
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 40.2 - 43.2 - 45.2)



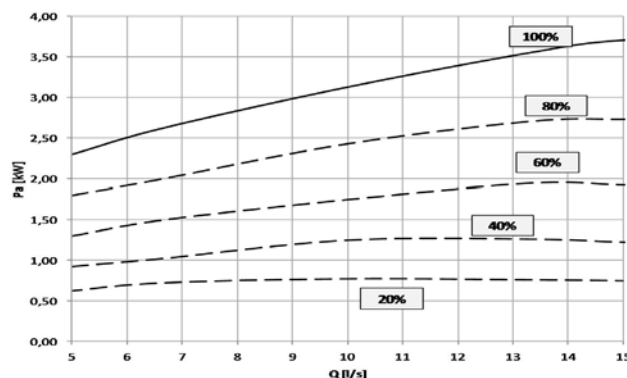
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

Pump absorption curves (Size 50.2)



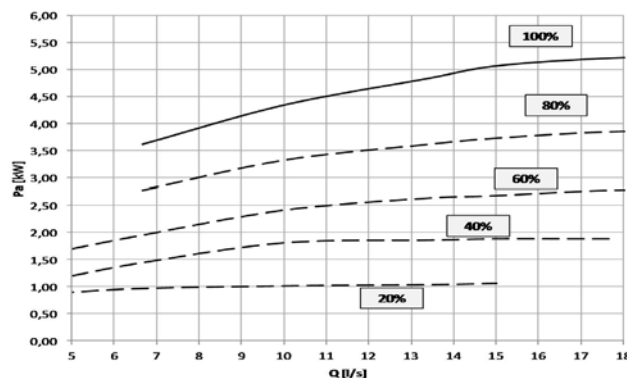
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

Pump absorption curves (Size 55.2 - 60.2)



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

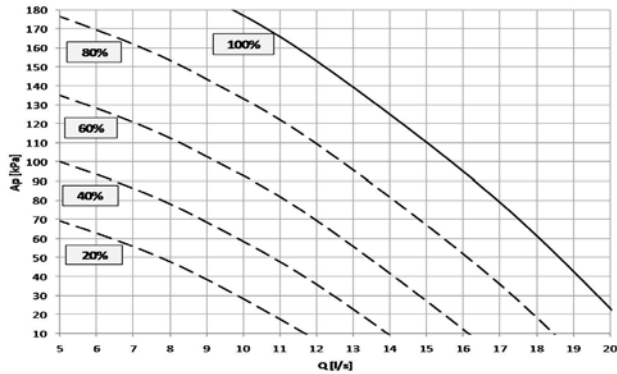
Pump absorption curves (Size 70.2 - 80.2)



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

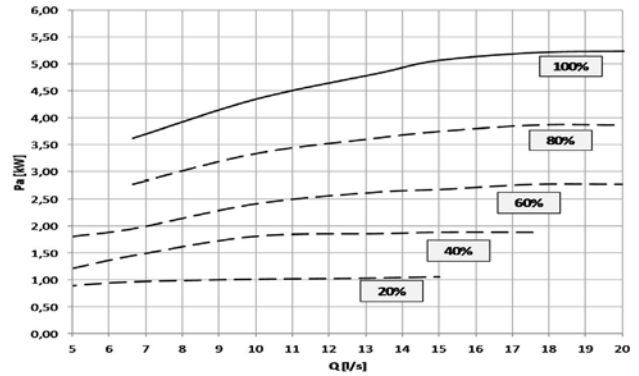
Configuration: Unit with VARYFLOW + (VARYS)

Available pressure (Size 90.2)



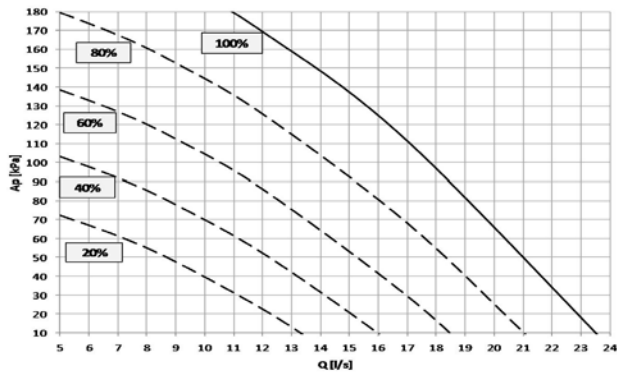
Q = Water flow rate[l/s] A_p = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 90.2)



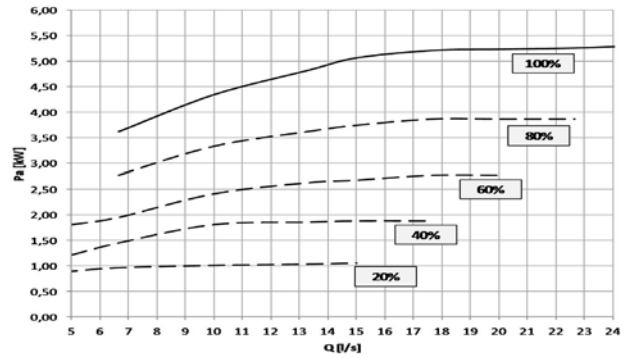
Q = Water flow rate[l/s] P_a = Electrical power input [kW]

Available pressure (Size 100.2)



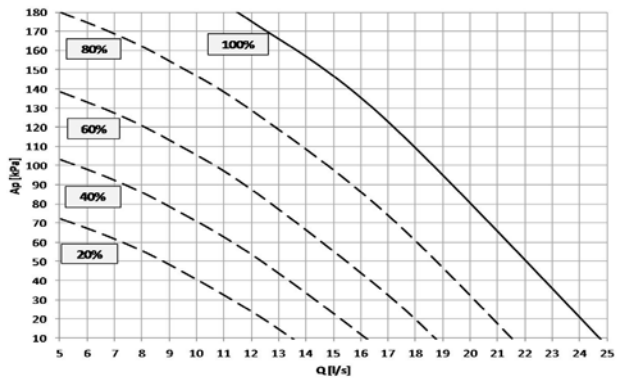
Q = Water flow rate[l/s] A_p = Pressure head, available to the unit fittings [kPa]

Pump absorption curves (Size 100.2)



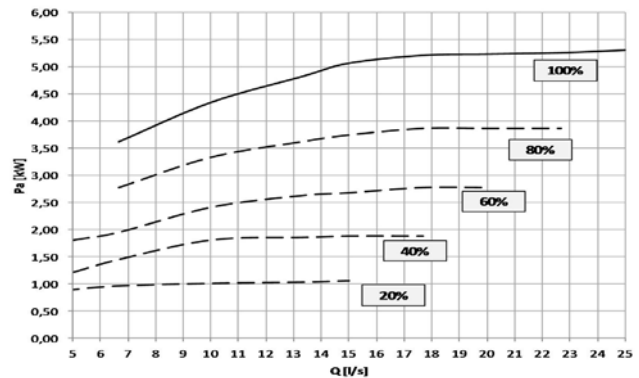
Q = Water flow rate[l/s] P_a = Electrical power input [kW]

Available pressure (Size 120.2)



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

Pump absorption curves (Size 120.2)



Q = Water flow rate[l/s] P_a = Electrical power input [kW]

Source side (2/4-pipe)

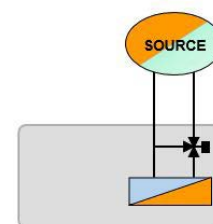
Configuration: Unit with 3-way modulating valve (VS3M)

Configuration with one 3-way modulating valve on the source side and components as listed on the key of the enclosed plumbing circuit diagram. All water fittings are Victaulic.

The 3-way modulating valve connects the source side exchanger intake 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.

Option available only for the size from 10.2 to 80.2.

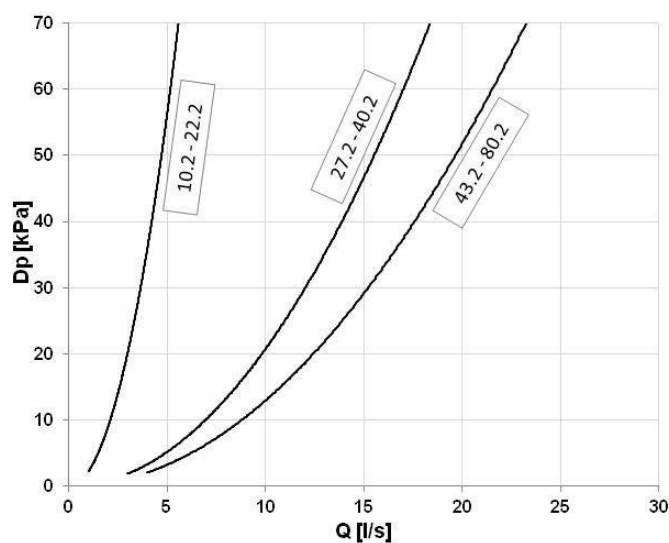


It is recommended not to exceed the pressure drops indicated in the graph to ensure a correct unit operation.



The limits indicated in the admissible water flow rate table are larger and can be achieved with specific modulating valves provided by the Customer.

Source side 3-way modulating valve pressure drops

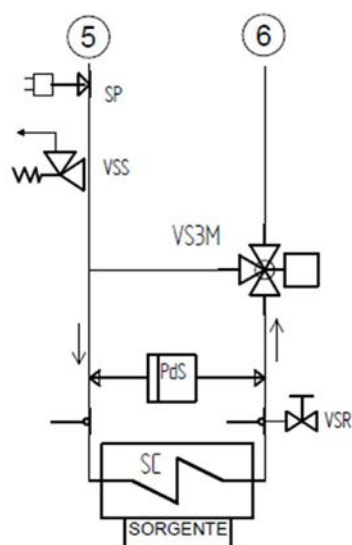


The pressure drops on the water side are calculated by considering an average water temperature at 7°C.

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

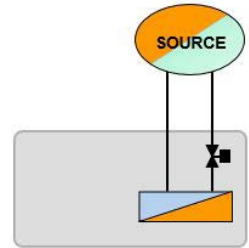
Source side (2/4-pipe)

Configuration: Unit with 2-way modulating valve (VS2M)

Configuration with one 2-way modulating valve on the source side and components as listed on the key of the enclosed plumbing circuit diagram. All water fittings are Victaulic.

The 2-way modulating valve, installed on the source side exchanger intake, modulates the water flow-rate through a 0-10V signal emitted from the unit's controller.

Option available only for the size from 10.2 to 80.2.

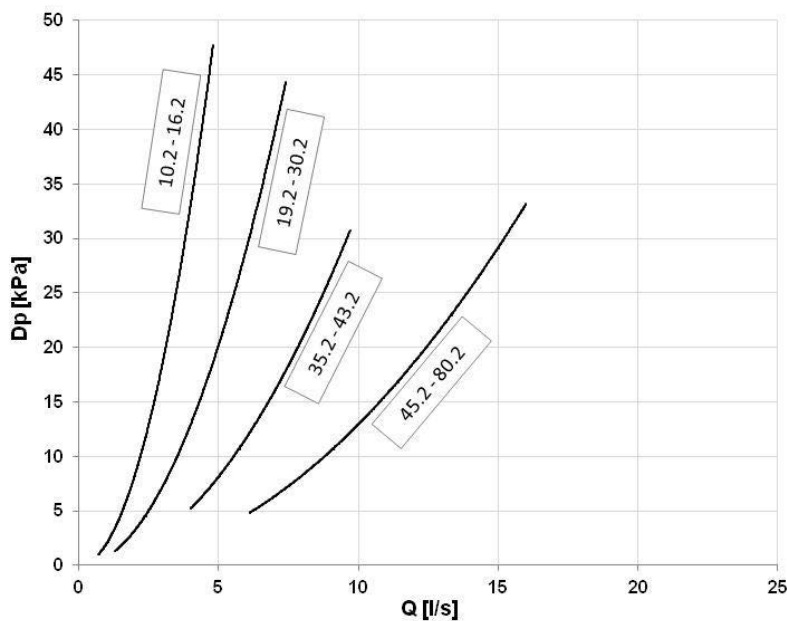


It is recommended not to exceed the pressure drops indicated in the graph to ensure a correct unit operation.



The limits indicated in the admissible water flow rate table are larger and can be achieved with specific modulating valves provided by the Customer.

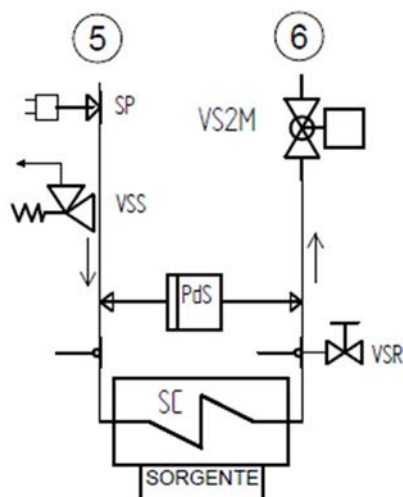
Source side 2-way modulating valve pressure drops



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

Built-in configuration options

PFCP - Power factor correction capacitors (cosφ > 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 cosφ 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:

- salvaguardare i componenti interni dell'unità, che essendo alimentati da una tensione anomala potrebbero funzionare in modo non corretto o rompersi;
- 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

The presence of supply and intake cutoff valves enables the compressors 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 to 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 to 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 to 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.

VS2MX - Source side 2-way modulating valve

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

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 intake, modulates the flow of water in response to a 0-10 V signal from the unit's controller.

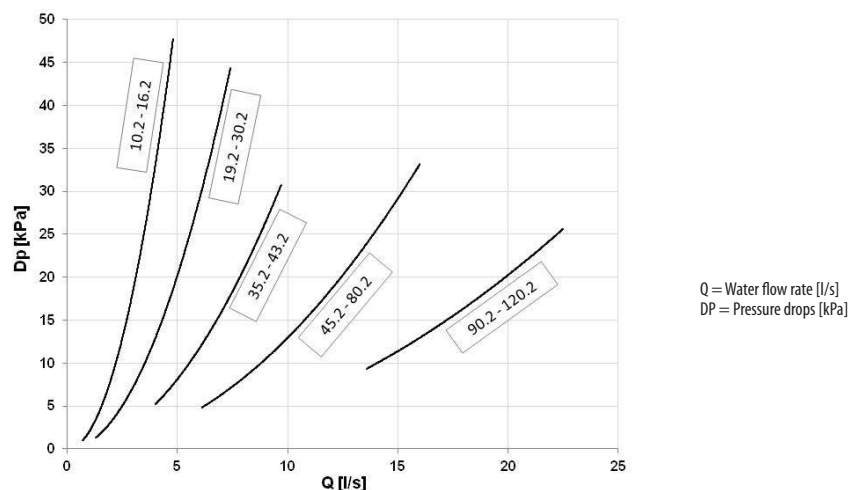


It is recommended not to exceed the pressure drops indicated in the graph to ensure a correct unit operation.



The limits indicated in the admissible water flow rate table are larger and can be achieved with specific modulating valves provided by the Customer

2-way modulating valve pressure drops



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.

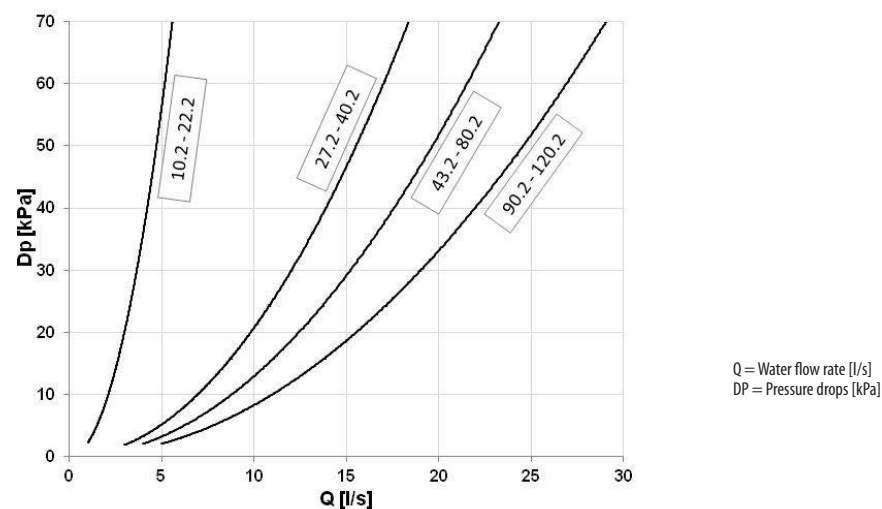


It is recommended not to exceed the pressure drops indicated in the graph to ensure a correct unit operation.



The limits indicated in the admissible water flow rate table are larger and can be achieved with specific modulating valves provided by the Customer.

3-way modulating valve pressure drops



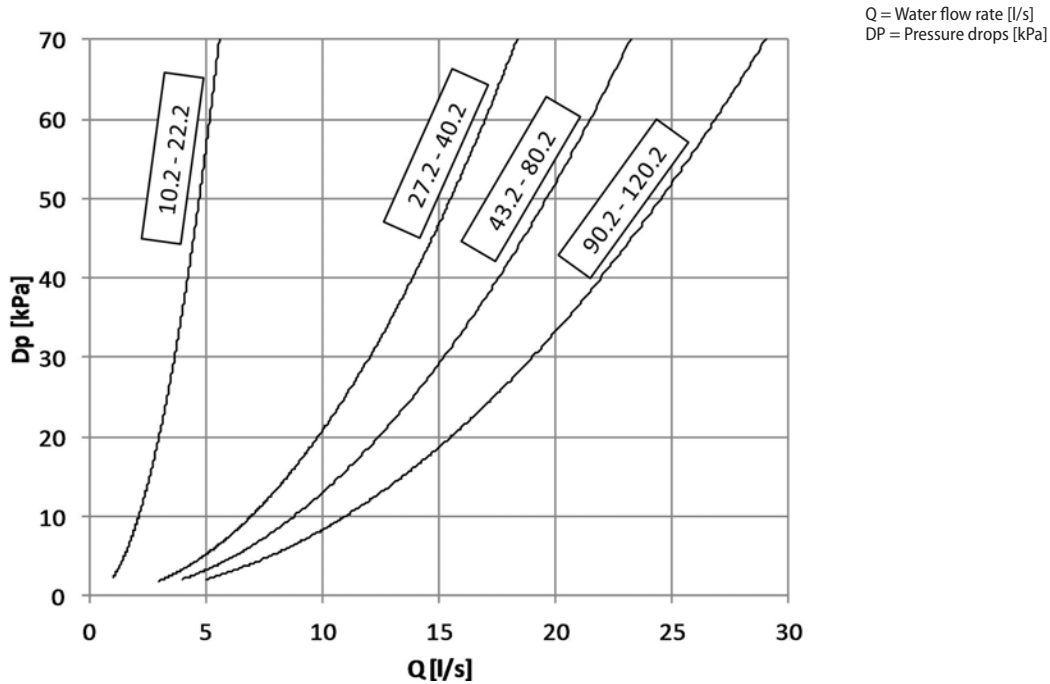
AVIBX - Anti-vibration mount supports

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.

VACSRX - Total recovery side DHW switching valve

The domestic hot water switching valve on the recovery side is also supplied as a separate accessory.

DHW switching valve pressure drops



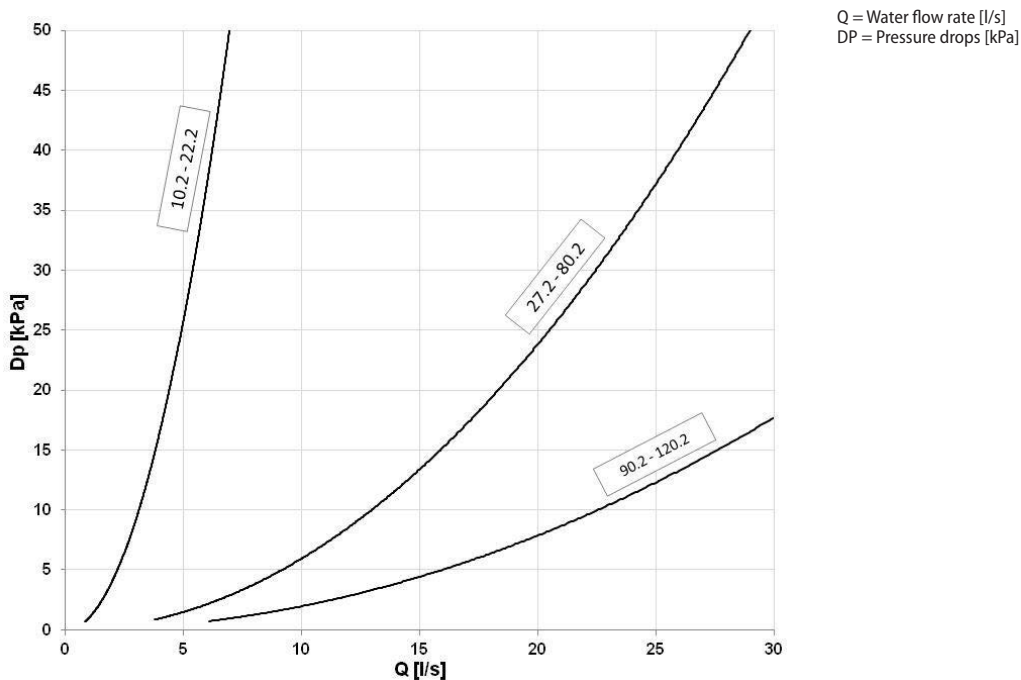
IFWX - Steel mesh strainer on the water side

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 utility, source and recovery 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



Configuration for 2-pipe system and 4-pipe system

Groundwater/tower version

Cooling 100% - Heating 0% - Size 10.2 - 30.2

Size	To°C	Hot side water outlet temperature														
		30			35			40			45			50		
		kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER
10.2	5	29,2	5,60	5,21	28,0	6,29	4,46	26,7	7,13	3,74	25,0	7,96	3,14	22,8	9,10	2,51
	7	31,1	5,57	5,58	29,9	6,25	4,79	28,4	7,10	4,00	26,8	7,92	3,38	24,4	9,03	2,71
	10	33,9	5,53	6,13	32,7	6,21	5,25	30,9	7,06	4,38	29,2	7,88	3,70	26,8	8,96	2,99
	12	35,5	5,51	6,45	34,3	6,20	5,53	32,7	7,03	4,66	30,8	7,84	3,93	28,4	8,91	3,19
	15	38,9	5,48	7,11	37,5	6,18	6,06	35,6	7,00	5,09	33,7	7,80	4,32	31,1	8,85	3,51
	18	42,2	5,45	7,75	40,8	6,15	6,63	38,5	6,97	5,53	36,6	7,76	4,72	33,8	8,79	3,85
12.2	5	33,5	6,52	5,14	32,4	7,32	4,42	30,6	8,31	3,69	28,8	9,30	3,10	26,4	10,6	2,48
	7	35,7	6,54	5,46	34,4	7,34	4,69	32,7	8,33	3,92	30,7	9,32	3,30	28,2	10,6	2,65
	10	38,7	6,59	5,88	37,3	7,39	5,05	35,6	8,37	4,26	34,0	9,09	3,74	31,1	10,5	2,95
	12	40,9	6,69	6,10	39,3	7,51	5,23	37,5	8,48	4,42	35,3	9,46	3,73	32,6	10,7	3,03
	15	44,1	6,77	6,53	42,7	7,59	5,62	40,6	8,55	4,74	38,4	9,53	4,03	35,4	10,8	3,26
	18	48,0	6,85	7,01	46,4	7,69	6,03	44,0	8,64	5,10	41,7	9,60	4,35	38,5	10,8	3,56
14.2	5	40,4	7,86	5,14	38,8	8,78	4,42	36,7	9,91	3,70	34,8	10,9	3,18	31,8	12,5	2,55
	7	43,1	7,93	5,43	41,4	8,84	4,69	39,2	10,0	3,94	37,5	10,8	3,46	34,1	12,5	2,73
	10	46,6	8,03	5,80	44,9	8,94	5,02	42,8	10,0	4,26	40,3	11,2	3,58	37,1	12,7	2,93
	12	49,2	8,21	5,99	47,2	9,11	5,19	45,0	10,2	4,41	42,4	11,3	3,74	39,1	12,9	3,04
	15	53,1	8,34	6,37	51,3	9,24	5,55	49,0	10,3	4,74	47,2	11,0	4,28	43,1	12,8	3,37
	18	57,8	8,48	6,81	55,7	9,38	5,94	53,4	10,4	5,12	51,0	11,3	4,50	46,9	12,9	3,64
16.2	5	46,9	9,44	4,96	45,1	10,2	4,41	42,8	11,5	3,71	40,3	12,7	3,18	37,0	14,4	2,57
	7	50,0	9,74	5,14	48,2	10,3	4,67	45,8	11,5	3,96	43,1	12,8	3,37	39,6	14,4	2,75
	10	54,3	9,74	5,57	52,3	10,4	5,01	49,7	11,7	4,26	47,0	12,9	3,65	43,3	14,5	2,98
	12	57,3	9,57	5,99	55,1	10,6	5,18	52,3	11,9	4,41	49,4	13,0	3,80	45,6	14,7	3,10
	15	62,5	9,73	6,42	60,1	10,7	5,60	57,1	12,0	4,77	53,8	13,2	4,08	49,7	14,8	3,36
	18	67,8	9,88	6,86	65,1	10,9	5,95	61,9	12,2	5,09	58,2	13,4	4,35	53,9	14,9	3,61
19.2	5	55,7	10,8	5,15	53,8	12,0	4,50	51,0	13,4	3,81	48,0	14,8	3,24	43,8	16,9	2,60
	7	59,5	10,8	5,49	57,4	12,0	4,80	54,6	13,4	4,08	51,4	14,9	3,44	46,9	16,9	2,78
	10	64,5	10,9	5,90	62,3	12,1	5,17	59,0	13,5	4,38	55,6	14,9	3,73	50,9	17,0	3,00
	12	67,8	11,1	6,09	65,6	12,3	5,35	62,1	13,7	4,54	58,6	15,1	3,88	53,8	17,2	3,13
	15	74,1	11,3	6,53	71,5	12,5	5,73	67,8	13,8	4,92	64,1	15,2	4,21	58,8	17,2	3,43
	18	80,4	11,5	6,96	77,5	12,6	6,16	73,5	13,9	5,29	69,6	15,3	4,54	63,9	17,3	3,70
22.2	5	64,6	13,3	4,86	62,3	14,7	4,23	59,1	16,4	3,62	55,4	18,1	3,06	50,8	20,3	2,50
	7	69,1	13,3	5,20	66,5	14,8	4,48	63,2	16,5	3,84	59,1	18,2	3,25	54,3	20,4	2,66
	10	74,6	13,3	5,61	72,1	14,9	4,83	68,4	16,7	4,11	64,5	18,4	3,51	59,1	20,5	2,88
	12	78,3	13,5	5,81	75,5	15,1	4,99	72,2	16,9	4,28	67,8	18,7	3,63	62,2	20,8	2,98
	15	85,4	13,4	6,38	82,2	15,2	5,40	78,5	17,0	4,63	74,0	18,8	3,93	68,1	21,1	3,23
	18	92,3	13,3	6,95	88,9	15,2	5,84	84,9	17,1	4,98	80,1	19,0	4,21	73,9	21,3	3,48
27.2	5	79,4	15,3	5,18	76,3	17,1	4,47	72,5	19,1	3,80	67,9	21,3	3,19	61,9	23,9	2,59
	7	84,4	15,4	5,47	81,3	17,2	4,74	77,4	19,2	4,03	72,5	21,4	3,40	66,2	24,0	2,76
	10	91,4	15,4	5,92	88,1	17,3	5,10	83,8	19,3	4,34	78,7	21,5	3,67	72,2	24,1	2,99
	12	96,3	15,4	6,24	92,5	17,3	5,36	88,4	19,4	4,55	82,9	21,6	3,84	75,8	24,2	3,13
	15	104	15,4	6,76	100	17,4	5,78	96,3	19,4	4,96	90,3	21,7	4,17	82,9	24,4	3,39
	18	113	15,3	7,37	109	17,4	6,28	104	19,5	5,34	97,6	21,9	4,46	89,9	24,5	3,67
30.2	5	89,3	17,6	5,08	86,0	19,6	4,38	81,7	21,9	3,74	76,4	24,1	3,17	70,0	26,9	2,61
	7	95,2	17,6	5,41	91,6	19,7	4,64	87,0	22,0	3,96	81,4	24,3	3,35	74,7	27,1	2,76
	10	102	17,5	5,86	98,5	19,8	4,97	94,4	22,2	4,26	88,6	24,5	3,61	81,3	27,3	2,98
	12	108	17,6	6,15	104	20,0	5,21	99,5	22,5	4,43	93,2	24,9	3,74	85,6	27,8	3,08
	15	118	17,3	6,82	113	19,9	5,67	108	22,5	4,81	101	25,1	4,03	93,4	28,0	3,34
	18	128	17,0	7,52	123	19,9	6,16	117	22,6	5,18	110	25,3	4,34	101	28,3	3,58

kWf = Cooling capacity in kW

kWe = total power input(kW)

To = Water outlet temperature user side (°C)

EER = Ratio between delivered cooling capacity and power input

Unit configuration for system with 2 pipes: cooling performances relative to the user side

Unit configuration for system with 4 pipes: cooling performances relative to the user side

non-glycolic source side

Configuration for 2-pipe system and 4-pipe system

Groundwater/tower version

Cooling 100% - Heating 0% - Size 35.2 - 70.2

Size	To°C	Hot side water outlet temperature														
		30			35			40			45			50		
		kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER
35.2	5	103	20,5	5,03	98,5	22,7	4,34	93,9	25,0	3,75	87,6	27,7	3,16	80,2	31,1	2,58
	7	110	20,6	5,33	105	22,9	4,60	100	25,2	3,98	93,4	27,9	3,35	85,6	31,3	2,74
	10	120	20,7	5,77	114	23,1	4,94	109	25,6	4,27	102	28,2	3,63	93,6	31,6	2,96
	12	127	21,1	6,01	121	23,5	5,14	115	26,0	4,43	107	28,7	3,73	98,5	32,2	3,06
	15	138	21,1	6,56	132	23,6	5,61	126	26,2	4,80	117	29,0	4,03	107	32,5	3,30
	18	149	21,2	7,03	143	23,8	6,00	136	26,4	5,17	127	29,3	4,31	117	32,8	3,56
40.2	5	117	23,4	4,99	112	25,9	4,33	106	28,6	3,71	99	31,6	3,15	91,6	35,3	2,60
	7	125	23,5	5,30	120	26,0	4,61	114	28,8	3,96	106	31,8	3,34	97,6	35,5	2,75
	10	134	23,6	5,69	129	26,2	4,95	123	29,0	4,23	116	32,0	3,62	106	35,8	2,97
	12	142	23,9	5,94	136	26,6	5,13	130	29,4	4,43	122	32,5	3,75	112	36,3	3,09
	15	155	24,0	6,44	149	26,7	5,58	142	29,6	4,79	132	32,8	4,03	123	36,6	3,35
	18	167	24,0	6,96	161	26,9	6,00	154	29,8	5,15	144	33,1	4,35	132	36,9	3,59
43.2	5	128	26,3	4,85	123	28,7	4,27	117	31,8	3,68	109	35,2	3,10	100	39,4	2,55
	7	136	26,5	5,15	131	29,0	4,53	125	32,0	3,90	117	35,3	3,32	107	39,6	2,71
	10	148	26,8	5,52	142	29,3	4,84	135	32,3	4,19	127	35,7	3,55	116	40,0	2,90
	12	156	27,3	5,70	150	29,8	5,02	142	32,8	4,33	133	36,3	3,67	123	40,6	3,02
	15	170	27,7	6,14	163	30,3	5,40	156	33,2	4,68	146	36,6	3,99	134	41,0	3,28
	18	185	28,1	6,60	178	30,7	5,80	169	33,5	5,04	158	37,0	4,28	146	41,3	3,53
45.2	5	139	27,6	5,04	133	30,5	4,38	127	33,7	3,75	119	37,3	3,19	108	41,8	2,59
	7	148	27,8	5,32	142	30,7	4,63	135	33,9	3,99	127	37,5	3,37	116	42,0	2,76
	10	160	28,0	5,73	155	31,1	4,97	147	34,2	4,29	137	37,9	3,62	126	42,4	2,96
	12	169	28,4	5,95	163	31,6	5,17	155	34,9	4,43	145	38,6	3,75	133	43,1	3,09
	15	185	28,6	6,45	178	31,9	5,57	169	35,2	4,81	158	39,0	4,06	145	43,5	3,33
	18	200	28,8	6,94	192	32,1	5,99	184	35,6	5,16	171	39,4	4,33	157	44,0	3,57
50.2	5	151	30,1	5,00	145	33,1	4,38	137	36,6	3,75	128	40,4	3,18	118	45,4	2,60
	7	161	30,5	5,30	155	33,3	4,64	147	36,8	3,99	137	40,6	3,38	127	45,6	2,78
	10	176	30,9	5,70	168	33,8	4,97	160	37,2	4,31	150	41,0	3,65	137	46,0	2,98
	12	185	31,5	5,86	178	34,4	5,16	169	37,8	4,47	157	41,7	3,78	145	46,7	3,10
	15	202	32,0	6,31	193	35,0	5,53	185	38,3	4,81	172	42,1	4,08	158	47,2	3,36
	18	219	32,5	6,75	210	35,5	5,91	200	38,8	5,15	186	42,5	4,39	172	47,7	3,60
55.2	5	163	33,2	4,92	156	36,5	4,29	149	40,4	3,69	140	44,6	3,14	128	50,0	2,57
	7	175	33,5	5,22	167	36,8	4,54	159	40,6	3,93	149	44,9	3,32	137	50,3	2,73
	10	188	33,9	5,55	182	37,2	4,88	173	41,0	4,22	162	45,3	3,58	149	50,7	2,93
	12	200	34,6	5,77	192	37,9	5,07	183	41,7	4,38	171	46,0	3,72	157	51,4	3,06
	15	218	35,2	6,21	210	38,4	5,46	199	42,2	4,71	186	46,5	4,01	172	52,0	3,31
	18	236	35,7	6,61	227	38,9	5,83	216	42,6	5,08	202	47,0	4,29	186	52,5	3,55
60.2	5	186	37,5	4,97	179	41,2	4,34	169	45,5	3,72	158	50,4	3,14	145	56,5	2,56
	7	199	37,8	5,26	190	41,5	4,59	182	45,8	3,97	169	50,7	3,33	155	56,8	2,72
	10	215	38,4	5,61	207	42,1	4,91	196	46,3	4,24	184	51,1	3,59	168	57,3	2,93
	12	227	39,1	5,80	217	42,9	5,06	207	47,1	4,39	193	52,1	3,71	178	58,4	3,05
	15	248	39,8	6,24	238	43,5	5,46	226	47,7	4,74	212	52,7	4,01	194	59,0	3,29
	18	270	40,4	6,68	258	44,2	5,84	245	48,3	5,08	229	53,3	4,29	212	59,7	3,54
70.2	5	209	42,6	4,90	201	46,6	4,31	191	51,4	3,72	180	56,6	3,17	165	63,3	2,61
	7	223	43,1	5,17	214	47,0	4,56	205	51,8	3,95	191	57,0	3,35	176	63,7	2,76
	10	242	43,8	5,51	233	47,8	4,87	221	52,5	4,21	209	57,7	3,61	191	64,4	2,97
	12	255	45,0	5,67	245	49,0	5,01	233	53,6	4,35	218	58,9	3,71	201	65,5	3,07
	15	277	46,0	6,03	268	50,0	5,35	254	54,5	4,66	239	59,8	3,99	219	66,4	3,30
	18	300	46,9	6,40	289	50,9	5,68	275	55,4	4,97	258	60,7	4,25	238	67,3	3,53

kWf = Cooling capacity in kW

kWe = total power input(kW)

To = Water outlet temperature user side (°C)

EER = Ratio between delivered cooling capacity and power input

Unit configuration for system with 2 pipes: cooling performances relative to the user side

Unit configuration for system with 4 pipes: cooling performances relative to the user side

non-glycolic source side

Configuration for 2-pipe system and 4-pipe system

Groundwater/tower version

Cooling 100% - Heating 0% - Size 80.2 - 120.2

Size	To°C	Hot side water outlet temperature														
		30			35			40			45			50		
		kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER
80.2	5	236	48,2	4,89	227	52,6	4,31	215	57,9	3,72	203	63,8	3,18	185	70,9	2,61
	7	250	48,9	5,12	242	53,3	4,53	230	58,6	3,93	215	64,4	3,35	198	71,5	2,77
	10	273	50,1	5,46	263	54,5	4,82	250	59,5	4,21	234	65,3	3,58	215	72,5	2,97
	12	287	51,5	5,57	276	55,9	4,94	264	60,8	4,34	246	66,7	3,69	227	73,9	3,07
	15	312	52,9	5,89	300	57,2	5,25	287	62,0	4,62	269	67,9	3,96	247	75,0	3,30
	18	337	54,4	6,20	326	58,7	5,55	310	63,3	4,90	291	69,1	4,21	269	76,1	3,53
90.2	5	267	54,3	4,91	255	59,7	4,27	244	66,0	3,70	228	73,3	3,11	209	82,6	2,53
	7	284	54,7	5,19	271	60,1	4,52	260	66,4	3,91	243	73,7	3,30	223	82,9	2,69
	10	308	55,3	5,57	296	60,8	4,86	282	66,9	4,21	265	74,2	3,57	242	83,4	2,91
	12	322	56,2	5,72	310	61,9	5,01	296	68,1	4,34	278	75,4	3,69	255	84,7	3,01
	15	352	56,9	6,18	338	62,8	5,39	323	68,8	4,69	302	76,1	3,97	278	85,3	3,26
	18	381	57,6	6,60	367	63,5	5,78	350	69,5	5,03	327	76,9	4,26	300	86,1	3,49
100.2	5	290	61,4	4,72	279	67,5	4,14	266	74,0	3,59	248	81,7	3,04	227	91,8	2,47
	7	308	62,0	4,97	296	68,1	4,34	281	74,5	3,77	264	82,2	3,21	241	92,2	2,61
	10	331	63,1	5,25	320	69,0	4,64	304	75,4	4,03	285	83,0	3,43	262	92,9	2,82
	12	348	64,5	5,39	335	70,4	4,76	319	76,9	4,15	299	84,4	3,55	275	94,4	2,92
	15	379	65,6	5,77	364	71,5	5,09	348	78,0	4,46	326	85,4	3,81	299	95,4	3,14
	18	409	66,8	6,11	394	72,8	5,42	376	79,1	4,75	353	86,5	4,08	325	96,3	3,37
120.2	5	339	73,9	4,59	326	81,2	4,01	310	89,2	3,48	290	99,1	2,92	264	112	2,35
	7	358	74,4	4,82	345	81,8	4,22	328	89,7	3,66	307	99,4	3,09	280	112	2,49
	10	387	75,1	5,16	375	82,6	4,54	357	90,5	3,95	333	100,1	3,33	304	112	2,71
	12	407	76,4	5,32	393	84,0	4,68	374	92,0	4,06	350	101,6	3,44	322	114	2,81
	15	442	77,4	5,72	426	85,0	5,01	407	92,9	4,38	382	102,2	3,73	351	115	3,04
	18	477	78,3	6,10	460	86,0	5,35	440	93,8	4,68	412	103,2	4,00	380	115	3,29

kWf = Cooling capacity in kW

kWe = total power input(kW)

To = Water outlet temperature user side (°C)

EER = Ratio between delivered cooling capacity and power input

Unit configuration for system with 2 pipes: cooling performances relative to the user side

Unit configuration for system with 4 pipes: cooling performances relative to the user side

non-glycolic source side

Configuration for 2-pipe system and 4-pipe system Groundwater version

Cooling 0% - Heating 100% - Size 10.2 - 40.2

Size	To°C	Cold side water outlet temperature																	
		5			7			10			12			15			17		
		kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP
10.2	30	33,1	5,40	6,13	35,1	5,37	6,54	38,0	5,33	7,13	40,2	5,30	7,59	43,7	5,27	8,30	46,4	5,24	8,84
	35	33,0	6,11	5,40	34,9	6,08	5,74	37,8	6,06	6,25	39,9	6,04	6,62	43,3	6,02	7,21	45,8	6,01	7,62
	45	32,5	7,76	4,19	34,3	7,72	4,45	37,0	7,67	4,83	39,0	7,64	5,11	42,1	7,59	5,55	44,5	7,57	5,87
	55	30,1	10,0	3,01	31,7	9,91	3,20	34,0	9,83	3,46	35,8	9,77	3,67	38,5	9,68	3,98	40,5	9,63	4,21
	60	-	-	-	30,8	11,3	2,73	33,2	11,2	2,97	34,8	11,1	3,14	37,5	11,0	3,41	39,4	10,9	3,62
12.2	30	38,9	6,23	6,25	4,2	6,25	0,67	44,9	6,28	7,14	47,5	6,31	7,52	51,6	6,37	8,09	54,7	6,43	8,50
	35	38,8	7,08	5,49	41,0	7,11	5,78	44,6	7,16	6,23	47,1	7,19	6,54	51,0	7,27	7,01	53,9	7,34	7,34
	45	38,1	9,01	4,23	40,3	9,02	4,47	43,4	9,05	4,80	45,9	9,07	5,06	49,5	9,13	5,42	52,3	9,17	5,70
	55	35,6	11,7	3,05	37,5	11,7	3,21	40,2	11,6	3,47	42,3	11,6	3,65	45,6	11,6	3,93	48,0	11,6	4,14
	60	-	-	-	36,8	13,3	2,77	39,5	13,3	2,98	41,4	13,2	3,14	44,6	13,2	3,38	47,0	13,2	3,56
14.2	30	46,5	7,47	6,22	49,4	7,53	6,55	53,7	7,62	7,04	56,7	7,70	7,36	61,7	7,83	7,88	65,2	7,92	8,24
	35	46,3	8,48	5,45	49,0	8,54	5,73	53,2	8,65	6,15	56,2	8,73	6,44	60,9	8,86	6,87	64,4	8,96	7,19
	45	45,4	10,7	4,24	48,0	10,7	4,48	51,8	10,8	4,79	54,7	10,9	5,02	59,2	11,0	5,38	62,5	11,0	5,68
	55	42,2	13,7	3,09	44,5	13,7	3,25	47,9	13,7	3,50	50,4	13,8	3,66	54,3	13,8	3,94	57,2	13,9	4,12
	60	-	-	-	43,7	15,5	2,83	46,8	15,1	3,10	49,5	15,5	3,20	53,4	15,6	3,43	56,3	15,6	3,62
16.2	30	55,1	8,91	6,18	58,8	9,20	6,39	64,4	9,71	6,63	67,7	9,30	7,29	73,4	9,20	7,99	77,7	9,30	8,35
	35	54,6	10,0	5,45	57,9	10,0	5,78	63,0	10,1	6,23	66,5	10,2	6,52	72,3	10,4	6,95	76,4	10,5	7,27
	45	53,6	12,4	4,33	56,6	12,4	4,57	61,4	12,5	4,92	64,6	12,5	5,18	69,8	12,7	5,51	73,6	12,8	5,76
	55	49,7	15,8	3,15	52,4	15,8	3,32	56,4	15,8	3,58	59,4	15,8	3,77	63,8	15,8	4,05	67,0	15,9	4,23
	60	-	-	-	51,2	17,9	2,85	55,1	17,8	3,09	57,9	17,8	3,25	62,3	17,8	3,49	65,5	17,8	3,67
19.2	30	65,3	10,3	6,34	69,1	10,3	6,71	75,3	10,4	7,23	79,7	10,6	7,51	86,8	10,7	8,11	91,6	10,8	8,48
	35	64,8	11,5	5,64	68,5	11,5	5,96	74,5	11,6	6,42	78,6	11,8	6,66	85,5	12,0	7,13	90,2	12,1	7,46
	45	63,3	14,4	4,41	66,8	14,5	4,62	72,2	14,5	4,99	76,2	14,7	5,19	82,6	14,8	5,59	86,9	14,9	5,85
	55	58,3	18,4	3,16	61,4	18,4	3,33	66,0	18,3	3,60	69,5	18,6	3,73	74,9	18,6	4,02	78,7	18,6	4,22
	60	56,6	20,9	2,71	59,7	20,9	2,86	64,3	20,8	3,09	67,5	21,1	3,20	72,7	21,1	3,45	76,4	21,1	3,62
22.2	30	77,2	12,7	6,08	81,6	12,7	6,43	88,6	12,6	7,04	93,5	12,6	7,43	101	12,5	8,12	106	12,4	8,59
	35	76,7	14,2	5,41	81,1	14,3	5,68	88,0	14,4	6,12	92,7	14,5	6,41	100	14,5	6,94	106	14,5	7,35
	45	75,1	17,3	4,33	79,2	17,4	4,54	85,7	17,5	4,89	90,4	17,6	5,13	97,8	17,8	5,48	103	17,9	5,76
	55	69,3	21,5	3,22	72,9	21,6	3,38	78,4	21,7	3,61	82,4	21,8	3,78	88,9	22,0	4,04	93,1	22,1	4,21
	60	67,6	24,3	2,79	71,2	24,3	2,93	76,5	24,4	3,14	80,5	24,4	3,30	86,5	24,5	3,53	91,1	24,6	3,71
27.2	30	90,1	14,6	6,19	94,8	14,6	6,51	102	14,6	7,03	107	14,6	7,37	115	14,5	7,98	121	14,5	8,39
	35	89,4	16,5	5,40	94,7	16,5	5,72	101	16,6	6,09	106	16,6	6,39	114	16,7	6,83	120	16,7	7,19
	45	88,8	20,3	4,37	93,7	20,3	4,61	100	20,4	4,92	105	20,5	5,14	113	20,6	5,50	117	20,7	5,67
	55	84,2	25,4	3,32	88,2	25,4	3,48	94,2	25,6	3,69	98,1	25,7	3,82	104	25,7	4,07	109	25,9	4,23
	60	82,7	28,4	2,91	85,9	28,5	3,01	92,4	28,6	3,23	95,7	28,7	3,33	102	28,8	3,55	107	28,9	3,71
30.2	30	102	16,8	6,08	106	16,8	6,31	115	16,7	6,89	121	16,6	7,29	130	16,5	7,93	136	16,3	8,40
	35	101	19,1	5,30	106	19,2	5,53	115	19,3	5,97	120	19,3	6,23	129	19,3	6,70	136	19,3	7,06
	45	101	23,2	4,37	106	23,3	4,57	114	23,6	4,85	119	23,7	5,04	127	23,9	5,34	134	24,0	5,61
	55	95,6	28,5	3,35	99,3	28,6	3,47	106	28,9	3,68	110	29,0	3,80	118	29,3	4,04	124	29,5	4,21
	60	-	-	-	99,0	32,0	3,09	106	32,2	3,30	109	32,3	3,39	117	32,5	3,61	122	32,7	3,74
35.2	30	114	19,4	5,89	120	19,5	6,17	129	19,5	6,63	136	19,6	6,95	149	19,7	7,53	157	19,7	7,94
	35	114	21,9	5,22	119	22,0	5,43	129	22,2	5,83	135	22,4	6,05	146	22,6	6,48	155	22,7	6,81
	45	113	26,6	4,27	119,4	26,8	4,46	128	27,0	4,76	134	27,1	4,97	144	27,4	5,28	151	27,5	5,48
	55	107	33,1	3,24	112	33,3	3,38	119	33,5	3,56	125	33,7	3,72	134	34,0	3,96	139	34,2	4,08
	60	-	-	-	112	37,5	3,00	120	37,7	3,20	124	37,8	3,30	132	38,0	3,49	139	38,3	3,65
40.2	30	134	22,3	6,03	140	22,3	6,30	152	22,4	6,77	160	22,5	7,09	172	22,5	7,63	180	22,6	7,95
	35	133	25,2	5,30	140	25,4	5,54	151	25,6	5,89	158	25,7	6,14	171	25,9	6,59	180	26,1	6,89
	45	133	30,5	4,37	138	30,7	4,51	149	30,9	4,80	156	31,1	5,00	168	31,4	5,33	176	31,6	5,55
	55	126	37,8	3,35	132	38,0	3,49	139	38,3	3,65	145	38,5	3,78	155	38,6	4,00	164	38,9	4,20
	60	-	-	-	130	42,4	3,08	139	42,6	3,27	144	42,7	3,38	154	42,9	3,58	161	43,1	3,72

kWt = Heating capacity (kW)

kWe = total power input(kW)

To = Water outlet temperature user side (°C)

COP = Ratio between delivered heating capacity and power input

Unit configurations for system with 2 pipes: heating performances relative to the user side or recovery side without cooling request

Unit configurations for system with 4 pipes: heating performances relative to the recovery side without cooling request

Configuration for 2-pipe system and 4-pipe system

Groundwater version

Cooling 0% - Heating 100% - Size 43.2 - 120.2

Size	To°C	Cold side water outlet temperature																	
		5			7			10			12			15			17		
		kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP
43.2	30	144	24,9	5,81	153	25,0	6,11	165	25,3	6,51	175	25,4	6,88	189	25,7	7,35	199	26,0	7,65
	35	144	27,9	5,17	152	28,1	5,38	164	28,4	5,75	172	28,6	5,99	187	29,0	6,43	196	29,3	6,67
	45	143	33,9	4,23	151	34,1	4,42	162	34,4	4,70	170	34,6	4,90	183	35,0	5,22	191	35,2	5,42
	55	136	42,4	3,22	144	42,6	3,39	153	42,9	3,55	159	43,1	3,68	170	43,4	3,91	177	43,6	4,05
	60	137	47,7	2,88	143	47,9	3,00	154	48,2	3,19	161	48,2	3,33	170	48,5	3,50	179	48,7	3,67
45.2	30	156	26,2	5,94	164	26,3	6,23	178	26,5	6,71	186	26,6	6,99	202	26,8	7,54	212	26,8	7,91
	35	156	29,6	5,25	162	29,8	5,42	177	30,1	5,86	183	30,3	6,02	199	30,6	6,49	210	30,8	6,80
	45	154	36,0	4,27	162,6	36,3	4,48	174	36,6	4,75	181	36,8	4,91	194	37,2	5,21	205	37,5	5,46
	55	147	44,9	3,29	154	45,1	3,40	164	45,5	3,60	170	45,7	3,71	182	46,0	3,95	190	46,4	4,09
	60	-	-	-	153	50,4	3,02	161	50,1	3,20	170	50,8	3,34	182	51,2	3,54	191	51,6	3,69
50.2	30	176	28,7	6,11	186	28,9	6,41	202	29,3	6,88	214	29,5	7,24	233	29,9	7,78	245	30,2	8,10
	35	174	32,2	5,39	183	32,5	5,62	199	32,9	6,04	209	33,2	6,29	228	33,7	6,76	240	34,0	7,06
	45	169	38,9	4,33	179	39,2	4,55	193	39,5	4,87	203	39,8	5,09	219	40,3	5,42	231	40,7	5,67
	55	159	48,7	3,26	166	49,0	3,38	178	49,3	3,61	186	49,5	3,75	201	49,9	4,02	210	50,3	4,17
	60	157	54,9	2,85	164	55,0	2,97	177	55,3	3,19	185	55,5	3,33	199	56,0	3,55	210	56,3	3,73
55.2	30	192	31,6	6,06	203	31,8	6,37	220	32,2	6,82	233	32,4	7,18	253	32,9	7,69	267	33,2	8,04
	35	189	35,6	5,30	200	35,9	5,57	216	36,3	5,95	229	36,6	6,26	248	37,1	6,69	262	37,5	6,99
	45	185	43,1	4,28	195	43,3	4,49	210	43,7	4,80	222	44,0	5,04	240	44,5	5,39	252	44,8	5,62
	55	173	53,5	3,23	181	53,8	3,36	194	54,1	3,58	203	54,4	3,73	219	54,9	3,98	230	55,2	4,16
	60	172	60,0	2,86	180	60,2	2,99	192	60,6	3,17	202	60,7	3,32	218	61,1	3,56	228	61,4	3,71
60.2	30	214	35,5	6,02	227	35,8	6,34	245	36,2	6,77	260	36,5	7,13	283	37,0	7,65	299	37,4	8,00
	35	211	40,1	5,25	223	40,3	5,52	242	40,8	5,92	255	41,2	6,18	277	41,8	6,62	292	42,2	6,92
	45	207	48,7	4,25	218	48,9	4,46	236	49,4	4,78	248	49,6	4,99	268	50,2	5,33	282	50,6	5,57
	55	193	60,6	3,18	202	60,9	3,31	217	61,3	3,53	228	61,6	3,70	245	62,2	3,93	256	62,7	4,08
	60	193	68,0	2,83	202	68,3	2,95	217	68,7	3,16	226	68,9	3,28	244	69,5	3,51	257	70,0	3,67
70.2	30	246	40,4	6,08	260	40,8	6,37	284	41,5	6,84	300	42,1	7,12	326	43,0	7,58	343	43,6	7,87
	35	244	45,2	5,40	258	45,6	5,66	280	46,3	6,05	295	46,9	6,29	320	47,7	6,72	337	48,3	6,99
	45	239	54,5	4,38	252	54,9	4,59	272	55,4	4,91	286	55,9	5,12	309	56,6	5,46	325	57,2	5,69
	55	222	67,3	3,30	233	67,7	3,44	250	68,3	3,66	263	68,7	3,83	282	69,4	4,06	297	70,0	4,25
	60	220	75,0	2,93	231	75,4	3,06	247	76,0	3,25	259	76,5	3,38	278	77,2	3,60	294	77,8	3,78
80.2	30	273	45,4	6,01	289	46,0	6,28	315	47,0	6,71	333	47,8	6,97	360	49,0	7,36	380	49,8	7,63
	35	270	50,7	5,32	285	51,3	5,55	310	52,2	5,94	327	53,0	6,17	354	54,1	6,55	373	55,0	6,79
	45	266	60,9	4,36	279	61,5	4,53	302	62,3	4,85	318	62,9	5,05	343	63,8	5,38	360	64,6	5,58
	55	247	74,9	3,29	259	75,4	3,43	278	76,3	3,64	291	76,9	3,78	313	77,8	4,02	328	78,5	4,18
	60	244	83,2	2,93	257	83,8	3,06	276	84,7	3,26	288	85,2	3,38	310	86,2	3,60	327	86,9	3,76
90.2	30	306	52,8	5,79	324	53,2	6,09	351	53,7	6,54	370	54,2	6,83	400	54,8	7,31	422	55,3	7,64
	35	304	58,2	5,23	321	58,6	5,48	348	59,2	5,89	366	59,7	6,14	397	60,4	6,58	418	60,8	6,88
	45	297	70,7	4,20	314	71,1	4,42	339	71,6	4,74	356	71,9	4,95	384	72,7	5,28	403	73,2	5,51
	55	276	88,8	3,11	291	89,1	3,27	312	89,5	3,49	326	89,8	3,63	350	90,4	3,87	367	90,8	4,05
	60	275	100	2,75	289	100	2,89	308	101	3,05	323	101	3,20	346	101	3,42	363	101	3,59
100.2	30	337	59,8	5,64	357	60,4	5,92	383	61,1	6,27	406	61,9	6,56	440	63,0	6,99	464	63,8	7,26
	35	332	65,1	5,10	351	65,7	5,35	377	66,5	5,67	399	67,2	5,94	431	68,3	6,32	455	69,1	6,58
	45	325	79,0	4,12	343	79,6	4,31	365	80,2	4,56	386	80,8	4,78	416	81,8	5,09	437	82,4	5,31
	55	301	98,6	3,05	317	99,1	3,20	336	99,1	3,39	353	100	3,53	379	101	3,75	398	101	3,94
	60	300	111	2,70	316	111	2,85	335	111	3,02	353	112	3,15	379	113	3,36	398	113	3,53
120.2	30	403	71,6	5,63	427	72,2	5,92	460	72,9	6,30	486	73,4	6,61	525	74,3	7,06	552	74,9	7,37
	35	398	78,4	5,08	421	79,0	5,34	453	79,8	5,67	478	80,4	5,94	516	81,3	6,35	543	82,0	6,62
	45	386	95,7	4,04	408	96,2	4,24	436	96,7	4,51	458	97,2	4,71	494	98,1	5,03	518	98,6	5,25
	55	358	121	2,96	378	121	3,13	400	122	3,28	419	122	3,44	452	122	3,70	472	123	3,84
	60	359	137	2,63	378	137	2,77	401	138	2,91	415	132	3,15	452	138	3,28	475	138	3,45

kWt = Heating capacity (kW)

kWe = total power input(kW)

To = Water outlet temperature user side (°C)

COP = Ratio between delivered heating capacity and power input

Unit configurations for system with 2 pipes: heating performances relative to the user side or recovery side without cooling request

Unit configurations for system with 4 pipes: heating performances relative to the recovery side without cooling request

Configuration for 2-pipe system and 4-pipe system

Geothermal and Groundwater application

Cooling 100% - Heating 100% - Size 10.2 - 30.2

Size	Tw	User side water outlet temperature (cold)																							
		5				7				10				12				15				17			
		kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE
10.2	30	34,8	5,55	29,2	11,5	36,7	5,52	31,1	12,3	39,7	5,48	34,21	13,5	41,8	5,46	36,4	14,3	45,5	5,43	40,0	15,7	47,6	5,41	42,2	16,6
	35	34,3	6,21	28,1	10,0	36,2	6,18	30,0	10,7	39,2	6,15	33,05	11,7	41,3	6,13	35,1	12,5	44,7	6,10	38,6	13,7	46,8	6,09	40,8	14,4
	45	33,2	7,79	25,4	7,53	35,0	7,75	27,2	8,03	37,7	7,71	30,02	8,79	39,7	7,67	32,0	9,35	42,7	7,63	35,1	10,2	44,7	7,61	37,1	10,7
	55	31,0	10,0	21,0	5,19	32,4	9,93	22,5	5,53	34,8	9,83	24,96	6,08	36,7	9,77	26,9	6,50	39,3	9,69	29,6	7,11	41,0	9,65	31,3	7,49
	60	30,5	12,0	18,5	4,08	32,0	11,9	20,1	4,39	34,5	11,8	22,70	4,85	36,1	11,7	24,4	5,16	38,7	11,5	27,2	5,73	40,3	11,4	28,9	6,07
12.2	30	40,1	6,48	33,6	11,4	42,3	6,50	35,8	12,0	45,8	6,54	39,23	13,0	48,2	6,58	41,6	13,7	52,3	6,65	45,7	14,7	55,3	6,70	48,6	15,5
	35	39,6	7,23	32,4	9,95	41,7	7,26	34,5	10,5	45,1	7,31	37,77	11,3	47,5	7,35	40,2	11,9	51,5	7,43	44,1	12,9	54,9	7,48	47,4	13,7
	45	38,3	9,10	29,2	7,42	40,4	9,12	31,3	7,85	43,8	8,89	34,92	8,86	45,8	9,17	36,6	8,98	49,4	9,23	40,2	9,70	51,6	9,27	42,4	10,1
	55	36,1	11,7	24,4	5,16	37,8	11,7	26,1	5,47	40,6	11,7	28,87	5,94	42,5	11,7	30,8	6,27	45,7	11,7	34,0	6,81	47,6	11,7	35,9	7,14
	60	36,0	14,1	21,9	4,10	37,6	14,0	23,6	4,38	40,6	14,0	26,57	4,80	42,4	13,9	28,5	5,11	45,5	13,9	31,6	5,54	47,4	13,8	33,6	5,87
14.2	30	48,2	7,84	40,4	11,3	51,0	7,90	43,1	11,9	55,1	8,00	47,08	12,8	58,1	8,08	50,0	13,4	63,1	8,2	54,9	14,4	66,3	8,32	58,0	14,9
	35	47,6	8,68	38,9	9,97	50,4	8,74	41,6	10,5	54,3	8,84	45,45	11,3	57,2	8,91	48,3	11,8	62,0	9,0	53,0	12,7	65,3	9,13	56,1	13,3
	45	45,9	10,8	35,1	7,49	48,3	10,9	37,4	7,86	52,3	10,9	41,43	8,60	55,1	11,0	44,1	9,01	60,2	10,7	49,5	10,2	62,9	10,9	52,0	10,5
	55	43,0	13,8	29,2	5,24	45,1	13,8	31,3	5,53	48,6	13,9	34,71	5,99	51,0	13,9	37,1	6,33	54,9	14,0	40,9	6,84	57,4	14,0	43,4	7,20
	60	43,0	16,3	26,7	4,28	45,2	16,3	28,9	4,54	48,6	16,3	32,3	4,96	50,6	16,1	34,5	5,28	54,9	16,3	38,6	5,73	57,4	16,3	41,1	6,05
16.2	30	56,2	9,25	46,9	11,14	59,4	9,34	50,0	11,7	64,2	9,42	54,8	12,6	67,8	9,42	58,4	13,4	73,4	9,55	63,9	14,4	77,3	9,66	67,7	15,0
	35	55,4	10,1	45,3	9,96	58,5	10,2	48,3	10,5	63,2	10,3	52,9	11,3	66,7	10,4	56,3	11,8	72,2	10,5	61,7	12,8	76,0	10,7	65,3	13,2
	45	53,4	12,4	41,0	7,61	56,4	12,5	43,9	8,02	60,9	12,6	48,3	8,66	63,8	12,6	51,2	9,13	68,9	12,8	56,1	9,76	72,5	12,9	59,6	10,2
	55	50,1	15,8	34,3	5,34	52,5	15,8	36,7	5,65	56,4	15,8	40,6	6,13	59,2	15,8	43,4	6,49	63,4	15,9	47,5	6,98	66,5	16,0	50,5	7,32
	60	49,7	18,9	30,8	4,26	52,0	18,8	33,2	4,54	55,9	18,7	37,2	4,97	58,4	18,7	39,7	5,25	62,8	18,6	44,2	5,75	66,0	18,7	47,3	6,05
19.2	30	66,5	10,8	55,7	11,32	70,4	10,8	59,6	12,0	76,2	10,9	65,3	13,0	80,5	11,0	69,5	13,6	86,9	11,2	75,7	14,5	91,5	11,3	80,2	15,2
	35	65,7	11,8	53,9	10,13	69,4	11,8	57,6	10,8	75,1	11,9	63,2	11,6	79,1	12,0	67,1	12,2	85,3	12,1	73,2	13,1	90,0	12,3	77,7	13,6
	45	63,4	14,5	48,9	7,75	66,7	14,6	52,1	8,14	71,7	14,6	57,1	8,83	75,5	14,7	60,8	9,27	81,6	14,7	66,9	10,1	85,8	14,8	71,0	10,6
	55	58,7	18,5	40,2	5,35	61,5	18,5	43,0	5,65	66,0	18,5	47,5	6,13	69,3	18,5	50,8	6,49	74,5	18,6	55,9	7,01	78,2	18,6	59,6	7,41
	60	57,7	22,0	35,7	4,25	60,7	22,0	38,7	4,51	65,1	21,9	43,2	4,94	68,1	21,9	46,2	5,22	73,1	21,8	51,3	5,71	76,7	21,8	54,9	6,04
22.2	30	77,9	13,0	64,9	10,99	82,3	13,0	69,3	11,7	88,9	13,0	75,9	12,7	93,5	13,0	80,5	13,4	101	12,9	88,0	14,6	106	12,8	93,0	15,5
	35	77,2	14,4	62,8	9,73	81,4	14,4	67,0	10,3	88,0	14,5	73,5	11,1	92,5	14,6	77,9	11,7	100	14,6	85,4	12,7	105	14,6	90,3	13,4
	45	74,7	17,5	57,2	7,53	78,8	17,6	61,2	7,95	84,8	17,7	67,1	8,58	89,0	17,8	71,2	9,00	95,6	18,0	77,6	9,62	100	18,0	82,0	10,1
	55	69,3	21,7	47,6	5,39	72,6	21,8	50,8	5,66	78,1	21,9	56,2	6,13	82,1	21,5	60,6	6,64	87,8	22,2	65,6	6,91	92,0	22,3	69,7	7,25
	60	68,7	25,4	43,3	4,41	72,0	25,4	46,6	4,67	76,93	25,4	51,5	5,06	80,8	25,4	55,4	5,36	86,7	25,5	61,2	5,80	90,9	25,6	65,3	6,11
27.2	30	94,4	15,2	79,2	11,42	100	15,2	84,8	12,2	108	15,2	92,6	13,2	113	15,2	97,5	13,8	123	15,2	107	15,1	128	15,2	113	15,9
	35	93,2	16,7	76,5	10,16	98,0	16,8	81,2	10,7	106	16,9	88,9	11,5	112	16,9	94,8	12,2	121	17,0	104	13,2	126	17,0	109	13,9
	45	89,6	20,6	69,0	7,70	94,4	20,6	73,8	8,16	102	20,8	81,1	8,80	107	20,9	85,9	9,22	115	21,0	93,7	9,92	121	21,1	99,4	10,4
	55	82,4	25,7	56,7	5,41	86,5	25,8	60,7	5,71	93,2	25,9	67,3	6,20	97,3	26,0	71,3	6,49	105	26,2	78,7	7,00	110	26,3	83,5	7,35
	60	80,7	28,9	51,8	4,58	84,7	28,9	55,8	4,86	91,1	29,1	62,0	5,26	95,6	29,1	66,5	5,57	103	29,3	73,6	6,02	108	29,4	78,4	6,33
30.2	30	107	17,5	89,3	11,21	113	17,5	95,2	11,9	121	17,4	103	12,9	127	17,3	110	13,7	137	17,0	120	15,1	144	16,9	127	16,0
	35	106	19,4	86,4	9,91	112	19,5	92,2	10,5	120	19,6	100	11,2	126	19,6	107	11,9	136	19,6	117	12,9	143	19,5	124	13,7
	45	101	23,6	77,3	7,55	107	23,8	83,0	7,98	115	24,0	90,7	8,56	121	24,2	96,3	8,96	130	24,3	106	9,73	136	24,5	112	10,1
	55	93,7	29,0	64,7	5,46	98,0	29,2	68,8	5,71	106	29,5	76,3	6,18	111	29,6	81,1	6,48	119	30,0	88,6	6,91	124	30,2	94,3	7,24
	60	91,9	32,3	59,6	4,69	96,3	32,4	63,9	4,95	104	32,6	71,3	5,37	109	32,8	76,0	5,63	118	33,1	84,5	6,11	123	33,3	90,2	6,42

kWt = Heating capacity (kW)
 kWe = total power input(kW)
 kWf = Cooling capacity in kW
 GLE = Overall efficiency
 Tw = Recovery side water outlet temperature (hot)

Configuration for 2-pipe system and 4-pipe system

Geothermal and Groundwater application

Cooling 100% - Heating 100% - Size 35.2 - 70.2

Size	Tw	User side water outlet temperature (cold)																							
		5				7				10				12				15				17			
		kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE
35.2	30	123	20,5	103,0	11,05	130	20,5	110	11,72	141	20,7	120	12,6	149	20,7	128	13,4	162	20,8	141	14,5	171	20,8	150	15,4
	35	122	22,4	99,1	9,85	128	22,6	106	10,4	139	22,8	116	11,2	147	23,0	124	11,8	159	23,1	136	12,7	168	23,2	144	13,4
	45	117	27,1	89,5	7,61	123	27,3	95,2	7,97	132	27,6	105	8,59	139	27,8	111	9,01	150	28,1	122	9,67	158	28,3	129	10,2
	55	108	33,7	74,1	5,40	113	33,9	78,8	5,65	122	34,2	87,3	6,11	127	34,5	92,9	6,39	137	34,8	102	6,89	144	35,0	109	7,23
	60	107	37,8	69,0	4,65	113	37,9	74,8	4,95	122	38,2	83,3	5,36	127	38,4	89,0	5,64	137	38,7	98,5	6,09	144	38,9	105	6,41
40.2	30	140	23,3	117	11,03	148	23,4	125	11,6	160	23,6	136	12,5	168	23,6	144	13,2	182	23,7	159	14,4	191	23,7	167	15,1
	35	138	25,5	113	9,84	145	25,7	119	10,3	158	25,9	132	11,2	166	26,0	140	11,7	179	26,2	153	12,7	188	26,3	162	13,3
	45	132	30,9	101	7,56	139	31,1	108	7,95	150	31,3	119	8,58	158	31,5	126	9,02	170	31,8	138	9,66	178	31,9	146	10,2
	55	123	38,1	84,4	5,43	128	38,3	90,1	5,70	138	38,6	99,6	6,16	145	38,8	106	6,48	156	39,1	117	6,97	163	39,3	123	7,28
	60	121	42,5	78,0	4,67	126	42,6	83,8	4,94	136	42,8	93,4	5,37	143	43,0	100	5,65	154	43,3	111	6,11	161	43,5	117	6,39
43.2	30	154	26,2	128	10,75	163	26,4	136	11,3	176	26,7	150	12,2	186	27,0	159	12,8	202	27,4	174	13,7	213	27,6	185	14,4
	35	152	28,4	124	9,70	160	28,7	131	10,1	172	29	143	10,9	182	29,2	153	11,5	198	29,6	168	12,4	208	29,9	178	12,9
	45	145	34,4	111	7,43	153	34,5	118	7,86	165	34,9	130	8,43	173	35,1	138	8,88	187	35,5	152	9,55	196	35,7	160	9,98
	55	135	42,8	92,4	5,32	142	42,9	99,2	5,62	153	43,2	110	6,08	160	43,5	116	6,34	172	43,9	129	6,86	180	44,1	136	7,18
	60	134	47,5	86,8	4,65	140	46,8	93,3	4,99	151	48,3	103	5,25	159	48,5	110	5,55	172	48,8	123	6,03	179	49,0	130	6,32
45.2	30	167	27,6	139	11,07	175	27,7	148	11,7	190	28	162	12,6	201	28,1	173	13,3	218	28,2	189	14,4	228	28,3	200	15,1
	35	164	30,1	134	9,87	172	30,3	142	10,4	187	30,7	156	11,2	197	30,9	166	11,7	214	31,2	182	12,7	224	31,3	193	13,3
	45	157	36,5	120	7,59	165	36,7	128	7,97	178	37,1	141	8,62	187	37,4	150	9,01	203	37,8	165	9,73	213	38,1	175	10,2
	55	145	45,3	99,7	5,40	152	45,5	106	5,68	163	45,9	117	6,09	172	46,2	125	6,42	184	46,6	138	6,91	193	47,0	146	7,22
	60	144	50,5	93,6	4,71	151	50,7	100	4,95	162	51,1	111	5,33	171	51,3	119	5,65	183	51,9	131	6,06	193	52,2	141	6,40
50.2	30	181	30,2	151	11,01	191	30,4	161	11,6	208	30,9	177	12,4	220	31,2	188	13,1	239	31,6	208	14,1	251	31,9	219	14,7
	35	178	32,7	146	9,91	188	32,9	155	10,4	204	33,4	170	11,2	216	33,7	182	11,8	233	34,2	199	12,6	246	34,5	211	13,3
	45	171	39,5	131	7,63	179	39,7	140	8,03	193	40,1	153	8,63	204	40,4	163	9,09	221	40,9	181	9,83	232	41,3	191	10,2
	55	158	49,3	108	5,40	166	49,5	116	5,69	178	49,8	129	6,16	187	50,1	137	6,47	202	50,7	151	6,96	211	51,1	160	7,25
	60	157	55,3	102	4,67	164	55,4	108	4,91	176	55,7	121	5,33	185	56,0	129	5,62	200	56,5	143	6,08	210	56,9	153	6,37
55.2	30	197	33,3	164	10,83	208	33,5	174	11,4	225	33,9	192	12,3	238	34,3	204	12,9	258	34,7	223	13,9	271	35,1	236	14,5
	35	193	36,1	157	9,70	204	36,3	168	10,2	221	36,8	184	11,0	233	37,1	196	11,6	253	37,6	215	12,4	266	38,0	228	13,0
	45	186	43,6	143	7,54	195	43,9	151	7,88	211	44,3	166	8,51	222	44,6	178	8,98	239	45,1	194	9,60	251	45,4	205	10,1
	55	172	54,2	118	5,36	181	54,5	127	5,65	194	54,8	139	6,08	204	55,1	149	6,40	220	55,6	164	6,90	229	56,0	173	7,19
	60	172	60,5	111	4,67	178	60,7	118	4,88	192	61	131	5,30	202	61,3	141	5,59	217	61,7	155	6,02	227	62,1	165	6,32
60.2	30	221	35,9	185	11,28	233	36,2	197	11,9	254	36,6	217	12,9	268	37,0	231	13,5	290	37,4	253	14,5	307	37,8	269	15,2
	35	216	40,3	175	9,70	227	40,6	187	10,2	247	41,1	206	11,0	262	41,6	220	11,6	283	42,2	241	12,4	299	42,6	256	13,0
	45	212	48,7	163	7,69	223	49,1	174	8,10	240	49,5	191	8,70	254	49,9	204	9,17	273	50,5	223	9,83	286	50,9	235	10,2
	55	198	60,7	137	5,52	208	61,0	147	5,81	222	61,4	161	6,25	233	61,8	171	6,55	251	62,5	188	7,03	263	62,9	200	7,35
	60	195	68,1	127	4,73	205	68,4	136	4,99	220	68,7	151	5,39	230	69,1	161	5,67	247	69,7	177	6,09	260	70,1	190	6,41
70.2	30	251	42,7	208	10,75	266	43,2	222	11,30	288	44	244	12,1	304	44,6	259	12,6	329	45,6	284	13,4	346	46,2	300	14,0
	35	247	46,0	201	9,74	262	46,5	215	10,3	283	47,3	236	11,0	299	47,9	251	11,5	323	48,8	275	12,3	340	49,5	291	12,7
	45	238	55,4	183	7,60	251	55,8	195	7,99	270	56,5	214	8,57	284	57,0	227	8,97	308	57,9	250	9,63	323	58,6	265	10,0
	55	221	68,4	152	5,45	231	68,8	162	5,72	248	69,4	179	6,15	261	69,9	191	6,46	280	70,9	209	6,91	294	71,5	223	7,22
	60	219	76,1	142	4,74	228	76,5	152	4,97	245	77,1	168	5,36	258	77,5	180	5,65	277	78,4	199	6,08	291	78,9	212	6,38

kWt = Heating capacity (kW)

kWe = total power input(kW)

kWf = Cooling capacity in kW

GLE = Overall efficiency

Tw = Recovery side water outlet temperature (hot)

Configuration for 2-pipe system and 4-pipe system

Geothermal and Groundwater application

Cooling 100% - Heating 100% - Size 80.2 - 120.2

Size	Tw	User side water outlet temperature (cold)																							
		5				7				10				12				15				17			
		kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE	kWt	kWe	kWf	GLE
80.2	30	284	48,2	236	10,79	300	48,9	251	11,3	325	50	275	12,0	343	50,9	292	12,5	372	52,3	320	13,2	392	53,2	339	13,7
	35	279	52	227	9,74	295	52,7	242	10,2	319	53,8	266	10,9	337	54,7	282	11,3	365	56	309	12,0	383	56,8	326	12,5
	45	269	62,4	206	7,61	282	63	219	7,96	305	63,9	241	8,54	320	64,6	256	8,92	345	65,8	279	9,49	363	66,5	296	9,91
	55	248	76,5	171	5,48	261	77,1	184	5,76	279	78	201	6,16	293	78,6	214	6,46	317	79,7	237	6,94	332	80,4	252	7,26
	60	246	84,6	161	4,82	258	85,2	173	5,05	277	86,1	191	5,44	291	86,7	204	5,71	314	87,7	226	6,15	328	88,3	240	6,44
90.2	30	319	54,2	265	10,79	337	54,6	283	11,3	365	55,2	309	12,2	384	55,6	329	12,8	417	56,3	360	13,8	437	56,7	380	14,4
	35	315	59	256	9,66	332	59,4	273	10,2	360	60,1	300	11,0	378	60,6	318	11,5	410	61,3	348	12,4	430	61,8	368	12,9
	45	304	71,7	232	7,47	320	72,1	248	7,89	344	72,6	271	8,48	362	73,1	289	8,89	389	73,8	315	9,54	407	74,2	333	9,96
	55	282	89,9	192	5,28	296	90,2	206	5,56	317	90,6	226	5,99	332	91,0	241	6,30	357	91,6	265	6,79	372	92,0	280	7,10
	60	281	101	180	4,57	293	101	192	4,80	314	102	212	5,15	328	102	226	5,44	353	103	250	5,85	369	103	266	6,17
100.2	30	350	60,7	289	10,53	368	61,3	306	11,0	396	62,1	334	11,8	417	62,8	354	12,3	451	63,9	387	13,1	473	64,7	409	13,6
	35	345	66	279	9,45	363	66,6	296	9,89	390	67,5	323	10,6	411	68,2	342	11,0	443	69,3	374	11,8	466	70,0	396	12,3
	45	331	79,9	251	7,29	347	80,4	267	7,63	371	81,2	290	8,15	390	81,8	308	8,54	420	82,7	338	9,17	441	83,4	358	9,58
	55	306	99,6	206	5,14	319	100	219	5,39	343	101	242	5,79	360	101	259	6,12	385	102	283	6,55	403	102	301	6,90
	60	305	112	193	4,44	319	112	207	4,69	341	112	229	5,09	358	113	245	5,33	384	114	270	5,74	402	114	288	6,05
120.2	30	414	72,4	341	10,42	434	72,8	361	10,9	466	73,5	392	11,7	490	74	416	12,2	529	74,9	454	13,1	555	75,4	479	13,7
	35	408	79,1	329	9,31	427	79,6	348	9,74	460	80,4	379	10,4	482	80,9	401	10,9	520	81,8	439	11,7	545	82,4	462	12,2
	45	392	96,4	296	7,13	411	96,8	314	7,48	440	97,4	343	8,04	462	97,9	364	8,43	497	98,7	398	9,07	520	99,2	421	9,49
	55	363	122	241	4,94	378	122	256	5,20	404	122	282	5,62	425	122	303	5,97	454	123	331	6,38	473	123	350	6,70
	60	363	137	226	4,29	378	137	241	4,52	405	138	267	4,87	424	138	286	5,15	455	138	317	5,59	475	138	337	5,89

kWt = Heating capacity (kW)

kWe = total power input(kW)

kWf = Cooling capacity in kW

GLE = Overall efficiency

Tw = Recovery side water outlet temperature (hot)

Configuration for 2-pipe system and 4-pipe system

Geothermal application/ source source glycol

Cooling 100% - Heating 0% - Size 10.2 - 30.2

Size	To °C	Hot side water outlet temperature																	
		25			30			35			40			45			50		
		kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER
10.2	5	30,7	5,42	5,67	29,6	6,15	4,81	28,4	6,88	4,13	26,8	7,73	3,47	24,7	8,72	2,83	22,2	9,90	2,24
	7	33,1	5,41	6,12	31,7	6,14	5,16	30,3	6,87	4,41	28,6	7,71	3,71	26,5	8,70	3,04	24,0	9,86	2,43
	10	35,6	5,40	6,60	34,2	6,13	5,59	32,9	6,86	4,79	31,2	7,69	4,05	28,7	8,67	3,31	26,0	9,81	2,65
	12	37,3	5,39	6,93	35,9	6,13	5,86	34,6	6,87	5,03	32,5	7,68	4,24	30,2	8,67	3,48	27,3	9,77	2,80
	15	40,4	5,39	7,50	38,9	6,13	6,35	37,4	6,87	5,45	35,4	7,68	4,61	32,8	8,64	3,79	29,9	9,74	3,07
	18	43,9	5,44	8,07	42,1	6,19	6,80	40,3	6,94	5,80	38,2	7,77	4,91	35,3	8,72	4,05	32,1	9,84	3,27
12.2	5	36,1	6,31	5,72	34,6	7,18	4,81	33,0	8,04	4,10	31,2	9,03	3,45	28,7	10,27	2,80	26,0	11,6	2,23
	7	38,5	6,37	6,04	36,9	7,23	5,10	35,3	8,10	4,36	33,3	9,08	3,66	30,7	10,30	2,98	27,9	11,7	2,37
	10	41,8	6,44	6,49	40,0	7,30	5,47	38,2	8,17	4,67	36,0	9,17	3,93	33,4	10,40	3,21	30,2	11,7	2,57
	12	43,6	6,49	6,71	41,8	7,36	5,67	40,0	8,24	4,85	37,8	9,23	4,10	34,9	10,40	3,35	31,8	11,7	2,71
	15	47,1	6,62	7,11	45,2	7,48	6,04	43,2	8,33	5,19	40,8	9,33	4,37	37,9	10,51	3,61	34,6	11,8	2,92
	18	50,9	6,81	7,47	48,8	7,68	6,35	46,6	8,56	5,45	44,2	9,55	4,63	40,7	10,71	3,80	37,4	12,1	3,10
14.2	5	41,7	7,67	5,43	39,9	8,67	4,60	38,1	9,67	3,93	35,4	10,92	3,24	32,9	12,3	2,68	29,8	13,8	2,16
	7	44,3	7,75	5,72	42,5	8,76	4,86	40,7	9,76	4,17	38,3	10,9	3,50	35,3	12,4	2,86	32,0	13,9	2,30
	10	48,1	7,89	6,10	46,1	8,89	5,19	44,1	9,89	4,46	41,6	11,1	3,74	38,2	12,5	3,06	34,8	14,0	2,48
	12	50,0	8,00	6,25	48,1	9,00	5,35	46,2	10,00	4,62	43,5	11,1	3,91	40,2	12,6	3,20	36,5	14,1	2,58
	15	54,6	8,20	6,66	52,4	9,18	5,71	50,1	10,16	4,94	47,3	11,3	4,17	43,6	12,7	3,44	39,9	14,3	2,78
	18	58,9	8,51	6,93	56,6	9,46	5,99	54,3	10,40	5,22	51,3	11,6	4,41	47,2	13,0	3,63	43,1	14,5	2,97
16.2	5	49,9	8,98	5,56	47,8	10,05	4,76	45,7	11,1	4,11	42,9	12,4	3,47	39,5	13,8	2,86	35,6	15,7	2,27
	7	53,2	9,29	5,73	51,0	10,26	4,97	48,8	11,2	4,34	45,9	12,5	3,68	42,4	13,9	3,05	38,4	15,7	2,45
	10	58,2	9,48	6,14	55,8	10,40	5,36	53,3	11,3	4,71	50,4	12,6	4,01	46,3	14,0	3,31	42,0	15,8	2,66
	12	60,8	9,58	6,35	58,2	10,51	5,54	55,5	11,4	4,86	52,5	12,7	4,14	48,5	14,1	3,44	44,0	15,9	2,77
	15	66,1	9,58	6,91	63,3	10,61	5,96	60,4	11,6	5,19	57,0	12,9	4,43	52,6	14,3	3,67	47,8	16,0	2,99
	18	71,6	9,89	7,24	68,5	10,92	6,27	65,4	11,9	5,47	61,6	13,2	4,67	56,8	14,6	3,88	51,7	16,4	3,16
19.2	5	60,8	10,3	5,91	58,9	11,2	5,25	57,0	12,2	4,69	54,0	13,6	3,97	50,1	15,2	3,29	45,4	17,2	2,64
	7	65,4	10,4	6,29	63,2	11,3	5,58	61,0	12,3	4,97	57,9	13,7	4,22	54,0	15,2	3,54	48,9	17,2	2,84
	10	71,0	10,5	6,76	68,8	11,4	6,02	66,6	12,4	5,39	63,2	13,7	4,61	58,8	15,3	3,83	53,4	17,2	3,11
	12	74,1	10,6	6,98	71,9	11,5	6,23	69,6	12,5	5,59	66,0	13,8	4,78	61,5	15,3	4,01	56,1	17,3	3,24
	15	81,0	10,7	7,56	78,4	11,6	6,74	75,9	12,6	6,04	72,1	13,9	5,18	67,3	15,5	4,36	61,4	17,3	3,55
	18	87,6	11,0	7,94	84,8	11,9	7,10	82,0	12,9	6,37	78,0	14,2	5,49	72,7	15,8	4,61	66,5	17,6	3,77
22.2	5	70,3	12,5	5,64	68,1	13,7	4,97	65,8	14,9	4,41	62,4	16,5	3,79	58,2	18,2	3,19	53,0	20,4	2,60
	7	75,0	12,6	5,97	72,7	13,8	5,27	70,4	15,0	4,68	66,8	16,6	4,03	62,2	18,4	3,37	56,8	20,4	2,79
	10	81,7	12,5	6,56	79,3	13,8	5,74	76,9	15,1	5,08	72,9	16,8	4,34	68,2	18,5	3,68	62,1	20,6	3,02
	12	85,2	12,4	6,90	82,7	13,8	5,99	80,1	15,2	5,26	76,2	16,9	4,51	71,1	18,6	3,82	65,2	20,7	3,15
	15	93,0	12,3	7,58	90,1	13,8	6,53	87,2	15,3	5,68	83,0	17,0	4,88	77,5	18,8	4,11	71,1	20,9	3,40
	18	101	12,3	8,22	97,6	13,9	7,02	94,4	15,6	6,07	90,0	17,3	5,20	84,0	19,3	4,36	77,1	21,3	3,61
27.2	5	86,2	14,1	6,11	83,2	15,7	5,31	80,2	17,2	4,66	75,9	19,2	3,96	70,6	21,2	3,33	64,1	23,7	2,71
	7	92,1	14,0	6,58	89,0	15,7	5,69	86,0	17,3	4,97	81,4	19,3	4,23	75,8	21,3	3,55	68,8	23,8	2,89
	10	99,0	14,1	7,02	95,6	15,8	6,07	92,2	17,4	5,30	87,5	19,4	4,52	81,4	21,5	3,78	74,1	23,9	3,10
	12	102	14,1	7,26	98,8	15,8	6,27	95,2	17,4	5,47	90,3	19,4	4,66	84,2	21,6	3,89	76,6	24,0	3,19
	15	112	14,0	8,02	108	15,8	6,86	104	17,5	5,93	98,7	19,6	5,04	92,0	21,7	4,23	84,2	24,2	3,48
	18	121	13,9	8,69	117	15,8	7,40	112	17,6	6,38	107,1	19,7	5,44	100	21,9	4,56	91,5	24,4	3,75
30.2	5	96,9	16,3	5,95	93,6	18,1	5,16	90,3	20,0	4,52	85,6	22,0	3,89	79,6	24,3	3,27	72,7	26,9	2,70
	7	104	16,2	6,42	100	18,1	5,53	96,8	20,1	4,82	91,8	22,2	4,13	85,4	24,5	3,49	77,9	27,1	2,88
	10	111	16,1	6,89	107	18,1	5,91	103	20,2	5,12	98,3	22,5	4,38	91,6	24,8	3,69	83,6	27,3	3,06
	12	116	15,8	7,33	111	18,0	6,17	107	20,3	5,28	102	22,6	4,51	94,9	24,9	3,81	86,7	27,5	3,15
	15	125	15,6	8,04	121	17,9	6,74	117	20,3	5,75	111	22,7	4,91	104	25,2	4,10	94,8	27,8	3,41
	18	136	15,0	9,02	131	17,6	7,46	127	20,2	6,30	121	22,8	5,31	112	25,3	4,43	103	28,1	3,66

kWf = Cooling capacity in kW

kWe = total power input(kW)

EER = Ratio between delivered cooling capacity and power input

To = Water outlet temperature user side (°C)

Data refer to operation with a mix of water and propylene glycol at 30% on the source side

Configuration for 2-pipe system and 4-pipe system

Geothermal application/ source source glycol

Cooling 100% - Heating 0% - Size 35.2 - 70.2

Size	To °C	Hot side water outlet temperature																	
		25			30			35			40			45			50		
		kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER
35.2	5	110	19,1	5,77	106	21,0	5,04	102	23,0	4,44	96,5	25,3	3,81	89,5	28,0	3,19	81,8	31,1	2,63
	7	118	19,1	6,17	113	21,1	5,37	109	23,2	4,71	104	25,4	4,07	96,2	28,2	3,41	87,3	31,2	2,80
	10	128	19,3	6,66	123	21,3	5,77	118	23,4	5,03	111	25,8	4,32	104	28,4	3,65	94,7	31,5	3,00
	12	133	19,2	6,92	127	21,3	5,97	122	23,5	5,19	116	25,9	4,47	107	28,6	3,74	97,8	31,7	3,08
	15	143	19,2	7,47	138	21,4	6,43	133	23,7	5,59	126	26,2	4,82	117	28,9	4,03	107	32,0	3,34
	18	157	19,2	8,19	151	21,5	6,99	144	23,9	6,03	137	26,4	5,19	127	29,3	4,35	117	32,4	3,59
40.2	5	126	21,3	5,92	122	23,8	5,12	118	26,3	4,48	111	28,9	3,85	103	32,0	3,22	94,2	35,7	2,64
	7	137	21,4	6,38	131	23,9	5,50	126	26,4	4,78	120	29,1	4,11	111	32,2	3,45	102	35,9	2,83
	10	148	21,3	6,96	142	24,0	5,92	136	26,7	5,09	129	29,4	4,41	120	32,4	3,69	109	36,2	3,02
	12	153	21,4	7,12	146	24,1	6,07	140	26,8	5,22	134	29,6	4,52	124	32,7	3,80	113	36,4	3,12
	15	166	21,6	7,69	160	24,3	6,58	154	27,0	5,70	145	29,8	4,88	136	33,0	4,12	124	36,7	3,38
	18	179	21,8	8,20	173	24,6	7,02	166	27,4	6,07	158	30,3	5,22	147	33,6	4,39	137	37,2	3,68
43.2	5	141	24,0	5,87	135	26,6	5,07	128	29,1	4,40	122	32,1	3,79	113	35,6	3,18	103	40,0	2,59
	7	152	24,3	6,24	145	26,9	5,40	139	29,5	4,71	131	32,4	4,05	122	35,9	3,39	111	40,2	2,77
	10	164	24,4	6,73	157	27,1	5,79	149	29,8	5,02	142	32,7	4,35	131	36,2	3,64	121	40,5	2,99
	12	170	24,8	6,83	162	27,4	5,92	155	30,0	5,16	146	32,9	4,45	136	36,4	3,73	125	40,7	3,07
	15	184	25,2	7,31	177	27,8	6,37	170	30,4	5,58	160	33,3	4,81	149	36,8	4,06	137	41,0	3,34
	18	200	25,9	7,75	192	28,4	6,75	183	31,0	5,91	174	34,0	5,11	162	37,4	4,34	149	41,7	3,58
45.2	5	149	24,9	6,00	143	27,8	5,15	137	30,7	4,45	130	33,9	3,85	121	37,5	3,22	110	41,9	2,63
	7	161	25,1	6,41	155	28,0	5,52	148	30,9	4,80	140	34,1	4,10	130	37,7	3,46	120	42,2	2,84
	10	173	25,2	6,85	166	28,2	5,90	160	31,2	5,13	152	34,4	4,41	141	38,0	3,71	129	42,5	3,04
	12	180	25,4	7,08	173	28,4	6,08	165	31,4	5,26	157	34,6	4,53	146	38,2	3,83	134	42,7	3,12
	15	195	25,5	7,64	188	28,6	6,55	180	31,7	5,68	171	35,0	4,87	159	38,7	4,11	146	43,2	3,39
	18	211	25,6	8,22	204	28,8	7,06	196	32,0	6,12	186	35,3	5,25	173	39,1	4,41	159	43,6	3,65
50.2	5	165	27,7	5,97	158	30,8	5,13	151	33,9	4,44	143	37,3	3,84	133	41,3	3,21	122	46,5	2,62
	7	178	28,0	6,36	171	31,1	5,49	163	34,2	4,77	154	37,6	4,09	143	41,6	3,44	130	46,8	2,79
	10	191	28,5	6,69	183	31,5	5,82	176	34,5	5,10	166	37,9	4,39	154	41,9	3,67	141	47,0	3,00
	12	198	28,7	6,90	190	31,7	5,98	181	34,7	5,22	172	38,1	4,51	159	42,1	3,77	145	47,2	3,08
	15	215	29,3	7,36	207	32,2	6,41	198	35,2	5,63	188	38,6	4,86	174	42,6	4,08	160	47,7	3,36
	18	234	29,7	7,90	225	32,8	6,86	215	35,8	6,00	204	39,2	5,19	190	43,2	4,40	174	48,2	3,61
55.2	5	180	30,3	5,95	173	33,6	5,15	165	36,9	4,48	157	40,7	3,86	146	45,1	3,24	134	50,5	2,65
	7	195	30,6	6,38	187	33,9	5,51	178	37,2	4,79	169	41,0	4,11	158	45,3	3,48	144	50,8	2,84
	10	209	31,0	6,74	200	34,3	5,84	192	37,6	5,10	182	41,3	4,41	170	45,6	3,72	156	51,1	3,05
	12	215	31,1	6,92	207	34,5	5,99	198	37,9	5,23	188	41,5	4,52	175	45,9	3,81	160	51,3	3,12
	15	235	31,6	7,44	226	35,0	6,45	216	38,4	5,63	206	42,0	4,89	192	46,5	4,13	175	51,8	3,38
	18	257	32,2	7,96	246	35,5	6,92	235	38,8	6,06	224	42,5	5,26	208	46,9	4,43	191	52,2	3,65
60.2	5	202	34,0	5,96	194	37,8	5,13	186	41,6	4,46	175	45,8	3,82	163	50,8	3,21	149	57,0	2,62
	7	216	34,2	6,32	208	38,1	5,45	199	42,0	4,74	189	46,1	4,09	176	51,2	3,44	161	57,4	2,81
	10	234	34,9	6,71	225	38,6	5,82	215	42,3	5,08	204	46,6	4,37	190	51,6	3,68	174	57,8	3,01
	12	242	35,2	6,86	232	38,9	5,96	223	42,6	5,22	211	46,9	4,50	196	51,8	3,79	179	58,0	3,09
	15	265	35,7	7,41	253	39,6	6,41	242	43,4	5,57	230	47,5	4,84	214	52,4	4,08	196	58,5	3,35
	18	286	36,8	7,78	275	40,6	6,77	263	44,4	5,92	249	48,6	5,12	232	53,6	4,33	213	59,8	3,56
70.2	5	229	39,0	5,87	220	43,2	5,11	212	47,3	4,48	201	52,0	3,87	188	57,5	3,26	172	64,3	2,67
	7	248	39,6	6,27	237	43,7	5,44	227	47,8	4,75	215	52,5	4,10	201	58,0	3,47	183	64,7	2,84
	10	268	40,3	6,66	257	44,4	5,78	245	48,5	5,05	233	53,1	4,39	216	58,6	3,69	198	65,3	3,04
	12	273	41,3	6,62	263	45,1	5,83	252	48,9	5,16	240	53,5	4,48	224	59,0	3,79	205	65,7	3,11
	15	299	42,0	7,11	287	45,9	6,25	276	49,9	5,53	262	54,4	4,81	243	59,8	4,06	223	66,4	3,35
	18	324	43,6	7,44	312	47,5	6,56	299	51,4	5,82	284	55,9	5,08	265	61,4	4,32	243	68,0	3,57

kWf = Cooling capacity in kW

kWe = total power input(kW)

EER = Ratio between delivered cooling capacity and power input

To = Water outlet temperature user side (°C)

Data refer to operation with a mix of water and propylene glycol at 30% on the source side

Configuration for 2-pipe system and 4-pipe system

Geothermal application/ source source glycol

Cooling 100% - Heating 0% - Size 80.2 - 120.2

Size	To°C	Hot side water outlet temperature																	
		25			30			35			40			45			50		
		kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER	kWf	kWe	EER
80.2	5	257	44,0	5,83	246	48,6	5,06	235	53,3	4,42	224	58,4	3,83	208	64,5	3,22	190	71,8	2,64
	7	273	44,7	6,12	263	49,3	5,33	252	54,0	4,67	240	59,1	4,05	223	65,2	3,41	205	72,4	2,83
	10	296	45,8	6,45	284	50,4	5,64	272	54,9	4,96	259	59,9	4,31	241	65,9	3,65	220	73,2	3,01
	12	306	46,5	6,59	294	51,0	5,76	281	55,5	5,06	266	60,5	4,40	248	66,4	3,73	227	73,6	3,08
	15	332	48,2	6,88	318	52,4	6,07	304	56,7	5,37	289	61,6	4,70	270	67,6	4,00	248	74,7	3,32
	18	358	50,2	7,14	345	54,4	6,33	331	58,6	5,64	314	63,6	4,94	293	69,4	4,21	269	76,5	3,52
90.2	5	284	49,9	5,70	273	55,5	4,93	263	61,2	4,30	249	67,5	3,69	231	75,1	3,08	210	84,8	2,48
	7	304	50,3	6,05	293	55,9	5,23	281	61,6	4,56	266	67,9	3,92	247	75,5	3,27	226	85,1	2,65
	10	331	51,1	6,47	318	56,7	5,61	305	62,2	4,91	290	68,5	4,24	269	76,0	3,54	247	85,5	2,89
	12	348	51,6	6,74	335	57,2	5,86	322	62,7	5,14	305	68,9	4,43	283	76,4	3,70	260	85,8	3,03
	15	377	52,3	7,21	364	57,9	6,28	350	63,4	5,51	331	69,7	4,74	308	77,1	4,00	283	86,4	3,28
	18	412	53,5	7,71	396	59,2	6,69	381	65,0	5,86	361	71,3	5,07	337	78,7	4,28	308	88,1	3,50
100.2	5	320	56,0	5,71	307	62,1	4,95	295	68,2	4,32	281	75,2	3,74	262	83,4	3,14	240	93,6	2,56
	7	342	56,9	6,02	329	62,8	5,23	315	68,8	4,58	299	75,8	3,94	279	83,9	3,32	255	94,1	2,71
	10	370	57,7	6,41	356	63,8	5,59	342	69,8	4,90	325	76,7	4,24	305	84,9	3,60	280	95,0	2,95
	12	385	58,4	6,59	372	64,5	5,77	359	70,6	5,09	340	77,4	4,40	317	85,4	3,71	292	95,4	3,06
	15	423	59,6	7,09	407	65,6	6,20	391	71,6	5,46	374	78,4	4,77	347	86,4	4,01	319	96,3	3,31
	18	461	60,6	7,61	443	66,7	6,64	425	72,9	5,83	406	79,4	5,11	377	87,4	4,32	348	97,2	3,58
120.2	5	371	67,4	5,51	357	74,9	4,77	343	82,4	4,17	326	91,3	3,58	303	102	2,99	277	115	2,40
	7	393	67,7	5,81	379	75,4	5,03	366	83,1	4,40	348	91,7	3,79	322	102	3,16	296	115	2,56
	10	435	68,3	6,36	418	76,1	5,49	401	83,9	4,77	383	92,5	4,14	355	103	3,45	326	115	2,83
	12	454	68,8	6,59	437	76,7	5,69	420	84,7	4,96	399	92,9	4,29	370	103	3,59	339	116	2,91
	15	494	69,8	7,07	476	77,7	6,13	458	85,5	5,36	435	93,8	4,63	405	104	3,89	372	117	3,17
	18	541	70,7	7,65	519	78,6	6,61	498	86,5	5,76	474	94,9	4,99	441	105	4,20	405	117	3,45

kWf = Cooling capacity in kW

kWe = total power input(kW)

EER = Ratio between delivered cooling capacity and power input

To = Water outlet temperature user side (°C)

Data refer to operation with a mix of water and propylene glycol at 30% on the source side

Configuration for 2-pipe system and 4-pipe system

Geothermal application

Cooling 0% - Heating 100% - Size 10.2 - 40.2

Size	To°C	Cold side water outlet temperature																	
		-6			-3			-1			0			1			3		
		kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP
10.2	30	25,7	5,53	4,64	28,1	5,49	5,12	29,7	5,46	5,44	30,6	5,45	5,61	31,5	5,43	5,80	33,2	5,40	6,15
	35	25,5	6,22	4,09	27,8	6,18	4,49	29,4	6,15	4,78	30,3	6,14	4,93	31,1	6,13	5,07	32,8	6,10	5,37
	45	25,2	8,04	3,13	27,4	7,96	3,44	28,9	7,91	3,65	29,7	7,89	3,76	30,5	7,86	3,88	32,1	7,82	4,10
	50	24,3	9,23	2,63	26,5	9,13	2,90	28,0	9,06	3,09	28,7	9,04	3,17	29,5	9,01	3,27	31,0	8,94	3,47
	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12.2	30	30,1	6,18	4,87	32,9	6,19	5,31	34,8	6,19	5,62	35,9	6,20	5,79	36,9	6,21	5,94	39,0	6,22	6,27
	35	29,9	6,98	4,28	32,5	7,01	4,64	34,4	7,02	4,90	35,4	7,03	5,04	36,4	7,04	5,17	38,4	7,06	5,44
	45	29,7	9,10	3,26	32,1	9,08	3,54	33,9	9,07	3,74	34,8	9,07	3,84	35,7	9,07	3,94	37,6	9,06	4,15
	50	28,8	10,5	2,74	31,3	10,5	2,98	33,0	10,4	3,17	33,9	10,4	3,26	34,7	10,4	3,34	36,5	10,4	3,51
	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14.2	30	35,1	7,27	4,83	38,4	7,32	5,25	40,6	7,35	5,52	41,8	7,37	5,67	43,1	7,39	5,83	45,5	7,44	6,12
	35	34,8	8,22	4,24	37,8	8,28	4,56	40,0	8,32	4,81	41,3	8,35	4,95	42,4	8,37	5,07	44,9	8,43	5,33
	45	34,4	10,6	3,24	37,4	10,6	3,53	39,4	10,7	3,68	40,5	10,7	3,79	41,6	10,7	3,89	43,8	10,7	4,10
	50	33,4	12,1	2,76	36,5	12,1	3,02	38,3	12,2	3,14	39,4	12,2	3,23	40,4	12,2	3,32	42,6	12,2	3,50
	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16.2	30	41,7	8,75	4,77	45,7	8,76	5,22	48,3	8,76	5,52	49,9	8,77	5,70	51,4	8,78	5,85	54,5	8,80	6,19
	35	41,4	9,74	4,25	45,2	9,76	4,63	47,7	9,77	4,89	49,1	9,78	5,02	50,6	9,8	5,16	53,5	9,83	5,44
	45	41,0	12,4	3,31	44,5	12,3	3,62	46,9	12,3	3,82	48,2	12,3	3,93	49,4	12,3	4,02	52,2	12,3	4,24
	50	39,8	14,2	2,81	43,2	14,1	3,07	45,5	14,1	3,24	46,7	14,1	3,32	47,9	14,1	3,41	50,5	14,0	3,61
	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19.2	30	50,0	10,1	4,95	54,8	10,2	5,37	58,1	10,2	5,69	59,8	10,2	5,86	61,6	10,2	6,03	65,1	10,2	6,38
	35	49,6	11,3	4,39	54,2	11,4	4,75	57,3	11,4	5,03	58,9	11,4	5,17	60,6	11,4	5,32	64,2	11,5	5,58
	45	48,7	14,4	3,39	53,0	14,4	3,69	55,9	14,4	3,89	57,7	14,4	4,01	59,2	14,4	4,12	62,3	14,4	4,33
	50	47,2	16,5	2,87	51,3	16,4	3,13	54,0	16,4	3,30	55,6	16,4	3,40	57,1	16,4	3,49	60,0	16,4	3,67
	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22.2	30	58,5	12,3	4,76	63,8	12,4	5,15	67,3	12,4	5,43	69,3	12,5	5,55	71,4	12,5	5,72	75,3	12,5	6,03
	35	57,8	13,6	4,26	63,1	13,8	4,58	66,6	13,9	4,80	68,3	13,9	4,92	70,6	13,9	5,09	74,5	14,0	5,33
	45	57,0	16,9	3,36	62,1	16,9	3,66	65,3	17,0	3,83	67,0	17,1	3,91	68,8	17,1	4,01	72,7	17,2	4,22
	50	55,7	19,2	2,90	60,3	19,2	3,14	63,4	19,2	3,30	64,9	19,3	3,36	66,7	19,3	3,45	70,2	19,4	3,61
	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27.2	30	69,8	14,3	4,89	76,0	14,4	5,29	80,4	14,5	5,56	82,9	14,5	5,73	85,4	14,5	5,90	90,5	14,5	6,25
	35	68,9	15,9	4,35	75,3	16,1	4,69	79,4	16,2	4,92	81,9	16,2	5,07	84,2	16,3	5,18	89,1	16,4	5,45
	45	67,4	19,7	3,42	73,4	19,8	3,70	77,5	19,9	3,89	79,6	20,0	3,98	81,7	20,1	4,06	86,3	20,2	4,27
	50	65,3	22,4	2,92	70,9	22,5	3,15	74,8	22,6	3,31	76,7	22,6	3,40	78,7	22,7	3,47	82,9	22,8	3,64
	55	-	-	-	68,3	25,1	2,72	72,1	25,2	2,86	73,8	25,2	2,93	75,7	25,3	3,00	79,6	25,3	3,15
30.2	30	78,7	16,5	4,79	86,0	16,5	5,19	90,9	16,6	5,46	93,5	16,7	5,58	96,4	16,7	5,76	102	16,7	6,11
	35	77,9	18,2	4,27	85,0	18,4	4,61	89,8	18,6	4,82	92,4	18,7	4,93	94,9	18,8	5,04	100	18,9	5,30
	45	76,2	22,3	3,42	82,9	22,6	3,67	87,5	22,7	3,85	90,1	22,8	3,95	92,6	22,9	4,04	97,4	23,1	4,22
	50	73,9	25,2	2,94	80,3	25,4	3,17	84,6	25,5	3,32	86,9	25,6	3,40	89,2	25,7	3,47	93,8	25,9	3,63
	55	-	-	-	77,7	28,2	2,75	81,7	28,3	2,88	83,8	28,3	2,95	85,8	28,4	3,02	90,1	28,5	3,16
35.2	30	88,5	18,9	4,67	97,0	19,0	5,10	102	19,2	5,32	105	19,2	5,48	109	19,3	5,66	116	19,3	6,02
	35	87,5	21,0	4,16	95,6	21,3	4,49	101	21,4	4,73	104	21,5	4,85	107	21,6	4,97	113	21,8	5,20
	45	85,8	25,8	3,33	93,3	26,1	3,58	98,3	26,2	3,76	101	26,3	3,86	104	26,4	3,96	110	26,7	4,14
	50	83,2	29,2	2,85	90,6	29,4	3,08	95,4	29,5	3,23	98,0	29,6	3,31	100	29,7	3,37	106	29,9	3,55
	55	-	-	-	-	-	-	92,6	33,0	2,81	94,7	33,0	2,87	97,4	33,1	2,94	102	33,3	3,07
40.2	30	102	21,7	4,71	111	21,9	5,08	118	22,0	5,38	122	22,0	5,56	125	22,1	5,67	133	22,2	6,01
	35	101	24,0	4,22	110	24,3	4,54	116	24,5	4,75	120	24,6	4,90	123	24,7	5,00	130	24,8	5,26
	45	99,5	29,4	3,38	108	29,7	3,64	114	29,9	3,82	117	30,0	3,91	120	30,1	4,00	126	30,3	4,17
	50	96,4	33,2	2,90	104	33,4	3,12	110	33,6	3,28	113	33,7	3,36	116	33,8	3,44	122	34,0	3,60
	55	-	-	-	-	-	-	106	37,2	2,86	109	37,4	2,93	112	37,4	3,01	117	37,6	3,12

kWt = Heating capacity (kW)

kWe = total power input(kW)

To = Water outlet temperature user side (°C)

COP = Ratio between delivered heating capacity and power input

Data refer to operation with a mix of water and propylene glycol at 30% on the source side

Configuration for 2-pipe system and 4-pipe system

Geothermal application

Cooling 0% - Heating 100% - Size 43.2 - 120.2

Size	To°C	Cold side water outlet temperature																	
		-6			-3			-1			0			1			3		
		kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP
43.2	30	112	24,2	4,65	123	24,4	5,06	130	24,5	5,33	133	24,6	5,43	138	24,6	5,63	146	24,8	5,91
	35	110	26,9	4,11	121	27,1	4,49	127	27,3	4,67	131	27,4	4,80	135	27,5	4,93	143	27,6	5,19
	45	109	32,9	3,32	118	33,2	3,57	124	33,4	3,72	128	33,5	3,83	132	33,6	3,94	139	33,8	4,13
	50	-	-	-	115	37,4	3,09	121	37,6	3,23	124	37,7	3,30	128	37,9	3,39	134	38,1	3,53
	55	-	-	-	-	-	-	-	-	-	-	-	-	123	42,0	2,94	130	42,2	3,09
45.2	30	120	25,4	4,74	131	25,6	5,14	138	25,8	5,37	143	25,8	5,57	147	25,9	5,70	156	26,1	6,00
	35	118	28,2	4,19	129	28,6	4,52	136	28,8	4,73	140	28,9	4,85	145	29,1	4,99	153	29,3	5,23
	45	117	35,0	3,35	127	35,2	3,62	133	35,4	3,77	137	35,5	3,87	141	35,7	3,96	148	35,9	4,14
	50	114	39,6	2,88	123	39,7	3,10	129	39,8	3,25	133	39,9	3,34	136	40,1	3,40	143	40,3	3,56
	55	-	-	-	-	-	-	126	44,4	2,85	129	44,5	2,91	132	44,6	2,97	138	44,8	3,09
50.2	30	130	27,7	4,70	142	27,9	5,10	151	28,1	5,38	156	28,2	5,54	160	28,3	5,66	171	28,5	5,97
	35	128	30,7	4,18	140	31,0	4,53	148	31,2	4,76	153	31,3	4,90	158	31,4	5,04	168	31,7	5,28
	45	126	38,0	3,33	138	38,2	3,63	145	38,4	3,79	149	38,5	3,89	153	38,5	3,98	162	38,7	4,19
	50	-	-	2,90	134	43,0	3,12	141	43,2	3,27	145	43,3	3,36	149	43,4	3,44	156	43,6	3,59
	55	-	-	-	-	-	-	-	-	-	-	-	-	144	48,3	2,99	151	48,5	3,13
55.2	30	143	30,5	4,70	157	30,8	5,11	168	31,0	5,40	173	31,1	5,54	178	31,2	5,69	189	31,4	6,00
	35	142	34,0	4,19	155	34,4	4,52	164	34,6	4,76	170	34,7	4,89	175	34,9	5,00	186	35,0	5,30
	45	140	42,0	3,34	152	42,3	3,60	160	42,5	3,77	165	42,6	3,88	171	42,8	3,98	180	43,0	4,17
	50	-	-	2,89	148	47,6	3,12	156	47,8	3,28	160	47,9	3,35	164	48,0	3,43	174	48,3	3,60
	55	-	-	-	-	-	-	-	-	-	-	-	-	159	53,2	3,00	168	53,5	3,13
60.2	30	159	34,2	4,66	176	34,5	5,09	186	34,7	5,35	192	34,9	5,49	198	35,0	5,65	210	35,3	5,94
	35	158	38,4	4,13	173	38,7	4,45	184	38,9	4,71	189	39,1	4,82	195	39,3	4,95	206	39,6	5,19
	45	157	47,7	3,30	170	47,9	3,54	180	48,0	3,74	185	48,2	3,83	189	48,3	3,91	200	48,6	4,11
	50	-	-	-	165	54,0	3,06	175	54,1	3,23	180	54,2	3,31	184	54,4	3,37	194	54,6	3,55
	55	-	-	-	-	-	-	170	60,3	2,81	174	60,4	2,88	179	60,5	2,95	187	60,6	3,08
70.2	30	182	38,4	4,73	199	38,8	5,11	211	39,1	5,38	217	39,3	5,51	224	39,5	5,66	238	39,9	5,95
	35	180	42,6	4,21	197	43,2	4,55	208	43,6	4,76	215	43,8	4,90	221	44,0	5,01	233	44,5	5,23
	45	178	52,5	3,38	194	53,0	3,65	204	53,4	3,81	210	53,6	3,91	216	53,8	4,01	227	54,2	4,18
	50	-	-	-	189	59,6	3,17	198	59,9	3,30	204	60,1	3,39	209	60,3	3,46	220	60,6	3,62
	55	-	-	-	-	-	-	193	66,3	2,90	198	66,6	2,97	202	66,8	3,02	212	67,2	3,15
80.2	30	202	42,6	4,73	221	43,2	5,11	234	43,7	5,35	241	44,0	5,47	248	44,2	5,61	264	44,8	5,89
	35	200	47,5	4,20	218	48,3	4,51	231	48,8	4,73	237	49,1	4,83	244	49,4	4,94	259	50,0	5,17
	45	198	58,3	3,39	214	59,1	3,62	227	59,7	3,80	233	59,9	3,89	239	60,2	3,97	252	60,8	4,14
	50	-	-	-	209	66,0	3,16	220	66,6	3,30	226	66,9	3,37	231	67,2	3,43	244	67,8	3,60
	55	-	-	-	-	-	-	213	73,5	2,89	218	73,9	2,94	224	74,2	3,01	235	74,8	3,14
90.2	30	229	50,5	4,52	249	50,9	4,88	263	51,2	5,13	270	51,4	5,25	278	51,6	5,38	295	51,9	5,68
	35	227	55,7	4,07	247	56,2	4,39	261	56,5	4,62	267	56,7	4,71	275	56,9	4,83	291	57,2	5,09
	45	225	69,4	3,24	244	69,7	3,50	256	69,9	3,66	262	70,0	3,74	269	70,1	3,84	284	70,4	4,03
	50	-	-	-	237	79,0	3,00	249	79,1	3,15	255	79,2	3,22	261	79,3	3,29	275	79,6	3,45
	55	-	-	-	-	-	-	242	88,3	2,74	247	88,4	2,79	253	88,5	2,86	266	88,7	3,00
100.2	30	246	55,3	4,44	268	55,9	4,79	283	56,3	5,02	290	56,5	5,13	299	56,8	5,26	316	57,3	5,52
	35	245	60,9	4,02	266	61,5	4,32	280	62,0	4,51	287	62,2	4,61	295	62,4	4,72	313	63,0	4,97
	45	243	75,4	3,22	263	76,0	3,46	276	76,4	3,61	283	76,6	3,69	290	76,8	3,77	307	77,3	3,97
	50	-	-	-	255	85,8	2,97	268	86,2	3,11	274	86,4	3,17	281	86,6	3,24	296	87,0	3,40
	55	-	-	-	-	-	-	260	96,0	2,71	266	96,2	2,76	273	96,4	2,83	286	96,8	2,95
120.2	30	290	67,3	4,31	314	67,9	4,62	331	68,3	4,85	341	68,5	4,98	349	68,7	5,08	369	69,1	5,34
	35	289	74,2	3,89	312	74,9	4,16	329	75,3	4,37	338	75,6	4,47	346	75,8	4,56	367	76,3	4,81
	45	287	92,6	3,10	309	93,1	3,32	326	93,5	3,49	333	93,6	3,56	341	93,8	3,63	360	94,2	3,82
	50	-	-	-	300	106	2,83	315	106	2,97	323	106	3,05	331	107	3,09	348	107	3,25
	55	-	-	-	-	-	-	305	119	2,56	312	119	2,62	321	120	2,68	336	120	2,80

kWt = Heating capacity (kW)

kWe = total power input(kW)

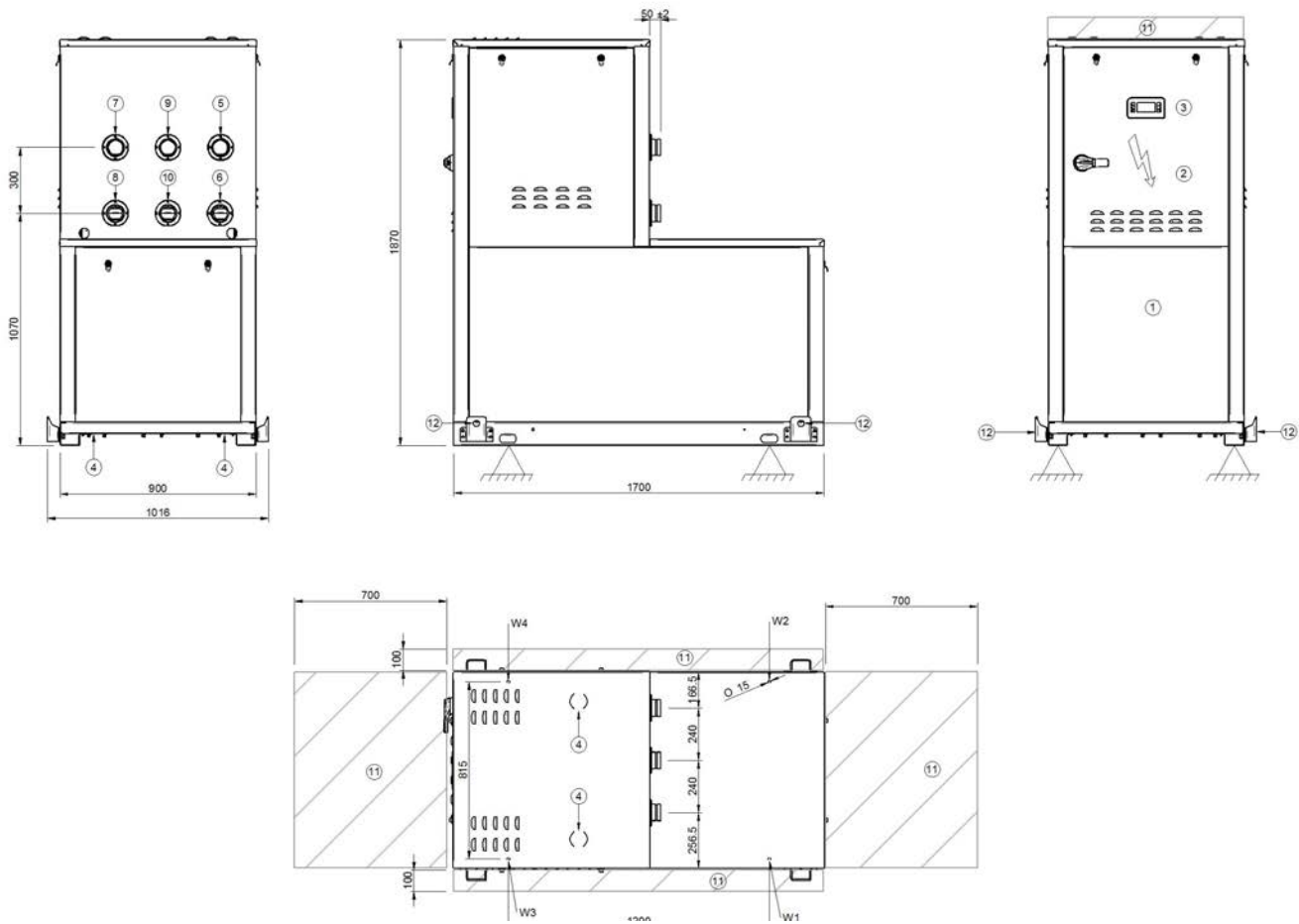
To = Water outlet temperature user side (°C)

COP = Ratio between delivered heating capacity and power input

Data refer to operation with a mix of water and propylene glycol at 30% on the source side

Dimensional drawings

WSHN-XEE MF sizes 10.2 - 30.2



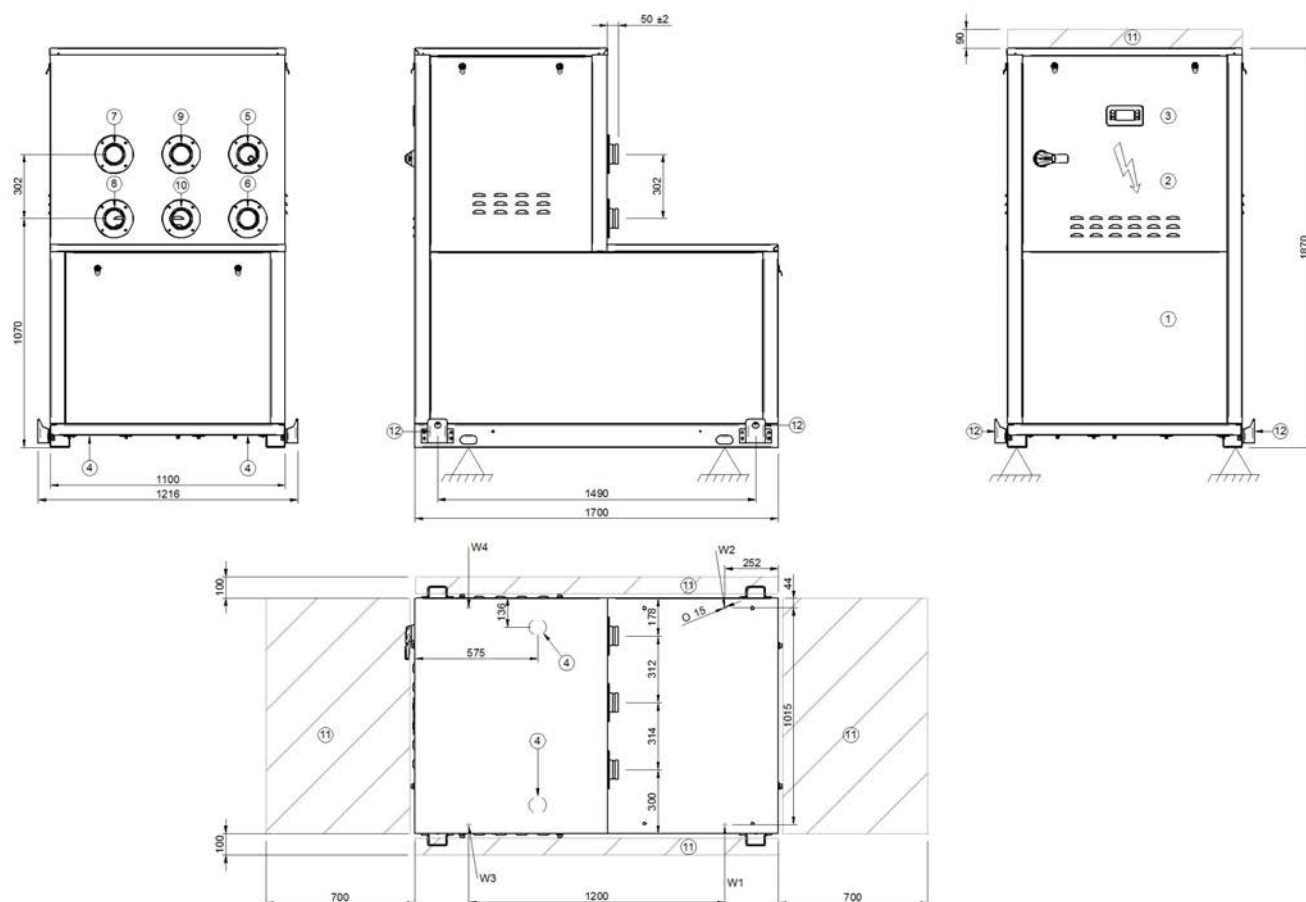
1. Compressor compartment
2. Electrical panel
3. Unit control keypad
4. Power input
5. Source side water return
6. Source side water supply
7. User side water return
8. User side water supply
9. Recovery side water return
10. Recovery side water supply
11. Functional spaces
12. Lifting brackets (removable)

Size		10.2	12.2	14.2	16.2	19.2	22.2	27.2	30.2
Length	mm	900	900	900	900	900	900	900	900
Height	mm	1870	1870	1870	1870	1870	1870	1870	1870
Depth	mm	1700	1700	1700	1700	1700	1700	1700	1700
Operating weight	kg	403	403	400	471	491	497	550	555
Shipping weight	kg	364	364	361	419	433	439	489	494

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

Dimensional drawings

WSHN-XEE MF sizes 35.2 - 80.2



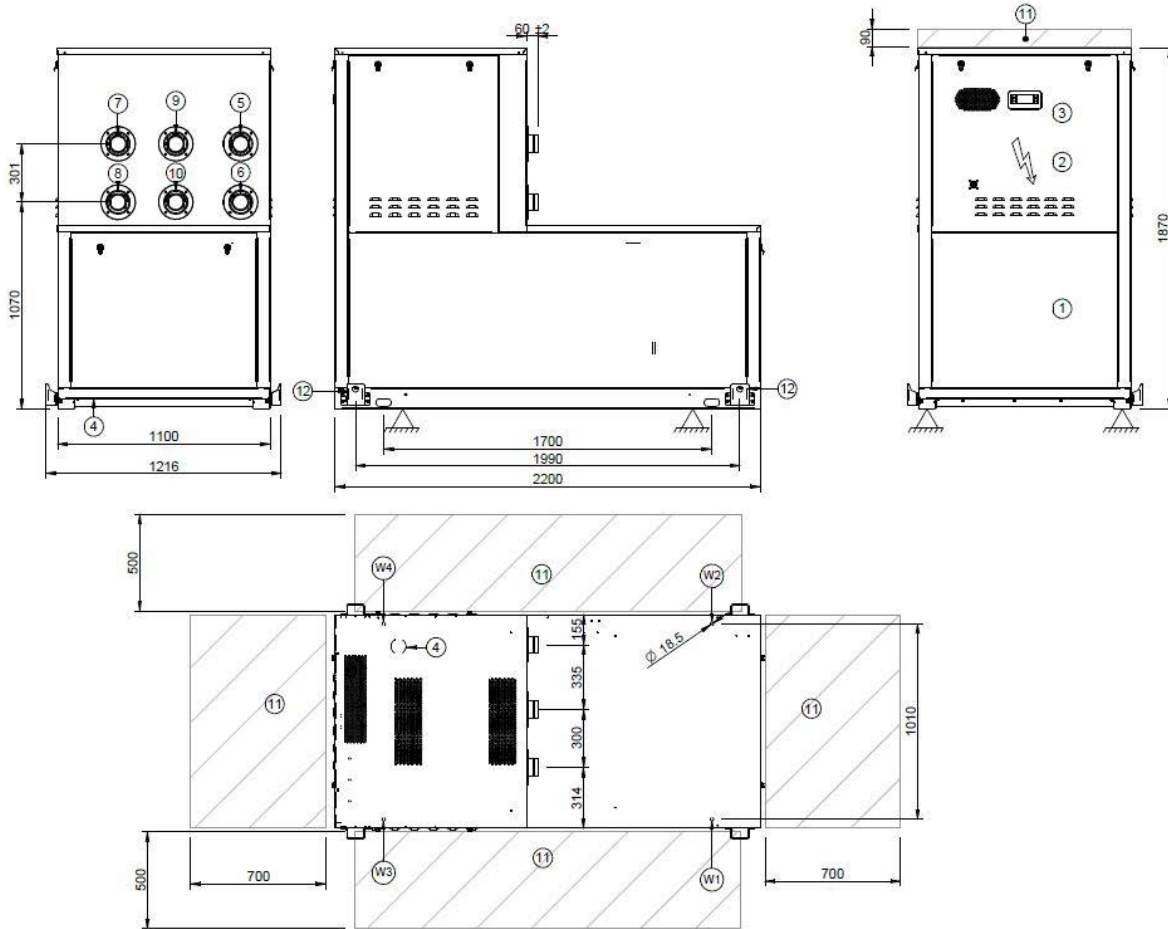
1. Compressor compartment
2. Electrical panel
3. Unit control keypad
4. Power input
5. Source side water return
6. Source side water supply
7. User side water return
8. User side water supply
9. Recovery side water return
10. Recovery side water supply
11. Functional spaces
12. Lifting brackets (removable)

Size		35.2	40.2	43.2	45.2	50.2	55.2	60.2	70.2	80.2
Length	mm	1100	1100	1100	1100	1100	1100	1100	1100	1100
Height	mm	1870	1870	1870	1870	1870	1870	1870	1870	1870
Depth	mm	1700	1700	1700	1700	1700	1700	1700	1700	1700
Operating weight	kg	656	721	816	754	901	924	941	1045	1056
Shipping weight	kg	595	650	729	667	801	824	841	927	938

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

Dimensional drawings

WSHN-XEE2 MF sizes 90.2 - 120.2



1. Compressor compartment
2. Electrical panel
3. Unit control keypad
4. Power input
5. Source side water return
6. Source side water supply
7. User side water return
8. User side water supply
9. Recovery side water return
10. Recovery side water supply
11. Functional spaces
12. Lifting brackets (removable)

Size		90.2	100.2	120.2
Length	mm	1100	1100	1100
Height	mm	1870	1870	1870
Depth	mm	2200	2200	2200
Operating weight	kg	1186	1412	1539
Shipping weight	kg	1038	1188	1238

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

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