

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

## ELFOEnergy Ground Medium<sup>2</sup>

WSHN-XEE2 MF 12.2-80.2 RANGE



TECHNICAL BULLETIN



SIZE	12.2	16.2	19.2	22.2	27.2	35.2	40.2	45.2	55.2	60.2	70.2	80.2
COOLING CAPACITY KW	34,3	48,0	57,2	66,2	81,0	105	119	142	166	190	214	241
HEATING CAPACITY KW	40,4	56,8	67,2	79,8	94,0	120	139	163	196	219	253	280

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Clivet is taking part in the EUROVENT certification programme up to 1.500 kW. The products concerned appear in the certified products list of the EUROVENT [www.eurovent-certification.com](http://www.eurovent-certification.com) site.

# ELFOEnergy Ground Medium<sup>2</sup>

three solutions to satisfy different installation requirements

## GROUND MEDIUM<sup>2</sup> - COOLING ONLY or HEATING ONLY

### WSH-XEE2:



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



## GROUND MEDIUM<sup>2</sup> - HEAT PUMP

### WSHN-XEE2:



- Reversible-cycle heat pump
- Partial energy recovery
- Domestic hot water production with DHW switching valve



## GROUND MEDIUM<sup>2</sup> - MULTIFUNCTION

### WSHN-XEE2 MF:

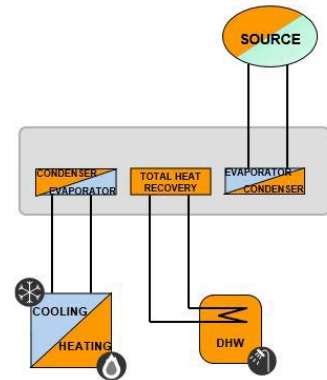
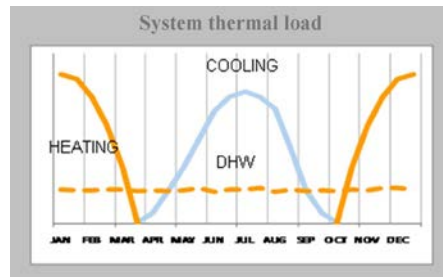


- Reversible-cycle heat pump
- Simultaneous production of hot and chilled water

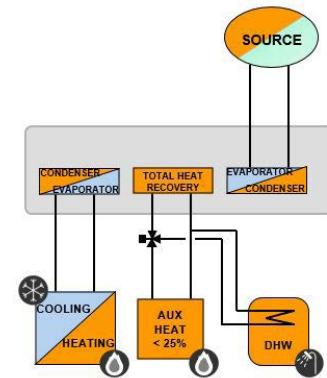
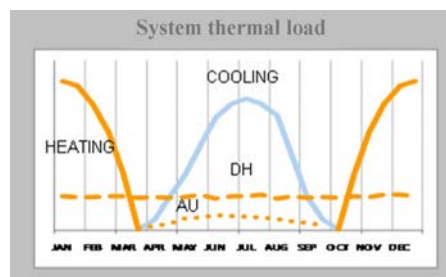


## Reversible 2-pipe systems:

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

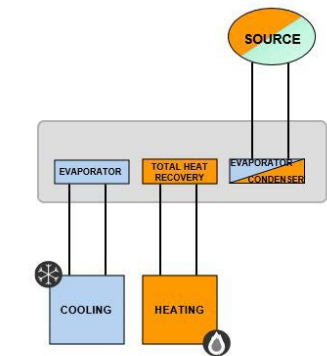
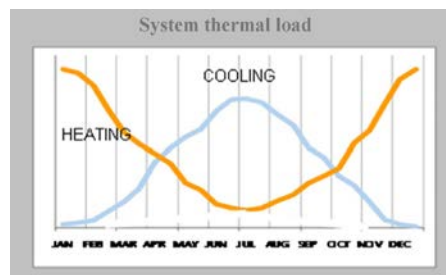


- Production of chilled or hot water on the user side
- Production of hot water on the recovery side (Free in summer)
- Priority hot water production with 3-way valve

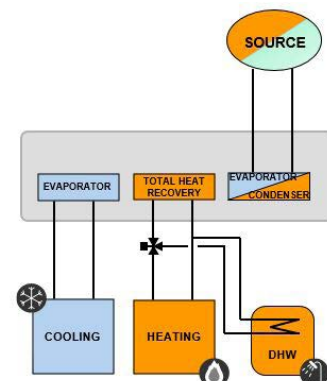
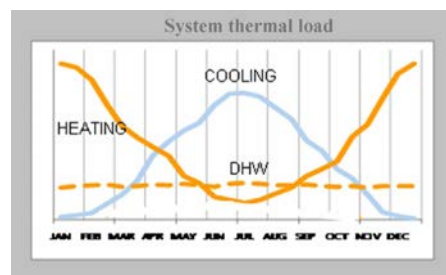


## Systems with 4 pipes:

- 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



# 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
- compressor control contactor

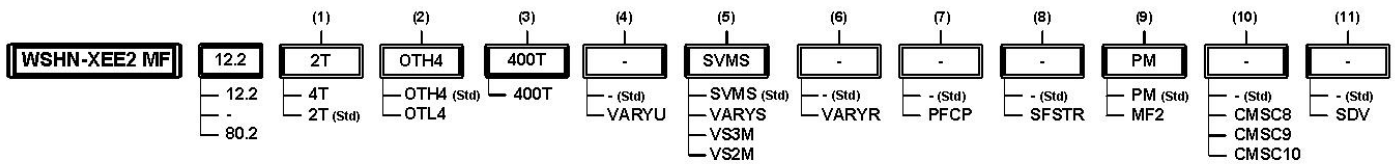
The control section includes:

- 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 (MO-DBUS)
- CMSLWX - LonWorks serial communication module
- BACX - BACnet serial communication module
- AVIBX - Anti-vibration mount supports
- RCTX - Remote control
- VACSRX - Total recovery side DHW switching valve

## 2-pipe system



### (1) Functionalities

2T - Unit for reversible 2-pipe system (standard)  
4T - Unità per impianto a 4 tubi

### (2) Version

OTH4 - Operating conditions above 4 ° C (standard)  
OTL4 - Operating conditions below 4 ° C

### (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

### (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

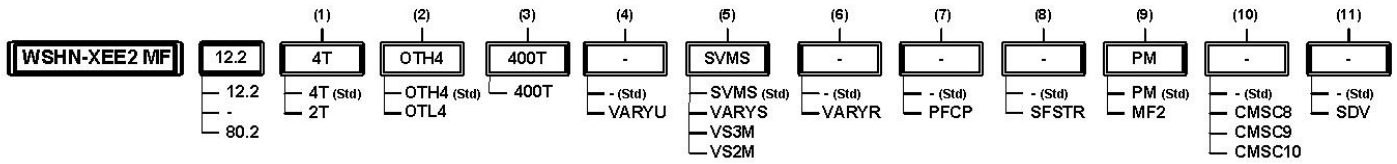
### (11) Cutoff valve

(-) not required (standard)  
SDV - Cutoff valve on compressor supply and return

FUNCTIONALITIES	DIAGRAM HYDRONIC ASSEMBLIES			
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)

# Unit configuration

## 4-pipe system



### (1) Functionalities

4T - Unità per impianto a 4 tubi (standard)  
2T - Unit for reversible 2-pipe system

### (2) Version

OTH4 - Operating conditions above 4 ° C (standard)  
OTL4 - Operating conditions below 4 ° C

### (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

### (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)

## **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.

## **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)

## **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)

## **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.

## **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.

## **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.

## **PFCP Power factor correction capacitors (cosfi > 0.9)**

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



# Accessories separately supplied

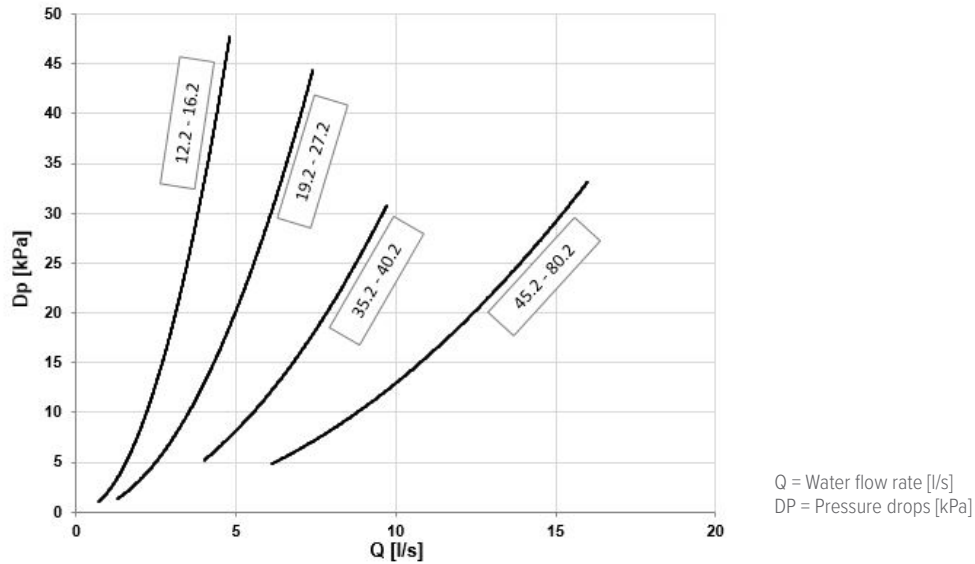
## VS2MX

### 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

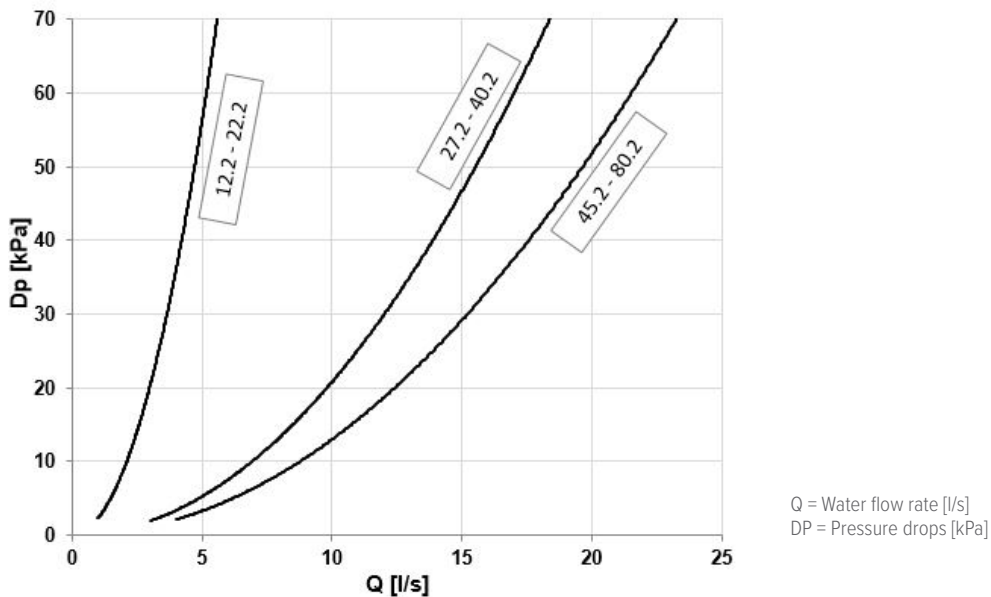
### Source side 3-way modulating valve

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

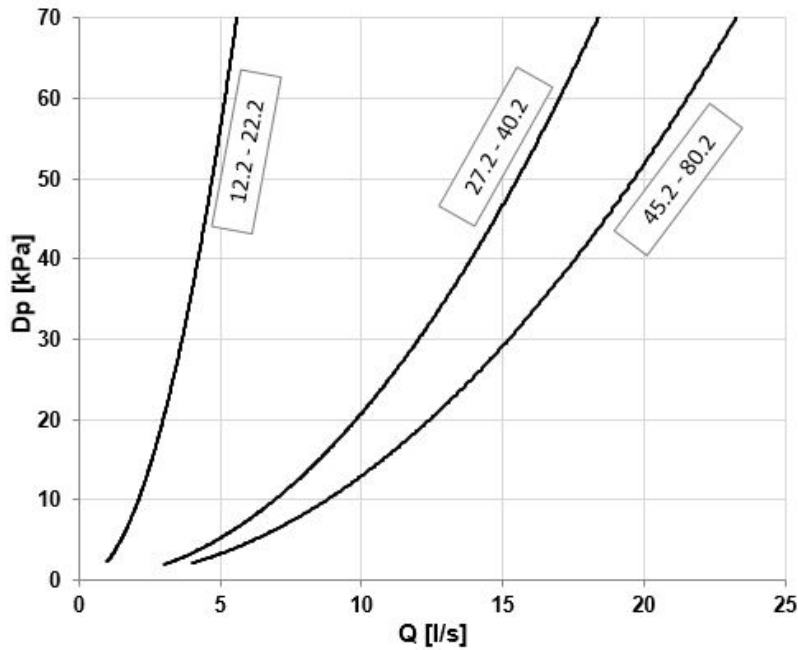


## VACSRX

### 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



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

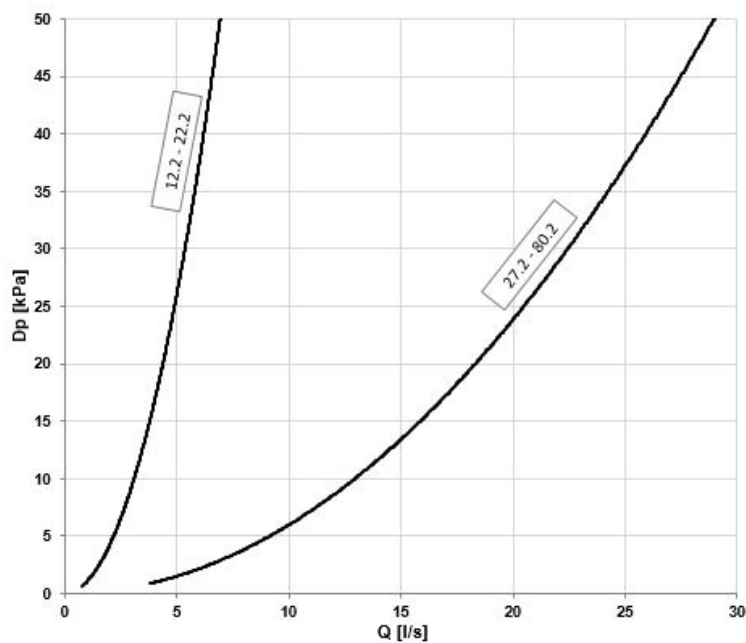
## IFWX

### 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



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

# Accessories separately supplied

## **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.

## **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)

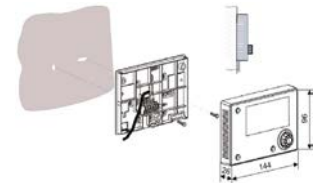
## **RCTX Remote control**

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.



## **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.

## **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.

## OTH4 - Operating conditions above 4°C - Performance

SIZE		12.2	16.2	19.2	22.2	27.2	35.2	40.2	45.2	55.2	60.2	70.2	80.2
<b>COOLING</b>													
Cooling capacity	1 kW	34,4	48,2	57,4	66,5	81,3	105	120	142	167	190	215	242
Total power input	1 kW	7,34	10,3	12,0	14,8	17,2	22,9	26,0	30,7	36,8	41,5	47,0	53,3
EER	1 kW	4,69	4,68	4,78	4,49	4,73	4,60	4,61	4,63	4,54	4,59	4,56	4,53
Cold side exchanger water flow rate	1 -	1,64	2,30	2,74	3,18	3,88	5,03	5,72	6,78	7,98	9,09	10,2	11,5
Cold side exchanger pressure drop	1 l/s	30	37	32	42	28	25	32	27	36	31	39	34
Source side exchanger water flow rate	1 kPa	1,99	2,80	3,32	3,88	4,71	6,13	6,97	8,25	9,74	11,1	12,5	14,1
Source side exchanger pressure drop	1 l/s	29	40	51	70	22	36	28	38	35	45	39	49
Cooling capacity (EN14511:2018)	2 kPa	34,3	48,0	57,2	66,2	81,0	105	119	142	166	190	214	241
Total power input (EN14511:2018)	3 kW	7,69	10,9	12,7	15,7	17,8	23,7	26,9	31,8	38,2	43,1	48,8	55,3
EER (EN14511:2018)	4 kW	4,46	4,42	4,51	4,20	4,56	4,42	4,43	4,45	4,36	4,40	4,38	4,35
SEER	11 -	5,30	4,85	4,84	4,85	5,05	5,17	5,31	5,29	4,93	4,92	5,00	4,82
<b>HEATING</b>													
Heating capacity	5 kW	40,3	56,6	66,8	79,2	93,7	119	139	163	195	218	252	279
Total power input	5 kW	9,02	12,4	14,5	17,4	20,3	26,8	30,7	36,3	43,3	48,9	54,9	61,5
COP	5 -	4,47	4,56	4,61	4,55	4,62	4,46	4,51	4,48	4,50	4,45	4,59	4,53
Hot side exchanger water flow rate	5 l/s	1,93	2,70	3,19	3,78	4,48	5,70	6,62	7,77	9,30	10,4	12,0	13,3
Hot side exchanger pressure drop	5 kPa	27	37	48	66	30	48	38	51	47	58	49	60
Source side exchanger water flow rate	5 l/s	2,49	3,52	4,16	4,92	5,84	7,37	8,58	10,1	12,1	13,4	15,7	17,3
Source side exchanger pressure drop	5 kPa	43,7	62,2	80,1	111	32,8	50,5	41,3	55,6	53,0	65,2	61,0	74,0
Heating capacity (EN14511:2018)	6 kW	40,4	56,8	67,2	79,8	94,0	120	139	163	196	219	253	280
Total power input (EN14511:2018)	3 kW	9,42	13,2	15,6	19,0	21,1	28,2	32,0	38,2	45,3	51,5	57,6	65,0
COP (EN14511:2018)	7 -	4,29	4,32	4,31	4,20	4,46	4,25	4,34	4,28	4,31	4,25	4,39	4,31
ErP Space Heating Energy Class - AVERAGE Climate - W35	10	A+++	A+++	-	-	-	-	-	-	-	-	-	-
SCOP - AVERAGE Climate - W35	11	5,69	5,45	5,47	4,85	5,97	5,67	5,84	5,68	5,68	5,55	5,63	5,45
ErP Space Heating Energy Class - AVERAGE Climate - W55	10	A+++	A+++	A+++	-	-	-	-	-	-	-	-	-
SCOP - AVERAGE Climate - W55	11	4,56	4,42	4,42	4,46	4,89	4,60	4,69	4,67	4,64	4,61	4,69	4,65
<b>COOLING 100% - HEATING 100%</b>													
Cooling capacity	8 kW	31,3	43,9	52,1	61,2	73,8	95,2	108	128	151	174	195	219
Heating capacity	8 kW	40,4	56,4	66,7	78,8	94,4	123	139	165	195	223	251	282
Total power input	8 kW	9,12	12,5	14,6	17,6	20,6	27,3	31,1	36,7	43,9	49,1	55,8	63,0
Global efficiency	9 -	7,86	8,02	8,14	7,95	8,16	7,97	7,95	7,97	7,88	8,10	7,99	7,96
Cold side exchanger water flow rate	8 l/s	1,49	2,10	2,49	2,92	3,52	4,55	5,16	6,11	7,22	8,33	9,32	10,5
Cold side exchanger pressure drop	8 kPa	25	31	26	36	23	21	26	22	30	26	33	28
Hot side exchanger water flow rate	8 l/s	1,93	2,69	3,19	3,76	4,51	5,85	6,65	7,86	9,32	10,7	12,0	13,5
Hot side exchanger pressure drop	8 kPa	27	37	48	66	31	50	38	53	47	60	49	61

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: Cold side exchanger water temperature 12/7°C. Source side exchanger water temperature 30/35°C.
2. Data referred to the following conditions: Cold side exchanger water temperature 12/7°C. Source side exchanger water temperature 30/35°C. Performance data calculated with reference to EN14511:2018
3. The total power draw is calculated by adding the compressor's power draw + the draw required to overcome the internal service and source side pressure drops + the control circuit power draw
4. EER (EN 14511:2018) cooling performance coefficient. Ratio between delivered cooling capacity and power input in compliance with EN 14511:2018
5. Data referred to the following conditions: Hot side exchanger water temperature 40/45°C. Source side exchanger water temperature 10/7°C.
6. Data referred to the following conditions: Hot side exchanger water temperature 40/45°C Source side exchanger water temperature 10/7°C. Performance data calculated with reference to EN14511:2018
7. COP (EN 14511:2018) heating performance coefficient. Ratio between delivered heating capacity and power input in compliance with EN 14511:2018
8. Data referred to the following conditions: Temperatura acqua allo scambiatore lato freddo 12/7°C. Temperatura acqua allo scambiatore lato caldo 40/45°C.
9. Overall efficiency. Calculated as (cooling capacity delivered + heating capacity delivered)/(total power input).
10. Seasonal Space Heating Energy Efficiency Class according to Commission delegated Regulation (EU) No 811/2013. W = Water outlet temperature (°C)
11. Data calculated according to the EN 14825:2018 Regulation

# General technical data

## OTH4 - Operating conditions above 4°C - Constructions

SIZE		12.2	16.2	19.2	22.2	27.2	35.2	40.2	45.2	55.2	60.2	70.2	80.2
<b>COMPRESSOR</b>													
Type of compressors		Scroll											
Refrigerant		R-410A											
No. of compressors	Nr	2	2	2	2	2	2	2	2	2	2	2	2
Std Capacity control steps	Nr	3	3	3	3	3	3	3	3	3	2	3	2
Oil charge	l	3,0	5,8	5,8	5,8	6,6	8,0	10,1	11,0	13,1	12,6	12,6	12,6
Refrigerant charge	kg	6,0	10,5	11,0	11,0	18,0	20,0	24,0	24,0	30,0	32,0	35,0	40,0
Refrigeration circuits	Nr	1	1	1	1	1	1	1	1	1	1	1	1
<b>COOLSIDE EXCHANGER</b>													
Type of exchanger	1	PHE											
No. of exchangers	Nr	1	1	1	1	1	1	1	1	1	1	1	1
Water content	l	3,2	4,3	5,9	5,9	7,2	9,8	9,8	13,2	13,2	17,2	17,2	23,0
<b>HEATING SIDE EXCHANGER</b>													
Type of exchanger	1	PHE											
No. of exchangers	Nr	1	1	1	1	1	1	1	1	1	1	1	1
Water content	l	4,7	6,8	7,8	7,8	10,6	10,6	14,2	14,2	18,6	18,6	25,0	25,0
<b>SOURCE SIDE EXCHANGER</b>													
Type of exchanger	1	PHE											
No. of exchangers	Nr	1	1	1	1	1	1	1	1	1	1	1	1
Water content	l	4,7	6,8	7,8	7,8	9,8	9,8	13,2	13,2	17,2	17,2	23,0	23,0
<b>CONNECTIONS</b>													
Water fittings		2"1/2	2"1/2	2"1/2	2"1/2	3"	3"	3"	3"	3"	3"	3"	3"
<b>WATER CIRCUIT</b>													
Maximum water side pressure	2 MPa	1	1	1	1	1	1	1	1	1	1	1	1
Minimum content cold side water system		300	480	480	480	750	1000	1000	1000	1600	2050	2050	2650
Minimum content hot side water system		300	470	470	470	730	950	950	950	1550	2000	2000	2550
<b>POWER SUPPLY</b>													
Standard power supply	V	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50

1. PHE = plate exchanger

2. Conditions for the circuit on the cold side, hot side and the circuit on the source side. In configurations with hydronic units, the maximum pressure on the water side is 600 kPa.

## Electrical data

SIZE		12.2	16.2	19.2	22.2	27.2	35.2	40.2	45.2	55.2	60.2	70.2	80.2
<b>F.L.A. - Full load current at max admissible conditions</b>													
F.L.A. - Total	A	23,8	31,5	36,4	44,9	51,8	66,8	74,9	89,6	104	119	133	148
<b>F.L.I. - Full load power input at max admissible conditions</b>													
F.L.I. - Total	kW	14,0	19,5	22,4	26,3	30,2	39,6	44,6	53,1	63,7	72,2	81,0	90,0
<b>M.I.C. Maximum inrush current</b>													
M.I.C. - Value	A	111	126	133	189	196	256	302	340	355	370	468	482
M.I.C. with soft start accessory	A	65,2	76,2	80,0	111	118	154	180	201	216	230	284	299

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)
12.2	78	69	62	56	52	44	43	38	60	44
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
35.2	81	83	80	67	61	61	52	45	74	58
40.2	81	79	80	67	65	63	55	50	74	58
45.2	81	78	80	69	66	62	55	48	74	58
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

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

# General technical data

## Fouling Correction Factors

m <sup>2</sup> °C/W	INTERNAL EXCHANGER		EXTERNAL EXCHANGER	
	F1	FK1	F1	FK1
0,44 x 10 <sup>^(-4)</sup>	1,00	1,00	1,00	1,00
0,88 x 10 <sup>^(-4)</sup>	0,97	0,99	0,97	1,08
1,76 x 10 <sup>^(-4)</sup>	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	–	0,997	0,993	0,990	0,988	0,986	0,984	0,982	1,124
Internal exchanger glycol solution flow factor	–	1,003	1,010	1,020	1,033	1,050	1,072	1,095	1,124
INTERNAL exchanger pressure drop factor	–	1,029	1,060	1,090	1,118	1,149	1,182	1,211	1,243
EXTERNAL exchanger chiller power factor	–	0,999	0,997	0,995	0,992	0,989	0,986	0,983	0,979
EXTERNAL exchanger compressor power draw factor	–	1,003	1,006	1,009	1,031	1,043	1,056	1,071	1,088
External exchanger glycol solution Flow-rate factor	–	1,004	1,011	1,020	1,031	1,043	1,056	1,071	1,088
EXTERNAL exchanger pressure drop factor	–	1,027	1,062	1,103	1,149	1,200	1,256	1,318	1,387

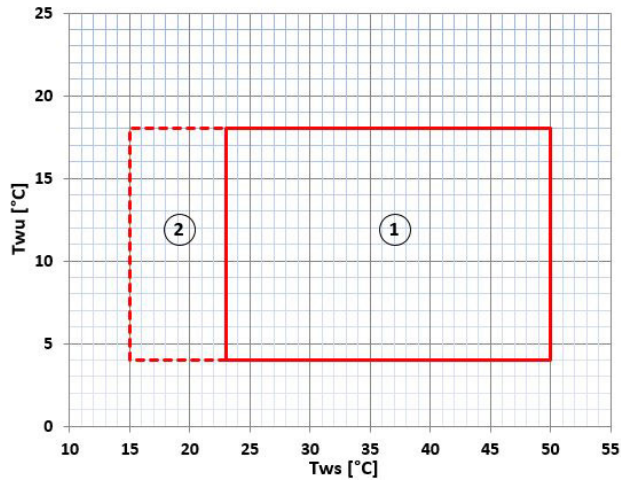
## Overload and control device calibrations

		APRE	CHIUDE	VALORE
High pressure switch (gas side)	[kPa]	4050	3300	-
Low pressure alarm (gas side)	[kPa]	450	600	-
Pressostato di bassa pressione (GEO) (lato gas)	[kPa]	200	350	-
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)	[n°]	-	-	10
Differential pressure switch (water side)	[kPa]	3	5	-
Max. pressure without hydronic assembly (water side)	[kPa]	-	-	1000
Max. pressure with hydronic assembly (water side)	[kPa]	-	-	600
Safety valve calibration (water side) (1)	[kPa]	-	-	600

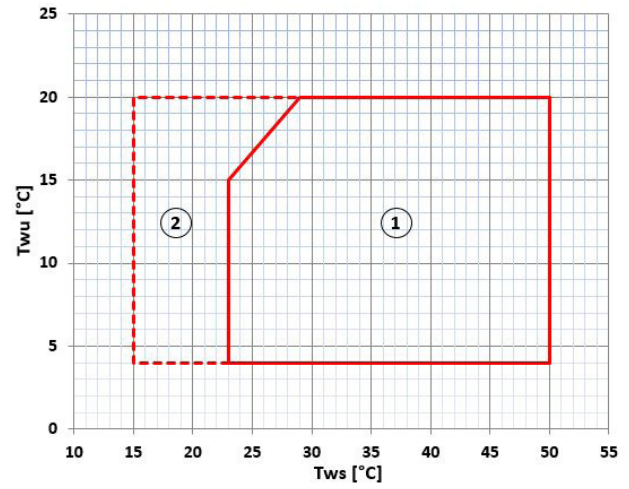
(1) Available only with hydronic assembly option

## Operating range - Cooling

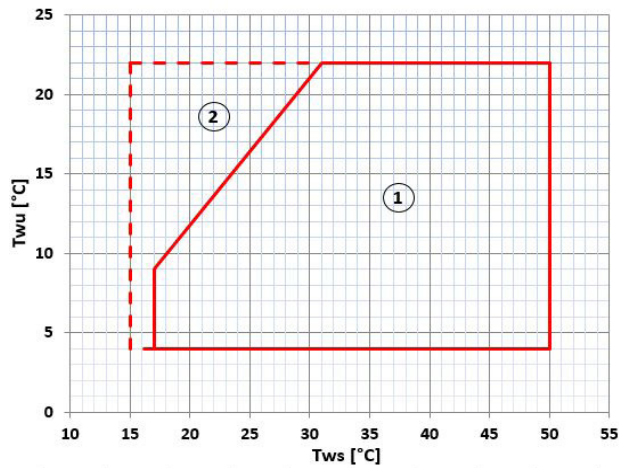
Size 12.2



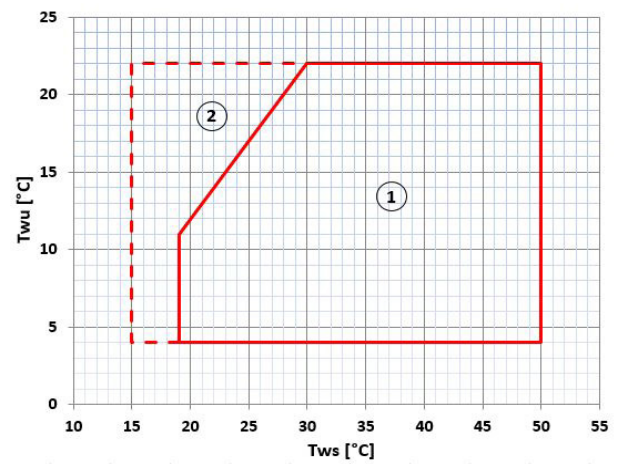
Size 16.2



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



Size 55.2-60.2-70.2-80.2



T<sub>wu</sub> [°C] = leaving water temperature user side  
 T<sub>ws</sub> [°C] = leaving water temperature source side  
 The limits refer to DT=5 °C on both the service and source sides

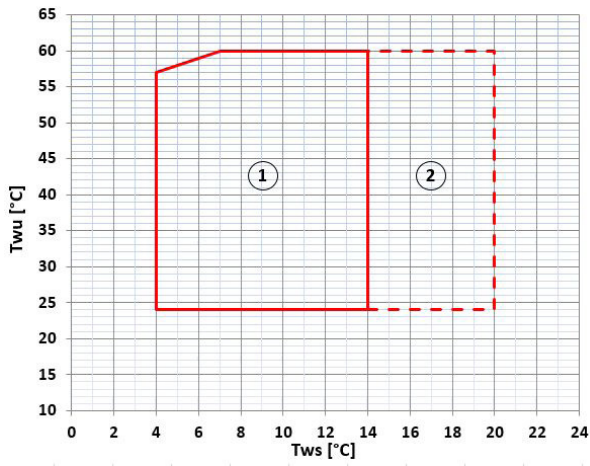
1. Normal operating range
2. Operating range with modulating valve on source side in regulation mode (optional configurations)



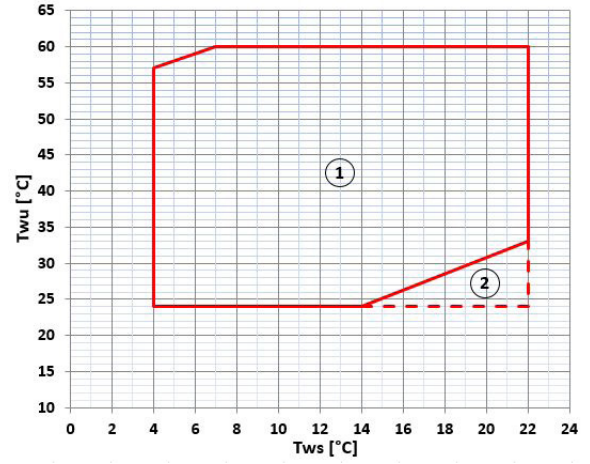
# General technical data

## Operating range - Heating - OTH4 - Operating conditions above 4°C

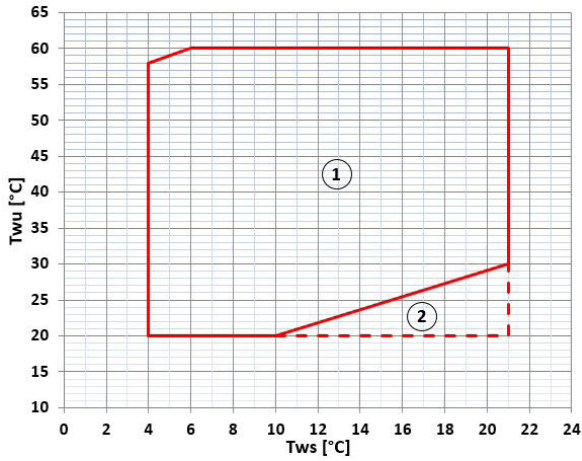
Size 12.2



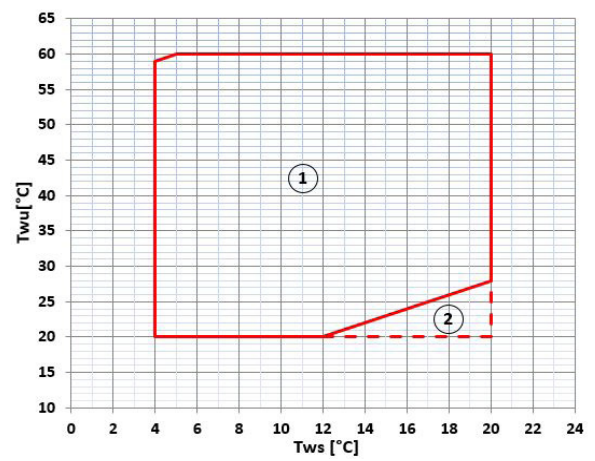
Size 16.2



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



Size 55.2-60.2-70.2-80.2



Twu [°C] = Leaving water temperature user side (2-pipe) or recovery side (4-pipe)

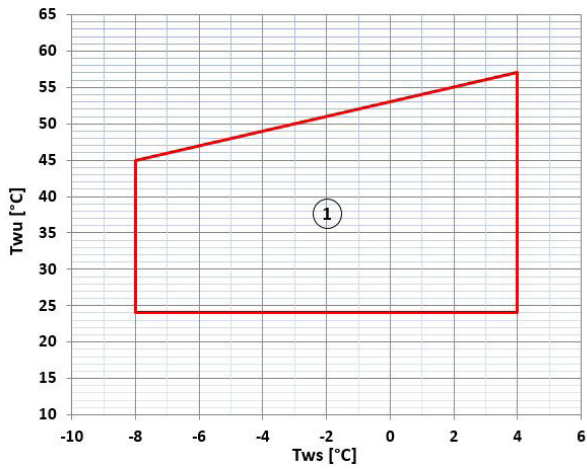
Tws [°C] = Leaving water temperature source side

The limits refer to DT=5 °C user side, source side and recovery side

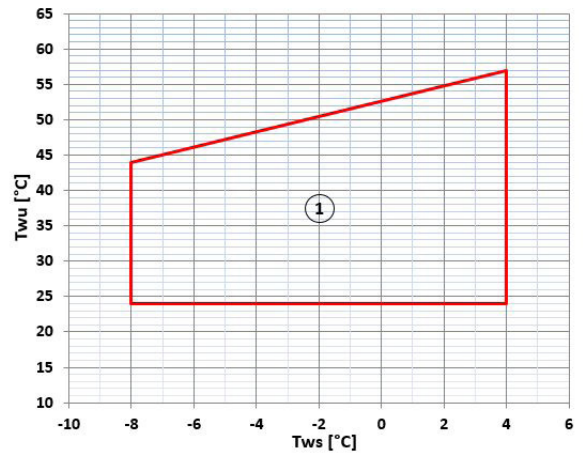
1. Normal operating range
2. Operating range where it is obligatory the use of water and glycol mixture depending on the outlet water temperature from the heat exchanger source side

## Operating range - Heating - OTL4 - Operating conditions below 4°C

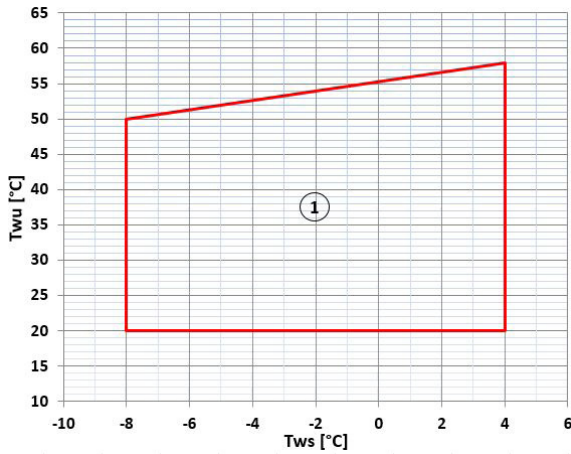
Size 12.2



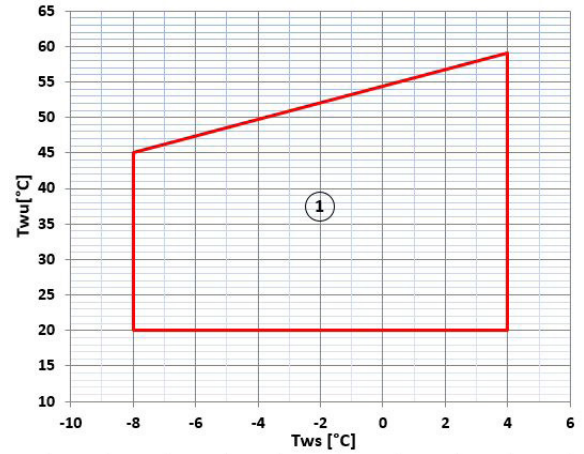
Size 16.2



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



Size 55.2-60.2-70.2-80.2



Twu [°C] = Leaving water temperature user side (2-pipe) or recovery side (4-pipe)

Tws [°C] = Leaving water temperature source side

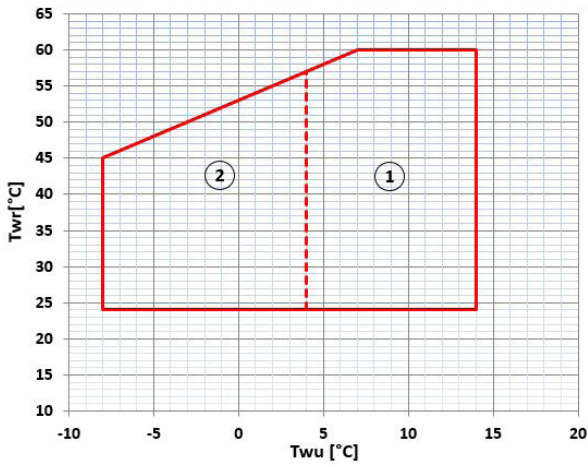
The limits refer to DT=5 °C user side, source side and recovery side

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

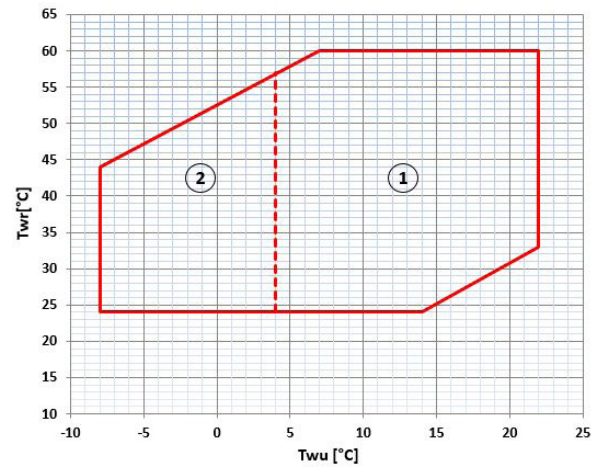
# General technical data

## Operating range - Cooling 100% - Heating 100%

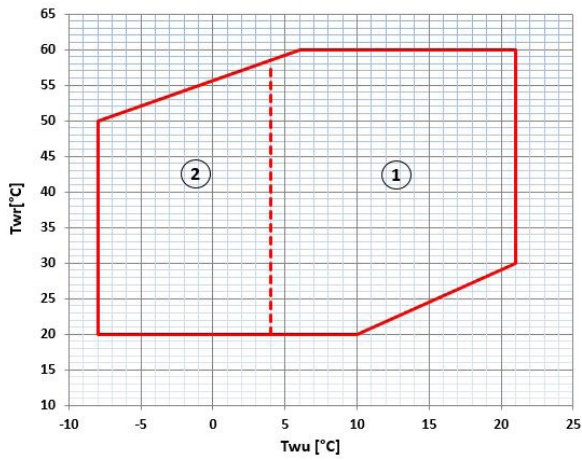
Size 12.2



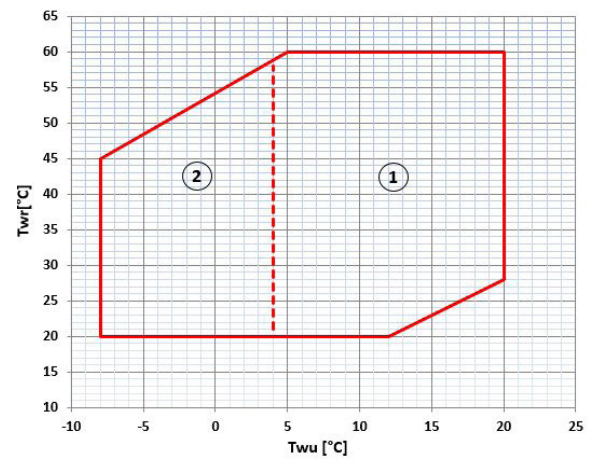
Size 16.2



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



Size 55.2-60.2-70.2-80.2



Twu [°C] = Leaving water temperature user side (2/4-pipe)  
 Twr [°C] = Leaving water temperature source side (2/4-pipe)  
 The limits refer to DT=5 °C user side and source side

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 user side (2/4-pipe)

## 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 X 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.

# Electronic control

## Description of step start-up control

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

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



## Main controls

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

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

## Unit status display

Attraverso l'interfaccia utente è possibile visualizzare:

- stato e modo di funzionamento delle unità;
- temperatura ingresso/uscita acqua;
- temperature e pressioni del circuito frigorifero;
- segnalazione allarmi e anomalie in corso.

## Probe, transducer and parameter display

A user interface dedicated section allows the maintenance or technical assistance personnel to control the unit operating stata. This section is accessible only by specialized personnel.

## Management of more units in cascade (ECOSHARE)

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

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

Sizes can be different.

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

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

## Remote control (RCTX)

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

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

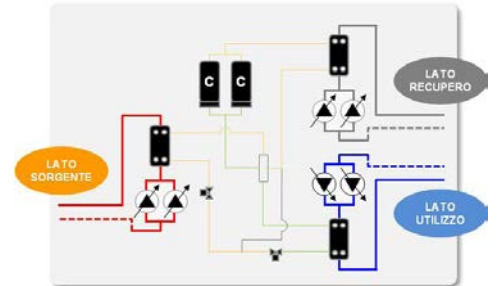
## 2-pipe unit operating range

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  $\Delta t$ .

### Example of how the unit operates

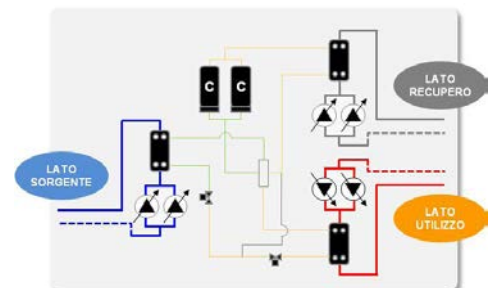
- **System cooling only:**

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.



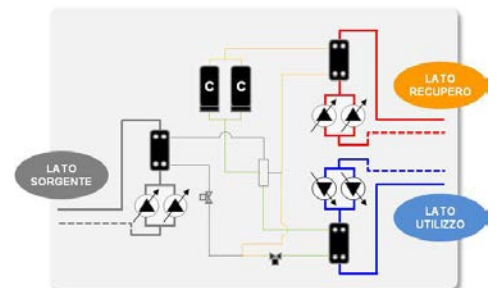
- **System heating only:**

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.



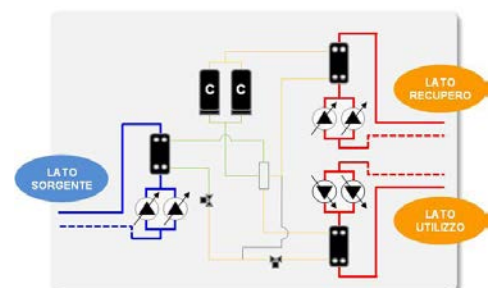
- **System cooling requirements and free production of domestic hot water:**

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.



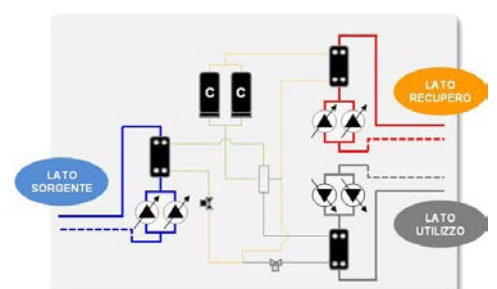
- **System heating requirements and production of domestic hot water:**

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.



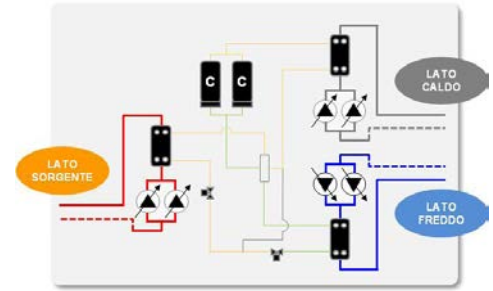
# 4-pipe unit operating range

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  $\Delta t$ .

## Example of how the unit operates

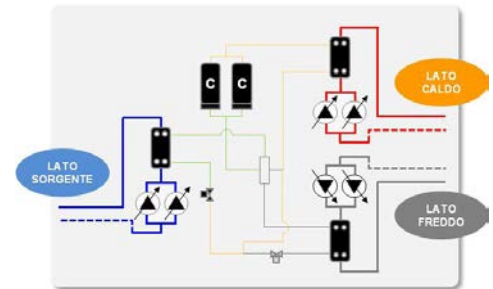
- **Cooling requirement 100%, Heating requirement 0%:**

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.



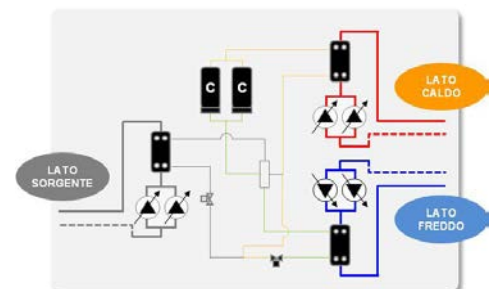
- **Cooling requirement 0%, Heating requirement 100%:**

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.

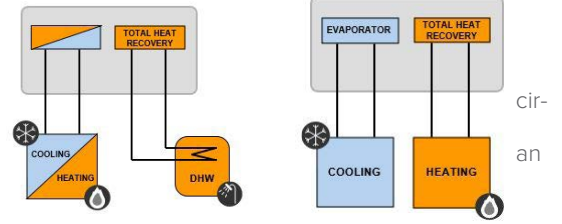


## User side and recovery side (2/4-pipe)

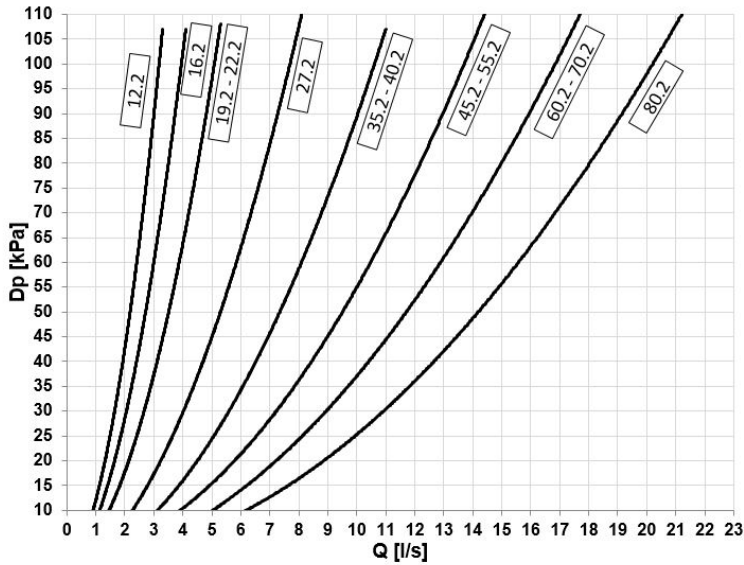
### Standard unit (STD)

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 on/off or 0-10V signal.



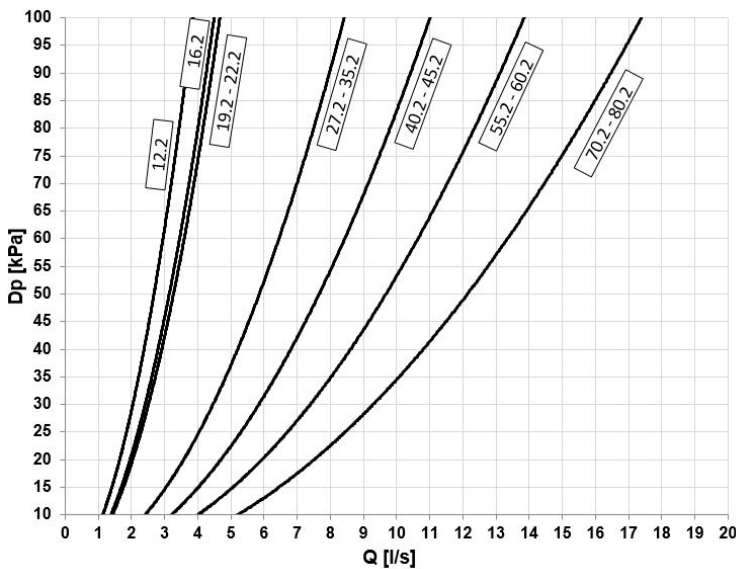
### User side exchanger pressure drop curves (2 pipe), cooling side exchanger (4 pipe)



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).



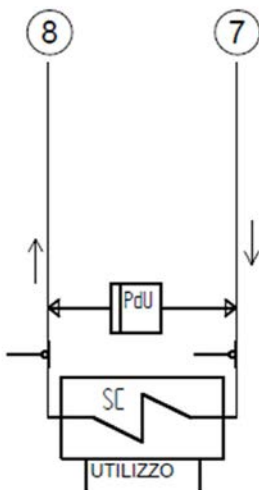
# Configurations

## 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.

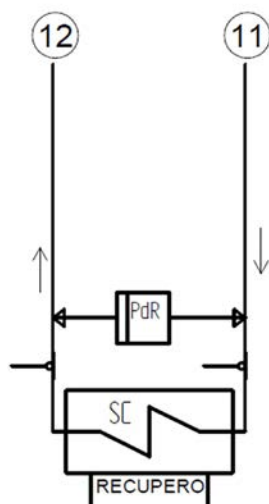
SIZE			12.2	16.2	19.2	22.2	27.2	35.2	40.2	45.2	55.2	60.2	70.2	80.2
Recovery side (2 pipe) or Heating side (4 pipe)	Qmin	[l/s]	0,8	1,0	1,1	1,1	1,8	1,8	2,4	2,4	2,9	2,9	3,8	3,8
	Qmax	[l/s]	4,2	4,8	4,9	5,1	8,8	9,3	11,4	12,2	15,0	15,4	18,3	19,0
User side (2 tubi) or Cooling side (4 tubi)	Qmin	[l/s]	0,8	1,0	1,1	1,1	1,9	2,6	2,6	3,5	3,5	4,5	4,5	5,0
	Qmax	[l/s]	3,5	4,4	4,9	5,1	8,5	11,5	11,5	14,5	15	18	18,5	21,5

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



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

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



11 = Recovery side inlet  
12 = Recovery side outlet  
PdR = Recovery side differential pressure switch  
SC = Plate heat exchangers

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

### 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.

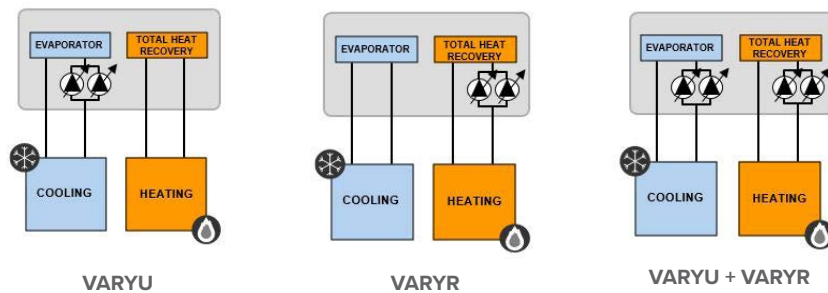
The electric pumps are equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

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

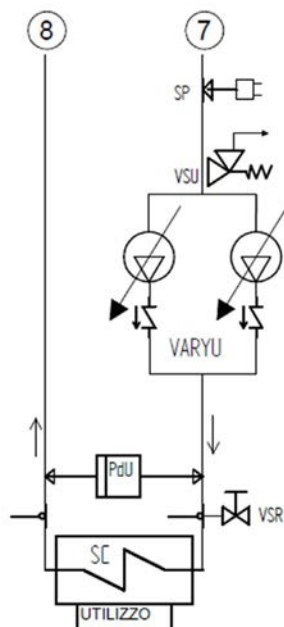
If the water temperature is in critical conditions, it allows to extend the unit operating ranges guaranteeing its operating, automatically reducing the water flow-rate. In the event of one of the two pumps is temporarily unavailable, it guarantees about the 80% of the nominal flow-rate.

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.

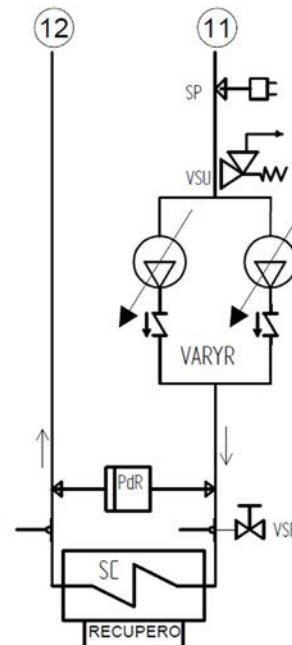


User side water diagram



- 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

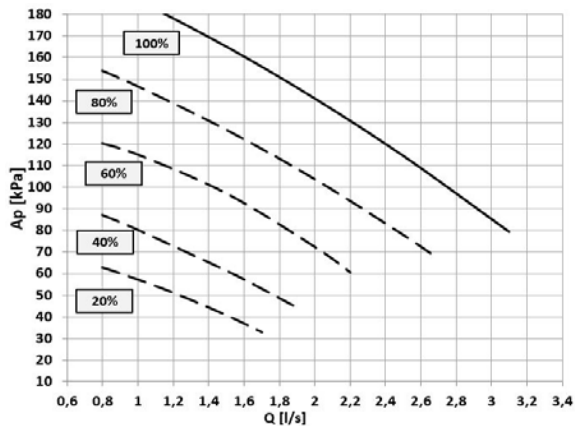


- 11 = Recovery side inlet
- 12 = Recovery side outlet
- SP = Circuit charging pressure switch, calibrated to 0.7 bar
- VSU = Safety valve calibrated to 6 bar
- VARYR = VARYFLOW + recovery side hydronic units
- PdR = Recovery side differential pressure switch
- VSR = Relief valve
- SC = Plate heat exchangers

# Configurations

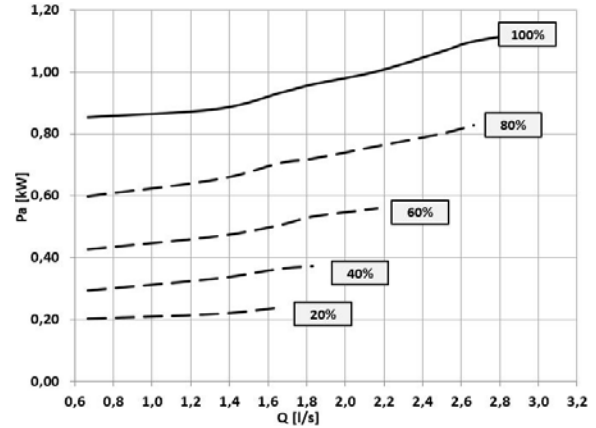
## Units with VARYFLOW + (VARYU or VARYR or VARYU + VARYR)

### Available pressure size 12.2



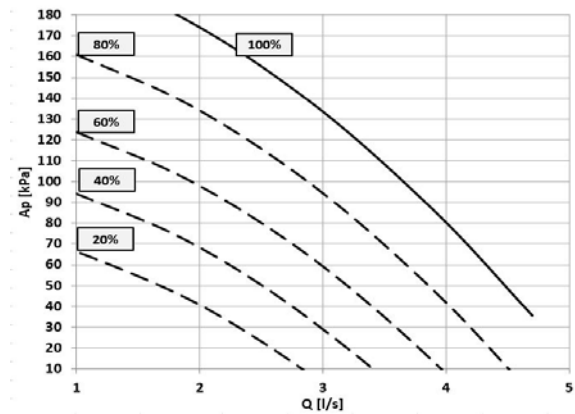
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

### Pump absorption curves size 12.2



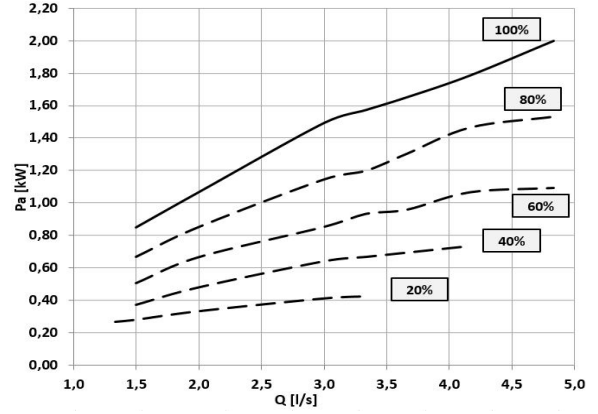
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

### Available pressure size 16.2



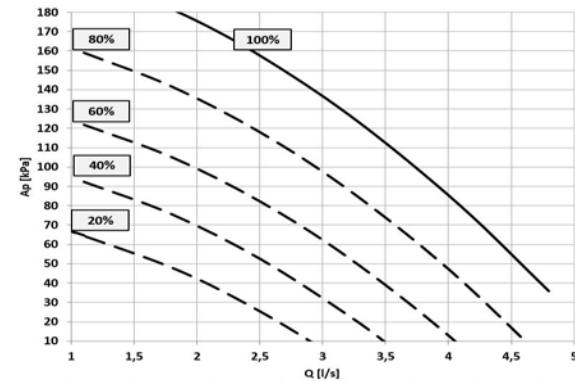
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

### Pump absorption curves size 16.2



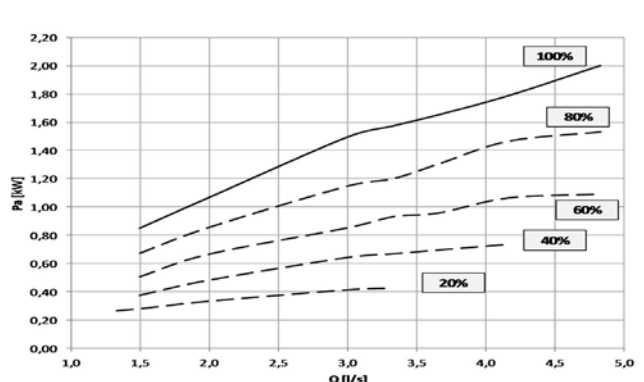
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

### Available pressure size 19.2 - 22.2



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

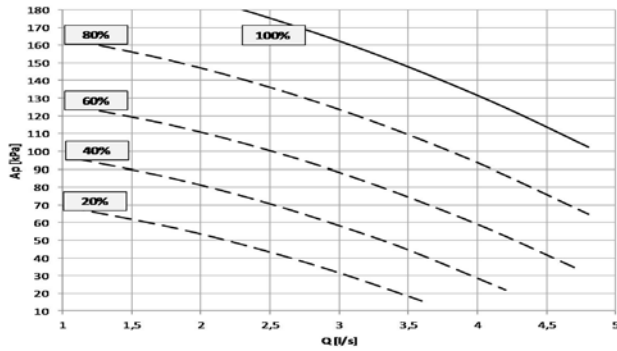
### Pump absorption curves size 19.2 - 22.2



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

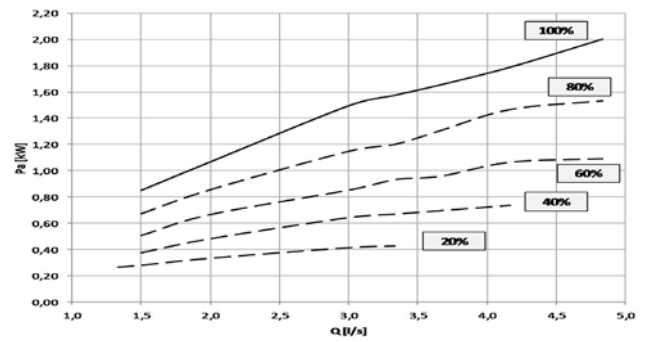
## Units with VARYFLOW + (VARYU or VARYR or VARYU + VARYR)

### Available pressure size 27.2



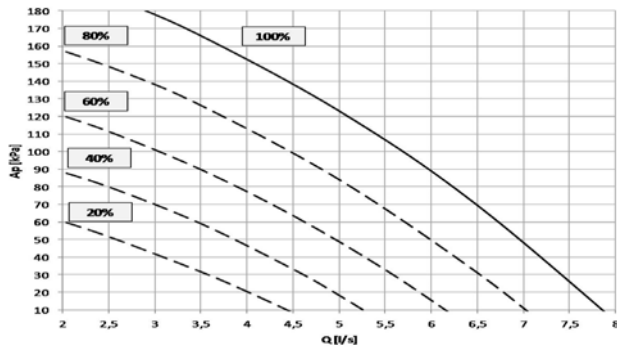
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

### Pump absorption curves size 27.2



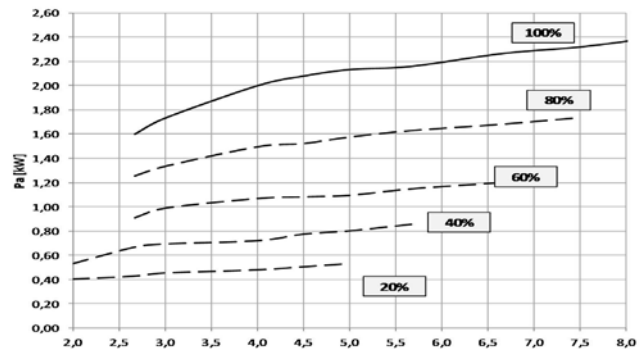
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

### Available pressure size 35.2



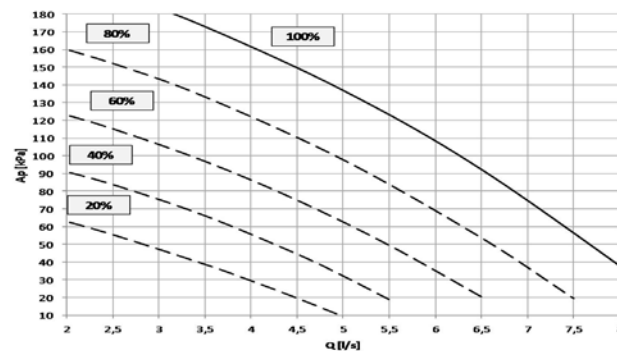
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

### Pump absorption curves size 35.2



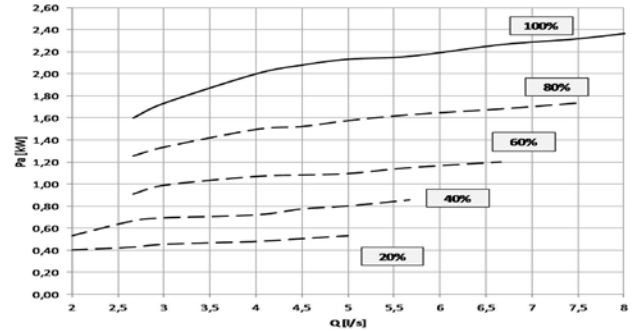
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

### Available pressure size 40.2



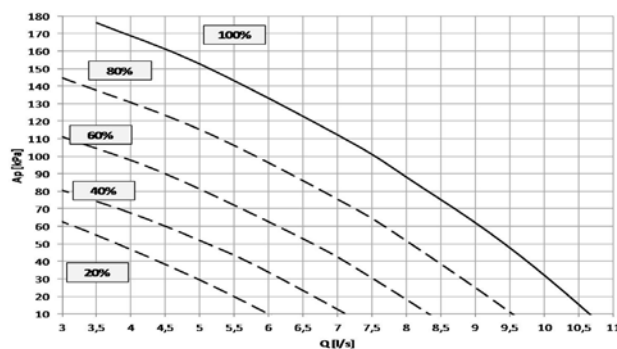
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

### Pump absorption curves size 40.2



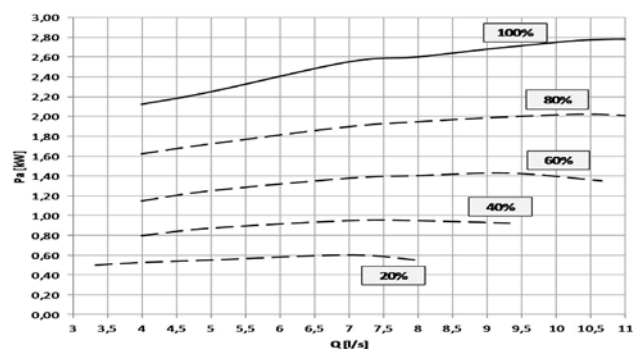
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

### Available pressure size 45.2



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

### Pump absorption curves size 45.2

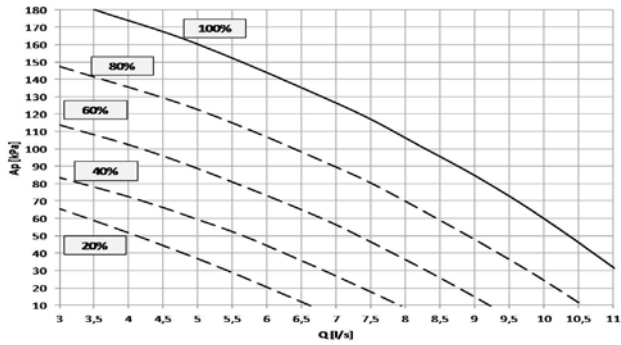


Q = Water flow rate[l/s] Pa = Electrical power input [kW]

# Configurations

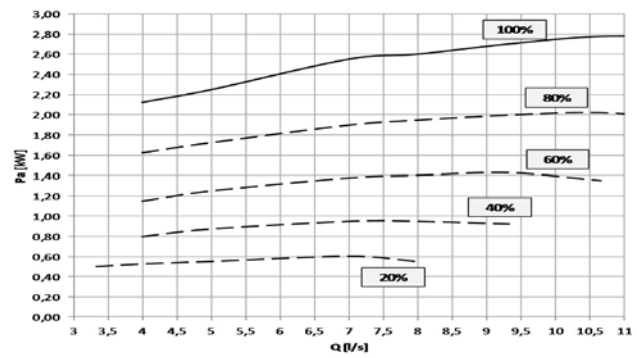
## Units with VARYFLOW + (VARYU or VARYR or VARYU + VARYR)

### Available pressure size 55.2



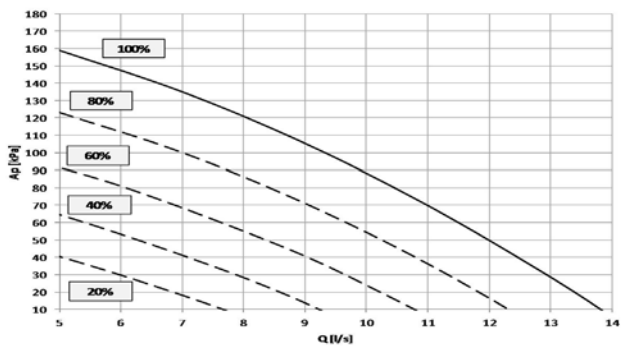
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

### Pump absorption curves size 55.2



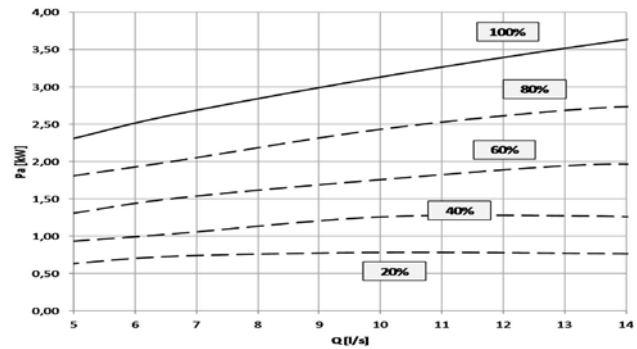
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

### Available pressure size 60.2



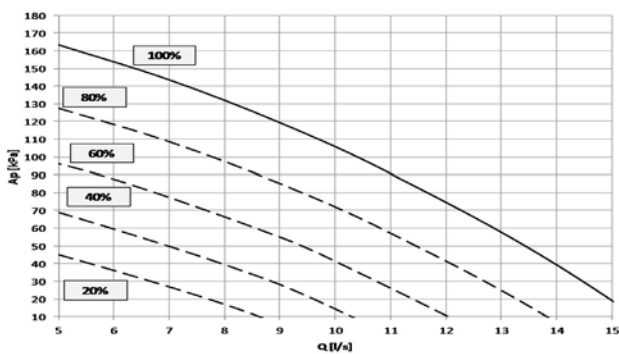
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

### Pump absorption curves size 60.2



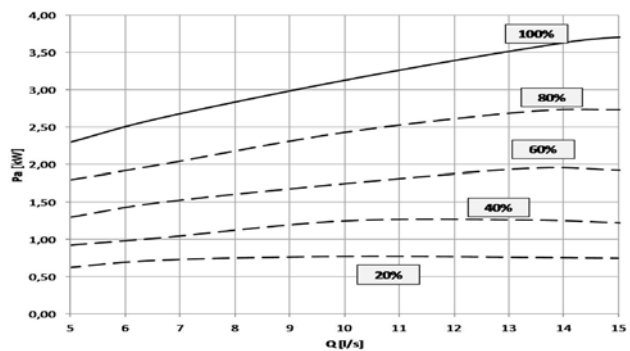
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

### 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 70.2 - 80.2



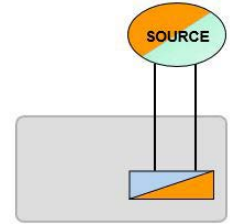
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

## Source side (2/4-pipe)

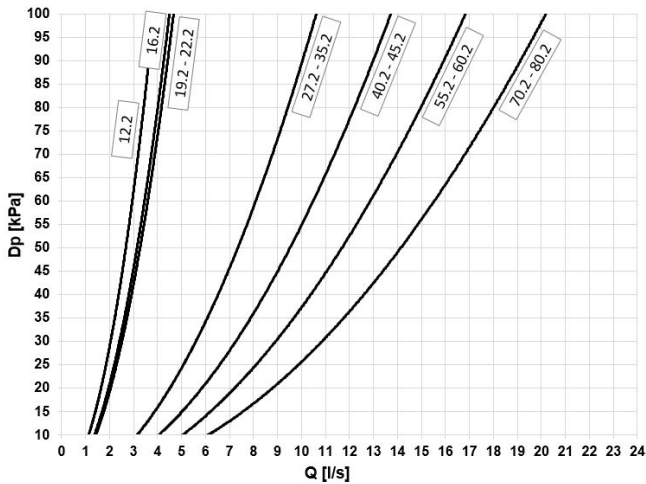
### Standard unit (SVMS)

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 - OTH4 - Operating conditions above 4°C



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]

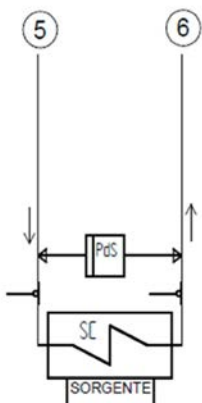
To the user side exchanger pressure drops must be added the pressure drops of the steel mesh mechanical filter that must be placed on the water input line. This device is essential to the unit's proper operation, and is available as accessory (IFWX).

### Admissible water flows - OTH4 - Operating conditions above 4°C

Admissible minimum (Qmin) and maximum (Qmax) 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		12.2	16.2	19.2	22.2	27.2	35.2	40.2	45.2	55.2	60.2	70.2	80.2
Source side	Min [l/s]	0,8	1,0	1,1	1,1	2,2	2,2	2,9	2,9	3,6	3,6	4,3	4,3
	Max [l/s]	4,2	4,8	4,9	5,1	11,0	11,5	14,4	15,0	18,0	18,5	21,3	21,7

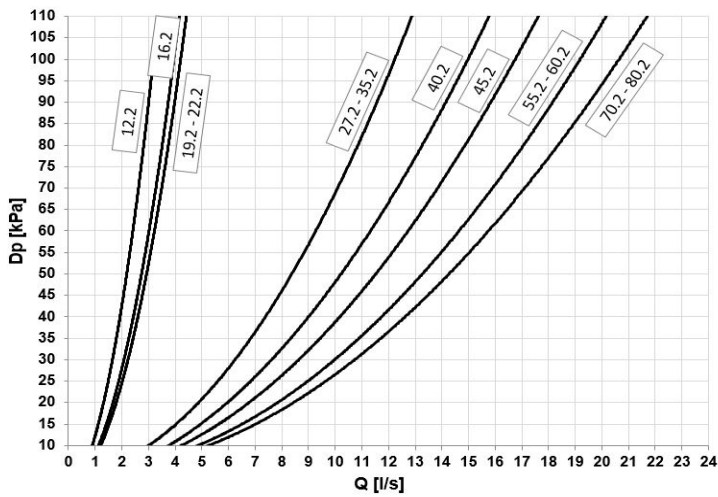
### Source side water diagram



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

# Configurations

## Source side exchanger pressure drop curves - OTL4 - Operating conditions below 4°C



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]

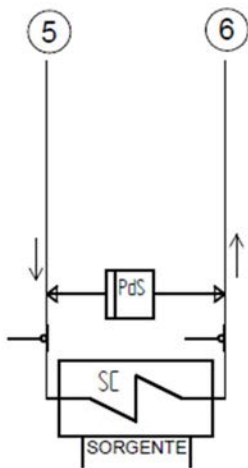
To the source side exchanger pressure drop must be added the pressure drop of the steel mesh mechanical filter that must be placed on the water input line. This device is essential to the unit's proper operation, and is available as accessory IFWX.

## Admissible water flows - OTL4 - Operating conditions below 4°C

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

SIZE		12.2	16.2	19.2	22.2	27.2	35.2	40.2	45.2	55.2	60.2	70.2	80.2
Source side	Min [l/s]	0,8	1,0	1,1	1,1	2,4	2,4	3,0	3,6	4,5	4,5	5,4	5,4
	Max [l/s]	3,6	4,4	4,6	4,6	13,5	13,5	16,5	18,5	21,0	21,0	23,0	23,0

## Source side water diagram



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

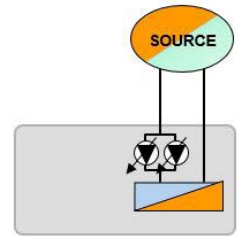
## Source side (2/4-pipe)

### 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.

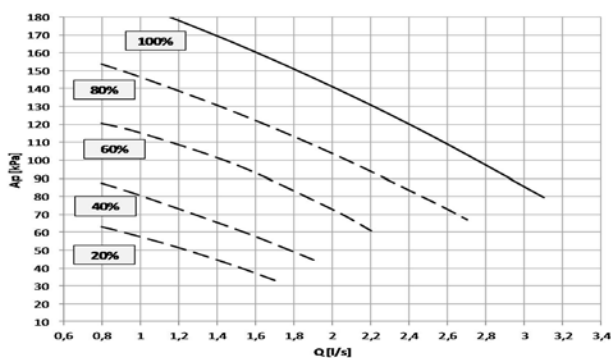
All water fittings are Victaulic type. The electric pumps are equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

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.



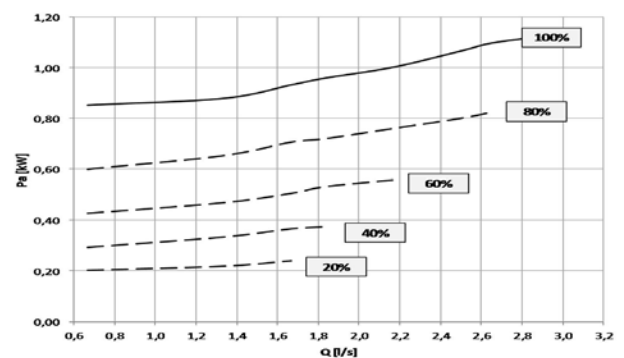
- ⚠ Selecting the Varyflow+ hydronic assembly, the minimum and maximum flow rate limits vary as indicated in the following graphs according to the corresponding size.
- ⚠ The limits indicated in the admissible water flow rate table are larger and can be achieved with specific hydronic assemblies provided by the Customer.

### Available pressure size 12.2



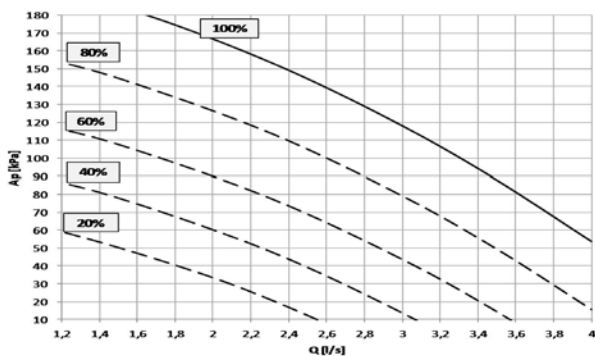
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

### Pump absorption curves size 12.2



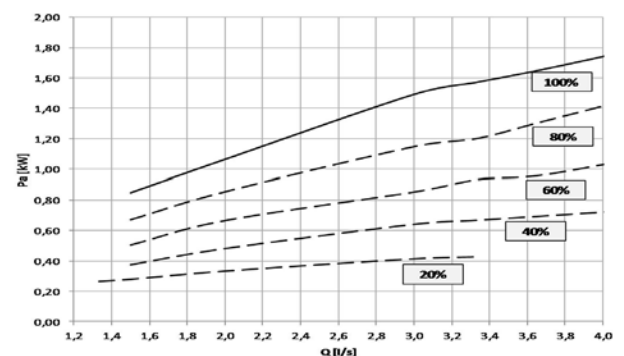
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

### Available pressure size 14.2



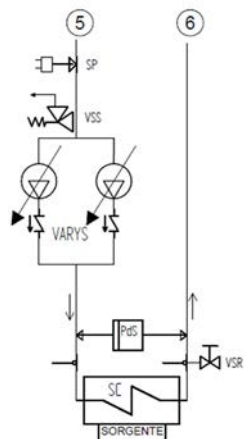
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

### Pump absorption curves size 14.2



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

### Source side water diagram

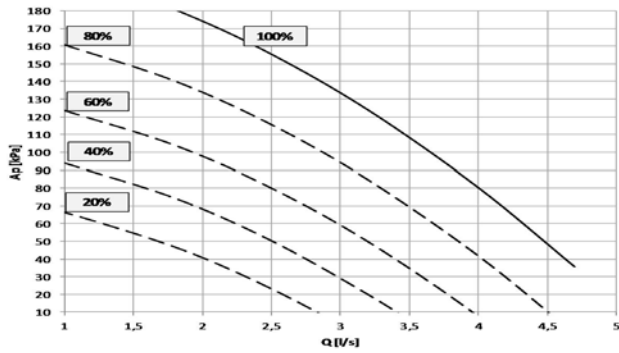


- 5 = Source side inlet
- 6 = Source side outlet
- SP = Circuit charging pressure switch, calibrated to 0.7 bar
- VSS = Safety valve calibrated to 6 bar
- VARYS = VARYFLOW+ source side hydronic unit
- PDS = Source side differential pressure switch
- VSR = Relief valve
- SC = Plate heat exchangers



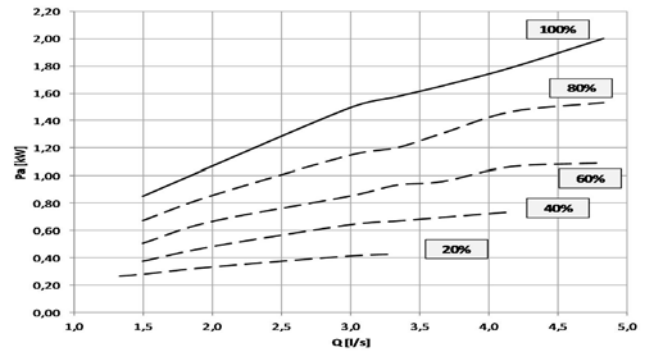
# Configurations

## Unit with VARYFLOW + (VARYS) Available pressure size 16.2



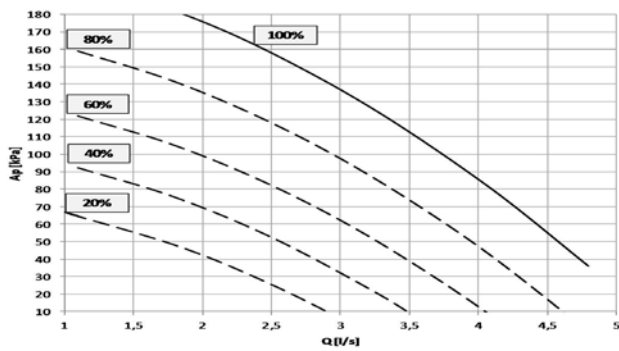
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

## Pump absorption curves size 16.2



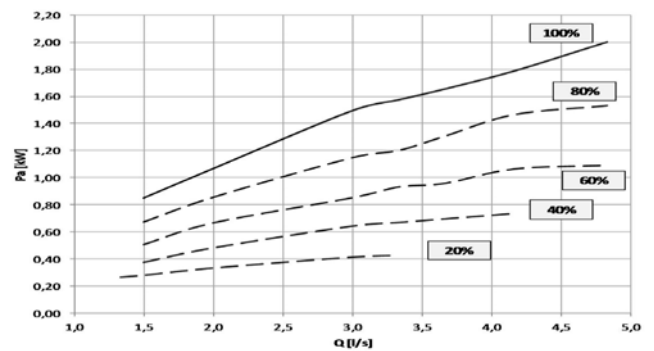
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

## Available pressure size 19.2 - 22.2



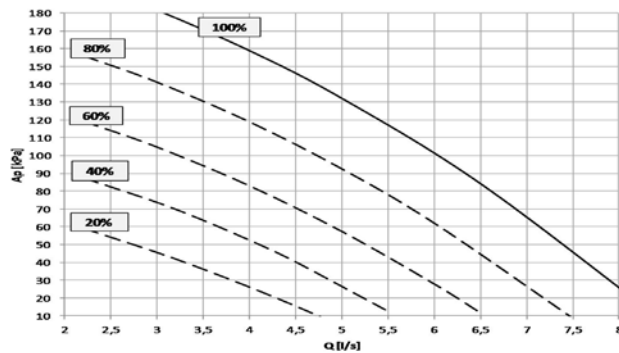
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

## Pump absorption curves size 19.2 - 22.2



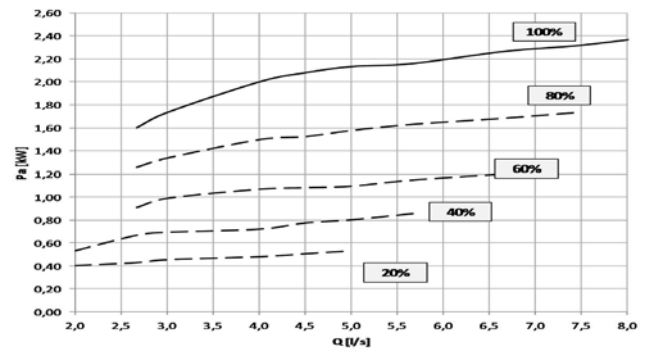
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

## Available pressure size 27.2



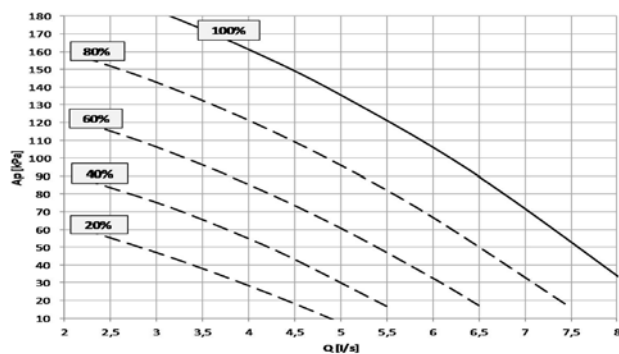
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

## Pump absorption curves size 27.2



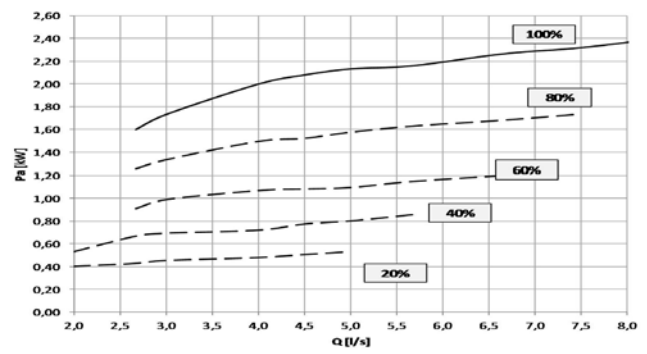
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

## Available pressure size 35.2



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

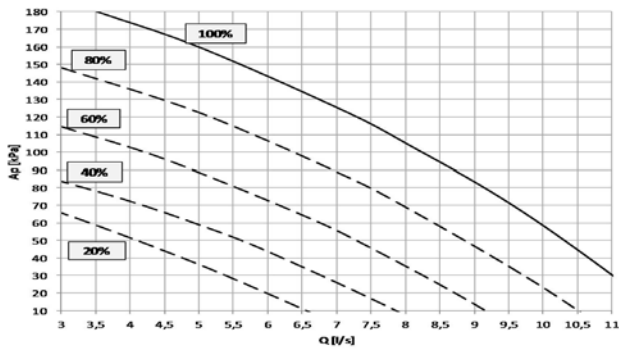
## Pump absorption curves size 35.2



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

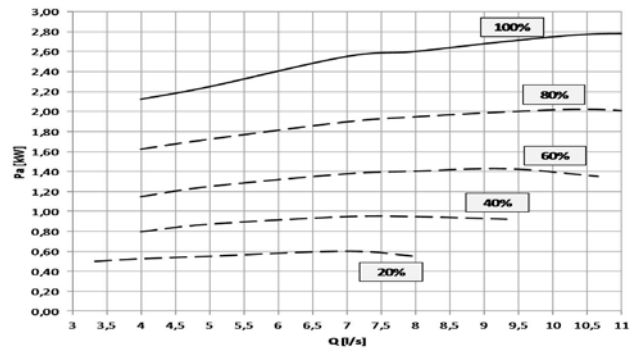
## Unit with VARYFLOW + (VARYS)

### Available pressure size 40.2 - 45.2



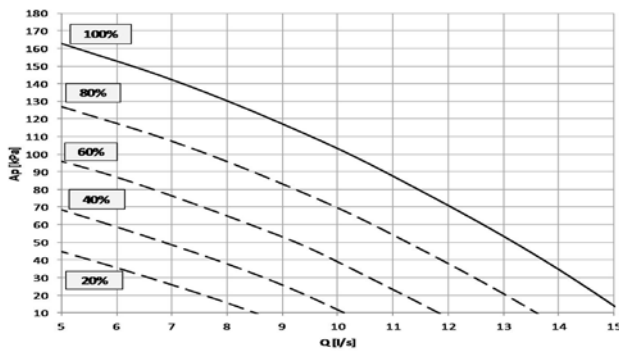
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

### Pump absorption curves size 40.2 - 45.2



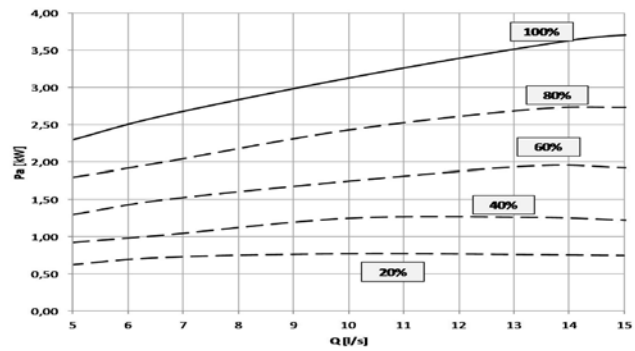
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

### Available pressure size 55.2 - 60.2



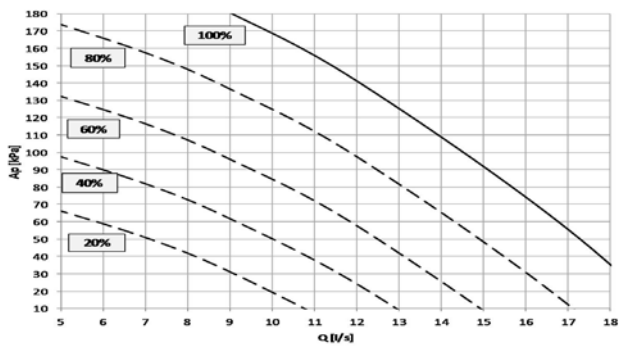
Q = Water flow rate[l/s] Ap = Pressure head, available to the unit fittings [kPa]

### Pump absorption curves size 55.2 - 60.2



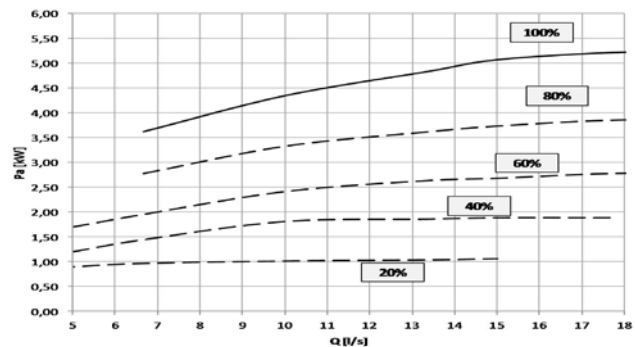
Q = Water flow rate[l/s] Pa = Electrical power input [kW]

### 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 70.2 - 80.2



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

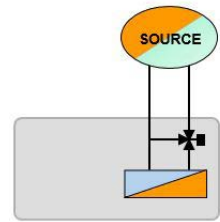
# Configurations

## Source side (2/4 tubi)

### 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.

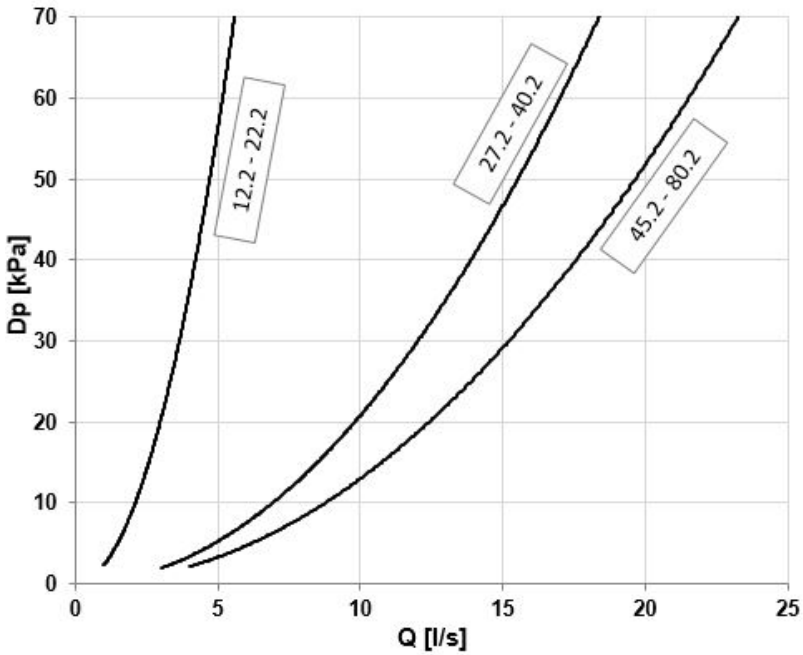
The 3-way modulating valve connects the source side exchanger intake and output, thus bypassing the exchanger and reducing the flow of water inside it, while keeping the machine's delivery flow constant. The valve modulation is managed by a 0-10V signal generated by the unit electronic control.



⚠ 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

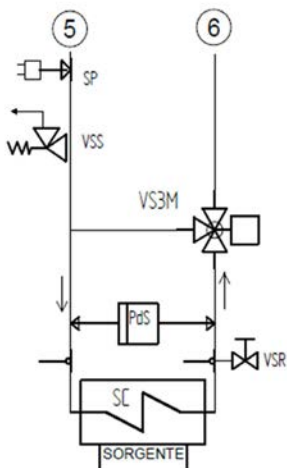


The pressure drops on the water side are calculated by considering an average water temperature at 7°C.

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

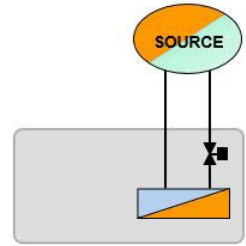
VS3M = Source side 3-way modulating valve

PDS = Source side differential pressure switch

SC = Plate heat exchangers

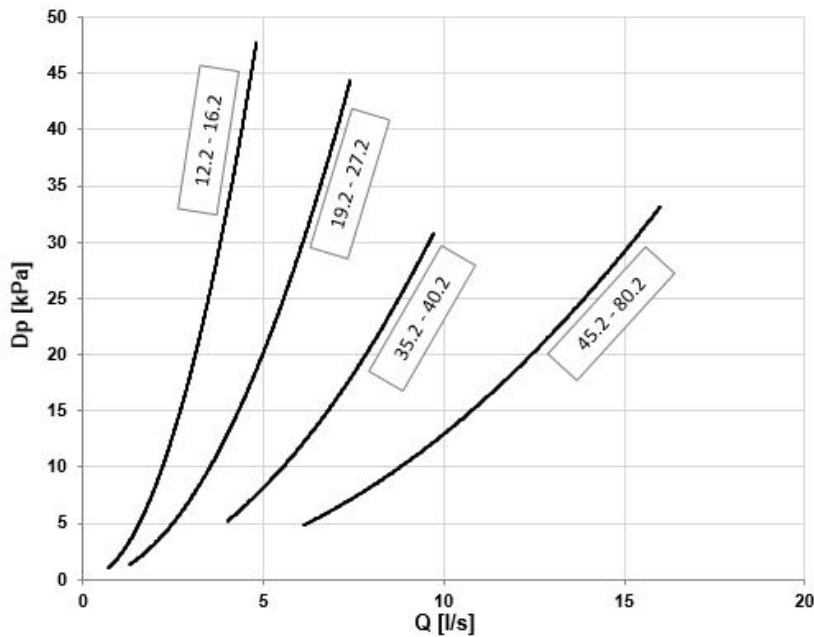
## Source side (2/4 tubi) Unit with 2-way modulating valve (VS2M)

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.



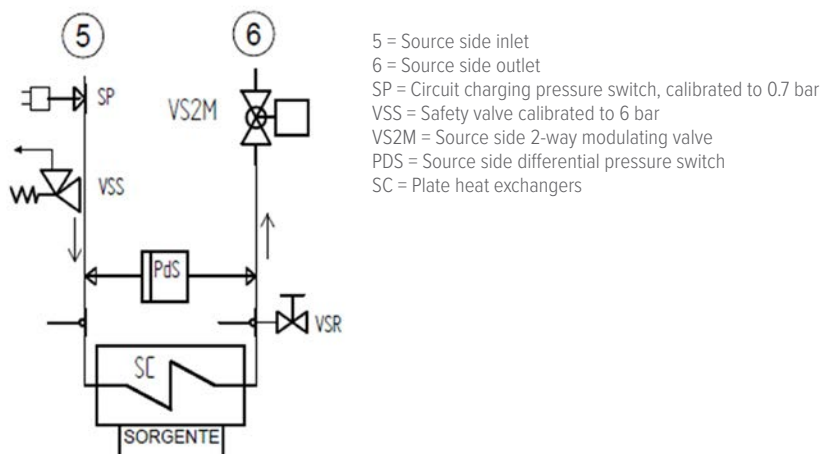
- ⚠ It is recommended not to exceed the pressure drops indicated in the graph to ensure a correct unit operation.
- ⚠ The limits indicated in the admissible water flow rate table are larger and can be achieved with specific modulating valves provided by the Customer.

### 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



# Performances

## Configuration for 2-pipe system and 4-pipe system

### OTH4 - Operating conditions above 4°C

#### Cooling - Size 12.2 - 40.2

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
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
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
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

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

### OTH4 - Operating conditions above 4°C

#### Cooling - Size 45.2 - 80.2

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
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
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
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

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

# Performances

## Configuration for 2-pipe system and 4-pipe system

### OTH4 - Operating conditions above 4°C

#### Heating - Size 12.2 - 55.2

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
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
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
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
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
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

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

### OTH4 - Operating conditions above 4°C

#### Heating - Size 60.2 - 80.2

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
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

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



# Performances

## Configuration for 2-pipe system and 4-pipe system

### Cooling 100% - Heating 100% - Size 12.2 - 45.2

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
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
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
35.2	30	123	20,5	103	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
45.2	30	167	27,6	139	11,07	175	27,7	148	11,7	190	28,0	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

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

Cooling 100% - Heating 100% - Size 55.2 - 80.2

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
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	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	44,0	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
80.2	30	284	48,2	236	10,79	300	48,9	251	11,3	325	50,0	275	12,0	343	50,9	292	12,5	372	52,3	320	13,2	392	53,2	339	13,7
	35	279	52,0	227	9,74	295	52,7	242	10,2	319	53,8	266	10,9	337	54,7	282	11,3	365	56,0	309	12,0	383	56,8	326	12,5
	45	269	62,4	206	7,61	282	63,0	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	78,0	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

kWt = Heating capacity (kW)

kWe = total power input(kW)

kWf = Cooling capacity in kW

GLE = Overall efficiency

Tw = Recovery side water outlet temperature (hot)

# Performances

## Configuration for 2-pipe system and 4-pipe system

### OTL4 - Operating conditions below 4°C

#### Cooling - Size 12.2 - 45.2

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
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
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
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
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

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

### OTL4 - Operating conditions below 4°C

#### Cooling - Size 55.2 - 80.2

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
55.2	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
60.2	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
70.2	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
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

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

# Performances

## Configuration for 2-pipe system and 4-pipe system

### OTL4 - Operating conditions below 4°C

#### Heating - Size 12.2 - 55.2

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
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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
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
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
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

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

### OTL4 - Operating conditions below 4°C

#### Heating - Size 60.2 - 80.2

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
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

kWt = Heating capacity (kW)

kWe = total power input(kW)

To = Water outlet temperature user side (°C)

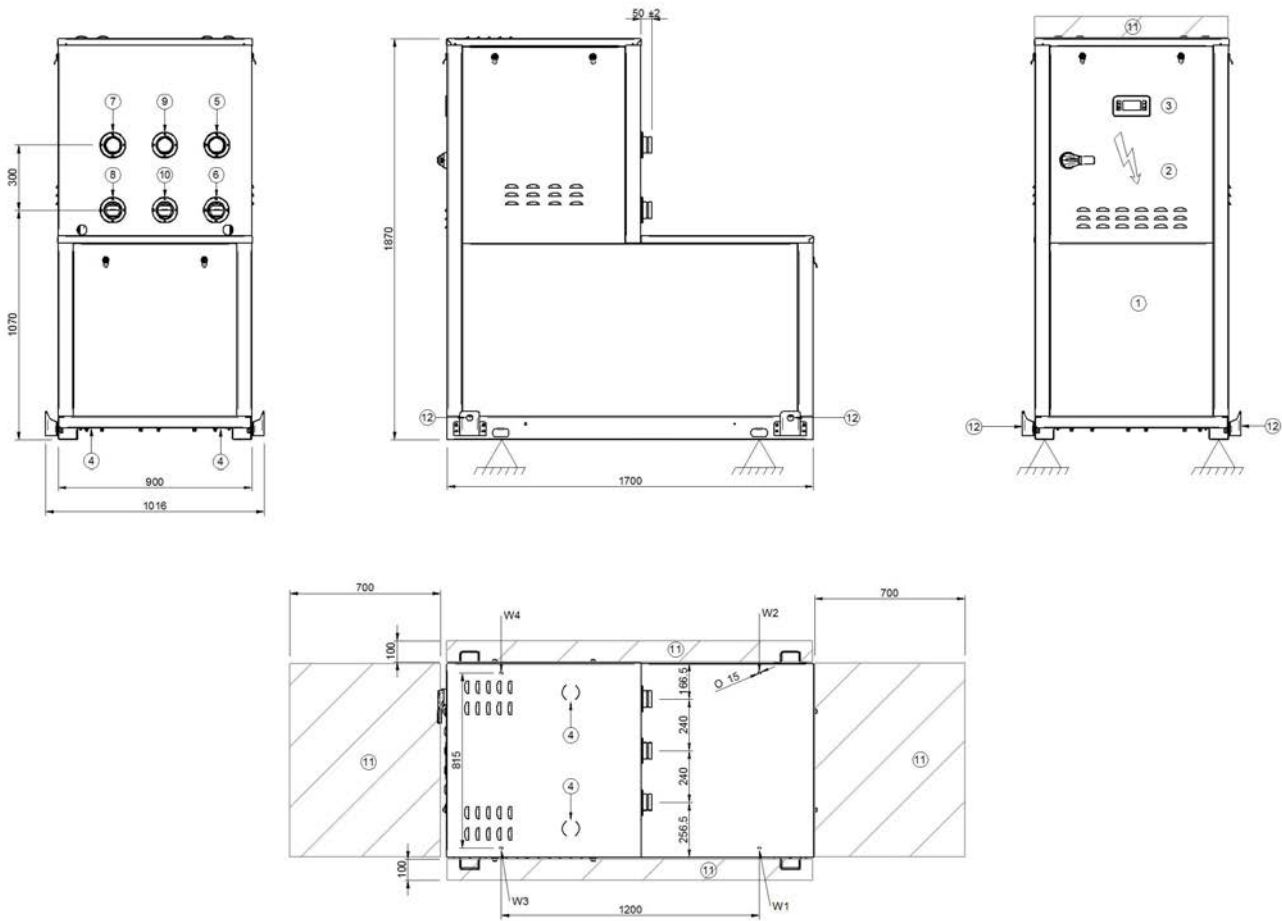
COP = Ratio between delivered heating capacity and power input

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

# Dimensionals drawings

## Size 12.2 - 27.2

DAA8R10 2\_30 2  
26/03/2014 REV00



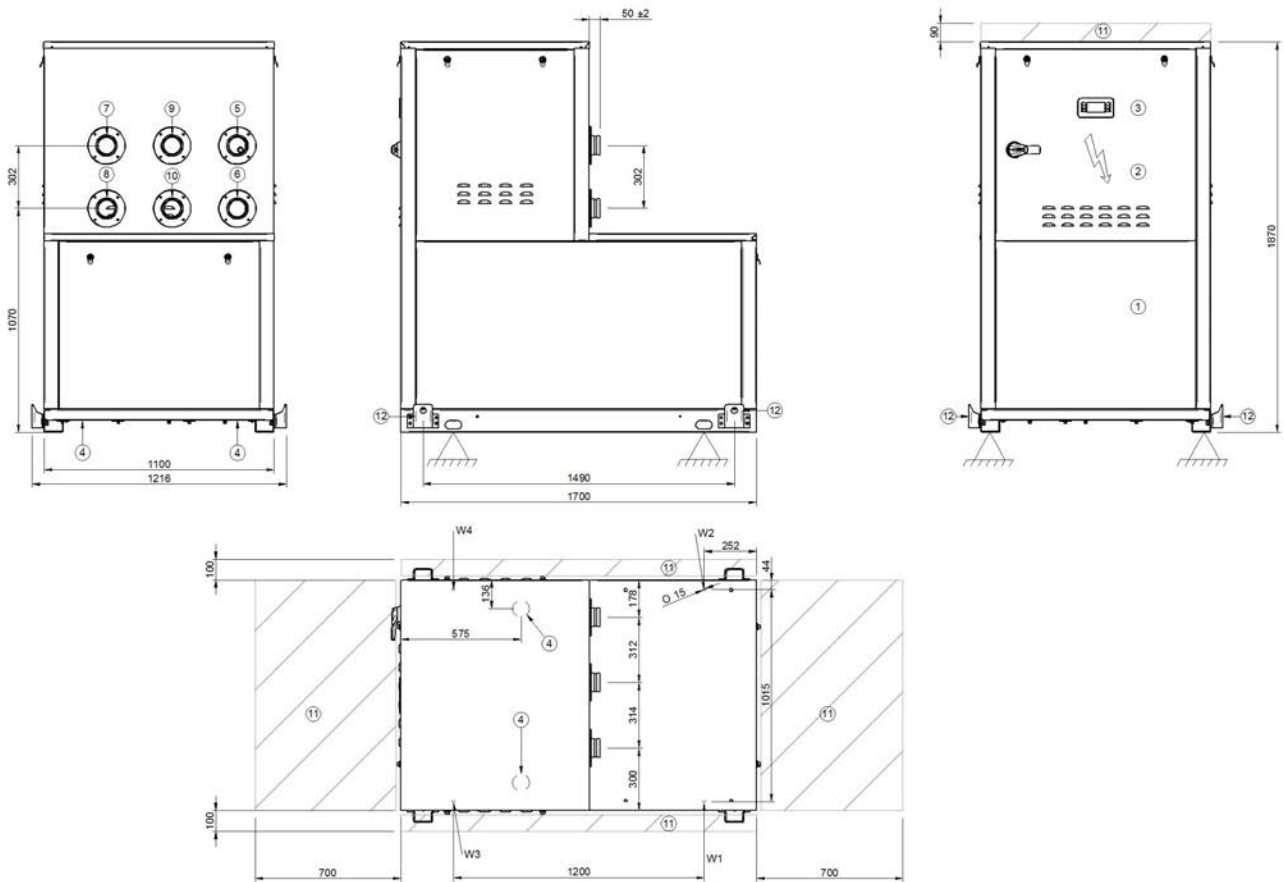
1. Compressor compartment
2. Electrical panel
3. Unit control keypad
4. Power input
5. Source side water return
6. Source side water supply
7. User side water return
8. User side water supply
9. Recovery side water return
10. Recovery side water supply
11. Functional spaces
12. Lifting brackets (removable)

SIZE		12.2	16.2	19.2	22.2	27.2
Length	mm	900	900	900	900	900
Height	mm	1870	1870	1870	1870	1870
Depth	mm	1700	1700	1700	1700	1700
Operating weight	kg	403	471	491	497	550
Shipping weight	kg	364	419	433	439	489

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

## Size 35.2 - 80.2

DAA8R35 2\_80 2  
26/03/2014 REV00



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	55.2	60.2	70.2	80.2
Length	mm	1100	1100	1100	1100	1100	1100	1100	1100
Height	mm	1870	1870	1870	1870	1870	1870	1870	1870
Depth	mm	1700	1700	1700	1700	1700	1700	1700	1700
Operating weight	kg	656	721	816	754	924	941	1045	1056
Shipping weight	kg	595	650	729	667	824	841	927	938

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



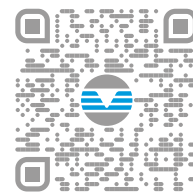
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