Air-cooled heat pump for outdoor installation

ELFOEnergy Magnum

WSAN-XIN 18.2 - 45.2 RANGE

TECHNICAL BULLETIN

ErP

R-410A

DC INVERTER

SIZE	18.2	20.2	25.2	30.2	35.2	40.2	45.2
COOLING CAPACITY KW	49,8	59,6	69,7	82,5	92,8	106	120
HEATING CAPACITY KW	55,7	68,0	77,8	92,6	106	122	139

Clivet is taking part in the EUROVENT certification programme up to 1.500 kW. The products concerned appear in the certified products list of the EUROVENT www.eurovent-certification.com site.

ELFOEnergy Magnum, three solutions to satisfy different installation requirements

MAGNUM HEAT PUMP

WSAN-XIN:

- Reverse cycle heat pump

MAGNUM MULTIFUNCTION

WSAN-XIN MF:

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

MAGNUM COOL ONLY

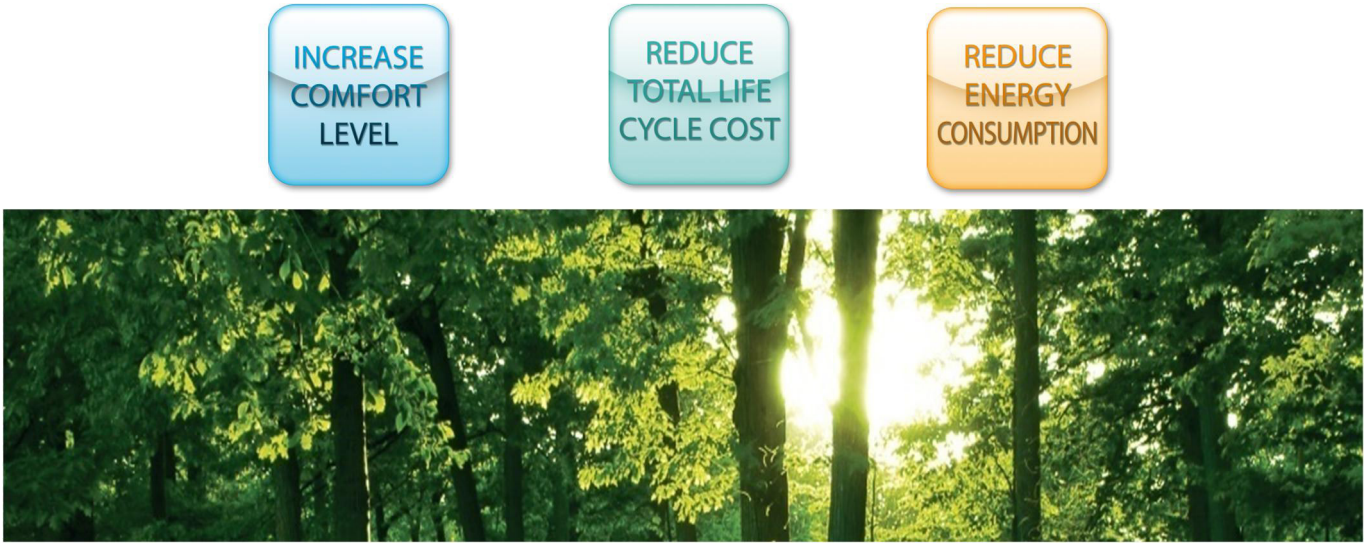
WSAT-XIN:

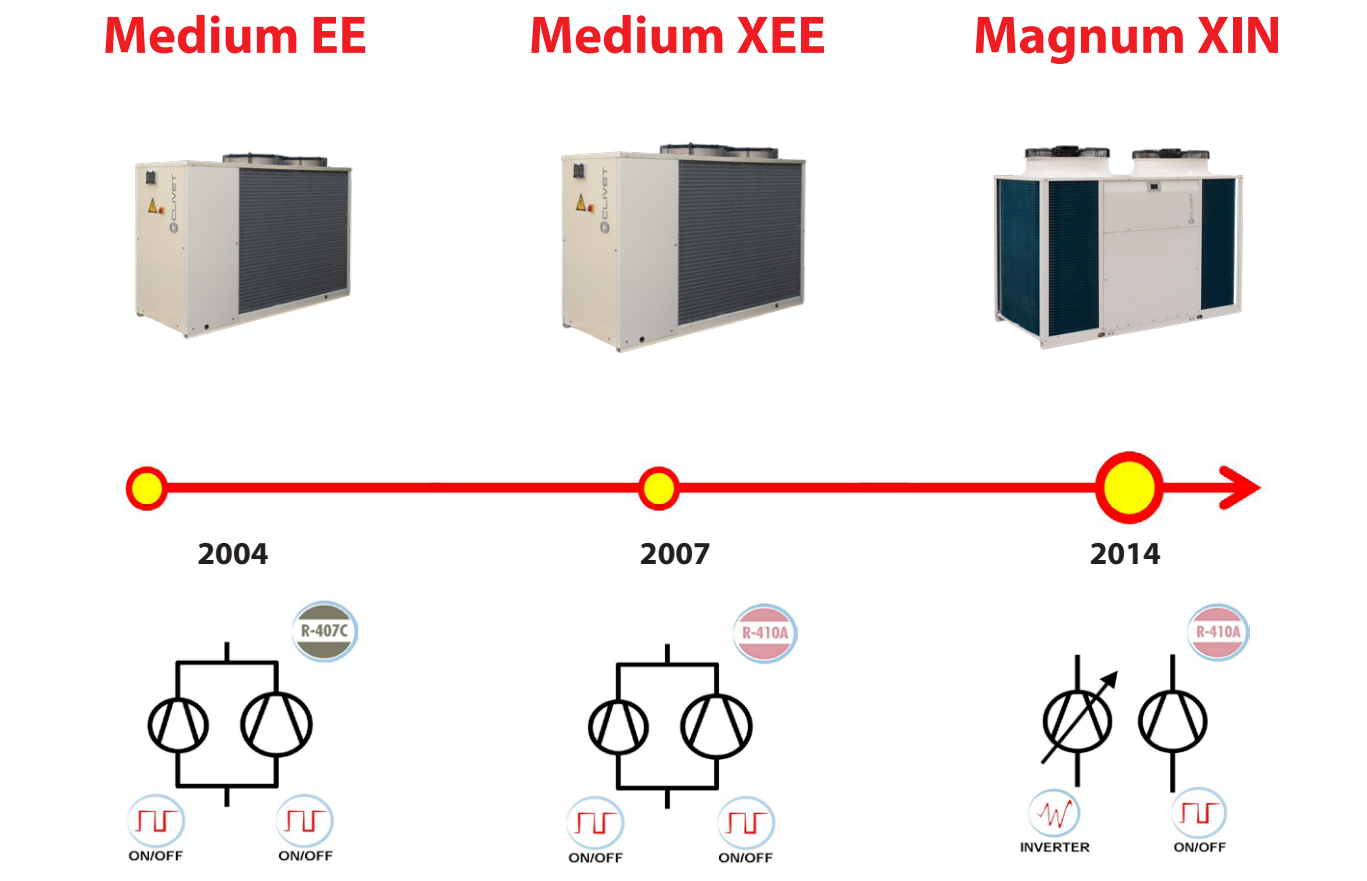
- Water chiller
- Hot water production with energy recovery option

Clivet. Change things.

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

Clivet, all along, has clearly defined its Business strategy in the **high Energy Efficiency systems** and has placed its Research and Development to full-service of this strategy, investing significant economic and human resources and identifying its Mission into **"Comfort & Energy Saving",** when topics as **energy saving** and **high seasonal efficiency** were not at the center of the public opinion as today.





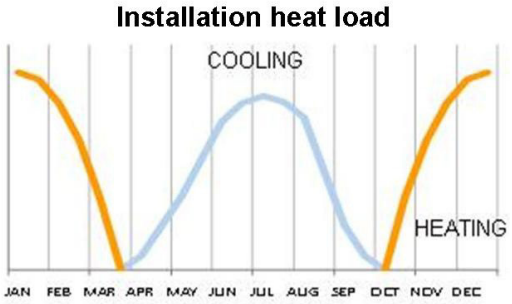
Maximum efficiency is necessary with a part load

Load variability

Heating and **cooling** capacity required from the air conditioning system typically **varies over the year and often even in the course of the same day**.

Climatic conditions **vary depending on the place** consequently also the load 's trend.

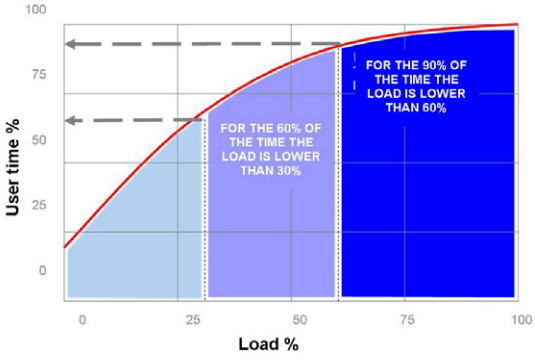
The **highest values appear for limited periods of time**, often coinciding with the most demanding weather conditions.



Maximum efficiency is necessary with a part load

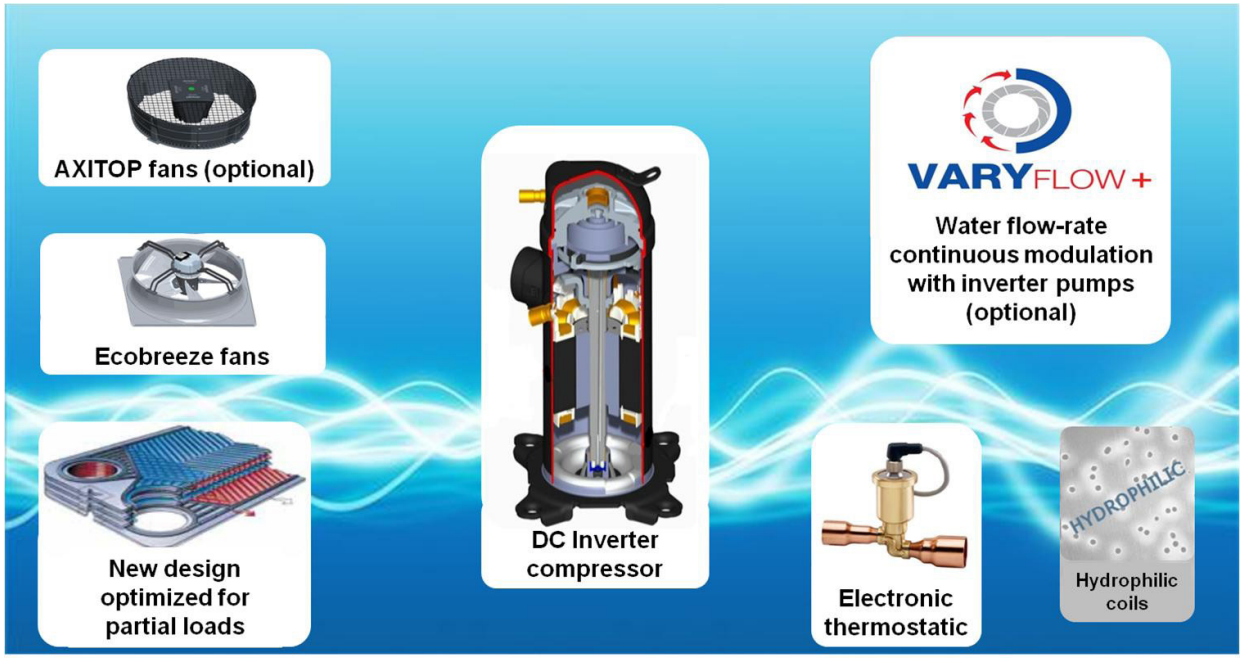
Since the system is required to generate maximum power **only for a short amount of time**, it is essential to have the **maximum efficiency under partialized load conditions.**

This is the only way to actually reduce overall yearly consumptions.



ELFOEnergy Magnum

The most advanced technologies, enclosed in a single compact unit, combined with the reliability advantages of the **double refrigeration circuits**, guarantee **the best seasonal efficiency**.



High seasonal efficiency thanks to the capacity continuous modulation

The progressive and sequential activation of the two refrigeration circuits, one controlled by inverter technology, guarantees the complete adjustment to the installation load.

The capacity modultation is necessary starting from minimum values which guarantee the continuous capacity supply depending on the requirements.

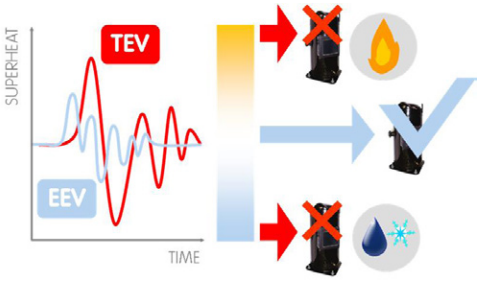
DC Inverter compressor

Control of the refrigerant flow

The load variability involves the continuous variation of the refrigerant volume moved by compressors.

The electronic expansion valve (EEV), standard on Clivet units, adapts rapidly and precisely to the actual load required for usage, allowing stable and reliable control in comparison with mechanical thermostatic valves (TEV). **This results also in a further increase in efficiency and longer compressor life.**

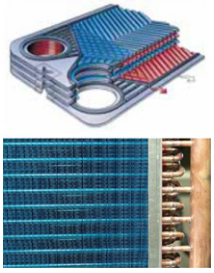
The overheating control allows preventing phenomena that are hazardous to the compressors, such as overtemperature and return fluids, thereby increasing even more efficiency and durability.



Efficient heat exchange

The new plate exchanger design allows an higher evaporating temperature, guaranteeing a better exchange efficiency, above all in the part-load operating that coincides with the most of the unit operating time.

The coil hydrophilic aluminium coating allows a faster water drop elimination and consequently a better flow distribution, reducing the defrosting time and increasing the exchange efficiency.



Standard supplied ECOBREEZE fans, electronically controlled

With ECOBREEZE, the electric motor with an external rotor is driven by the continuous magnetic switching of the stator, deriving from the integrated electronic control.

The advantages are:

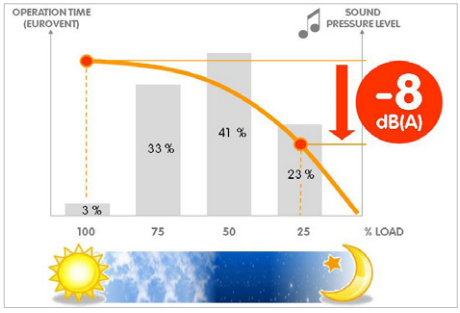
- **70% increase in efficiency** thanks to the brushless technology and the special electricity supply;
- **increase in the working life**, thanks to the elimination of the brush wear;
- **Reduction in the electrical consumption** by the system, thanks to a drastic reduction of the inrush current for the fans obtained using the integrated 'Soft starter' function.

Fans at variable speed for minimal noise emission

All units are equipped with **electronic condensation control**. It automatically reduces the fan speed when the heat load is reduced

Since the fans are the unit's main noise source, the benefits are evident especially during the night hours, when the load is reduced but sensitivity to noise is enhanced.

All this translates into a **reduction of sound pressure down to 8 dB(A)** compared to full load operation in 90% of operating time of the unit.

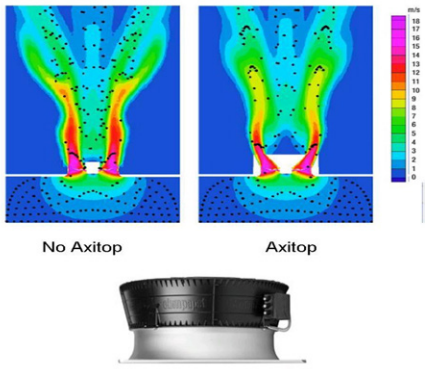


Efficient and silent ventilation technology (optional)

It is possible to further increase the seasonal efficiency with the innovative air handling system on the external exchangers.

The new AxiTop diffuser creates an ideal air distribution: it aerodynamically decelerates the flow and transforms a big part of its kinetic energy in static pressure. All AXITOP components are aerodinamically optimized enhancing significantly the efficiency and reducing the impeller speed and consequently the noise. Obtaining:

- down to –3 dB of silence
- reduction of 3% of the absorbed energy



Water flow-rate continuous modulation (optional)

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

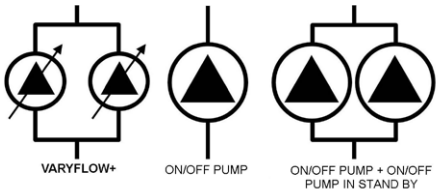
The VARYFLOW + modulating pumping unit made up of two pumps in parallel controlled by inverter, allows a precise water flow-rate modulation reducing notably the consumptions and at the same time it guarantees its functionality also in case of temporary unavailability of one of the two pumps, guaranteeing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

The water flow-rate modulation can be managed in function of the installation pressure or keeping constant the delta between return and supply temperature.

If the installation water temperature is in critical conditions, **VARYFLOW+** allows to extend the ELFOEnergy Magnum operating ranges guaranteeing the operating.

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

- **ON/OFF pump:** the traditional solution with high available pressure.
- **ON/OFF pump + ON/OFF pump in stand-by:** the solution that favours reliability. The built-in control balances the operating hours of the two pump and in case of any failure it signals the damage and automatically activates the stand-by pump.



Integrated inertial storage tank available (optional)

Available only for size 35.2 - 45.2.

In most Magnum systems it can be installed without inertial storage tank on the system. In fact, the unit quickly adapts to the load due to modular compressors, electronic thermostatic valve and low water content plate heat exchangers. However, in the event of hydraulic distribution networks with reduced dimensions, it is important to provide the system with a hydraulic flywheel. In such cases, inertial storage tank is available built-in, equipped with insulating coating and all the necessary safety devices. This allows eliminating installation times and costs and freeing space inside the building.

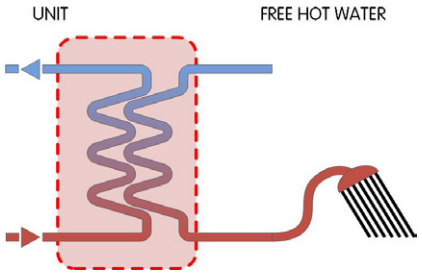
Produces hot water freely (optional)

Condensation heat partial recovery:

- it recovers about the 20% of the available heat (desuperheater)

It allows the free DHW production for:

- Hot water coil power supply for post-heating;
- Domestic hot water production (with intermediate exchanger)
- Other processes or operations.



Advanced control

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

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

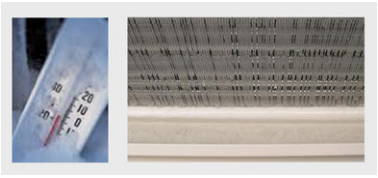
It allows the management of several units in cascade up to 1 master and 6 slave (Ecoshare)

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

Remote control (optional)

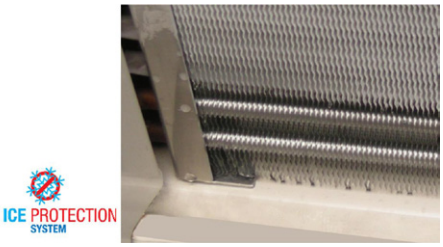
The remote control allows accessing to the same functions that are accessible by the built-in unit user interface, and can be installed at a maximum distance of 350 meters.

Smart management of defrosts



The automatic defrost cycles on the remaining external exchanger surface are managed in **ALTERNATED mode for each refrigeration circuit**, guaranteeing the 50% of the delivered capacity. The built-in electronic control analyzes not only the external conditions but also the evaporating pressure variations in the exchanger.

Coils protected against the formation of ice



The particular technology of the heat pump developed by Clivet guarantees its continued and reliable operation.

The ICE PROTECTION SYSTEM device prevents icing on the base of the external exchanger during winter operation, thanks to a special subcooling circuit. This prevents damages caused by freezing.

Even for low water temperature

The unit is also perfectly adapted for use in process cooling where the low temperature version (Brine) together with the addition of glycol to the thermo-vector liquid produces chilled water down to –8 °C.

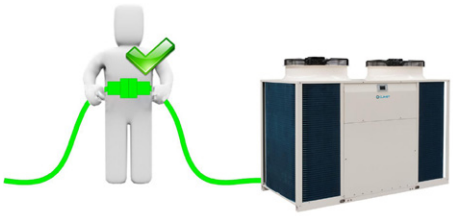
Remote system management

Magnum is standard equipped with:

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

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

Controlled power supply



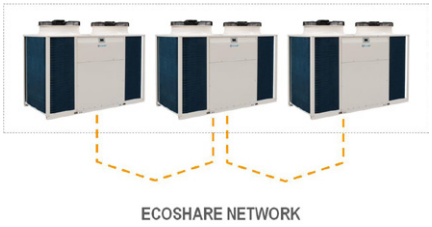
Proper power supply ensures optimal unit operation and protects its many electrical components.

The phase monitor, standard supplied.

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

Modularity

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



The Magnum units are designed to be connected in parallel in modular logic, thereby granting the following advantages:

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

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

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

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

Compact unit

All these distinctive elements are included in only **one packaged solution**.

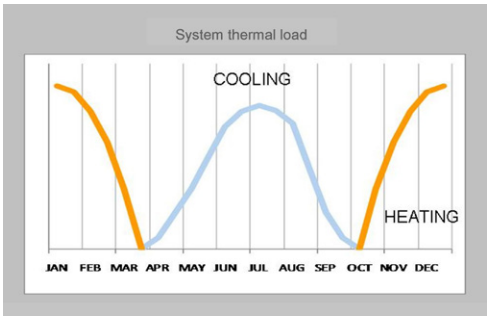
The new design reduces the **overall dimensions** and allows a **semplified access**, both front and rear, allowing a **quick maintenance.**

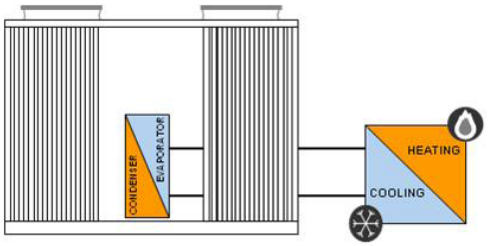
ELFOEnergy Magnum

System solutions:

Standard unit

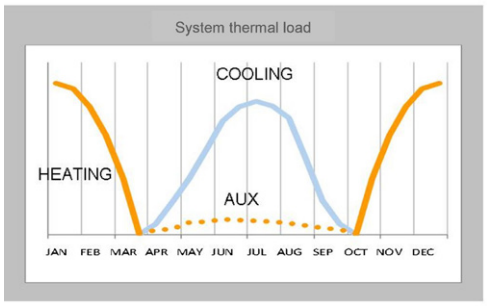
- **Production of chilled or hot water**

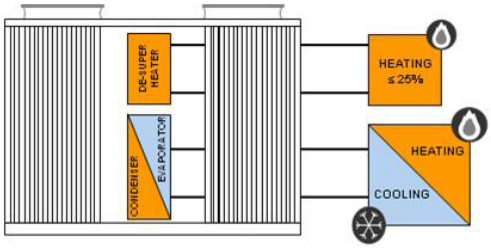




Unit with Partial energy recovery option

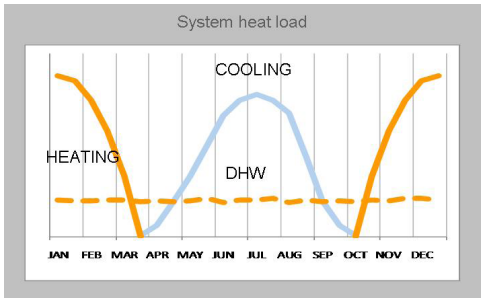
- **Production of chilled or hot water**
- **Free production of hot water from partial energy recovery**

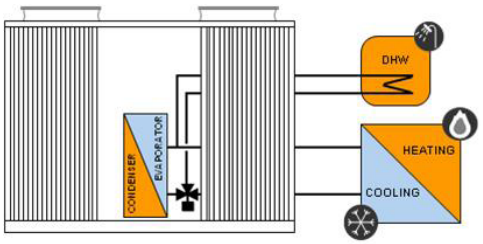




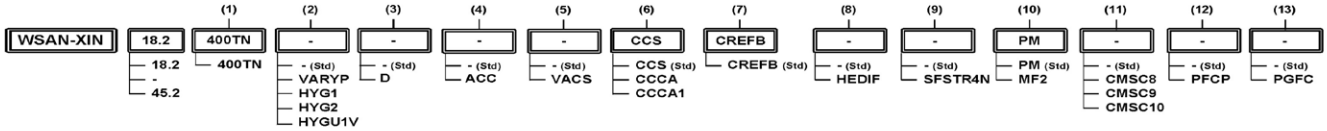
Unit with DHW switching valve option

- **Production of chilled or hot water**
- **Priority hot water production with DHW switching valve**





Unit configuration



(1) Voltage
Supply voltage 400/3/50 + N (standard)

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

(3) Partial recovery device
(-) not required (standard)
D - Partial energy recovery

(4) Storage tank
(-) not required (standard)
ACC - Storage tank (only for size 35.2 - 45.2)

(5) DHW switching valve
(-) not required (standard)
VACS - DHW switching valve

(6) Condensing coil
CCS - Standard condenser coil (standard)
CCCA - Copper / aluminium condenser coil with acrylic lining
CCCA1 - Condenser coil with Energy Guard DCC Aluminum

(7) Type of fans
CREFB - ECOBREEZE external section fans consumption reduction device (Standard)

(8) Diffuser for fan
(-) not required (standard)
HEDIF - Diffuser for high efficiency axial fan

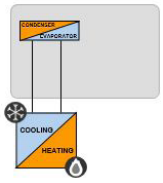
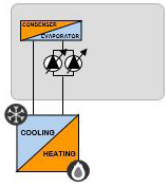
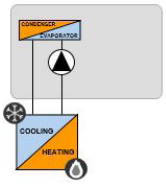
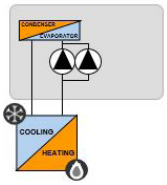
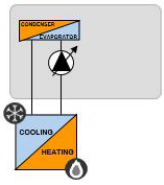
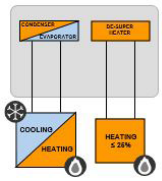
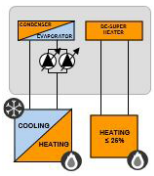
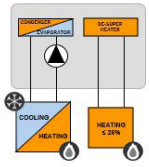
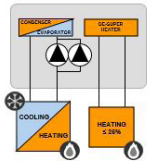
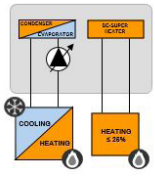
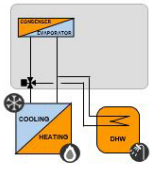
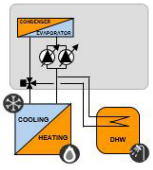
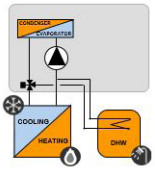
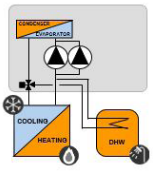
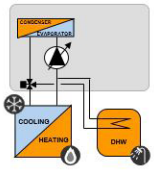
(9) Soft starter
(-) not required(standard)
SFSTR4N -Disposal for inrush current reduction, for unit 400/3/50+N

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

(11) Serial communication module
(-) not required (standard)
CMSC8 - Serial communication module to BACnet supervisor
CMSC9 - Serial communication module to Modbus supervisor
CMSC10 - Serial communication module to LonWorks supervisor

(12) Power factor correction capacitors
(-) not required (standard)
PFCC -Power factor correction capacitors (cosfi >0,95)

(13) Finned coil protection grill
(-) not required (standard)
PGFC - Finned coil protection grill

Functions	Diagram hydronic assemblies				
2-PIPE INSTALLATION Hot or chilled water production for installation	**1.1** Standard unit (Std)	**1.2** Unit with VARYFLOW + (VARYP)	**1.3** Unit with one ON/OFF pump (HYG1)	**1.4** Unit with two ON/OFF pumps (HYG2)	**1.5** Unit with one INVERTER pump (HYGU1V)
					
2-PIPE INSTALLATION + PARTIAL RECOVERY Hot or chilled water production for installation - Free production of hot water from partial recovery	**2.1** Unit with partial recovery (D)	**2.2** Unit with partial recovery and VARYFLOW+ (D+VARYP)	**2.3** Unit with partial recovery and one ON/OFF pump (D+HYG1)	**2.4** Unit with partial recovery and two ON/OFF pumps (D+HYG2)	**2.5** Unit with partial recovery and one INVERTER pump (D+HYGU1V)
					
2-PIPE INSTALLATION + 3-WAY VALVE Hot or chilled water production for installation - Priority hot water production with DWH switching valve	**3.1** Unit with DHW switching valve (VACS)	**3.2** Unit with DHW switching valve and VARYFLOW + (VACS+VARYP)	**3.3** Unit with DHW switching valve and one ON/OFF pump (VACS+HYG1)	**3.4** Unit with DHW switching valve and two ON/OFF pumps (VACS+HYG2)	**3.5** Unit with DHW switching valve and one INVERTER pump (VACS+HYGU1V)
					

Accessories separately supplied			
• **RCTX** - Remote control	• **BACX** - BACnet serial communication module • **CMMBX** - Serial communication module to supervisor (Modbus) • **CMSLWX** - LonWorks serial communication module	• **PGFCX** - Finned coil protection grill • **IFWX** - Steel mesh strainer on the water side	• **AVIBX** - Anti-vibration mount support

General technical data

Size			18.2	20.2	25.2	30.2	35.2	40.2	45.2
Cooling									
Cooling capacity	1	kW	49,8	59,6	69,7	82,5	92,8	106	120
Compressor power input	1	kW	14,5	18,1	20,5	25,6	30,4	35,0	42,2
Total power input	2	kW	16,7	20,3	23,4	28,5	33,3	38,4	45,6
EER	1		2,98	2,94	2,98	2,90	2,79	2,76	2,63
Water flow-rate	1	l/s	2,38	2,85	3,33	3,94	4,43	5,06	5,73
User side exchanger pressure drop	1	kPa	15	21	14	20	16	21	19
Cooling capacity (EN14511:2013)	3	kW	49,6	59,3	69,5	82,2	92,5	106	120
Total power input (EN14511:2013)	3	kW	16,9	20,6	23,6	28,8	33,6	38,8	46,0
EER (EN 14511:2013)	3		2,93	2,88	2,94	2,85	2,75	2,72	2,60
SEER	9		3,34	3,43	3,47	3,63	3,76	3,73	3,82
Minimum capacity	3	kW	14,2	14,2	14,6	19,4	19,7	20,1	27,3
Heating									
Heating capacity	4	kW	55,7	68,0	77,8	92,6	106	122	139
Compressor power input	4	kW	15,0	18,7	21,2	25,8	29,8	34,2	39,6
Total power input	2	kW	17,2	20,9	24,1	28,7	32,7	37,6	43,0
COP	4		3,24	3,25	3,23	3,23	3,24	3,24	3,23
Water flow-rate	4	l/s	2,66	3,25	3,72	4,42	5,06	5,83	6,64
User side exchanger pressure drop	4	kPa	19	27	18	24	21	27	26
Heating capacity (EN14511:2013)	5	kW	56,0	68,4	78,1	93,0	106	123	140
Total power input (EN14511:2013)	5	kW	17,5	21,3	24,4	29,0	33,1	38,2	43,6
COP (EN 14511:2013)	5		3,20	3,21	3,20	3,21	3,21	3,21	3,20
Minimum capacity	5	kW	15,5	15,5	15,5	21,3	21,6	22,0	29,9
Compressor									
Type of compressors			SCROLL INVERTER + SCROLL ON/OFF						
Refrigerant			R-410A						
No. of compressors		Nr	2	2	2	2	2	2	2
Oil charge (C1)		l	3,0	3,3	3,3	3,6	3,6	6,7	6,7
Oil charge (C2)		l	3,3	3,3	3,3	3,6	3,6	3,6	6,7
Refrigerant charge (C1)		Kg	5,0	5,0	8,0	7,0	13,0	14,0	13,5
Refrigerant charge (C2)		Kg	5,0	5,0	7,5	8,0	14,0	14,0	16,0
Refrigeration circuits		Nr	2	2	2	2	2	2	2
User side exchanger									
Type of exchanger	6		PHE						
No. of exchangers		Nr	1	1	1	1	1	1	1
Water content		l	10,6	10,6	17,4	17,4	18,7	18,7	22,4
External Section Fans									
Type of fans	7		EC						
No. of fans		Nr	2	2	2	2	2	2	2
Standard airflow		l/s	10556	10556	13056	13056	13333	14167	14167
Installed unit power		kW	1,1	1,1	1,4	1,4	1,4	1,7	1,7
Connections									
Water fittings			2"	2"	2" 1/2	2" 1/2	2" 1/2	2" 1/2	2" 1/2
Water circuit									
Maximum water side pressure		kPa	1000	1000	1000	1000	1000	1000	1000
Min. installation water contents	8	l	366	366	377	500	508	518	704
Power supply									
Standard power supply			400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N

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

1. Data referred to the following conditions: Internal exchanger water temperature = 12/7°C Entering external exchanger air temperature = 35°C
2. The Total Power Input value does not take into account the part related to the pumps and required to overcome the pressure drops for the circulation of the solution inside the exchangers
3. Data compliant to Standard EN 14511:2013 referred to the following conditions: - Internal exchanger water temperature = 12/7°C - Entering external exchanger air temperature = 35°C
4. Data referred to the following conditions: Internal exchanger water temperature = 40/45°C. Entering external exchanger air temperature= 7°C D.B./6°C W.B
5. Data compliant to Standard EN 14511:2013 referred to the following conditions: - Internal exchanger water temperature = 40/45°C - Entering external exchanger air temperature =7°C. D.B. / 6°C W.B.
6. PHE = plate exchanger
7. AX = axial fan
8. Volume calculated with internal exchanger water temperature ranging from 35°C to 20°C. This volume ensures energy sufficient defrost energy. If the internal exchanger water temperature is > 45°C, this volume can be multiplied by the coefficient 0,55. Excluding the water volume in the unit.
9. Data calculated according to the EN 14825:2016 Regulation

Technical data for specific applications

Size			18.2	20.2	25.2	30.2	35.2	40.2	45.2
Cooling (A35/W18) - Application: Radiant panels									
Cooling capacity (EN14511:2013)	1	kW	67,3	79,6	92,6	108	122	140	156
Total power input (EN14511:2013)	1	kW	18,4	22,5	25,6	31,9	37,2	42,6	50,7
EER (EN 14511:2013)	1		3,66	3,53	3,62	3,40	3,29	3,29	3,08
Water flow-rate	1	l/s	3,22	3,80	4,42	5,18	5,85	6,70	7,56
Heating (A7/W35) - Application: Radiant panels									
Heating capacity (EN14511:2013)	2	kW	58,4	71,4	81,2	96,7	110	128	144
Total power input (EN14511:2013)	2	kW	15,0	18,1	20,8	24,9	28,6	32,2	36,8
COP (EN 14511:2013)	2		3,89	3,94	3,90	3,88	3,87	3,96	3,90
Water flow-rate	2	**l/s**	2,79	3,41	3,88	4,62	5,28	6,10	6,87
ErP Space Heating Energy Class - AVERAGE Climate - W35	**3**		**A+**	**A+**	**A+**	**A+**	-	-	-
SCOP - AVERAGE Climate - W35	5		3,55	3,59	3,45	3,61	3,68	3,65	3,81
Heating (A7/W55) - Application: Radiators									
Heating capacity (EN14511:2013)	4	kW	52,1	64,6	73,0	86,8	99,1	115	132
Total power input (EN14511:2013)	4	kW	21,0	25,8	29,5	34,9	39,7	45,9	52,7
COP (EN 14511:2013)	4		2,48	2,51	2,47	2,48	2,50	2,49	2,50
Water flow-rate	4	l/s	1,25	1,54	1,74	2,07	2,37	2,74	3,14

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 compliant to Standard EN 14511:2013 referred to the following conditions: - Internal exchanger water temperature = 23/18 °C - Entering external exchanger air temperature = 35°C.
2. Data calculated in compliance with Standard EN 14511:2013 referred to the following conditions: Internal exchanger water temperature = 30/35°C - Entering external exchanger air temperature 7°C D.B./6°C W.B.
3. Seasonal Space Heating Energy Efficiency Class according to Commission delegated Regulation (EU) No 811/2013. W = Water outlet temperature (°C)
4. Data calculated in compliance with Standard EN 14511:2013 referred to the following conditions: Internal exchanger water temperature = 45/55°C - Entering external exchanger air temperature = 7°C D.B./6°C W.B.
5. Data calculated according to the EN 14825:2016 Regulation

Electrical data

Supply voltage 400/3/50+N

Size			18.2	20.2	25.2	30.2	35.2	40.2	45.2
F.L.A. - Full load current at max admissible conditions									
F.L.A. - Compressor 1 (ON/OFF)		A	16,8	24,3	26,6	30,8	30,8	40,6	40,6
F.L.A. - Compressor 2 (INVERTER)		A	20,8	20,8	23,3	29,5	32,1	32,1	40,5
F.L.A. - Single External Fan		A	3,9	3,9	3,9	3,9	3,9	3,9	3,9
F.L.A. - Total		A	45,5	52,9	57,7	68,1	70,7	80,5	88,9
L.R.A. - Locked rotor amperes									
L.R.A. - Compressor 1 (ON/OFF)		A	98,0	147	158	197	197	215	215
L.R.A. - Compressor 2 (INVERTER)		A	20,8	20,8	23,3	29,5	32,1	32,1	40,5
F.L.I. - Full load power input at max admissible conditions									
F.L.I. - Compressor 1 (ON/OFF)		kW	9,7	14,6	16,5	18,5	18,5	24,8	24,8
F.L.I. - Compressor 2 (INVERTER)		kW	12,7	12,7	14,6	18,0	19,6	19,6	26,7
F.L.I. - Single External Fan		kW	2,56	2,56	2,56	2,56	2,56	2,56	2,56
F.L.I. - Total		kW	27,5	32,5	36,3	41,6	43,3	49,6	56,6
M.I.C. - Maximum inrush current									
M.I.C - Value		A	126,6	175,6	189,1	234,3	237,0	255,0	263,3
M.I.C - With soft start accessory		A	77,6	102,1	110,1	135,8	138,4	147,4	155,8

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

Standard unit

Size	Sound power level (dB)								Sound pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
18.2	90	83	78	80	78	72	67	61	**65**	**82**
20.2	89	82	80	81	77	72	64	59	**65**	**82**
25.2	90	83	80	81	79	74	68	60	**66**	**83**
30.2	91	84	82	83	78	75	66	59	**66**	**84**
35.2	91	85	82	84	79	74	67	61	**68**	**85**
40.2	92	85	83	84	80	75	67	62	**68**	**85**
45.2	94	85	83	84	82	77	71	63	**69**	**86**

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

Unit with HEDIF - "Diffuser for high efficiency axial fan" option

Size	Sound pressure level	Sound power level
18.2	63	80
20.2	63	80
25.2	64	81
30.2	64	82
35.2	66	83
40.2	66	83
45.2	67	84

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

Correction factors for glycol use

Internal exchanger (evaporator)

% 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	1	-1	-4	-6	-10	-14	-19
Internal exchanger cooling capacity factor		0,995	0,990	0,985	0,981	0,977	0,974	0,971	0,968
Internal exchanger compressor power input factor		0,997	0,993	0,990	0,988	0,986	0,984	0,982	0,981
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

Fouling Correction Factors

	Internal exchanger (evaporator)	
m2 °C / W	**F1**	**FK1**
0.44 x 10 (-4)	1,0	1,0
0.88 x 10 (-4)	0,97	0,99
1.76 x 10 (-4)	0,94	0,98

F1 = Cooling capacity correction factors

FK1 = Compressor power input correction factor

Overload and control device calibrations

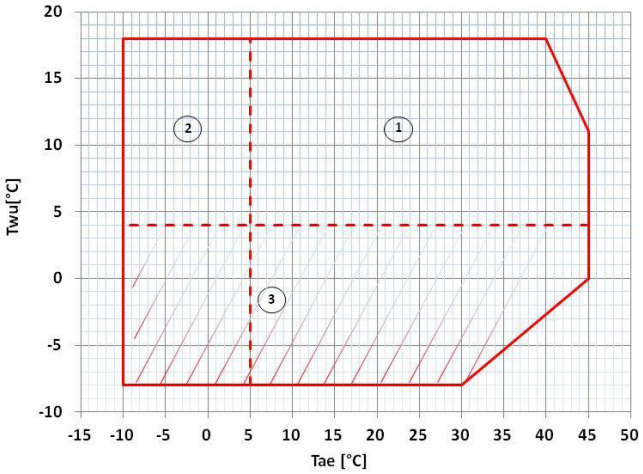
		Open	Closed	Value
High pressure safety pressure switch	[kPa]	4050	3300	-
Low pressure switch	[kPa]	450	600	-
Low pressure switch (Brine)	[kPa]	200	350	-
Antifreeze protection	[°C]	3	5,5	
high pressure safety valve	[kPa]	-	-	4500
Low pressure safety valve	[kPa]	-	-	3000
Max no. of compressor starts per hour	[n°]	-	-	10
High compressor discharge temperature safety thermostat		-	-	120

Integrated heating capacities

Air temperature external exchanger inlet °C (B.S. / B.U)	-10 / -10,5	-5 / -5,4	0 / 0,6	5 / 3,9	Others
Heating capacity multiplication coefficient	0,90	0,89	0,88	0,94	1

Operating Range

Cooling

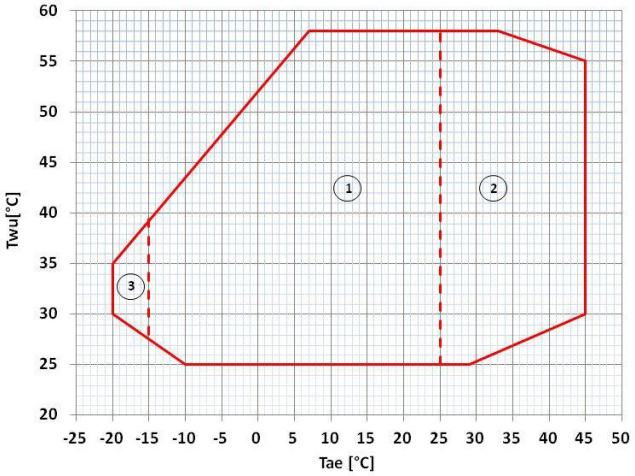


Twu [°C] = Internal exchanger outlet water temperature
Tae [°C] = External exchanger inlet air temperature

1. Standard unit operating range at full load
2. Standard unit operating range with air flow automatic modulation
3. Operating range where the use of ethylene glycol is mandatory in relation to the temperature of the water at the outlet of the user side exchanger

Operating Range

Heating



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

1. Standard unit operating range at full load
2. Standard unit operating range with air flow automatic modulation
3. Unit operating range with automatic staging of the compressor capacity.
   Not compatible with Clivet integrated pumping unit (HYG1 - HYG2 - VARYP).

Unit equipment with low outdoor temperatures

Minimum outdoor air temperature	Operating unit		Unit in stand-by *** (fed unit)	Unit in storage (unit not fed)
	Cool*	Heat**		
+11°C +2°C -5°C -7°C -10°C	√ standard unit	√ standard unit	√ standard unit	√ standard unit
Between –10°C and –15°C	NOT POSSIBLE	√ glycol in an appropriate percentage (1)	√ glycol in an appropriate percentage (1)	NOT POSSIBLE
Between –15°C and –20°C	NOT POSSIBLE	√ glycol in an appropriate percentage (1) X not compatible with Clivet integrated pumping device	√ glycol in an appropriate percentage (1) X not compatible with Clivet integrated pumping device	NOT POSSIBLE

Data referred to the following conditions:
* chilled water production:
internal exchanger water = 12/7°C
** hot water production:
internal exchanger water = 30/35 °C
*** 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.

Air conditions which are at rest are defined as the absence of air flowing towards the unit. Weak winds can induce air to flow through the exchanger and air-levels which can cause a reduction in the operating range. In the presence of predominant winds it is necessary to use suitable windbreak barriers.

Standard unit technical specifications

Compressor

First circuit: Hermetic orbiting scroll compressor, complete with motor over-temperature and over-current devices and protection against excessive gas discharge temperature. Fitted on rubber antivibration mounts and complete with oil charge. The automatic oil heater prevents the oil from being diluted by the refrigerant when the compressor stops.

Second circuit: Scroll hermetic compressor controlled by inverter, complete with motor over-temperature and over-current devices and protection against excessive gas discharge temperature. Fitted on rubber antivibration mounts and complete with oil charge. The automatic oil heater prevents the oil from being diluted by the refrigerant when the compressor stops.

Structure

Supporting structure realised with steel frame with zinc-magnesium superficial traitment painted with polyester powder RAL 9001, that ensures excellent mechanical features and high long-term resilience against corrosion.

Panelling

External pre-painted zinc-magnesium panelling that ensures superior resistance to corrosion for outdoor installation and eliminates the need for periodical painting. The panels can be easily removed to fully access internal components and are lined with sound-proof material on the inside to contain the unit's sound levels

Internal exchanger

Direct expansion heat exchanger, braze-welded AISI 316 stainless steel plates with large exchange surface and complete with external heat and anti-condensate insulation.

The exchanger is complete with:

- differential pressure switch, water side
- antifreeze heater to protect the water side exchanger, preventing the formation of frost if the water temperature falls below a set value.

External exchanger

Direct expansion finned coil exchanger made with copper pipes placed on staggered rows mechanically expanded to better adhere to the fin collar. The fins are made from aluminium with a hydrophilic treatment, a corrugated surface and adequately distanced to ensure the maximum heat exchange efficiency.

Fan

Axial fans with sickle profile blades terminating with "Winglets", directly coupled to the electronic controlled motor (IP54), driven by the magnetic switching of the stator. The brushless technology and the special supply increase both the life expectancy and the efficiency. As a result the electric consumption is reduced up to 50%. Fans are housed in aerodynamically shaped structures to increase efficiency and reduce noise level. The assembly is protected by accident prevention guards. Supplied with variable speed control (ECOBREEZE).

Refrigeration circuit

Double refrigeration circuit complete, for each circuit, with:

- replaceable anti-acid solid cartridge dehydrator filter
- high pressure safety pressure switch
- low pressure transducer
- high pressure transducer
- non-return valve
- hot gas injection valve
- liquid receiver
- liquid separator
- refrigerant temperature probe
- electronic thermostatic expansion valve
- reverse valve of the 4-way cycle
- high pressure safety valve

Electrical panel

The capacity section includes:

- main door lock isolator switch
- isolating transformer for auxiliary circuit power supply
- on-off scroll compressor protection magnetothermic
- inverter scroll compressor protection fuses
- inverter, complete with thermal protection, for continuous control of the modulating scroll compressor revolutions
- fan protection fuses and thermal protection
- on-off scroll 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 in function of the outdoor air temperature
- set-point compensation with signal 0-10 V
- 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
- remote ON/OFF control
- relay for remote cumulative fault signal
- inlet for demand limit (power input limitation according to a 0÷10V external signal)
- digital input for double set-point 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

Electronic control

Description of step start-up control

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

The compressor step activation favours the maximum efficiency and manages at its best the inverter compressor.

The inverter compressor is activated first modulating the capacity in function of the installation return temperature and controlling the supply temperature with PID control.

Main controls

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

- Auto-adaptive switching on differential: guarantees the compressors minimum operating time in systems with low water content.
- Set-point compensation with outdoor temperature
- 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
- "Anti-snow" function: in case of heavy snowfalls, it avoid the deposit of snow on fans
- Alarm log
- Autostart after voltage drop
- Local or remote control

Unit status display

By the user interface is possible to display:

- unit operating mode and status
- leaving/entering water temperature
- outdoor air temperature
- refrigeration circuit pressure and temperatures (circuit 1 and 2)
- signalling of alarms and anomalies in progress

Probe, transducer and parameter display

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

This section is accessible only by specialized personnel.

Management of more units in cascade (ECOSHARE)

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

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

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

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

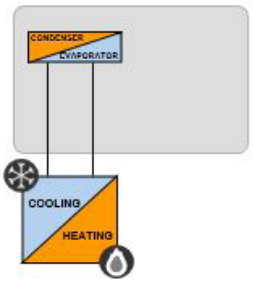
Remote control (RCTX)

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

Easy wall installation, it is similar in feature and functions to the built-in user interface

Hydronic assembly configuration - 1.1

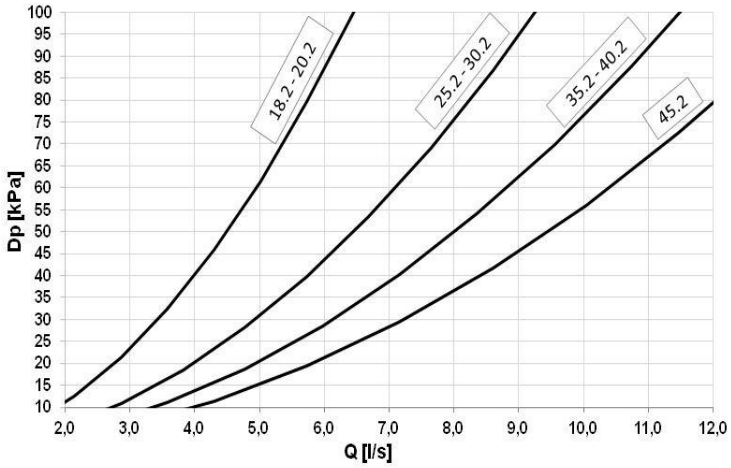
Standard unit



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

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

Internal exchanger pressure drop curves



Pressure drop water side are calculated considering a mean water temperature of 7°C

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

The water flow-rate can be calculated with the following formula:

Q [l/s] = kWf / (4,186 x DT)

kWf = Cooling capacity [kW]
DT = Difference between leaving/entering water temperature.

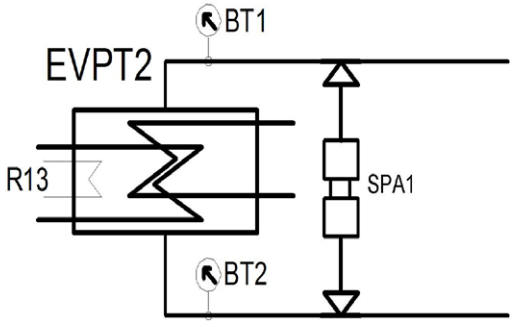
To the internal exchanger pressure drops must be added the pressure drops of the steel mesh mechanical strainer that must be placed on the water input line. It is a device compulsory for the correct unit operation, and it is available as Clivet option (IFWX).

Admissible water flow-rates

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

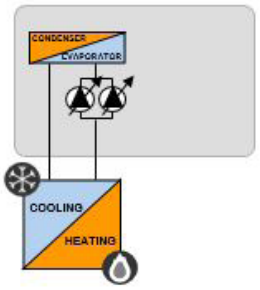
SIZE		18.2	20.2	25.2	30.2	35.2	40.2	45.2
Qmin	[l/s]	1,9	1,9	2,7	2,7	3,3	3,3	3,9
Qmax	[l/s]	6,5	6,5	9,3	9,3	11,5	11,5	13,6

Water diagram



EVPT2 = Plate evaporator 2 circuits
R13 = Evaporator group heater
BT1 = Probes of entering water temperature
BT2 = Probes of leaving water temperature
SPA1 = Differential water pressure switch

Hydronic assembly configuration - 1.2
Unit with VARYFLOW + (VARYP)

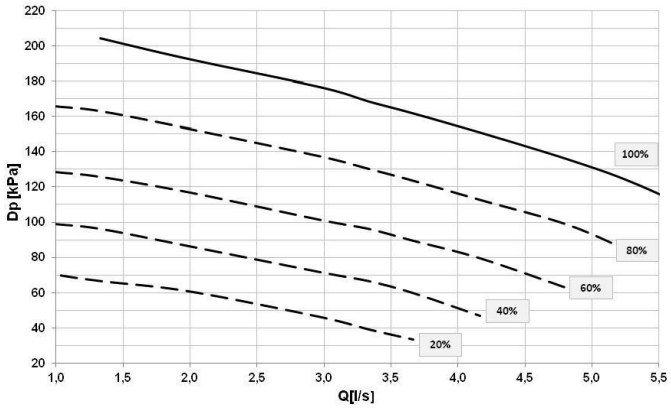


Configuration with 2 centrifugal electric pumps arranged in parallel and controlled by inverter, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

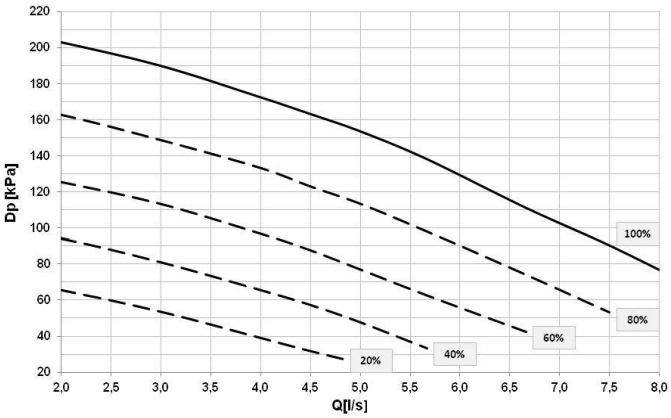
The electric pumps are equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

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.

VARYFLOW+ pressure head (Size 18.2 - 30.2)



VARYFLOW+ pressure head (Size 35.2 - 45.2)

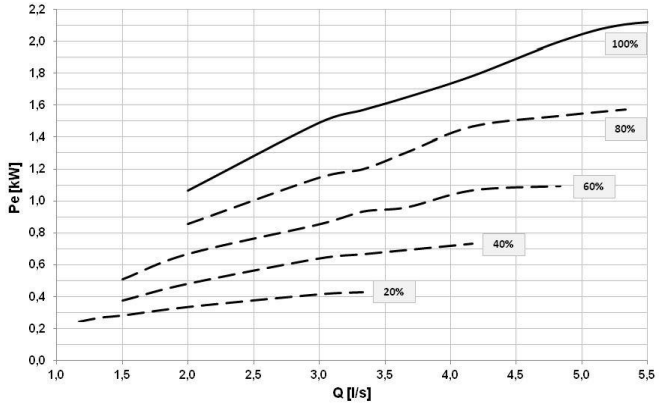


Q = Water flow rate [l/s]
DP = Pressure drop [kPa]

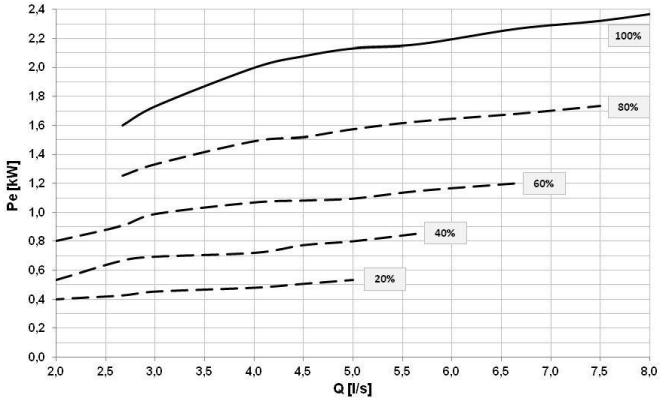
Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:

- User side exchanger pressure drops
- IFVX accessory –Steel mesh filter on the water side (where applicable)

VARYFLOW+ absorption curves (Size 18.2 - 30.2)

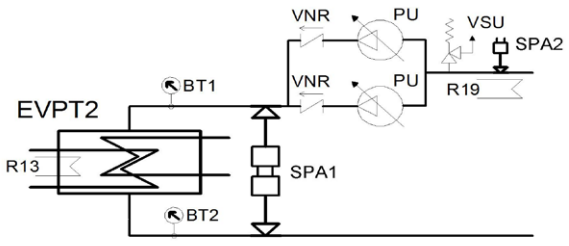


VARYFLOW+ absorption curves (Size 35.2 - 45.2)



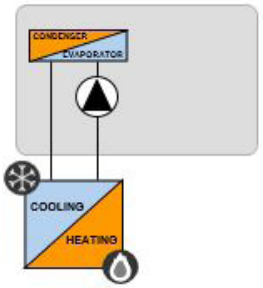
Q = Water flow rate [l/s]
Pe = Electric power consumption [kW]

Water diagram



EVPT2 = Plate evaporator 2 circuits
R13 = Evaporator group heater
BT1 = Probes of entering water temperature
BT2 = Probes of leaving water temperature
VNR = Non return valves
SPA1 = Differential water pressure switch
PU = Hydronic assembly VARYFLOW +
VSU = Water safety valve
R19 = Hydronic assembly heaters
SPA2 = System water pressure switch

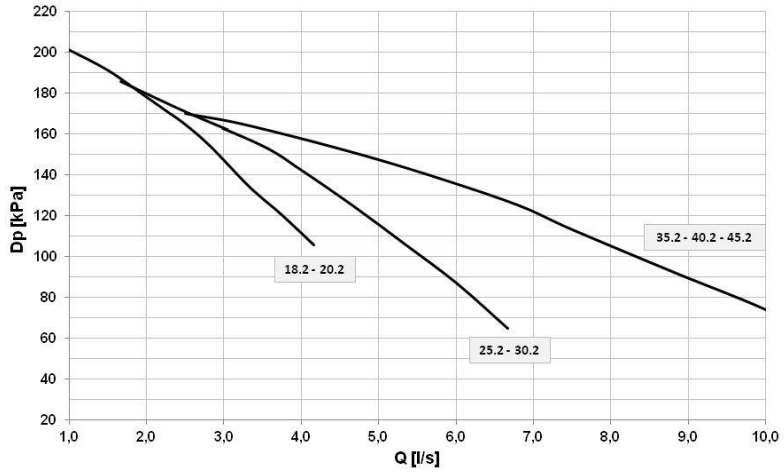
Hydronic assembly configuration - 1.3
Unit with one ON/OFF pump (HYG1)



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

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

ON/OFF pump pressure head (Size 18.2 - 45.2)

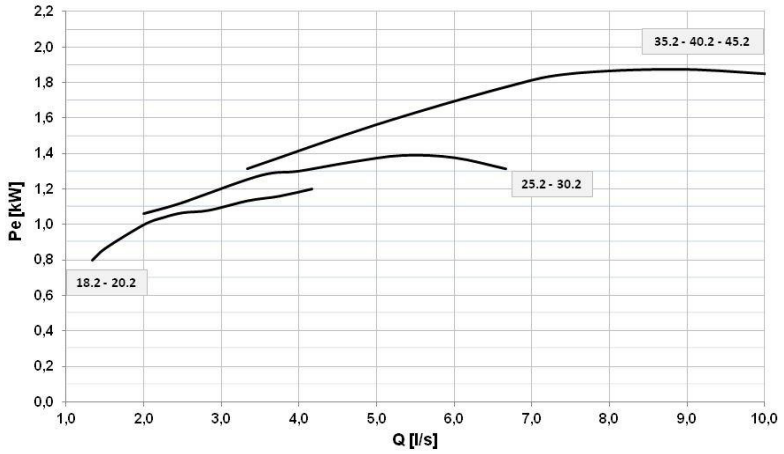


Q = Water flow rate [l/s]
DP = Pressure head [kPa]

Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:

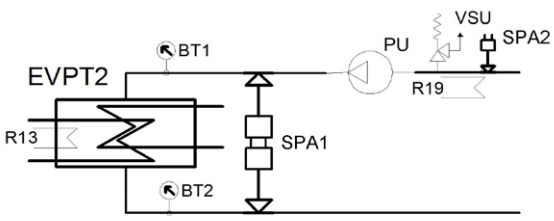
- User side exchanger pressure drops
- IFVX accessory –Steel mesh filter on the water side (where applicable)

ON/OFF pump absorption curves (Size 18.2 - 45.2)



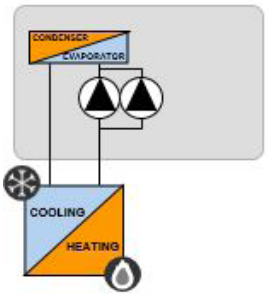
Q = Water flow rate [l/s]
Pe = Electric power consumption [kW]

Water diagram



EVPT2 = Plate evaporator 2 circuits
R13 = Evaporator group heater
BT1 = Probes of entering water temperature
BT2 = Probes of leaving water temperature
VNR = Non return valves
SPA1 = Differential water pressure switch
PU = Hydronic assembly 1 ON/OFF pump
VSU = Water safety valve
R19 = Hydronic assembly heaters
SPA2 = System water pressure switch

Hydronic assembly configuration - 1.4
Unit with two ON/OFF pumps (HYG2)

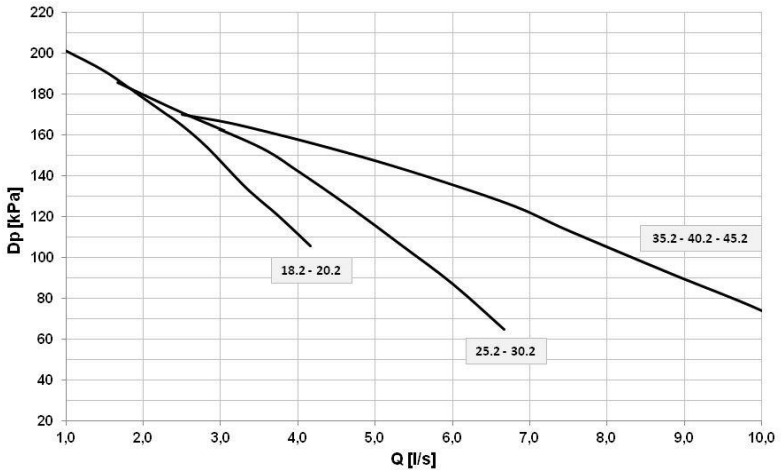


Configuration with 2 centrifugal electric pumps, 1 stand-by, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

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

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

ON/OFF pump pressure head (Size 18.2 - 45.2)

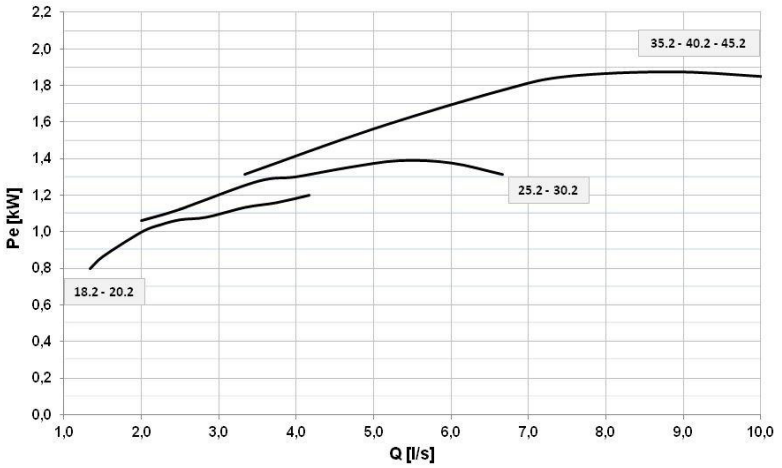


Q = Water flow rate [l/s]
DP = Pressure head [kPa]

Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:

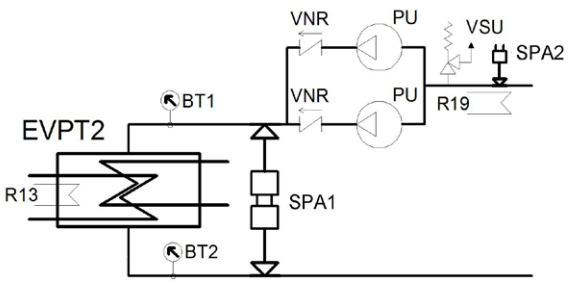
- User side exchanger pressure drops
- IFVX accessory –Steel mesh filter on the water side (where applicable)

ON/OFF pump absorption curves (Size 18.2 - 45.2)



Q = Water flow rate [l/s]
Pe = Electric power consumption [kW]

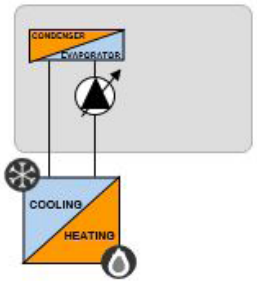
Water diagram



EVPT2 = Plate evaporator 2 circuits
R13 = Evaporator group heater
BT1 = Probes of entering water temperature
BT2 = Probes of leaving water temperature
VNR = Non return valves
SPA1 = Differential water pressure switch
PU = Hydronic assembly 2 ON/OFF pumps
VSU = Water safety valve
R19 = Hydronic assembly heaters
SPA2 = System water pressure switch

Hydronic assembly configuration - 1.5

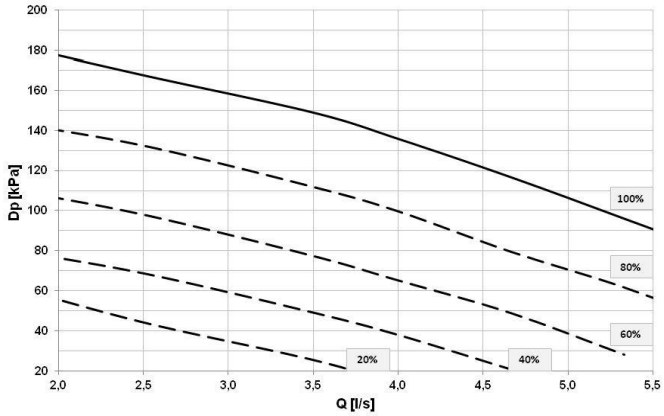
Unit with 1 INVERTER pump (HYGU1V)



This configuration provides for one inverter-controlled electric centrifugal pump with body and impeller in AISI 304 steel and components listed in the key of the included water diagram. All water fittings are Victaulic.
The electric pump is equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

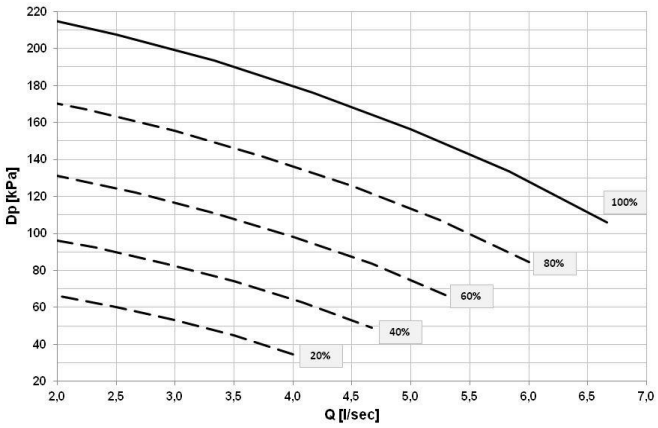
The control, modulates the water flow-rate keeping constant the delta T. If the water temperature is in critical conditions, it allows to extend the unit operating ranges guaranteeing its operating, automatically reducing the water flow-rate. In the event of one of the two pumps is temporarily unavailable,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

Inverter pump pressure head (Size 18.2 - 20.2)



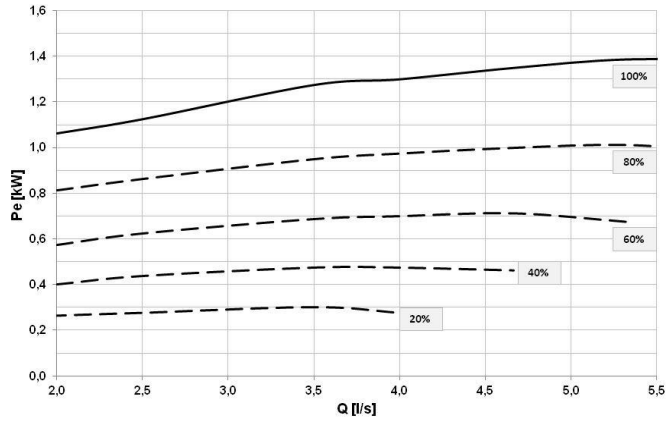
Q = Water flow rate [l/s]
DP = Pressure head [kPa]

Inverter pump pressure head (Size 25.2 - 30.2)



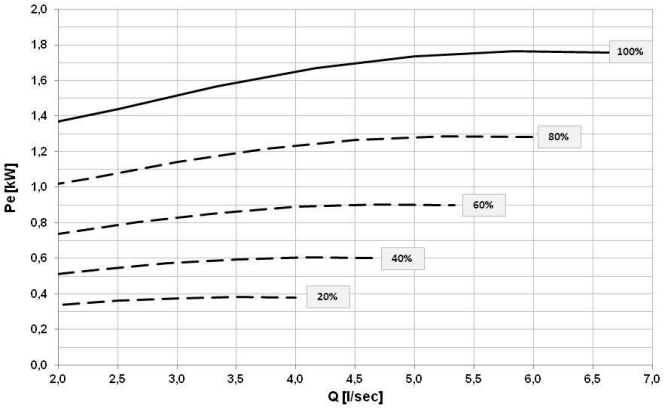
Q = Water flow rate [l/s]
DP = Pressure head [kPa]

Inverter pump absorption curve (Size 18.2 - 20.2)



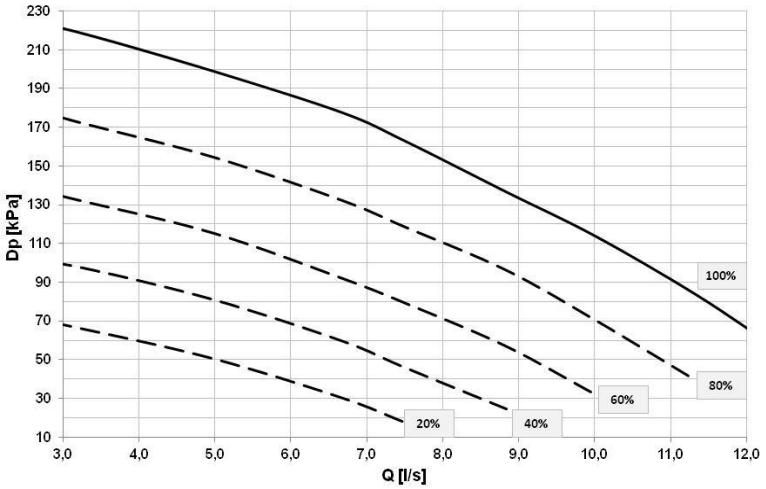
Q = Water flow rate [l/s]
Pe = Electric power consumption [kW]

Inverter pump absorption curve (Size 25.2 - 30.2)



Q = Water flow rate [l/s]
Pe = Electric power consumption [kW]

Inverter pump available pressure (Size 35.2 - 45.2)

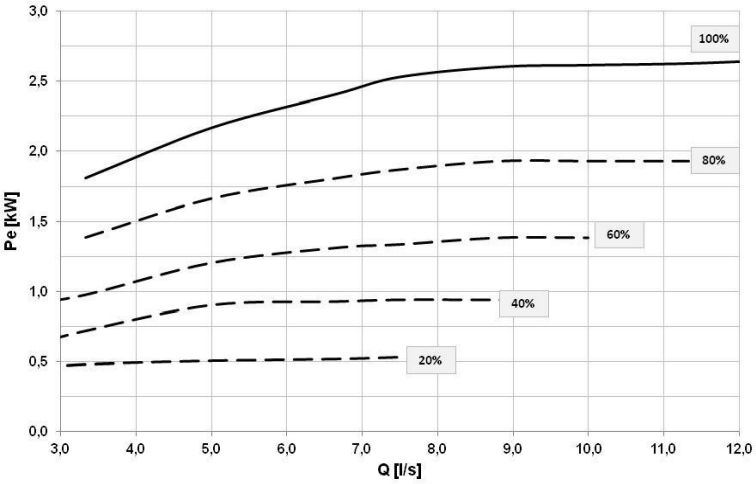


Q = Water flow rate [l/s]
DP = Pressure head [kPa]

Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:

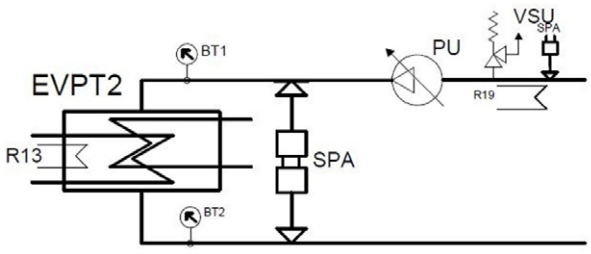
- User side exchanger pressure drops
- IFVX accessory steel mesh filter on the water side (where applicable)

Inverter pump absorption curve (Size 35.2 - 45.2)



Q = Water flow rate [l/s]
Pe = Electric power consumption [kW]

Water diagram



EVPT2 = Plate evaporator 2 circuits
R13 = Evaporator group heater
BT1 = Probes of entering water temperature
BT2 = Probes of leaving water temperature
SPA1 = Differential water pressure switch
PU = Hydronic assembly 1 inverter pump
VSU = Water safety valve
R19 = Hydronic assembly heaters
SPA2 = System water pressure switch

Configurations - Partial energy recovery (D)

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

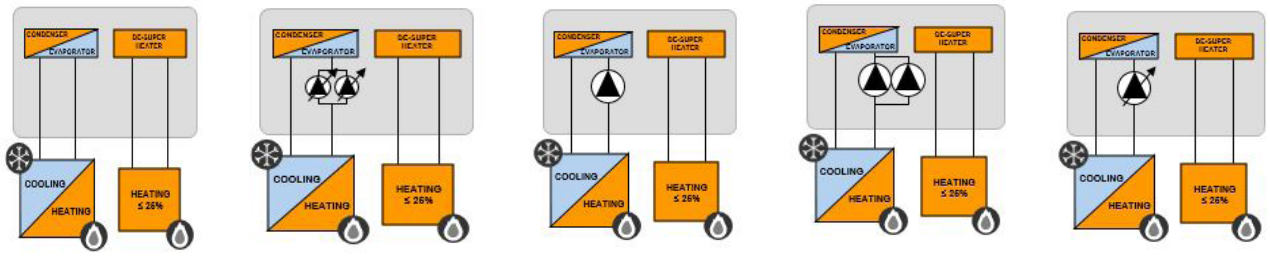
A configuration which enables the production of hot water free-of-charge while operating in the cooling mode, thanks to the partial recovery of condensation heat that would otherwise be rejected to the external heat source. It is possible to recovery about 20% of the unit rejected heating capacity equal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

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

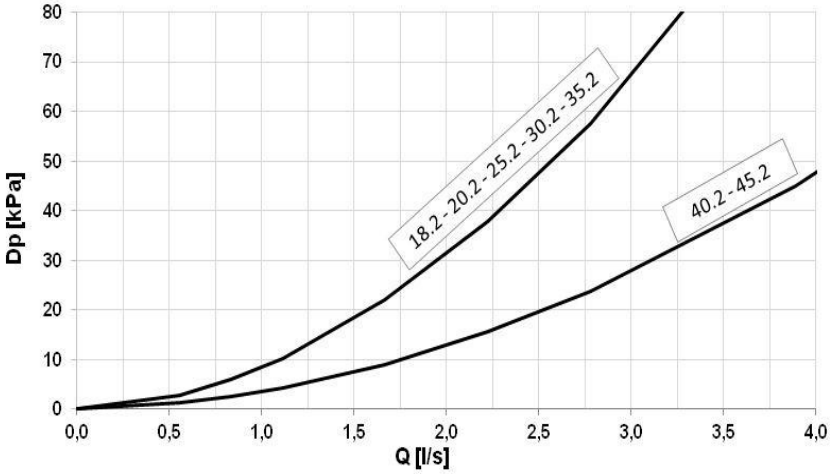
If cold water production is not requested, the unit can not produce hot water. The heating capacity request is made by the digital contact enabling, that activates the pump recovery side (outside the unit)

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

D **D+VARYP** **D+HYG1** **D+HYG2** **D+HYGU1V**



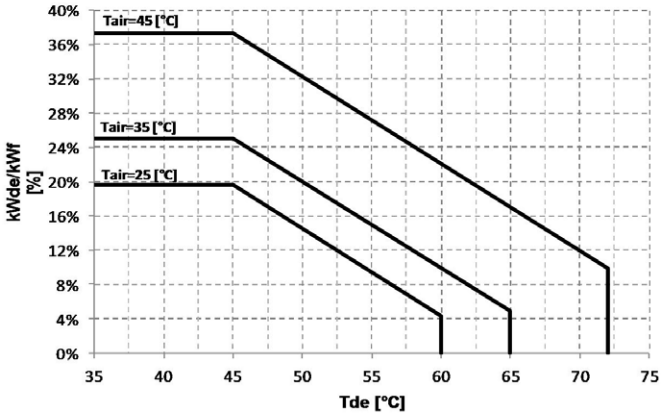
Partial energy recovery pressure drop curves



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

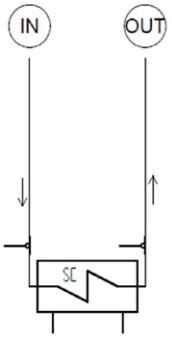
Q = Water flow rate [l/s]
DP = Pressure drops [kPa]

Partial recovery heating capacity



kWde/kWf = Heat recovered/Cooling capacity [%]
Tde = Heat recovering device outlet water temperature [°C]

Water diagram



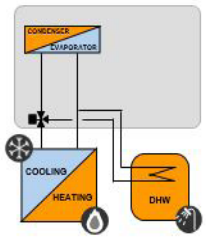
IN = Recovery side inlet
OUT = Recovery side outlet
SC = Plate heat exchangers

Configurations - DHW switching valve (VACS)

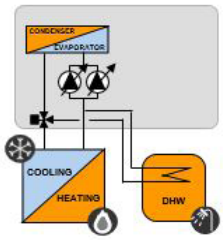
Configuration with on/off 3-way valve for the water flow-rate diverting, and components as described on the water diagram key. All water fittings are Victaulic type.
The DHW is called by the closure of the potential-free contact present in the unit electric panel.In heating, the control regulates the 3-way valve commutation because it deviates the flow-rate from installation to DHW storage tank, changes the installation set into the DHW one, thermoregulates and activates or deactivates the compressors depending on the distance from the DHW set. In cooling, the control switches off the compressors due to the mode changing, regulates the 3-way valve commutation and starts the compressors after the safety time owed to on/off.

The DHW switching valve (VACS) can be matched to the hydronic assemblies user side indicated in the previous pages according to the diagrams below.

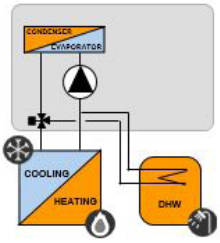
VACS



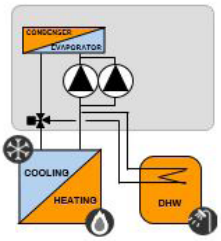
VACS+VARYP



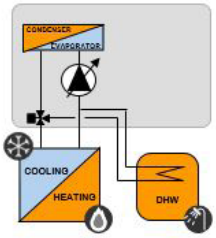
VACS+HYG1



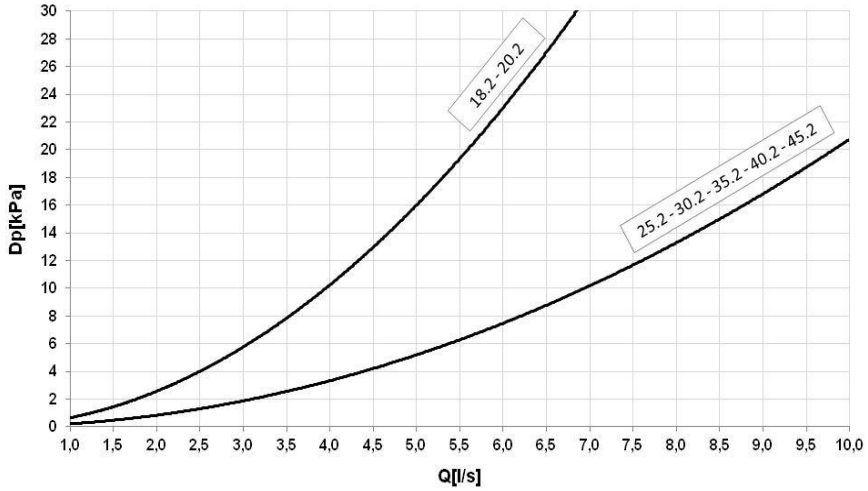
VACS+HYG2



VACS+HYGU1V

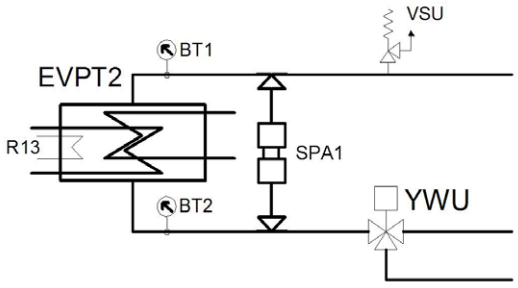


DWH switching valve pressure drop curves



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

Water diagram



EVPT2 = Plate evaporator 2 circuits
R13 = Evaporator group heater
BT1 = Probes of entering water temperature
BT2 = Probes of leaving water temperature
SPA1 = Differential water pressure switch
VSU = Water safety valve
YWU = DHW switching valve

Built-in configuration options

ACC - Storage tank

Option supplied built-in the unit. Steel storage tank complete with double layer covering with closed-cell insulation, stainless steel anti-freeze immersion resistance, bleed valve, draw off cock, cast-iron shut-off butterfly valve with quick connections and activation lever with a mechanical calibration lock at the evaporator output, quick connections with insulated casing.

Available only for size 35.2 ÷ 45.2

The storage tank capacity is 150L.

CCCA - Copper / aluminium condenser coil with acrylic lining

Coils with copper pipes and aluminium fins with acrylic lining. Resist bi-metallic corrosion and allow for application in coastal areas.

Attention!

- Cooling capacity variation -2.7%
- Variation in compressor power input +4.2%
- Operating range reduction -2.1°C

CCCA1 - Condenser coil with Aluminum Energy Guard DCC treatment

A treatment which offers an optimal thermal exchange and guarantees and protects the finned coil exchangers from corrosion over time. Can be used in settings with very aggressive saline concentrations and other chemical agents in the air thus maintaining the performance of the coils over time.

PFCC - Power factor correction capacitors (cosfi>0,95)

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 0.95, reducing the network reactive power. This often leads to an economic benefit which the energy provider grants to the final user.

MF2 - Multi-function phase monitor

The multifunction phase monitor controls the presence and the correct phase sequence, checks any voltage anomalies (+/–10%), automatically reset the unit operating as the correct power supply is restored.

This control allows to:

- protect components inside the unit, as if they are powered by an anomalous voltage they may operate incorrectly or break;
- quickly identify, among the alarms of the unit's components, what really caused the malfunction due to the sudden change of voltage.

SFSTR4N - Disposal for inrush current reduction, for unit 400/3/50+N

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.

PGFC – Finned coil protection grill

This accessory is used to protect the external coil from the accidental contact with external things or people.

Ideal for installation in places where persons can pass from, such as car parks, terraces, etc.

HEDIF - Diffuser for high efficiency axial fan

The new AxiTop diffuser creates an ideal air distribution: aerodinamically decelerates the flow and transforms most of its kinetic energy in static pressure, obtaining:

- Down to –3 dB of silence
- Reduction of 3% of the absorbed energy.

Since the fans are the unit's main noise source, the benefits are evident especially during the night hours, when the load is reduced but sensitivity to noise is enhanced.

CMSC8 - Serial communication module to BACnet supervisor

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 device is installed and wired built-in the unit

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

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

CMSC9 - Serial communication module to Modbus supervisor

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

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

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

CMSC10 - Serial communication module to LonWorks supervisor

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

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

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

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

Accessories separately supplied

RCTX - Remote control

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

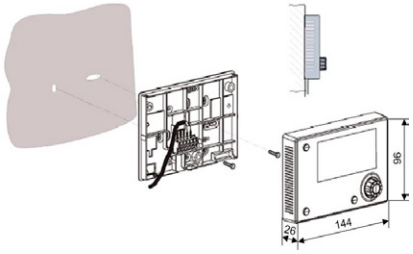
It can be easily installed on the wall and has the same aspect and functions of the user interface on the unit.

All the features of the device can be replicated with a normal laptop connected to the unit with an Ethernet network cable and an internet 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 no.1 shielded twisted pair. Conductor diameter 0.8 mm.

Installation is a responsibility of the Customer.



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)

Installation is a responsibility of the Customer.

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)

Installation is a responsibility of the Customer.

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.

Installation is a responsibility of the Customer.

PGFCX - Finned coil protection grill

This accessory is used to protect the external coil from the accidental contact with external things or people.

Ideal for installation in places where persons can pass from, such as car parks, terraces, etc.

This option is not suitable for application in sulphuric environments

Installation is a responsibility of the Customer.

AVIBX - Anti-vibration mount support

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.

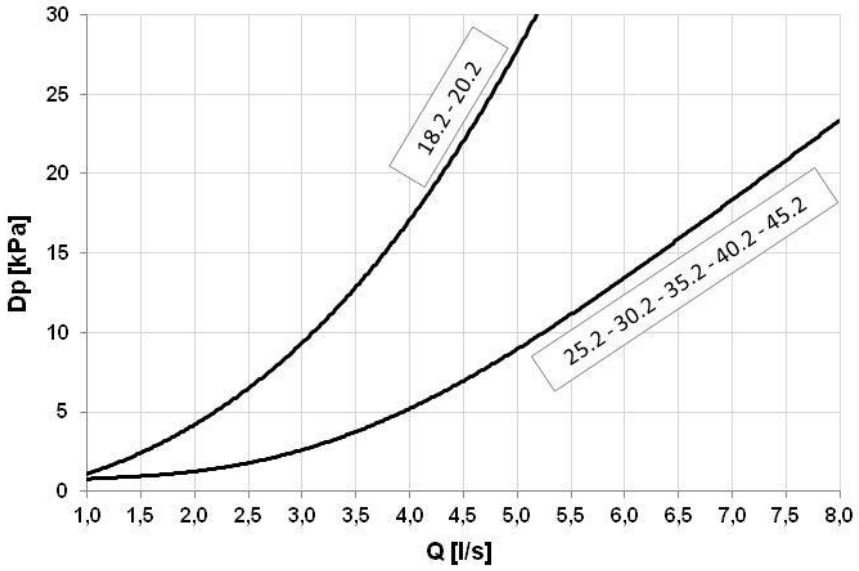
Installation is a responsibility of the Customer.

IFWX - Steel mesh strainer on the water side

The device stops the exchanger from being clogged by any impurities which are in the hydraulic circuit. The mechanical steel mesh strainer must be placed on the water input line. It can be easily dismantled for periodical maintenance and cleaning. It also includes: cast-iron shut-off butterfly valve with quick connections and activation lever with a mechanical calibration lock; quick connections with insulated casing.

Installation is a responsibility of the Customer.

Steel mesh strainer pressure drops



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

Heating Performace

Size	Tae (°C) D.B./W.B.	Leaving internal exchanger water temperature (°C)									
		25		35		45		55		58	
		kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe
18.2	-15 / -15.4	30,4	9,45	30,7	11,4	-	-	-	-	-	-
	-10 / -10.5	36,1	9,65	36,4	11,6	-	-	-	-	-	-
	-7 / -8	39,4	9,77	39,7	11,7	39,1	14,2	-	-	-	-
	0 / -0.6	48,6	10,1	48,6	12,1	47,0	14,6	-	-	-	-
	7 / 6	58,5	10,4	58,1	12,5	55,7	15,0	51,9	18,6	49,6	19,6
	15 / 13	71,5	10,8	70,5	12,9	67,1	15,4	62,0	19,0	59,3	20,0
	20 / 16	78,1	11,0	76,9	13,1	72,5	15,6	66,8	19,2	64,1	20,2
20.2	-15 / -15.4	38,2	11,8	38,9	14,3	-	-	-	-	-	-
	-10 / -10.5	45,1	12,1	45,4	14,5	-	-	-	-	-	-
	-7 / -8	49,0	12,2	49,2	14,7	48,2	17,8	-	-	-	-
	0 / -0.6	60,1	12,5	59,9	15,1	57,9	18,3	-	-	-	-
	7 / 6	72,0	12,9	71,0	15,5	68,0	18,7	64,2	23,2	60,8	24,5
	15 / 13	87,4	13,4	86,0	16,0	81,8	19,2	76,5	23,7	72,3	24,9
	20 / 16	95,2	13,6	93,3	16,2	88,2	19,4	82,1	23,9	78,1	25,1
25.2	-15 / -15.4	43,6	13,5	43,8	16,3	-	-	-	-	-	-
	-10 / -10.5	51,5	13,7	51,3	16,6	-	-	-	-	-	-
	-7 / -8	56,0	13,9	55,7	16,7	55,0	20,4	-	-	-	-
	0 / -0.6	69,2	14,2	68,0	17,2	66,1	20,8	-	-	-	-
	7 / 6	82,7	14,7	80,9	17,6	77,8	21,2	72,7	26,4	69,1	27,8
	15 / 13	101	15,3	98,1	18,2	93,1	21,7	86,0	26,7	82,2	28,2
	20 / 16	110	15,6	106	18,4	101	21,9	92,8	26,9	88,1	28,4
30.2	-15 / -15.4	52,1	16,2	52,9	19,6	-	-	-	-	-	-
	-10 / -10.5	61,3	16,6	61,7	20,0	-	-	-	-	-	-
	-7 / -8	66,4	16,8	66,5	20,3	65,8	24,5	-	-	-	-
	0 / -0.6	81,8	17,4	81,1	21,0	79,0	25,2	-	-	-	-
	7 / 6	98,2	18,1	96,3	21,6	92,6	25,8	86,4	31,7	83,2	33,5
	15 / 13	119	18,9	116	22,4	111	26,5	102	32,4	97,8	34,2
	20 / 16	130	19,3	126	22,8	120	26,9	111	32,8	106	34,6
35.2	-15 / -15.4	59,8	16,9	61,0	23,2	-	-	-	-	-	-
	-10 / -10.5	70,5	17,4	70,6	23,6	-	-	-	-	-	-
	-7 / -8	76,3	17,7	76,1	23,8	75,2	28,7	-	-	-	-
	0 / -0.6	94,3	18,5	92,6	24,4	90,0	29,2	-	-	-	-
	7 / 6	113	19,4	110	25,1	106	29,8	98,7	36,3	88,8	39,6
	15 / 13	138	20,5	133	26,0	126	30,6	116	37,0	106	40,2
	20 / 16	150	21,1	144	26,4	137	30,9	125	37,3	114	40,6
40.2	-15 / -15.4	69,1	23,0	70,1	26,2	-	-	-	-	-	-
	-10 / -10.5	80,7	23,3	81,5	26,6	-	-	-	-	-	-
	-7 / -8	87,6	23,5	87,9	26,9	87,0	33,0	-	-	-	-
	0 / -0.6	108	24,1	107	27,5	104	33,6	-	-	-	-
	7 / 6	129	24,8	127	28,2	122	34,2	114	42,0	105	44,3
	15 / 13	156	25,7	153	29,1	146	35,0	135	42,5	122	44,9
	20 / 16	170	26,2	167	29,6	158	35,4	146	43,1	130	45,3
45.2	-15 / -15.4	77,8	24,1	79,7	30,0	-	-	-	-	-	-
	-10 / -10.5	91,1	24,7	92,5	30,6	-	-	-	-	-	-
	-7 / -8	98,5	25,0	99,5	30,9	99,5	37,9	-	-	-	-
	0 / -0.6	121	25,9	121	31,9	119	38,8	-	-	-	-
	7 / 6	144	26,8	143	32,7	139	39,6	131	48,7	125	51,3
	15 / 13	175	27,9	172	33,7	165	40,5	153	49,3	146	51,9
	20 / 16	190	28,5	186	34,2	178	40,9	165	49,8	158	52,4

kWt = Internal exchanger heating capacity (kW)
kWe = Compressor power input (kW)
Tae [°C] = Entering external exchanger air temperature
Performances in function of the entering/leaving water temperature differential = 5°C

Cooling Performance

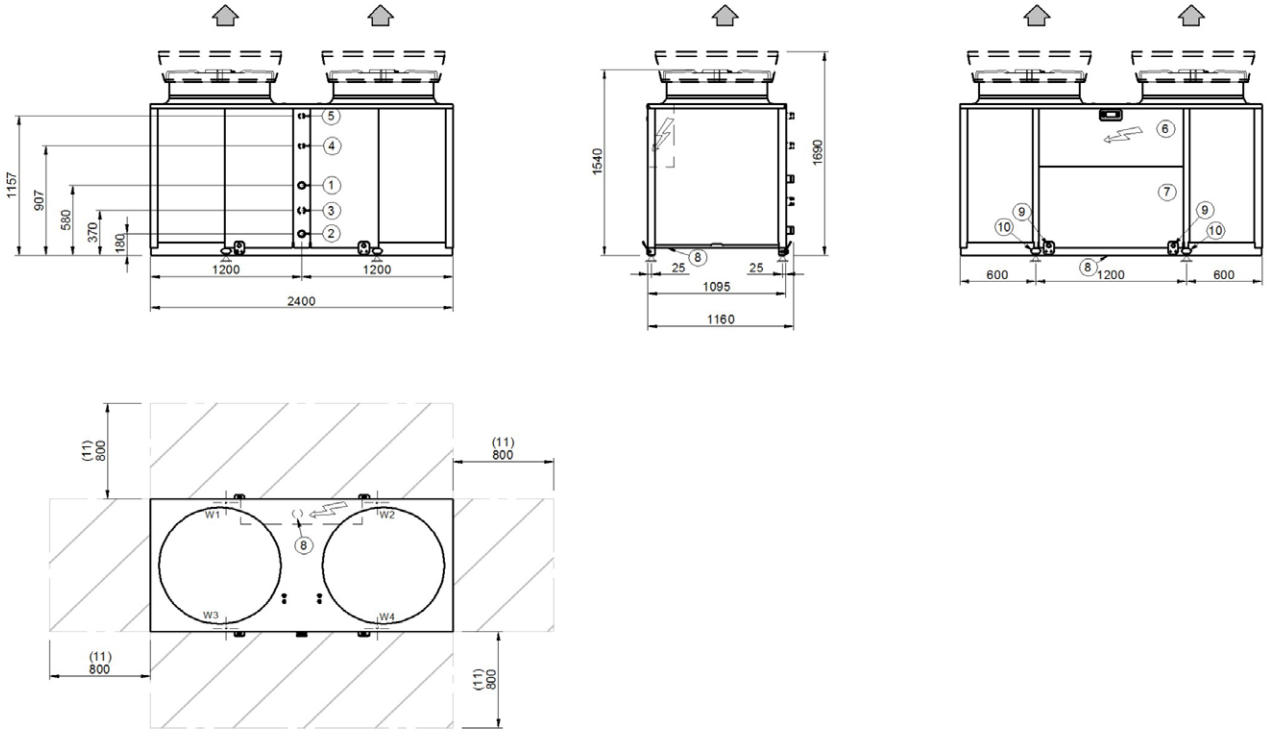
Size	To (°C)	Entering external exchanger air temperature (C°)											
		20		25		30		35		40		45	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
18.2	5	52,6	10,9	50,5	12,0	48,3	13,1	46,4	14,3	42,1	15,8	38,1	17,7
	7	56,3	11,1	54,1	12,2	51,8	13,3	49,8	14,5	45,0	16,1	40,8	18,0
	10	62,1	11,4	59,8	12,5	56,9	13,6	54,7	14,9	49,5	16,4	44,9	18,3
	12	65,8	11,7	63,2	12,7	60,2	13,8	57,7	15,1	52,1	16,6	-	-
	15	71,6	12,0	68,9	13,0	65,4	14,2	62,7	15,4	56,7	16,9	-	-
	18	77,7	12,3	74,6	13,4	70,8	14,5	67,7	15,8	61,3	17,3	-	-
20.2	5	63,2	13,6	60,9	14,9	58,0	16,3	55,5	17,8	50,4	19,6	45,8	22
	7	67,4	13,9	64,9	15,2	62,0	16,6	59,6	18,1	53,9	20,0	49,0	22,4
	10	74,4	14,3	71,5	15,6	68,1	17,0	65,3	18,6	59,1	20,4	54,2	22,7
	12	78,9	14,6	75,5	15,9	71,8	17,4	68,6	18,9	62,0	20,7	-	-
	15	85,6	15,0	82,0	16,3	77,6	17,8	74,2	19,4	67,4	21,2	-	-
	18	92,6	15,5	88,8	16,8	84,0	18,3	80,1	19,8	72,4	21,8	-	-
25.2	5	75,3	15,5	72,5	16,9	69,1	18,5	65,6	20,3	59,8	22,3	54,1	25,1
	7	80,3	15,8	77,0	17,2	73,3	18,8	69,7	20,5	63,5	22,6	57,4	25,3
	10	88,0	16,3	84,3	17,6	80,5	19,2	76,1	21,0	69,4	23,0	63,3	25,7
	12	92,9	16,6	89,2	18,0	84,8	19,6	80,3	21,3	73,3	23,3	-	-
	15	101	17,1	97,2	18,5	92,0	20,1	86,7	21,9	79,2	23,9	-	-
	18	109	17,7	104	19,1	98,9	20,6	93,0	22,3	85,1	24,4	-	-
30.2	5	89,2	19,7	86,5	21,4	82,2	23,1	77,6	25,2	71,0	27,7	64,4	30,9
	7	94,9	20,1	91,8	21,8	87,2	23,6	82,5	25,6	75,2	28,1	68,5	31,2
	10	104	20,8	100	22,5	95,0	24,4	89,5	26,4	81,5	28,9	75,3	32,0
	12	110	21,3	106	23,0	100	24,8	94,0	26,9	86,3	29,2	-	-
	15	119	22,0	115	23,6	108	25,5	102	27,6	93,1	30,3	-	-
	18	128	22,8	123	24,4	116	26,2	109	28,4	99,9	31,0	-	-
35.2	5	102	23,6	99,1	25,5	93,6	27,5	88,1	29,9	80,4	32,8	73,7	36,4
	7	109	24,1	105	26,0	98,7	28,1	92,8	30,4	84,6	33,3	78,2	36,8
	10	118	25,0	114	26,9	107	28,8	101	31,2	91,9	34,3	86,9	37,6
	12	126	25,5	121	27,5	114	29,5	107	31,9	98,0	34,8	-	-
	15	137	26,5	132	28,5	123	30,4	116	32,8	106	36,0	-	-
	18	146	27,3	139	29,3	131	31,3	123	33,6	114	36,6	-	-
40.2	5	118	26,6	114	28,9	108	31,4	101	34,3	92,1	37,8	84,3	41,8
	7	125	27,2	121	29,4	114	32,0	106	35,0	97,3	38,2	89,7	42,3
	10	136	28,1	131	30,3	124	32,9	116	35,7	106	39,1	98,8	43,2
	12	144	28,6	138	31,0	130	33,4	122	36,4	111	39,7	-	-
	15	156	29,6	150	31,9	141	34,4	131	37,3	120	40,9	-	-
	18	168	30,6	161	32,9	151	35,5	141	38,4	130	41,8	-	-
45.2	5	135	31,8	130	34,8	122	37,9	114	41,6	104	45,8	95,0	51,3
	7	142	32,5	136	35,5	128	38,7	120	42,2	109	46,6	100	51,8
	10	154	33,6	148	36,6	139	39,7	129	43,3	119	47,7	109	52,5
	12	162	34,3	155	37,2	145	40,4	136	44,0	126	48,6	-	-
	15	175	35,5	167	38,4	156	41,7	146	45,4	138	49,7	-	-
	18	188	36,9	179	39,8	167	42,8	157	46,5	145	51,8	-	-

kWf = Internal exchanger cooling capacity (kW)
kWe = Compressor power input (kW)
To (°C) = Leaving internal exchanger water temperature (°C)
Performances in function of the entering/leaving water temperature differential = 5°C

Dimensional drawings

Size18.2 - 20.2

DACM118 2_20 2_0
13/06/2019



1. Water inlet user side Ø 2" Victaulic
2. Water outlet user side Ø 2" Victaulic
3. Water outlet DHW preparation Ø 2" Victaulic (optional)
4. Water inlet recovery side Ø 1" 1/4 Victaulic (optional)
5. Water outlet recovery side Ø 1" 1/4 Victaulic (optional)
6. General electrical panel
7. Compressor compartment
8. Power input
9. Lifting Brackets (Removable)
10. Unit fixing holes Ø 18mm
11. Clearance access recommended

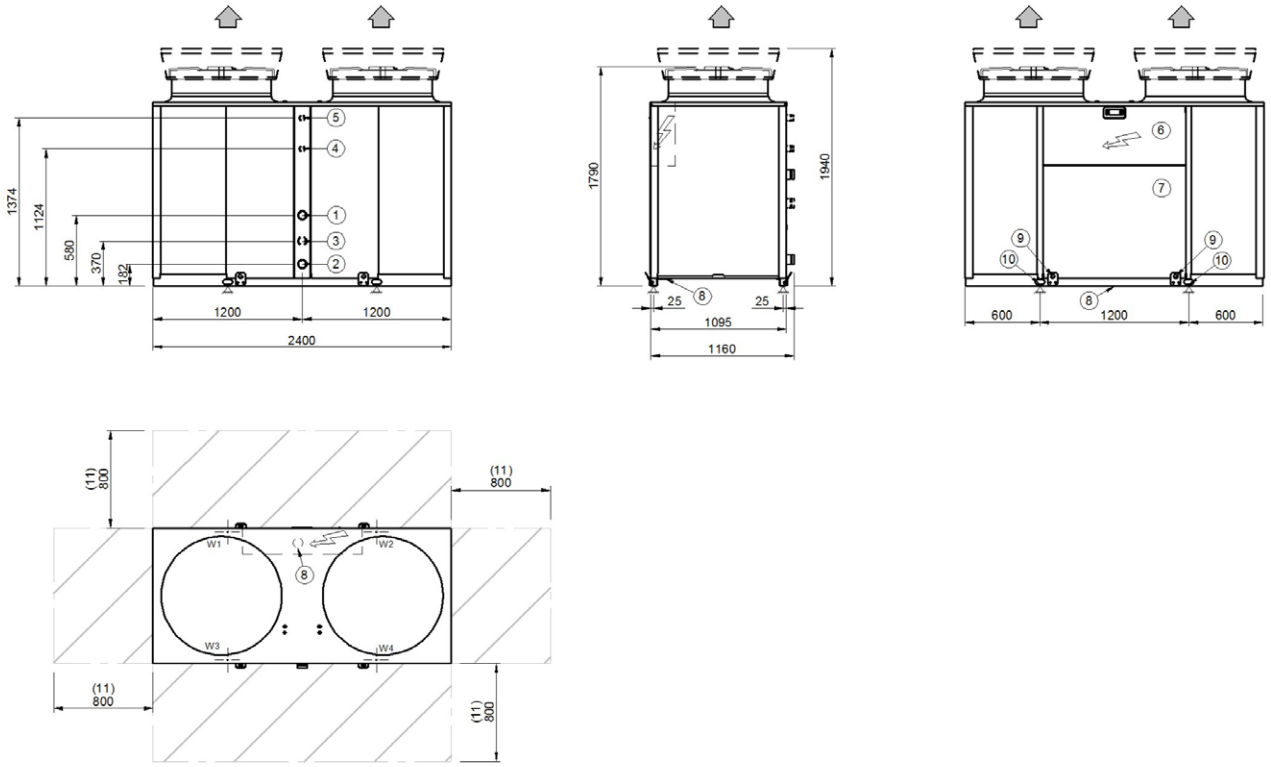
Size		18.2	20.2
A - Length	mm	2400	2400
B - Width	mm	1100	1100
C - Standard unit height	mm	1540	1540
C - Height with HEDIF option	mm	1690	1690
W1 Supporting Point	kg	174	179
W2 Supporting Point	kg	171	177
W3 Supporting Point	kg	131	133
W4 Supporting Point	kg	129	131
Shipping weight	kg	595	610
Operating weight	kg	605	620

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

Dimensional drawings

Size 25.2 - 30.2

DACM125 2_30 2_EXC_0
13/06/2019



1. Water inlet user side Ø 2" 1/2 Victaulic
2. Water outlet user side Ø 2" 1/2 Victaulic
3. Water outlet DHW preparation Ø 2" 1/2 Victaulic (optional)
4. Water inlet recovery side Ø 1" 1/4 Victaulic (optional)
5. Water outlet recovery side Ø 1" 1/4 Victaulic (optional)
6. General electrical panel
7. Compressor compartment
8. Power input
9. Lifting Brackets (Removable)
10. Unit fixing holes Ø 18mm
11. Clearance access recommended

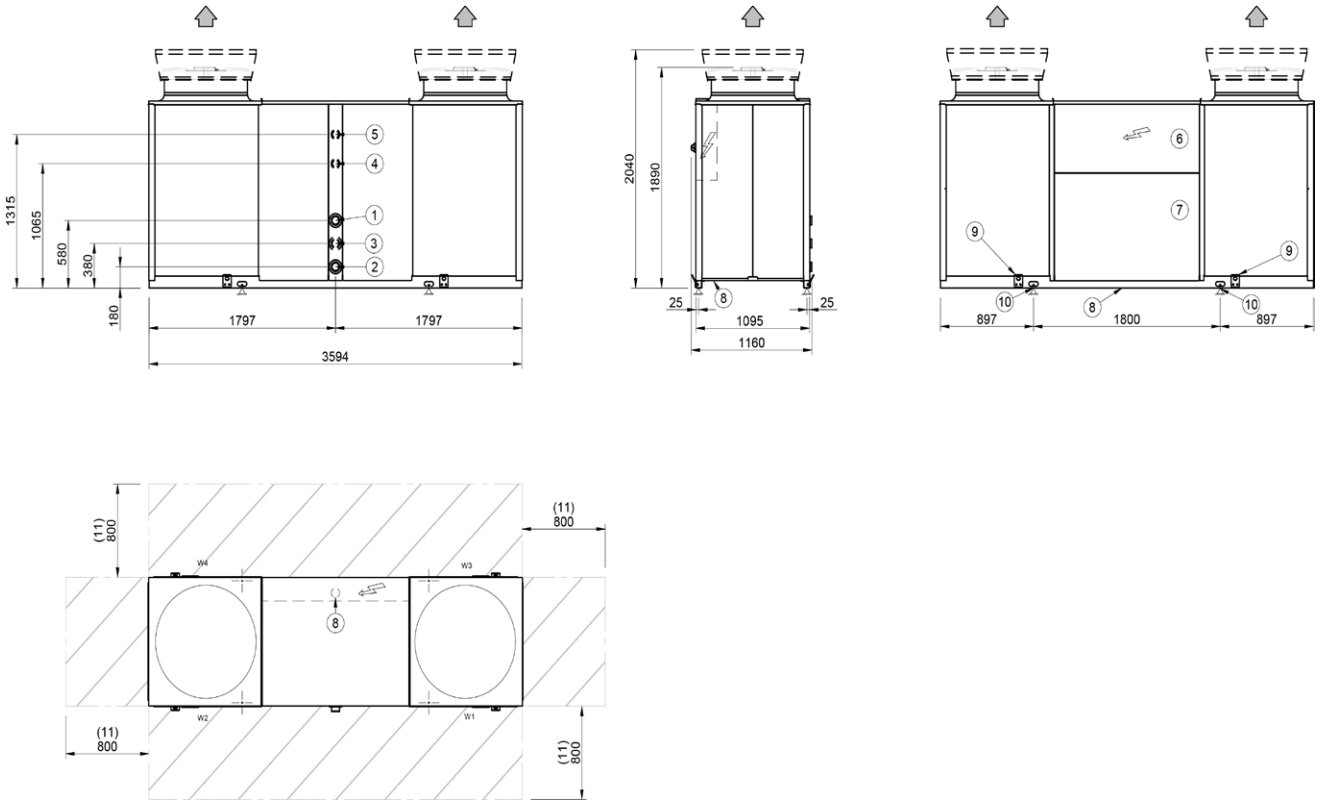
Size		25.2	30.2
A - Length	mm	2400	2400
B - Width	mm	1100	1100
C - Standard unit height	mm	1790	1790
C - Height with HEDIF option	mm	1940	1940
W1 Supporting Point	kg	188	199
W2 Supporting Point	kg	190	198
W3 Supporting Point	kg	146	150
W4 Supporting Point	kg	146	148
Shipping weight	kg	655	675
Operating weight	kg	670	695

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

Dimensional drawings

Size 35.2 - 45.2

DACM10003_40.2_45.2_1
24/05/2019



1. Water inlet user side Ø 2" 1/2 Victaulic
2. Water outlet user side Ø 2" 1/2 Victaulic
3. Water outlet DHW preparation Ø 2" 1/2 Victaulic (optional)
4. Water inlet recovery side Ø 1" 1/2 Victaulic (optional)
5. Water outlet recovery side Ø 1" 1/2 Victaulic (optional)
6. General electrical panel
7. Compressor compartment
8. Power input
9. Lifting Brackets (Removable)
10. Unit fixing holes Ø 18mm
11. Clearance access recommended

Size		35.2	40.2	45.2
A - Length	mm	3600	3600	3600
B - Width	mm	1100	1100	1100
C - Standard unit height	mm	1890	1890	1890
C - Height with HEDIF option	mm	2040	2040	2040
W1 Supporting Point	kg	196	206	221
W2 Supporting Point	kg	196	203	209
W3 Supporting Point	kg	233	245	259
W4 Supporting Point	kg	233	243	248
Shipping weight	kg	847	886	926
Operating weight	kg	858	897	937

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

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