

SCREWLINE³-i

WDAT-iL3 250.2 - 580.2 RANGE

Air cooled liquid chiller with inverter technology for outdoor installation



TECHNICAL BULLETIN

SIZE	250.2	280.2	320.2	360.2	400.2	420.2	440.2	480.2	540.2	580.2
Cooling capacity [kW]	556	616	712	802	902	954	997	1077	1169	1282



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Features

SCREWLINE³-i: Screw technology for an efficient and versatile product

SCREWLINE³-i the new generation of Clivet liquid chillers with Screw compression technology: high energy efficiency, great operating reliability and maximum choice versatility, with many versions and models for different types of installation.

WDAT-iL3

Air cooled liquid chiller with inverter technology

- PREMIUM compact version
- Continuous capacity control
- Seasonal efficiency 4,7
- Operating with 52°C of outdoor air temperature
- Copper aluminium condensing coils
- Partial recovery of the condensing heat



WDAT-iK4

Air cooled liquid chiller with inverter technology

- EXCELLENCE / PREMIUM Version
- Continuous capacity control
- Seasonal efficiency 5,3 / 4,9
- Operating with 52°C of outdoor air temperature
- Full aluminium microchannel coils
- Partial recovery of the condensing heat



WDAT-iZ4

Air cooled liquid chiller with inverter technology

- EXCELLENCE Version
- Continuous capacity control
- Seasonal efficiency 5,3
- Operating with 52°C of outdoor air temperature
- Full aluminium microchannel coils
- Partial recovery of the condensing heat



Standard unit technical specifications

Compressor

Compact, semi hermetic, helicoidal twin-screw compressors with high efficiency integrated oil separator. The cooling capacity continuous modulation is made by a variable speed motor activated by the inverter integrated in the compressor. The start-up with limited current absorption is achieved by progressively accelerating the compressor with the inverter. The inverter is cooled with the liquid cooler taken from the liquid line. The liquid flow is activated by a solenoid valve and is sent to the inverter cooling plate by a thermostatic valve. Subsequently, the steam generated by the heat exchange is sucked by the screws inside a closed chamber at medium pressure without thereby reducing the compressor suction capacity.

The electronic boards are housed inside the inverter. They, in addition to managing the inverter and the electric motor rotation speed, perform all the functions of protection, monitoring and control of the compressor: oil level, oil temperature, motor temperature, Vi control, oil heater activation, if necessary, liquid injection for the inverter and compressor cooling, check of the operating range by specific HP and LP transducers, communication via MODBUS, operating timing, alarm management. The inverter and electric motor supply is three-phase, the auxiliaries are supplied with single phase line. At the compressor discharge is provided a non-return valve to avoid the counter-rotating during the stop. The emergency internal overpressure valve connects the compressor discharge with suction in case of an extreme pressure drop.

Structure

Structure and base made entirely of sturdy sheet steel, thickness of 30/10 or 40/10, with the surface treatment in Zinc-Magnesium painted, for the parts in view, with polyester powder RAL 9001 that guarantees excellent mechanical characteristics and high corrosion strength over time.

Internal exchanger (evaporator)

Direct expansion exchanger with refrigerant side independent circuit for each compressor. The exchanger is composed of a cover made of carbon steel. The tubes, anchored to the tube plate by mechanical expansion, are made of copper, high efficiency, internally rifled to improve thermal exchange and specially designed for use with modern ecological refrigerants. It also includes a water side protection differential switch, an anti-freeze heating element to protect against icing, and covering in closed-cell thermo-insulating material that prevents the formation of condensation and heat exchange with the exterior.

The water connections of the exchanger are quick-release with splined joint

External exchanger (condenser)

Finned exchanger, made from copper pipes arranged in staggered rows and mechanically expanded for better adherence to the collar of the fins. The exchangers are planned, designed and produced directly by CLIVET. The fins are made of aluminium with a special corrugated surface, set a suitable distance apart to ensure maximum heat exchange efficiency. A proper liquid supply of the expansion valve is ensured by the subcooling circuit. Each finned heat exchanger is directly cooled by the air flow of its specific fans.

Fan

Axial fans with high performance and low-noise, balanced statically and dynamically, with blades in aluminum sheet coated in PP and sickle profile terminating with "Winglets", Wall ring in sheet steel pre-galvanised, directly coupled to the three-phase electric motor with external rotor and IP54 protection and class F insulation. Fans are located in aerodynamically shaped structures, equipped with accident prevention steel guards.

Device for consumption reduction of the external section at variable speed (phase-cutting)

Automatic device for reducing of the outdoor section consumption with variable speed fans. The speed of the fan motors is continuously adjusted according to the condensing pressure to ensure the right working of the unit at low outside temperatures.

Refrigeration circuit

Two independent refrigeration circuits made of copper, brazed and factory-assembled, complete with:

- solid, acid-proof cartridge filter drier complete with connection for quick refrigerant charging;
- safety high pressure switch,
- low pressure transducer;
- refrigerant temperature probe;
- electronic expansion valve;
- high-pressure safety pressure switch;
- high pressure safety valve (safety valve with sealed tap open for inspection);
- low pressure safety valve (safety valve with sealed tap open for inspection);
- liquid flow and humidity indicator;
- cut-off valve on compressor supply circuit;
- cut-off valve on liquid line.

Suction pipes thermally insulated with highly flexible EPDM rubber closed-cell elastomer insulation. Each cooling circuit is tested under pressure for leaks and is supplied complete with load of refrigerant gas.

Electrical panel

Entirely manufactured and wired in conformity to the EN 60204 standard.

The power section includes:

- door locking main circuit breaker;
- insulation transformer for powering the auxiliary circuit;
- compressor protection fuses;
- magneto-thermal cut-out switches to protect fans;
- electrical panel ventilation.

The control section includes:

- proportional-integral-derivative adjustment of water temperature;
- anti-freeze protection;
- management of unit start-up from local or remote device (serial);
- compressor overload protection and timer;
- potential-free contacts for compressor status and enabling;
- self-diagnosis system with instant error code visualisation;
- pre-alarm function for water anti-frost and refrigerant gas high pressure functions;
- visualisation of no. of hours of compressor operation;
- interface terminal with graphic display;
- multifunction phase monitor;
- remote ON/OFF control;
- second set-point enabling by potential-free contact;
- automatic rotation control of compressor starts;
- relay for remoting cumulative alarm signalling;
- set values, error codes and parameters can be displayed;
- high refrigerant gas pressure pre-alarm function that in many cases prevents the unit from being shut-down;
- input for demand limit (absorbed power limit according to an external signal 0÷10V or 4÷20mA);
- interface terminal with graphic display.

Accessories

- Finned coil protection grilles and compressor compartment
- Anti-hail protection grilles
- Copper / aluminium condenser coil with acrylic lining
- Condenser coil with Aluminium Energy Guard DCC treatment
- ECOBREEZE type outdoor section fans consumption reduction device
- High efficiency diffuser for axial fan - AxiTop
- Energy meter
- Set-point compensation with outdoor air temperature probe

- Set point compensation with 0-10 V signal
- Device for fan consumption reduction of the external section at variable speed (phase-cutting)
- Serial communication module for Modbus supervisor
- Serial communication module for LonWorks supervisor
- Serial communication module for BACnet/IP supervisor
- Inverter driven variable flow-rate user side control depending on the temperature differential
- Refrigerant leak detector assembled on the casing
- Remote control via microprocessor control (separately supplied accessories)
- Electrical panel antifreeze protection
- Device for the condensing coil partialization
- Spring antivibration mounts (separately supplied accessories)
- Spring antivibration mounts (separately supplied accessories)
- Couple of manually operated shut-off valves (separately supplied accessories)
- Steel mesh strainer on the water side (separately supplied accessories)
- Mains power supply (separately supplied accessories)

On special request is available:

- Copper / copper condenser coil
- Frame protective treatment

Test

All the units are factory-tested in specific steps, before shipping them.

Standard unit technical specifications

Unit equipment with outdoor air low temperatures

MINIMUM OUTDOOR AIR TEMPERATURE		OPERATING UNIT	UNIT IN STAND-BY ⁽⁵⁾ (fed unit)	UNIT IN STORAGE (unit not fed)
+11 °C	1	✓ STANDARD UNIT	✓ STANDARD UNIT	
+2 °C	2			
-7 °C	3			
-10 °C	4			
Between -10°C and -18°C		✓ STANDARD UNIT ✓ ELECTRICAL PANEL ANTIFREEZE PROTECTION ✓ GLYCOL IN AN APPROPRIATE PERCENTAGE ✓ DEVICE FOR THE CONDENSING COIL PARTIALIZATION	✓ ANTIFREEZE PROTECTION ELECTRICAL PANEL ✓ GLYCOL IN PERCENTAGE AN APPROPRIATE	✓ STANDARD UNIT
Between -18°C and -25°C		NOT POSSIBLE	✓ WATER EMPTY UNIT ✓ ELECTRICAL PANEL ANTI-FREEZE PROTECTION	✓ WATER EMPTY UNIT ✗ NOT SUITABLE: BUILT-IN PUMPS
Between -25°C and -39°C			✗ NOT SUITABLE: BUILT-IN PUMPS	NOT POSSIBLE

Data referred to the following conditions:
internal exchanger water = 12/7 °C

1. Part load unit and air speed equal to 1 m/s.
2. Part load unit and air speed equal to 0.5 m/s.
3. Unit at full load and outdoor air temperature at rest.
4. Full load unit and outdoor air temperature at rest.

(5) The water pumping unit must be fed and connected to the unit according to the manual.

(6) Unit without water or containing water with an appropriate quantity of glycol.

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.

Minimum system water content

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

$$\begin{aligned} \text{Minimum water content [l]} &= 5 \times \text{kWf (air conditioning application)} \\ &= 10 \times \text{kWf (application with low outdoor temperature or low loads required)} \end{aligned}$$

kWf = Nominal cooling capacity unit

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

Unit configuration

WDAT-iL3 **250** **.2** **PRM** **SC** **NAXI** **=** **=** **=** **=**
| | | | | | | | | |
(1) **(2)** **(3)** **(4)** **(5)** **(6)** **(7)** **(8)** **(9)** **(10)**

(1) Range

WDAT = Air cooled liquid chiller
iL3 = SCREWLine³-i range with inverter driver screw compressor

(2) Size

250 = Nominal compressor capacity (HP)

(3) Compressors

2 = Compressor quantity

(4) Energy version

PRM = Compact PREMIUM version

(5) Acoustic configuration

SC = Acoustic configuration with compressor soundproofing

(6) Fan diffusers

NAXI - Diffuser not required (standard)
AXIX - Diffuser for high efficiency fan (standard - separately supplied)

(7) Condensation heat recovery

(-) Recovery not required (standard)
D - Partial energy recovery (15% of available heat)

(8) Low evaporator water temperature configuration

(-) Low water temperature: not required (standard)
B - Low water temperature, down to -8°C (Brine)

(9) Pumping unit

(-) Not required (Standard)
2PM - Hydropack with no. 2 of pumps
2PMV- Hydropack user side with no. 2 of inverter pumps

(10) Maximum outdoor air temperature

(-) Not required (Standard)
52G - Maximum outdoor air temperature 52°C

Accessories

PGCC Finned coil protection grilles and compressor compartment

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. The accessory is provided and installed built-in the unit.

 This option is not suitable for application in sulphuric environments.

PGCCH Anti-hail protection grilles

These accessories are to protect the external coil from hail damage. Indeed, hail impact can deform the coil fins worsening the heat exchange with the air. The accessory is provided and installed built-in the unit.

CCCA Copper / aluminium condenser coil with acrylic lining

Coils with copper pipes and aluminium fins with acrylic lacquering. Can be used in settings with moderately aggressive saline concentrations and other chemical agents.

Attention!

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


CCCA1 Condenser coil with Aluminium 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.

CCCC Copper / copper condenser coil

Coils with copper pipes, copper fins and brass structure. Can be used in settings with moderately aggressive saline concentrations and other chemical agents.

 This option is not suitable for application in sulphuric environments.

 Option available on special request

REGBT Device for the condensing coil partialization

Electronic device supplied on the unit allows to extend the unit operating range in cooling down to an outdoor air temperature of -18°C. For good operation of the unit at low outdoor temperatures, the fan motors speed is continuously adjusted as well as the finned exchange surface according to the condensing pressure.

CMSC9 Serial communication module for Modbus supervisor

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

⚠ The total length of each individual serial line must not exceed 1000 m and the line must be connected in bus type (input/output).

CMSC10 Serial communication module for LonWorks supervisor

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

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

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

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

⚠ The total length of each individual serial line must not exceed 1000 m and the line must be connected in bus type (input/output).

CMSC11 Serial communication module for BACnet/IP supervisor

This enables the serial connection of the supervision system, using BACnet/IP 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 configuration and management activities for the BACnet networks are the responsibility of the client.

⚠ The total length of each individual serial line must not exceed 1000 m and the line must be connected in bus type (input/output).

CONTA2 Energy meter

Allows to display and record the unit's main electrical parameters. The data can be displayed with the user interface on the unit or via the supervisor through the specific protocol variables.

It is possible to control:

voltage (V),

absorbed current (A),

frequency (Hz),

cosfi,

power input (kW),

absorbed energy (kWh),

harmonic components (%).

The device is installed and wired on the unit.

CREFB Device for fan consumption reduction of the external section, ECOBREEZE type

An option which regards the external helical fans, as an alternative to the phase-cut device which is supplied as standard in SC and EN version. It provides for an IP54 brushless electronically commutated electrical motor and incorporated thermal protection. Supplied with variable speed control.

The height of the unit with this option is 2510 mm for all sizes.

Accessories

AXIX High efficiency diffuser for axial fan - AXITOP

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. Obtaining:

- 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.

The height of the unit with this option is 2668 mm for all sizes.

SCP4 Set-point compensation with 0-10 V signal

These accessories are to protect the external coil from hail damage. Indeed, hail impact can deform the coil fins worsening the heat exchange with the air.

The accessory is provided and installed built-in the unit.

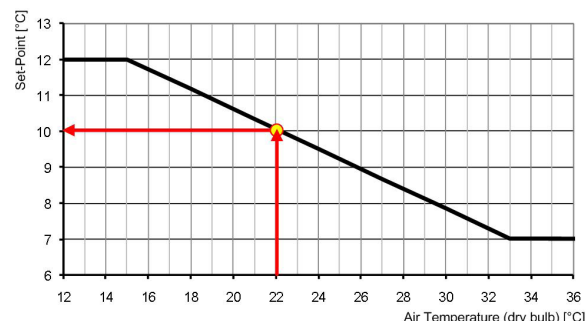


SPC2 Set-point compensation with outdoor air temperature probe

The device enables the automatic difference of the preset set-point according to the outdoor air temperature. This device makes it possible to obtain a flowing liquid temperature, i.e. variable according to outdoor conditions, thus resulting in energy saving for the entire system.

The device is installed and wired on the unit.

- ⚠ The device includes a probe controlled remotely from outside to measure the outdoor air temperature (installation to be carried out by the customer). The connection cable length is 16 m.



IVFDT Inverter driven variable flow-rate user side control depending on the temperature differential

This option allows water flow-rate modulation to the unit during partial load conditions, maintaining stable the temperature difference between inlet and outlet to the heat exchanger. Designed for systems with primary circuit variable flow-rate systems decoupled from secondary circuit. With no building load the unit switches off the compressors while concerning pumps is possible to select: Designed to work on systems with a variable flow-rate primary circuit decoupled from the secondary circuit. If the building has no load, the unit switches the compressors off, and one of the following operating modes can be selected for the pumps:

- keep the pumping unit running at minimum flow-rate to allow continuous monitoring of load variations on the secondary circuit;
- switch off the pumping unit completely and start it periodically (with settable time) to bring the temperatures of the secondary circuit back to the primary one;
- switch off the pumping unit completely and wait for the customer's consent to restart (potential-free contact).

Device installed and wired on board unit only available with inverter pumps installed on board.

- ⚠ This option is available only with inverter driven HYDROPACK selected (2PMV / 3PMV).

**RE-20/
RE-25/
RE-30/
RE-35/
RE-39**

Electrical panel antifreeze protection

This option is necessary for very cold climates, where the external temperature can be between -10°C and -39°C. It includes self-regulating temperature maintaining resistances which are able to protect the electrical panel against condensation and frost guaranteeing that it functions correctly. The choice of device should be carried out on the basis of the minimum temperatures reached at the unit installation site.

The device is installed and wired on the unit.

- ⚠ This accessory does not lead to substantial variations in the electrical data for the unit which has been declared in the Electrical Data section.
- ⚠ This accessory operates even when the unit is switched off provided that the power supply is maintained active and the unit continues to be connected.
- ⚠ It is necessary to make precautions against build up of snow and ice in front of the exhaust and outdoor air inlet locations.

RPRI

Refrigerant leak detector assembled on the casing

The leak detector device, in-built on the unit and positioned inside the compressor compartment, detects leaks from the internal refrigeration circuit.

TPS

Frame protective treatment

Transparent protective coating, waxy type, which is applied to the whole structure (excluding exchange coils) and guarantees 1000 hours of salt spray / 50 microns (SST Salt Spray Test) resistance.

For a better adhesion of the protective paint, a two-component epoxy primer is previously applied.

- ⚠ Option available on special request

52G

Maximum outdoor air temperature 52°C

Option that allows to extend the operating limits up to 52°C outside air temperature.

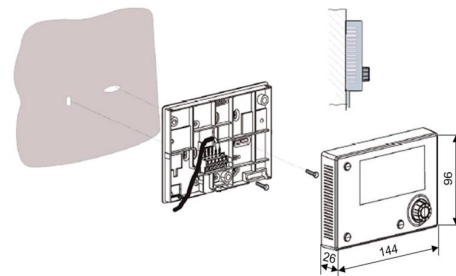
The compressors are protected from solar radiation by an open casing without insulation.

The sound levels of the SC acoustic version increase by 4dB(A) compared to what is stated in the sound level table on page 16.

Accessories separately supplied

RCMRX Remote control via microprocessor control

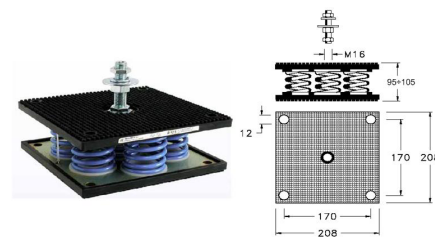
This option allows to have full control over all the unit functions from a remote position. It can be easily installed on the wall and has the same aspect and functions of the user interface on the unit.



- ⚠ 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 must be installed on the wall with suitable plugs and connected to the unit (installation and wiring to be conducted by the Customer). Maximum remote control distance 350 m without auxiliary power supply. For distances greater than 350 m and in any case less than 700 m it is necessary to install the 'PSX - Mains power unit' accessory.
- ⚠ Data and power supply serial connection cable n.1 twisted and shielded pair. Diameter of the individual conductor 0.8 mm.
- ⚠ Installation is a responsibility of the Customer.

AMMX Spring antivibration mounts

The spring 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.

AMMSX Anti-seismic spring antivibration mounts

The anti-seismic spring antivibration mounts must be fastened in special housings on the supporting metal struts.

The containment structure is designed to ensure high resistance multidirectional forces acting on the surface of the unit in the presence of wind and / or telluric movements.

The antivibration mounts have been tested according to ANSI/ASHRAE 171-2008 standard (Method of Testing Seismic Restraint devices for HVAC&R Equipment). The performance levels and the test methodology have been validated and certified by Lloyd's Register.

- ⚠ Installation is a responsibility of the Customer.

CSVX Couple of manually operated shut-off valves

The kit allows to isolated the input and output water circuit. It includes:
no. 2 of cast-iron shut-off butterfly valves with fast fittings and activation lever with a mechanical setting lock
no. 2 of quick connections

- ⚠ Power supply at 230V AC provided by Customer.
- ⚠ Installation is a responsibility of the Customer.

PSX Mains power supply

The device allows the unit and the remote control to communicate with the user interface even when the serial line is longer than 350 m. It must be connected to the serial line at a distance of 350m from the unit and allows to extend the length to 700m maximum in total. The device requires an external power supply at 230V AC.

- ⚠ Power supply at 230V AC provided by Customer.
- ⚠ Installation is a responsibility of the Customer.

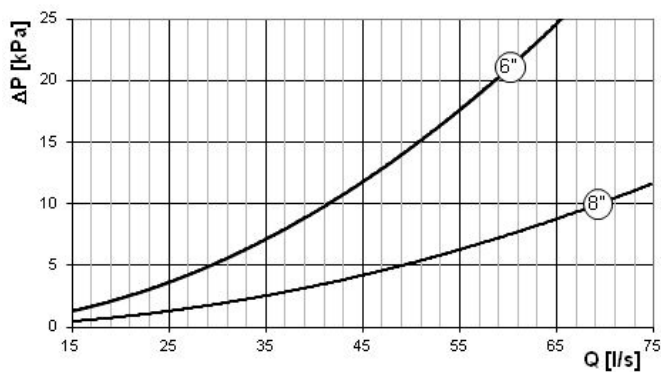
IFWX

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.

Steel mesh filter pressure drop



Steel mesh filter features

PREMIUM		
size	250.2 - 360.2	400.2 - 580.2
Diameter	6"	8"
Degree of filtration	1,6 mm	

Q = water flow-rate (l/s)

DP = Water side pressure drops (kPa)

- ⚠ Steel mesh strainer pressure drops
- ⚠ Installation is a responsibility of the Customer, outside the unit.
- ⚠ Check for the presence of the required hydraulic shut-off valves in the system, in order to undertake periodical maintenance.

IOTX

IoT industrial module for cloud based interoperability & services

This device allows the monitoring and the remote control the unit via Clivet Eye, the supervision cloud system for Clivet units.

With IoT module (i-LINK) it will be possible to monitor and manage the unit through the mobile app Clivet Eye and the dedicated web page.

Among the main functions, for all monitored units they allow to:

- display the main working parameters;
- display the alarms;
- switch on/off the unit;
- change the setpoint;
- change the operating mode;
- set the daily/weekly start-up or power-off programming of the unit;
- create charts of main system parameters trend (via web interface);
- display in a map the units monitored by Clivet Eye (via web interface).

Web interface at www.cliveteye.com.

Clivet Eye app available in Google Play and Apple Store



- ⚠ IoT module to be provided for each unit to be remotely monitored.
- ⚠ Internet ethernet connection in charge of customer.
- ⚠ Clivet Eye management is alternative to an external BMS supervision system.
- ⚠ Installation is a responsibility of the Customer.

General technical data

Performances

Acoustic configuration: compressor soundproofing (SC)

Size			250.2	280.2	320.2	360.2	400.2	420.2	440.2	480.2	540.2	580.2
Cooling												
Cooling capacity	1	kW	557	616	713	803	902	954	997	1077	1169	1282
Total power input	2	kW	196	222	248	280	309	351	355	394	416	457
Partial recovery heating capacity	3	kW	111	124	142	160	179	192	199	217	234	257
EER	1	-	2,84	2,77	2,87	2,87	2,92	2,72	2,81	2,74	2,81	2,80
Water flow-rate (User Side)	1	l/s	26,5	29,3	33,9	38,1	42,8	45,3	47,4	51,2	55,5	60,9
Internal exchanger pressure drop	1	kPa	53,8	42,2	50,8	49,6	23,7	26,6	29,1	50,0	58,8	70,7
Cooling capacity (EN14511:2022)	4	kW	556	616	712	802	902	954	997	1077	1169	1282
Total power input (EN14511:2022)	4	kW	198	224	251	282	311	352	358	398	421	463
EER (EN14511:2022)	4	-	2,80	2,75	2,84	2,84	2,90	2,71	2,79	2,71	2,78	2,77
SEER	6	-	4,63	4,57	4,59	4,61	4,68	4,68	4,67	4,72	4,77	4,79
SEPR	7		5,24	5,27	5,04	5,20	5,25	5,30	5,30	5,32	5,25	5,23
Cooling capacity (AHRI 550/590)	5	kW	554	613	708	798	896	947	983	1074	1155	1267
Total power input (AHRI 550/590)	5	kW	195	220	247	278	308	349	352	391	414	454
COPR	5	-	2,83	2,80	2,87	2,87	2,91	2,72	2,80	2,75	2,80	2,80
IPLV	5	-	5,04	5,03	5,01	5,01	5,06	5,12	5,08	5,13	5,18	5,20

1. Data referred to the following conditions: internal exchanger water = 12/7 °C. Entering external exchanger air temperature 35°C. Evaporator fouling factor = $0,44 \times 10^{-4} \text{ m}^2 \text{ K/W}$.
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. Recovery exchanger water = 40/45°C
4. Data compliant to Standard EN 14511:2022 referred to the following conditions: internal exchanger water temperature = 12/7°C. Entering external exchanger air temperature = 35°C
5. Data compliant to Standard AHRI 550/590 referred to the following conditions: internal exchanger water temperature = 6,7 °C. Water flow-rate 0,043 l/s per kW. Entering external exchanger air temperature 35°C. Evaporator fouling factor = $0,18 \times 10^{-4} \text{ m}^2 \text{ K/W}$
6. Data compliant to Standard EN 14825:2016
7. Data compliant according to EU regulation 2016/2281

Construction

Acoustic configuration: compressor soundproofing (SC)

Size		250.2	280.2	320.2	360.2	400.2	420.2	440.2	480.2	540.2	580.2	
Compressor												
Type of compressors	1	-						ISW				
Refrigerant		-						R-134a				
N° compressors		Nr						2				
Rated power (C1)		[HP]	125	125	160	160	200	200	220	240	270	290
Rated power (C2)		[HP]	125	160	160	200	200	220	220	240	270	290
Std Capacity control steps	6							17-100%				
Oil charge (C1)		[l]			18					35		
Oil charge (C2)		[l]			18					35		
Refrigerant charge (C1)		[kg]	52	61	75	92	108	108	108	133	141	141
Refrigerant charge (C2)		[kg]	54	67	70	97	115	115	115	140	149	149
Refrigeration circuits		-						2				
Internal exchanger (Evaporator)												
Type of internal exchanger	2	-						S&T				
N. of internal exchanger		Nr						1				
Water content		[l]	222	240	307	280	481	481	481	514	514	514
External exchanger												
Frontal surface		m ²	18,7	23,4	28,1	32,8	37,4	37,4	37,4	46,8	46,8	46,8
External Section Fans												
Type of fans	3	-						AX				
Number of fans		Nr	8	10	12	14	16	16	16	20	20	20
Type of motor	4	-						AC/P				
Standard airflow		[l/s]	46959	59689	72815	83566	93919	93919	93919	121358	121358	117399
Connections												
Water fittings		-	6"	6"	6"	6"	8"	8"	8"	8"	8"	8"
Power supply												
Standard power supply		V						400/3~/50				
Electrical data												
F.L.A. - Total		A	386,2	438,9	491,6	568,2	644,8	714,8	784,8	864,0	904,8	976,0
F.L.I. - Total		kW	233,4	266,6	299,8	348,9	398,0	436,2	474,4	483,0	521,0	591,0
M.I.C. - Value	5	A	386,2	438,9	491,6	568,2	644,8	714,8	784,8	864,0	904,8	976,0

1. ISW = double screw compressor
2. S&T = shell and tube
3. AX = axial fan
4. AC/P = asynchronous three-phase external rotor motor with phase cutting speed automatic control
5. M.I.C. = compressor 2 starting current + compressor 1 current at 75% of the max load + circuit 1 fan
6. Voltage unbalance between phases: max 2 %
7. Voltage variation: max +/- 10%
8. Electrical data refer to standard units; according to the installed accessories, the data can suffer some variations.
9. The unit is able to perform a continuous capacity control. The following data refers to the unit operation.

General technical data

Sound level

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)
250.2	107	96	80	89	100	81	77	72	100	80
280.2	112	103	85	98	99	85	80	73	101	80
320.2	115	106	87	101	98	88	82	74	102	80
360.2	116	107	88	101	98	88	83	75	102	81
400.2	116	107	88	102	98	89	83	76	102	81
420.2	117	108	89	102	99	89	84	76	103	81
440.2	117	108	89	103	99	90	84	76	103	81
480.2	118	109	90	103	100	90	85	78	104	82
540.2	118	109	90	103	100	90	85	78	104	82
580.2	118	109	90	103	100	90	85	78	104	82

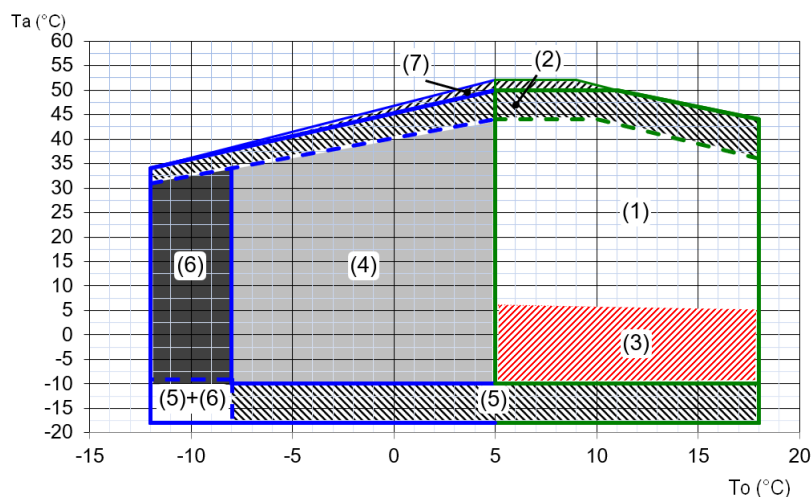
Sound levels refer to full load units, in test nominal conditions. The sound pressure level refers to 1 m. from the standard unit outer surface operating in open field. Measures according to UNI EN ISO 9614-2 regulations, with respect to the EUROVENT 8/1 certification, which provides for a tolerance of 3 dB(A) on the sound power level, which is the only acoustic data to be considered binding.

Data referred to the following conditions:

- internal exchanger water = 12/7 °C
- ambient temperature = 35 °C

Operating range

Acoustic configuration: compressor soundproofing (SC)

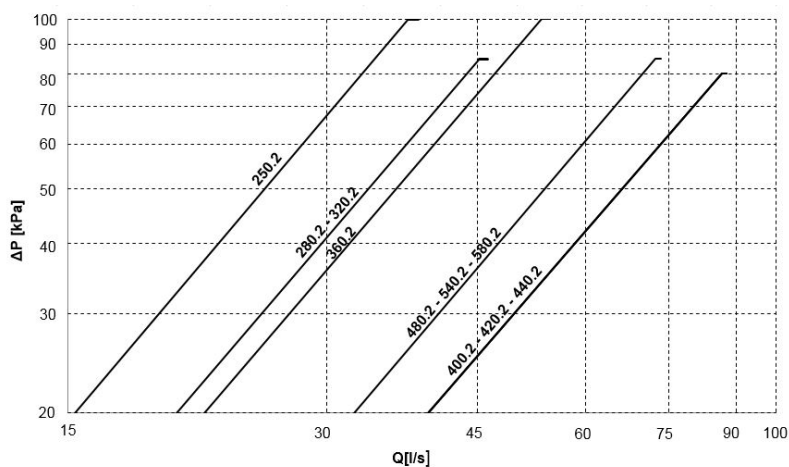


Ta (°C) = external exchanger inlet air temperature (D.B.)

To (°C) = internal exchanger outlet water temperature

1. Standard unit operating range at full load
2. Unit operating range with automatic staging of the compressor capacity
3. Standard unit operating range with air flow automatic modulation
4. Unit operating range in 'B - Low water temperature' configuration (40% ethylene glycol)
5. Unit operating range with 'REGBT - device for the condensing coil partialization'
6. Extended operating range (extremely low water temperature option available on request)
7. Unit operating range with 52G option and automatic staging of the compressor capacity

Internal exchanger pressure drop - Evaporator



The pressure drops are calculated considering a water temperature of 7°C

Q = Water flow-rate [l/s]

DP = Water side pressure drops (kPa)

The water flow-rate must be calculated with the following formula

$$Q [l/s] = kWf / (4,186 \times DT)$$

kWf = Cooling capacity in kW

DT = Temperature difference between inlet / outlet water

⚠ To the internal exchanger pressure drops must be added the pressure drops of the steel mesh mechanical filter (not supplied) that must be placed on the water input line. It is a device compulsory for the correct unit operation and it must be selected and installed by the Customer. It is forbidden the use of filters with the mesh pitch higher than 1,0 mm. Filters with higher mesh pitch can cause a bad unit operation and also its serious damaging.

General technical data

Admissible water flow-rates

Minimum (Qmin) and maximum (Qmax) admissible water flow for the unit to operate correctly.

PREMIUM SC		250.2	280.2	320.2	360.2	400.2	420.2	440.2	480.2	540.2	580.2
Qmin	[l/s]	10,4	13,6	13,6	14,0	28,0	28,0	28,0	22,8	22,8	22,8
Qmax	[l/s]	37,3	45,2	45,2	53,4	86,6	86,6	86,6	72,5	72,5	72,5

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
Compressor power input Factor	Nr	0,995	0,989	0,983	0,977	0,971	0,964	0,956	0,949
Compressor power input Factor	Nr	1,0011	1,0022	1,003	1,004	1,006	1,007	1,008	1,009
Internal exchanger glycol solution flow factor	Nr	1,003	1,01	1,02	1,033	1,05	1,072	1,095	1,124
Pressure drop Factor	Nr	1,05	1,10	1,15	1,20	1,25	1,30	1,35	1,40

Fouling Correction Factors

m ² °C / W	Internal exchanger (Evaporator)	
	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

Exchanger operating range

	Internal exchanger	
	DPr	DPw
PED (CE)	2450	1050

DPr = Maximum operating pressure on refrigerant side in kPa

DPw = Maximum operating pressure on water side in kPa

Overload and control device calibrations

		OPEN	CLOSE	VALUE
High pressure switch	[kPa]	2000	1450	-
Antifreeze protection	[°C]	3	5.5	-
High pressure safety valve	[kPa]	-	-	2400
Low pressure safety valve	[kPa]	-	-	1650
Max no. of compressor starts per hour	[n°]	-	-	6
Discharge safety thermostat	[°C]	-	-	120

General technical data

Cooling performance

Acoustic configuration: compressor soundproofing (SC)

Size	To (°C)	Entering external exchanger air temperature (°C)											
		25		30		35		40		45		50	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
250.2	5	575	153	549	166	523	180	499	193	472	206	378	181
	6	593	156	567	169	541	183	516	196	491	209	393	184
	7	617	160	584	172	558	185	533	199	508	211	406	186
	10	675	169	646	182	613	194	587	207	558	219	446	193
	15	771	183	744	196	717	209	680	220	597	208	515	-
	18	845	192	813	205	779	218	686	203	611	198	-	-
280.2	5	640	173	610	188	580	203	550	218	519	232	415	204
	6	659	176	628	191	597	200	569	221	535	234	428	206
	7	681	179	648	194	618	209	588	224	556	237	444	209
	10	744	189	711	204	678	218	648	232	608	245	487	215
	15	858	205	826	219	786	233	743	246	651	233	557	-
	18	926	213	890	227	851	242	751	226	662	219	-	-
320.2	5	737	193	702	209	668	225	634	240	597	255	478	225
	6	760	197	724	212	689	228	653	243	617	258	494	227
	7	782	200	746	216	715	232	678	247	640	261	512	230
	10	853	211	821	227	782	242	748	257	697	270	558	237
	15	978	231	939	244	901	260	846	271	746	256	638	-
	18	1055	241	1014	255	974	270	855	249	757	241	-	-
360.2	5	830	216	791	234	752	252	713	271	675	290	540	255
	6	860	222	817	239	777	257	740	276	697	295	558	259
	7	886	226	845	244	804	261	765	281	720	299	576	263
	10	968	241	927	259	884	276	842	296	793	314	635	276
	15	1129	270	1081	287	1029	306	970	321	849	298	724	-
	18	1215	286	1160	303	1103	320	980	295	860	284	-	-
400.2	5	936	236	894	257	846	278	807	302	764	327	611	288
	6	965	240	922	262	875	283	836	308	794	334	635	294
	7	1001	245	951	266	904	288	865	313	820	339	656	298
	10	1102	261	1053	283	1002	306	956	332	907	358	726	315
	15	1275	290	1225	314	1173	341	1109	365	971	340	833	-
	18	1389	309	1337	335	1274	361	1120	336	990	329	-	-
420.2	5	976	266	933	291	889	316	845	344	806	376	645	331
	6	1006	270	963	295	918	322	871	349	833	381	666	336
	7	1045	276	993	300	957	327	898	353	861	388	689	342
	10	1145	291	1097	317	1049	346	997	375	951	407	761	358
	15	1324	318	1263	345	1219	377	1164	410	1018	387	-	-
	18	1432	336	1375	354	1321	396	1175	377	-	-	-	-
440.2	5	995	264	952	290	902	317	861	349	820	381	656	335
	6	1027	268	983	294	939	322	889	352	847	386	678	340
	7	1058	272	1012	298	1000	331	918	357	875	391	700	344
	10	1166	285	1109	311	1061	342	1016	374	975	412	780	363
	15	1345	307	1295	337	1241	370	1179	404	1043	392	-	-
	18	1452	322	1394	352	1342	386	1191	371	-	-	-	-

Entering external exchanger air temperature (°C)

Size	To (°C)	Entering external exchanger air temperature (°C)											
		25		30		35		40		45		50	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
480.2	5	1127	294	1077	322	1028	353	975	384	928	421	742	370
	6	1162	299	1103	326	1054	356	1003	391	957	426	766	375
	7	1198	303	1147	331	1080	369	1044	397	996	434	797	382
	10	1320	319	1266	348	1204	379	1149	415	1097	453	877	399
	15	1525	346	1466	377	1395	410	1338	448	1174	430	-	-
	18	1675	367	1597	397	1534	433	1351	412	-	-	-	-
540.2	5	1191	326	1135	354	1082	385	1021	417	968	454	774	399
	6	1228	331	1173	359	1108	383	1055	423	1000	459	800	404
	7	1265	336	1207	365	1173	390	1094	431	1039	468	831	412
	10	1382	352	1331	383	1272	416	1201	450	1149	490	919	431
	15	1605	383	1521	413	1456	449	1391	486	1230	465	-	-
	18	1766	407	1677	438	1608	474	1405	447	-	-	-	-
580.2	5	1295	356	1235	385	1178	416	1127	452	1068	488	854	429
	6	1350	363	1286	392	1216	419	1163	458	1094	492	875	433
	7	1390	369	1326	398	1286	431	1201	463	1149	502	919	441
	10	1520	386	1449	415	1397	450	1328	485	1253	522	1002	459
	15	1750	417	1671	447	1599	481	1524	517	1340	496	-	-
	18	1941	445	1861	476	1766	507	1540	476	-	-	-	-

kWf = cooling capacity in kW

kWe = Compressor power input in kW

To (°C) = Internal exchanger outlet water temperature (evaporator)

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

The data do not consider the part related to the pumps, required to overcome the pressure drop for the solution circulation inside the exchangers

General technical data

Cooling performance at part load

Acoustic configuration: compressor soundproofing (SC)

Size	Load	Entering external exchanger air temperature (°C)											
		35°C			30°C			25°C			20°C		
		kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER
250.2	100%	558	197	2,84	584	183	3,19	617	170	3,63	647	157	4,12
	75%	419	131	3,20	438	121	3,62	462	112	4,13	485	102	4,75
	50%	279	80,0	3,49	292	72,5	4,03	308	65,9	4,67	323	59,5	5,43
	25%	140	40,1	3,49	146	36,9	3,96	154	34,1	4,52	162	31,3	5,18
	Minimum	98,3	23,9	4,11	103	22,0	4,68	109	20,2	5,40	115	18,5	6,22
280.2	100%	618	223	2,77	648	208	3,12	681	193	3,53	714	178	4,01
	75%	464	149	3,11	486	138	3,52	511	127	4,02	536	116	4,62
	50%	309	91,5	3,38	324	83,0	3,90	340	75,3	4,52	357	68,1	5,24
	25%	154	46,2	3,33	162	42,7	3,79	170	39,3	4,33	179	36,1	4,96
	Minimum	109	27,5	3,96	115	25,4	4,53	121	23,3	5,19	127	21,4	5,93
320.2	100%	715	248	2,88	746	232	3,22	782	216	3,62	821	200	4,11
	75%	536	167	3,21	559	155	3,61	587	142	4,13	616	130	4,74
	50%	358	102	3,51	373	93,2	4,00	391	85,0	4,60	410	76,9	5,33
	25%	179	52,1	3,44	186	48,2	3,86	196	44,7	4,38	205	41,1	4,99
	Minimum	126	31,0	4,06	132	28,7	4,60	139	26,5	5,25	146	24,4	5,98
360.2	100%	804	280	2,87	845	262	3,23	886	245	3,62	930	227	4,10
	75%	603	188	3,21	634	175	3,62	665	162	4,10	697	148	4,71
	50%	402	116	3,47	423	106	3,99	443	96,8	4,58	465	87,7	5,30
	25%	201	59,3	3,39	211	55,1	3,83	222	51,1	4,34	232	47,1	4,93
	Minimum	142	35,3	4,02	149	32,8	4,54	157	30,3	5,18	165	28,0	5,89
400.2	100%	904	310	2,92	951	289	3,29	1001	267	3,75	1050	247	4,25
	75%	678	209	3,24	713	193	3,69	751	176	4,27	787	162	4,86
	50%	452	129	3,50	476	117	4,07	500	106	4,72	525	96,5	5,44
	25%	226	66,6	3,39	238	61,5	3,87	250	56,7	4,41	262	52,4	5,00
	Minimum	159	39,6	4,02	168	36,5	4,60	177	33,7	5,25	186	31,1	5,98
420.2	100%	957	350	2,74	993	322	3,09	1045	298	3,51	1096	275	3,98
	75%	718	234	3,07	745	214	3,47	784	196	4,00	822	179	4,59
	50%	479	144	3,33	496	129	3,85	522	117	4,47	548	106	5,19
	25%	270	69,4	3,89	281	63,4	4,43	296	58,2	5,08	311	53,6	5,81
	Minimum	169	43,4	3,89	176	39,6	4,44	185	36,4	5,08	195	33,5	5,82
440.2	100%	1000	353	2,83	1012	320	3,16	1058	294	3,60	1110	272	4,09
	75%	750	237	3,17	759	213	3,56	793	193	4,10	832	177	4,70
	50%	500	145	3,44	506	129	3,94	529	116	4,58	555	105	5,31
	25%	250	73,5	3,40	253	66,4	3,81	264	60,8	4,35	277	56,0	4,96
	Minimum	176	33,2	5,30	179	39,5	4,53	187	36,1	5,18	197	33,2	5,93

		Entering external exchanger air temperature (°C)											
Size	Load	35°C			30°C			25°C			20°C		
		kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER
480.2	100%	1080	396	2,73	1147	358	3,21	1198	330	3,63	1256	305	4,12
	75%	810	266	3,04	860	239	3,60	898	218	4,12	942	199	4,72
	50%	540	164	3,29	574	145	3,95	599	131	4,57	628	119	5,29
	25%	305	79,9	3,81	325	72,0	4,50	339	66,1	5,13	357	61,0	5,85
	Minimum	190	50,0	3,80	203	45,0	4,51	212	41,3	5,13	223	38,1	5,85
540.2	100%	1173	417	2,81	1207	392	3,08	1265	362	3,49	1327	335	3,96
	75%	880	280	3,15	905	261	3,47	949	238	3,98	995	218	4,56
	50%	586	172	3,41	604	157	3,84	633	142	4,44	664	129	5,15
	25%	331	83,2	3,97	342	77,3	4,42	358	71,0	5,05	377	65,3	5,77
	Minimum	207	52,0	3,98	213	48,3	4,41	224	44,4	5,05	236	40,8	5,78
580.2	100%	1286	458	2,81	1326	425	3,12	1390	396	3,51	1458	366	3,98
	75%	965	312	3,09	995	293	3,39	1042	269	3,88	1094	247	4,43
	50%	643	194	3,31	663	178	3,73	695	160	4,33	729	145	5,04
	25%	331	83,2	3,97	342	77,3	4,42	358	71,0	5,05	377	65,3	5,77
	Minimum	207	52,0	3,98	213	48,3	4,41	224	44,4	5,05	236	40,8	5,78

Load = % of cooling capacity compared to the value at full load

kWf = cooling capacity in kW

kWe_tot = unit total power input in kW

The data do not consider the part related to the pumps, required to overcome the pressure drop for the solution circulation inside the exchangers

Internal exchanger water = leaving 7°C / entering 12°C / variable flow-rate with external exchanger air temperature

Configurations

B Water low temperature (Brine)

Configuration also known as “Brine”. Enables an “unfreezable” solution to be cooled (for example, water and ethylene glycol in suitable quantities) up to a temperature of between +4°C and -8°C. It includes:

- suitable exchangers with extra-thick closed-cell insulation
- electronic expansion valve, functional calibration and safety devices suitable for particular uses.

- ⚠ During the selection phase it is necessary to indicate the required operating type, the unit will be optimised on the basis of this: - Unit with single operating set-point (only at low temperature) - Unit with double operating set-point.
- ⚠ The unit in this configuration has a different operating field, which was reported in the previous pages.
- ⚠ In low temperature operation, some staging steps could not be available.
- ⚠ The glycol concentration must be chosen based on the minimum temperature the water can reach. The presence of glycol influences pressure drops on the water side and the unit's output as indicated in the table reporting the "correction factors for use with glycol".
- ⚠ The "Extremely low water temperature" option for the chilled water production down to -12°C is available on request.

Correction factor for water low temperature

Evaporator outlet water temperature factor	2	0	-2	-4
Cooling Capacity Factor	0.860	0.804	0.748	0.692
Compressor power input factor	0.945	0.923	0.901	0.879

- ⚠ The correction coefficients must be applied to condition: internal exchanger water (evaporator) = 12 / 7°C.

Example: Determine the performance with leaving water temperature -4°C for WDAT-iL3 250.2 PRM SC B ('Premium' version, acoustic configuration with compressor soundproofing (SC), 'Water low temperature (Brine)' configuration) with external exchanger water (condenser) 35°C, 30% glycol.

From the performance table referred to entering external exchanger water temperature (condenser) 35 °C and leaving internal exchanger water temperature (evaporator) 7°C:

Cooling capacity = 558 kW, Compressor power input = 185 kW

From the correction factor table for water low temperature: 0.692 for cooling capacity and 0.879 for compressor power input (supply water temperature -4°C)

From the glycol correction factor: 0.964 for cooling capacity, 1.007 for compressor power input, 1.072 the glycol solution flow, 1.3 for the evaporator pressure drop (glycol 30%)

Calculation WDAT-iL3 250.2 PRM SC B: Cooling capacity = 558 x 0.692 x 0.964 = 372.2 kW, Compressor power input = 185 x 0.879 x 1.007 = 163.7 kW

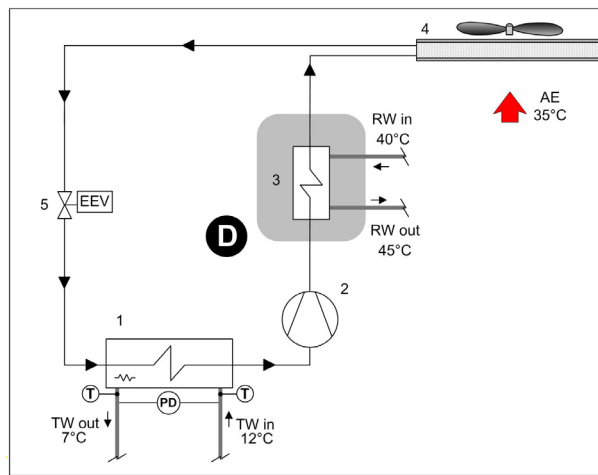
Water flow-rate = 17.8 (calculated on 372.2 kW) x 1.072 = 19.1 l/s, Evaporator pressure drop = 28 (calculated on 19.1 l/s) x 1.3 = 36.4 kPa

D Partial energy recovery

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. This option is also called 'desuperheater'. It consists of shell and tube heat exchangers, suitable to recover part of the unit heating capacity (equal to the sum of the cooling capacity and the capacity absorbed by the compressors).

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%.

When the temperature of the water to be heated is particularly low, it is wise to insert a flow control valve into the system water circuit, in order to maintain the temperature at the recovery output at above 35°C and thus avoid the condensation of the refrigerant into the partial energy recovery device.



D - Partial recovery device

- 1 - Internal exchanger
- 2 - Compressors
- 3 - Recovery exchanger
- 4 - External exchanger
- 5 - Electronic expansion valve

TW in chilled water inlet
TW out chilled water outlet

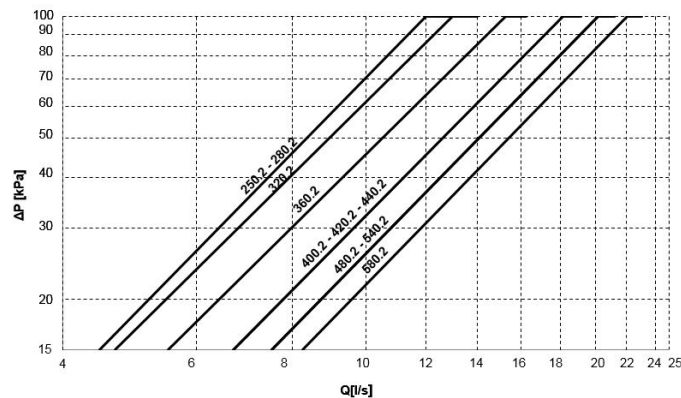
RW in - Ingresso acqua recupero
RW out - Uscita acqua recupero

T - Temperature probe
PD - Differential pressure switch
AE - Outdoor air

to the 20% of the rejected heating capacity (cooling capacity + compressor

⚠ Option not available for size 250.2.

Pressure drops of partial energy recovery exchanger



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

Example: Required cooling capacity: 600 kW at 12/7°C chilled water and 35°C outdoor air.

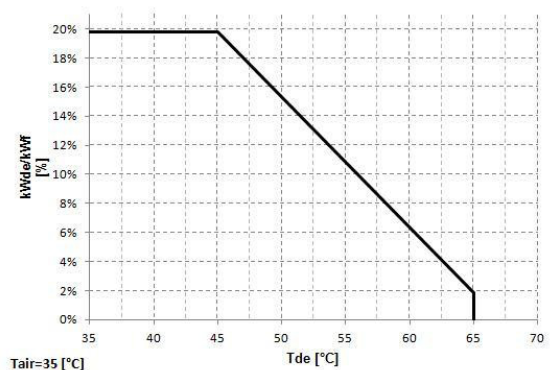
Size purpose of the study: WDAT-il3 280.2 PRM SC

Hot water required temperature: +45°C

Recovery capacity: 19% di 600 kW = 114 kW

Design flow-rate: 5.4 l/s

Partial recovery heating capacity



$\frac{kWde}{kWf}$ = Heat recovered/Cooling capacity [%]
Tde = Heat recovering device outlet water temperature [°C]

⚠ Data refer to outdoor air conditions T=35°C

Accessories - Hydronic assembly

2PM - HydroPack user side with no.2 of pumps

Option supplied built-in the unit. Pumping unit made up of two electric pumps laid out in parallel, with auto-adaptive modular logic activation.

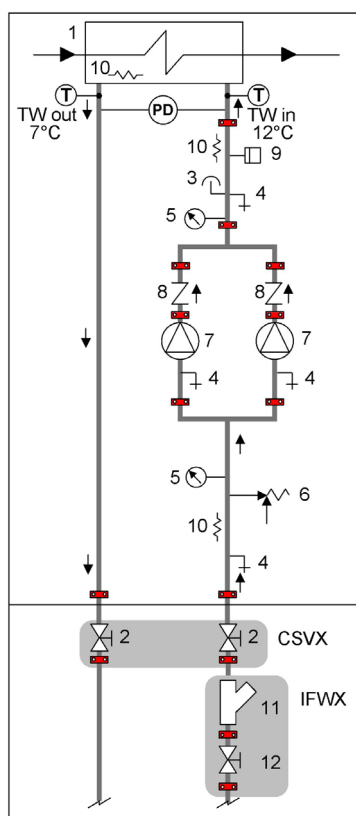
It enables the automatic reduction of the liquid flow-rate in critical conditions, avoiding blocks due to overloading and consequential intervention work by specialised technical personnel.

Centrifugal electric pump, with the pump body made of cast iron and the impeller made of AISI 316 stainless steel. Mechanical seal using ceramic, carbon and EPDM elastomer components.

Three-phase electric motor with IP55 protection rating. Complete with thermoformed insulating casing, quick-release couplings with an insulated casing, safety valve, pressure gauges, system load safety pressure switch, stainless steel immersion antifreeze heaters fitted on the suction and supply lines.

⚠ In order to increase the unit's silent operation, as an alternative to electric pumps with a 2-pole motor (2950 rpm), there are also electric pumps with 4-pole motors (1450 rpm), subject to a check regarding the maximum available pressure. The super-silent acoustic configuration (EN) only comes with electric pumps fitted with 4-pole motors.

CONNECTION DIAGRAM - GROUP WITH 2 PUMPS



- 1 - Internal exchanger
- 2 - Cutoff valve
- 3 - Vent valve
- 4 - Discharge stop valve
- 5 - Pressure gauge
- 6 - Safety valve (6 Bar)
- 7 - Packaged electric pump with high efficiency impeller
- 8 - Non return valve
- 9 - System load safety pressure switch (it avoids the pump operation if water is not present)
- 10 - Antifreeze heater
- 11 - Steel mesh strainer water side
- 12 - Cutoff valve with quick joints

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

CSVX - Couple of manually operated shut-off valves.

The grey area indicates further optional components.

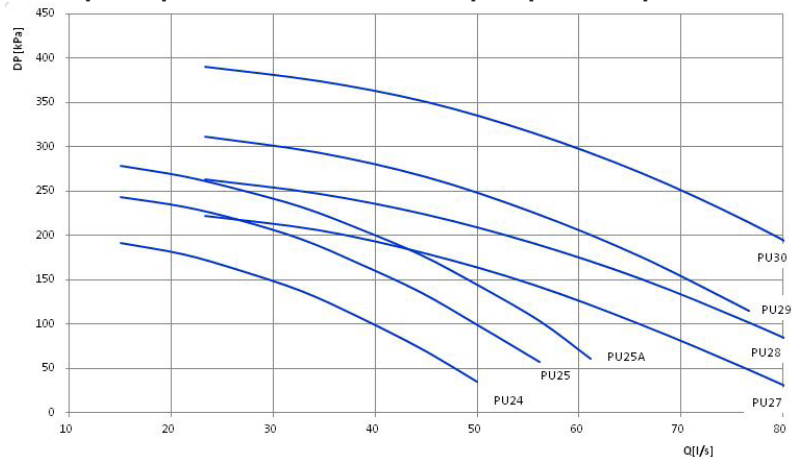
⚠ Provide hydraulic interceptions outside the unit ('CSVX - Couple of manually operated shut-off valves' option) to facilitate any possible extraordinary maintenance interventions.

Electrical data - HydroPack

To obtain the electrical consumption of the unit including the HydroPack accessory, the electrical data of the selected accessory are added to the standard electrical data indicated in the Electrical Data table..

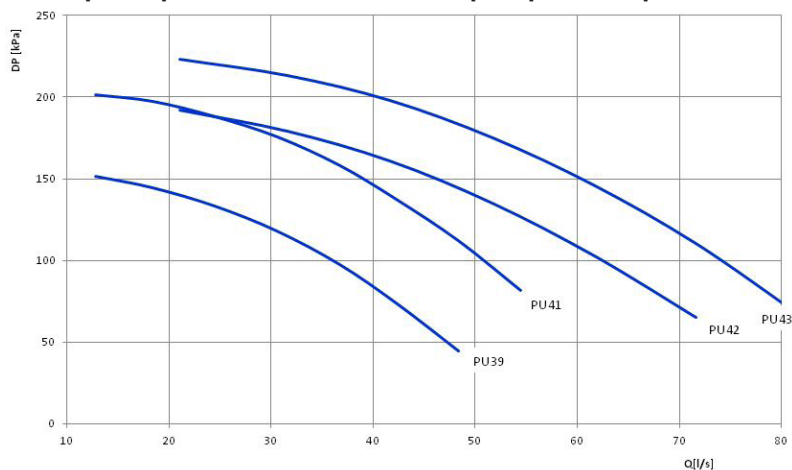
PUMP	Nominal power [A]	Rated power [kW]	PUMP	Nominal power [A]	Rated power [kW]
2 X PU24 L	2 x 4	2 x 7.6	2 X PU30 L	2 x 15	2 x 26.6
2 X PU25 L	2 x 5.5	2 x 10.5	2 X PU39	2 x 4	2 x 8.3
2 X PU25A L	2 x 7.5	2 x 14.1	2 X PU41	2 x 5.5	2 x 11.5
2 X PU27 L	2 x 7.5	2 x 14.1	2 X PU42	2 x 7.5	2 x 15.2
2 X PU28 L	2 x 9.2	2 x 16.7	2 X PU43	2 x 11	2 x 21.4
2 X PU29 L	2 x 11	2 x 20.2			

2PM option performances (electric pump with 2-pole motor)



- ⚠ Attention: the evaporator pressure drops have to be taken from the heads represented in these diagrams in order to obtain the available head values.
- ⚠ Not available with unit in extremely low noise configuration (EN)
- ⚠ Check availability of the different type of pump with size in the 'Option compatibility' table.

2PM option performances (electric pump with 4-pole motor)



- ⚠ Attention: the evaporator pressure drops have to be taken from the heads represented in these diagrams in order to obtain the available head values.
- ⚠ Check availability of the different type of pump with size in the 'Option compatibility' table.
- ⚠ To the internal exchanger pressure drops must be added the pressure drops of the steel mesh mechanical filter (not supplied) that must be placed on the water input line. It is a device compulsory for the correct unit operation and it must be selected and installed by the Customer. It is forbidden the use of filters with the mesh pitch higher than 1,0 mm. Filters with higher mesh pitch can cause a bad unit operation and also its serious damaging.

Accessories - Hydronic assembly

2PMV - Hydropack user side with no. 2 of inverter pumps

Option supplied on the unit. Pumping unit consisting of parallel electric pumps and controlled by inverter to adapt to the different application conditions.

It enables the automatic reduction of the liquid flow-rate in critical conditions, avoiding blocks due to overloading and consequential intervention work by specialised technical personnel.

Through the inverter calibration, standard supplied, it is possible to adapt the pump flow-rate/head to the installation feature.

Centrifugal electric pump with impeller made with AISI 304 steel and AISI 304 stainless steel body or grey cast iron (depending on models).

Mechanical seal using ceramic, carbon and EPDM elastomer components.

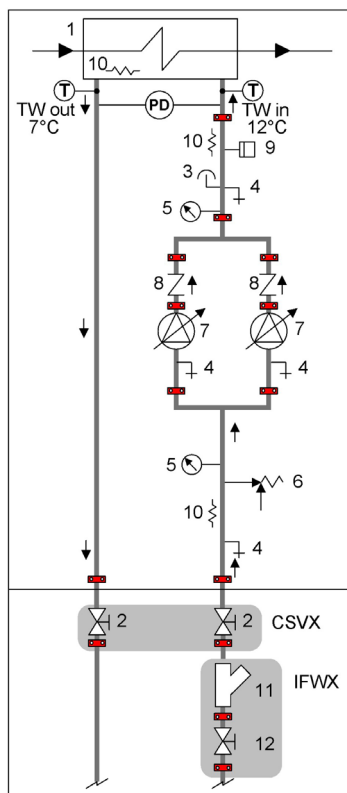
Three-phase electric motor with IP44-protection. Complete with thermoformed insulated casing, quick connections with insulated casing, non return valve, safety valve, pressure gauges, system load safety pressure switch, stainless steel antifreeze immersion heaters located at the return and supply point.

In combination with the "IVFDT" - Variable flow-rate control option, it allows variation of the water flow-rate to the system under partial-load to achieve the highest unit efficiency and lower consumption of the pumping group.

⚠ The 2PMV option is supplied with a kit made up of 2 quick blind connections, for the removal of one pump in case of maintenance.

⚠ Check the option compatibility table for combinations with storage tank.

⚠ Provided with hydraulic interceptions to the outside of the unit (option 'CSVX - A pair of manually operated shut-off valves') to facilitate any major maintenance operations



- 1 - Internal exchanger
- 2 - Cutoff valve
- 3 - Vent valve
- 4 - Discharge stop valve
- 5 - Pressure gauge
- 6 - Safety valve (6 Bar)
- 7 - Packaged electric pump with high efficiency impeller
- 8 - Non return valve
- 9 - System load safety pressure switch (it avoids the pump operation if water is not present)
- 10 - Antifreeze heater
- 11 - Steel mesh strainer water side
- 12 - Cutoff valve with quick joints

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

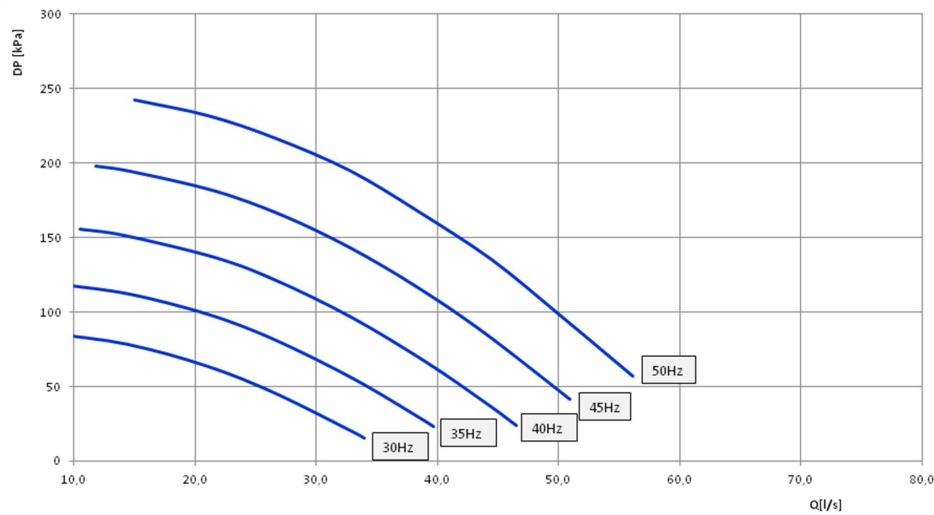
CSVX - Couple of manually operated shut-off valves

The grey area indicates further optional components.

2PMV option performances

Head

2 X PU25L

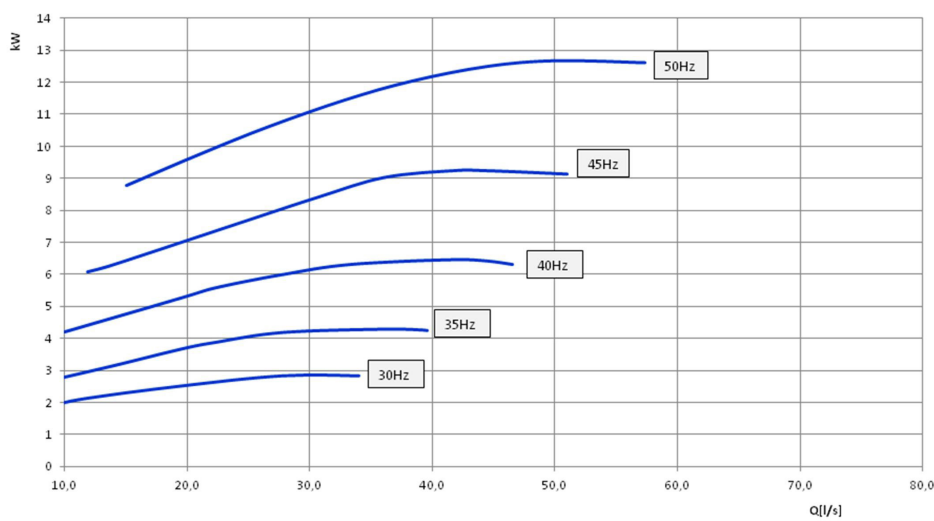


Q [l/s] = Water flow-rate
 Δ [kPa] = Pump head

- ⚠ Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:
- Internal exchanger pressure drop
 - IFVX accessory -Steel mesh filter on the water side (where applicable)

Power input

2 X PU25L



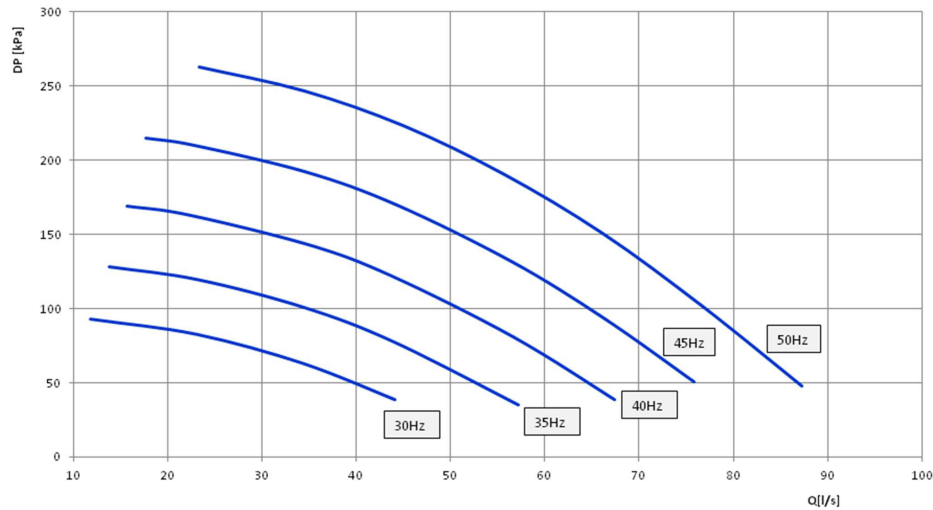
Q [l/s] = Water flow-rate
 kW = Power input

Accessories - Hydronic assembly

2PMV option performances

Head

2 X PU28L

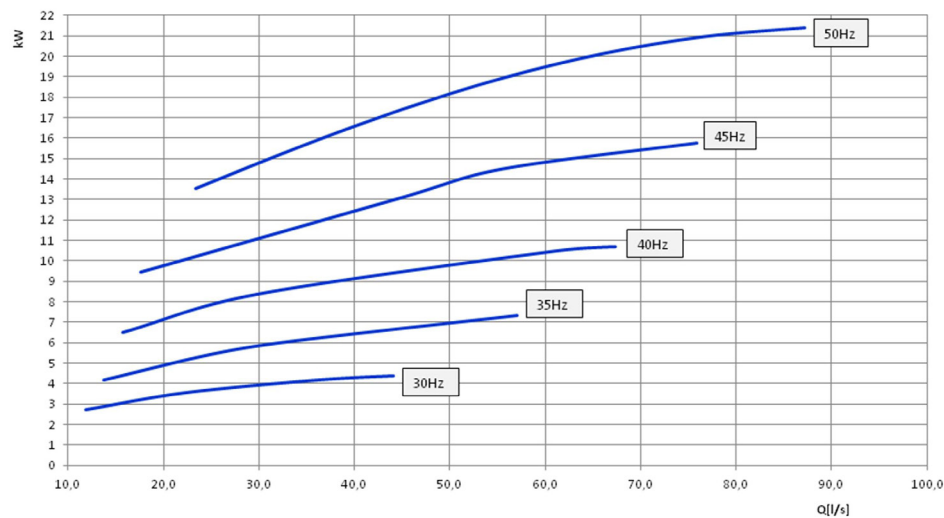


Q [l/s] = Water flow-rate
 Δ [kPa] = Pump head

- ⚠ Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:
- Internal exchanger pressure drop
 - IFVX accessory -Steel mesh filter on the water side (where applicable)

Power input

2 X PU28L



Q [l/s] = Water flow-rate
 kW = Power input

Option compatibility

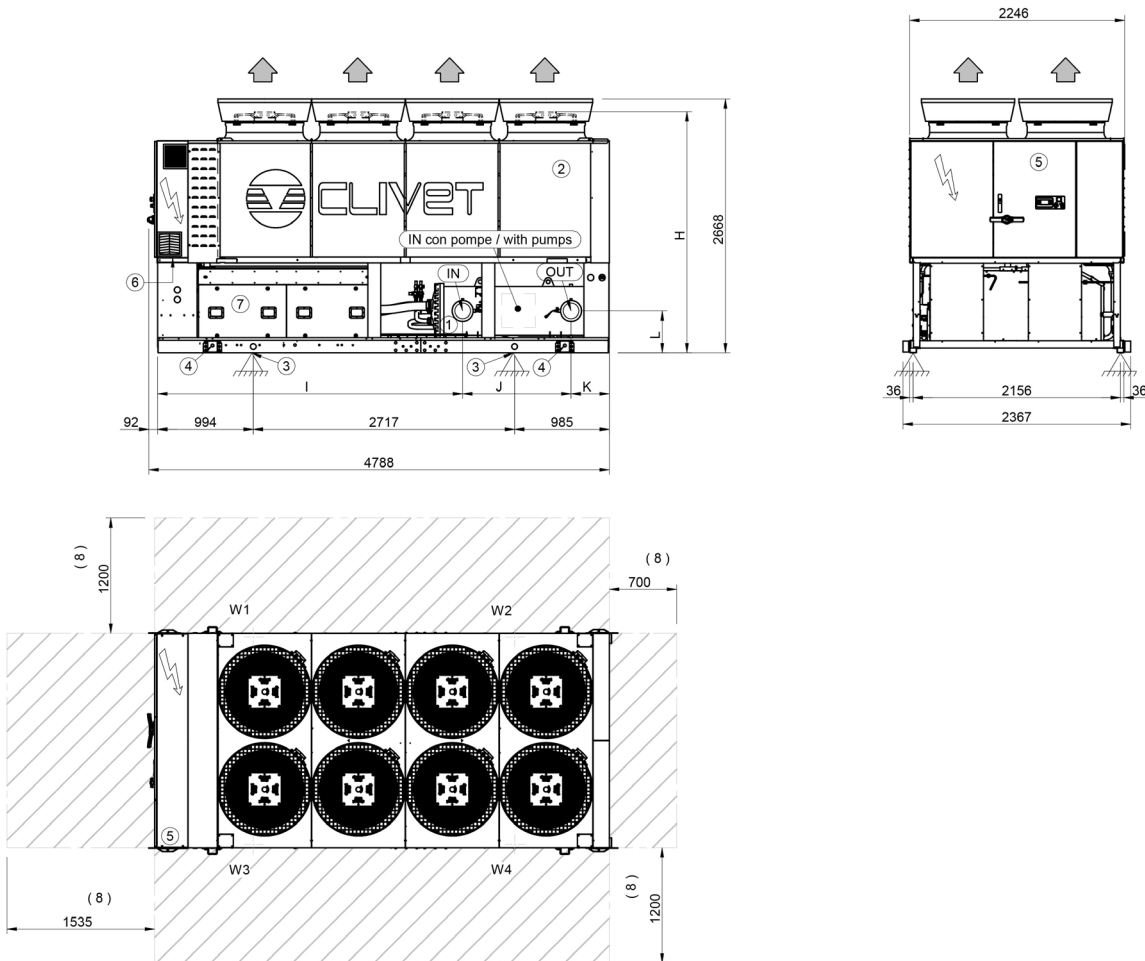
RIF.	DESCRIPTION	250.2	280.2	320.2	360.2	400.2	420.2	440.2	480.2	540.2	580.2
CONFIGURATIONS AND MAIN ACCESSORIES											
B	Low water temperature	O	O	O	O	O	O	O	O	O	O
D	Partial energy recovery	-	O	O	O	O	O	O	O	O	O
B + D	Low water temperature + Partial energy recovery	-	O	O	O	O	O	O	O	O	O
2PM - HYDROPACK USER SIDE WITH NO.2 PUMPS											
PU24 L	Pump type 24 L	Δ	Δ	Δ	O	O	O	-	-	-	-
PU25 L	Pump type 25 L	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	O	-
PU25A L	Pump type 25A L	O	O	O	O	O	O	O	O	O	-
PU27 L	Pump type 27 L	O	O	O	Δ	Δ	Δ	Δ	Δ	Δ	Δ
PU28 L	Pump type 28 L	O	O	O	O	O	Δ	Δ	Δ	Δ	Δ
PU29 L	Pump type 29 L	O	O	O	O	O	O	O	O	O	O
PU30 L	Pump type 30 L	O	O	O	O	O	O	O	O	Δ	Δ
PU39	Pump 39	Δ	Δ	Δ	Δ	Δ	O	-	-	-	-
PU41	Pump type 41	O	O	O	O	O	O	O	-	-	-
PU42	Pump type 42	O	O	O	O	O	O	O	O	O	O
PU43	Pump type 43	O	O	O	O	O	O	O	O	O	O
2PMV - HYDROPACK USER SIDE WITH NO.2 INVERTER PUMPS											
PU25 L	Pump type 25 L	O	O	O	O	-	-	-	-	-	-
PU28 L	Pump type 28 L	O	O	O	O	O	O	O	O	O	O
IVFDT - INVERTER DRIVEN VARIABLE FLOW-RATE USER SIDE CONTROL DEPENDING ON THE TEMPERATURE DIFFERENTIAL											
2PM	Hydropack user side with no. 2 of pumps	O	O	O	O	O	O	O	O	O	O
2PMV	Hydropack user side with no.2 of inverter pumps	O	O	O	O	O	O	O	O	O	O
OTHER ACCESSORIES											
CREFP	Device for consumption reduction of the external section at variable speed (phase-cutting)	•	•	•	•	•	•	•	•	•	•
CREFB	Device for fan consumption reduction of the external section, ECOBREEZE type	O	O	O	O	O	O	O	O	O	O

- = Standard
- = Option not available
- O = Available option
- Δ = Recommended option (low-mid high head, wherever available)

Dimensional drawings

Size 250.2 - Acoustic configuration: compressor soundproofing (SC)

DAA4Z280.2_PRM_SC_1_01
DATA/DATE 26/03/2018



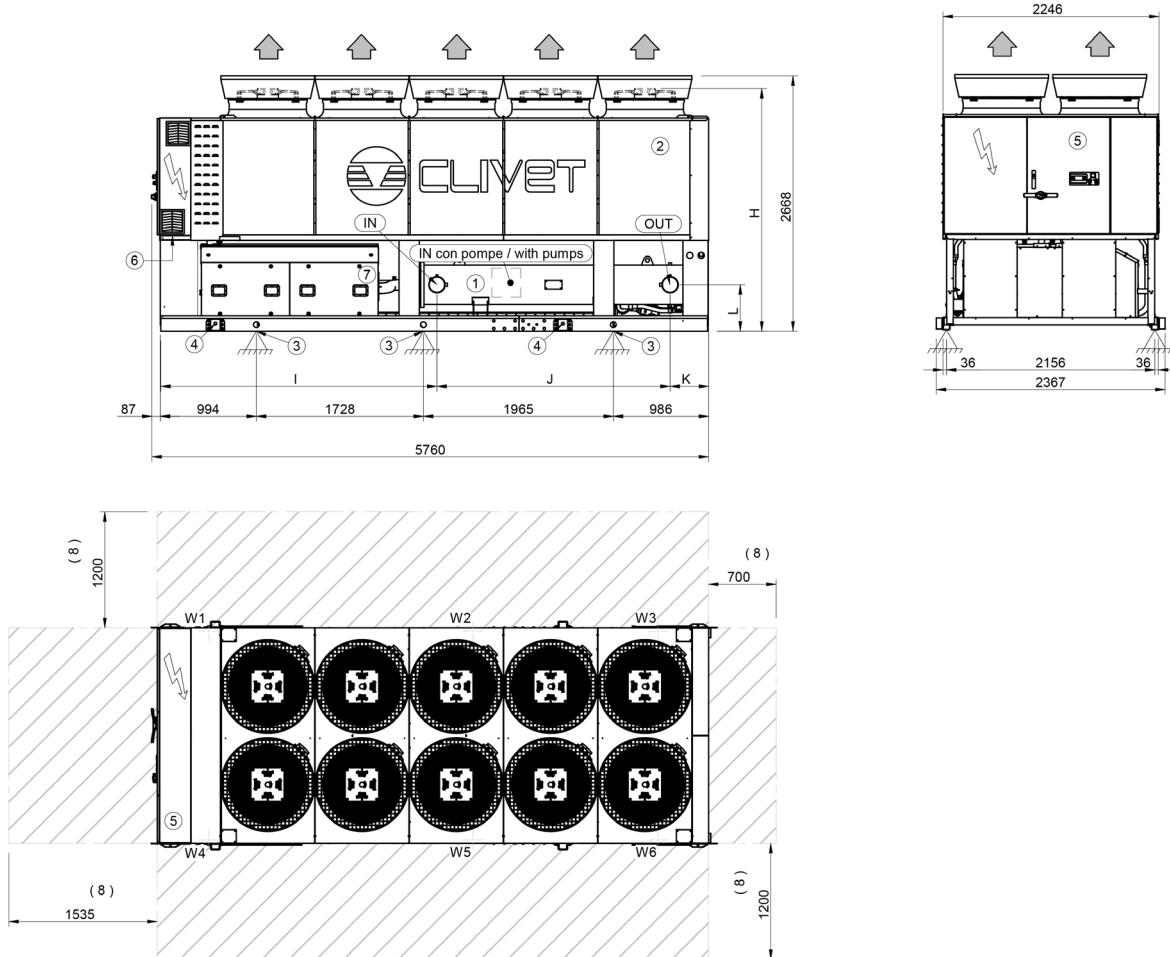
1. Internal exchanger (Evaporator)
2. External exchanger (condenser)
3. Unit fixing holes
4. Lifting brackets (removable, if required, after the unit positioning)
5. Electrical panel
6. Power input
7. Sound proof enclosure (only in the relevant versions)
8. Clearance access recommended

Size		SC-PRM
		250.2
I	mm	3171
J	mm	1127
K	mm	398
L	mm	437
OD	mm	6"
A - Length	mm	4788
B - Depth	mm	2246
C - Height	mm	2484
C - Height with AXITOP	mm	2668
W1 Supporting Point	kg	1402
W2 Supporting Point	kg	1121
W3 Supporting Point	kg	1408
W4 Supporting Point	kg	1127
Shipping weight	kg	4824
Operating weight	kg	5058

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Size 280.2 - Acoustic configuration: compressor soundproofing (SC)

DAA4Z280.2_PRM_SC_1_01
DATA/DATE 26/03/2018



Size		SC-PRM
		280.2
I	mm	2857
J	mm	2412
K	mm	399
L	mm	480
OD	mm	6"
A - Length	mm	5760
B - Depth	mm	2246
C - Height	mm	2484
C - Height with AXITOP	mm	2668
W1 Supporting Point	kg	1273
W2 Supporting Point	kg	1001
W3 Supporting Point	kg	551
W4 Supporting Point	kg	1276
W5 Supporting point	kg	1004
W6 Supporting point	kg	553
Shipping weight	kg	5418
Operating weight	kg	5658

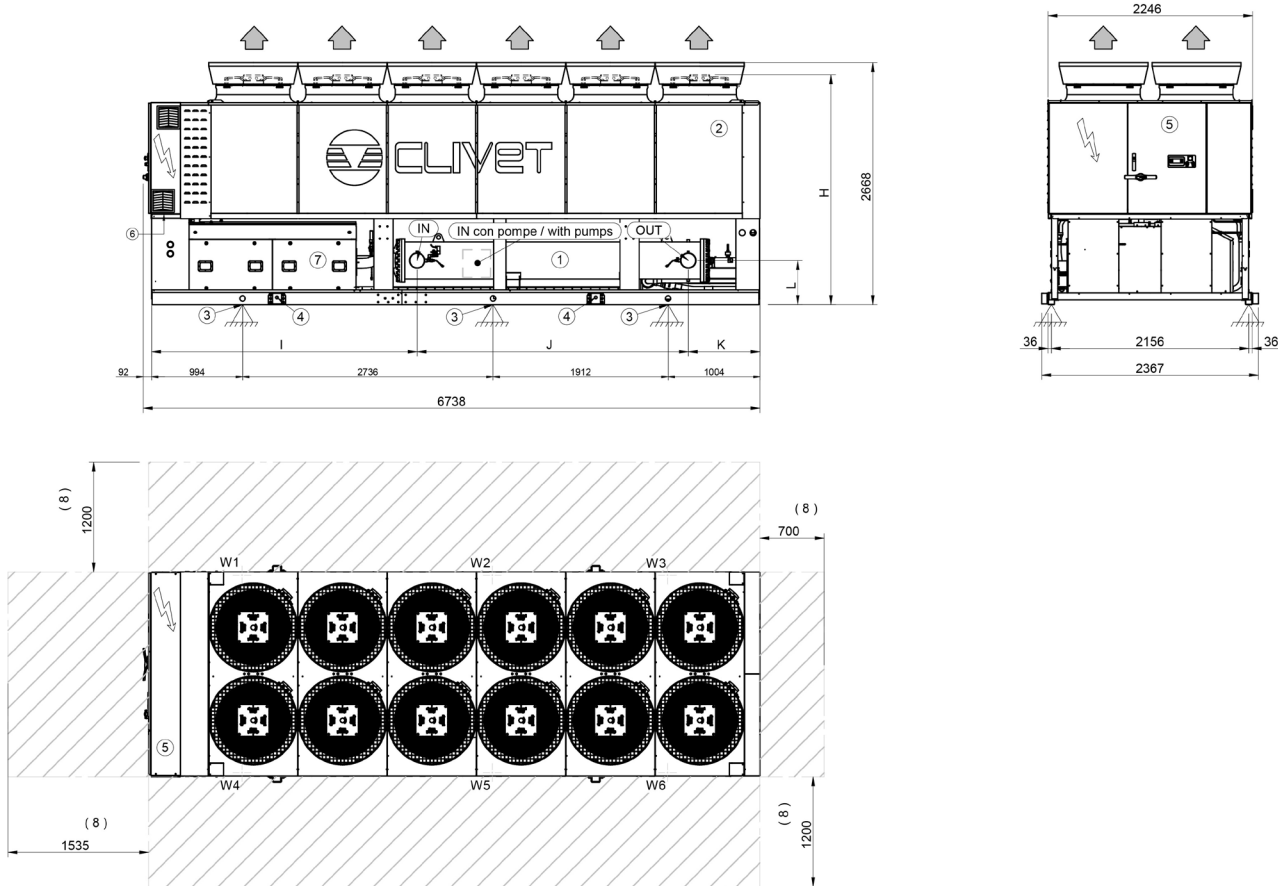
1. Internal exchanger (Evaporator)
2. External exchanger (condenser)
3. Unit fixing holes
4. Lifting brackets (removable, if required, after the unit positioning)
5. Electrical panel
6. Power input
7. Sound proof enclosure (only in the relevant versions)
8. Clearance access recommended

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Dimensional drawings

Size 320.2 - Acoustic configuration: compressor soundproofing (SC)

DAA4Z320.2_PRM_SC_1_01
DATA/DATE 26/03/2018



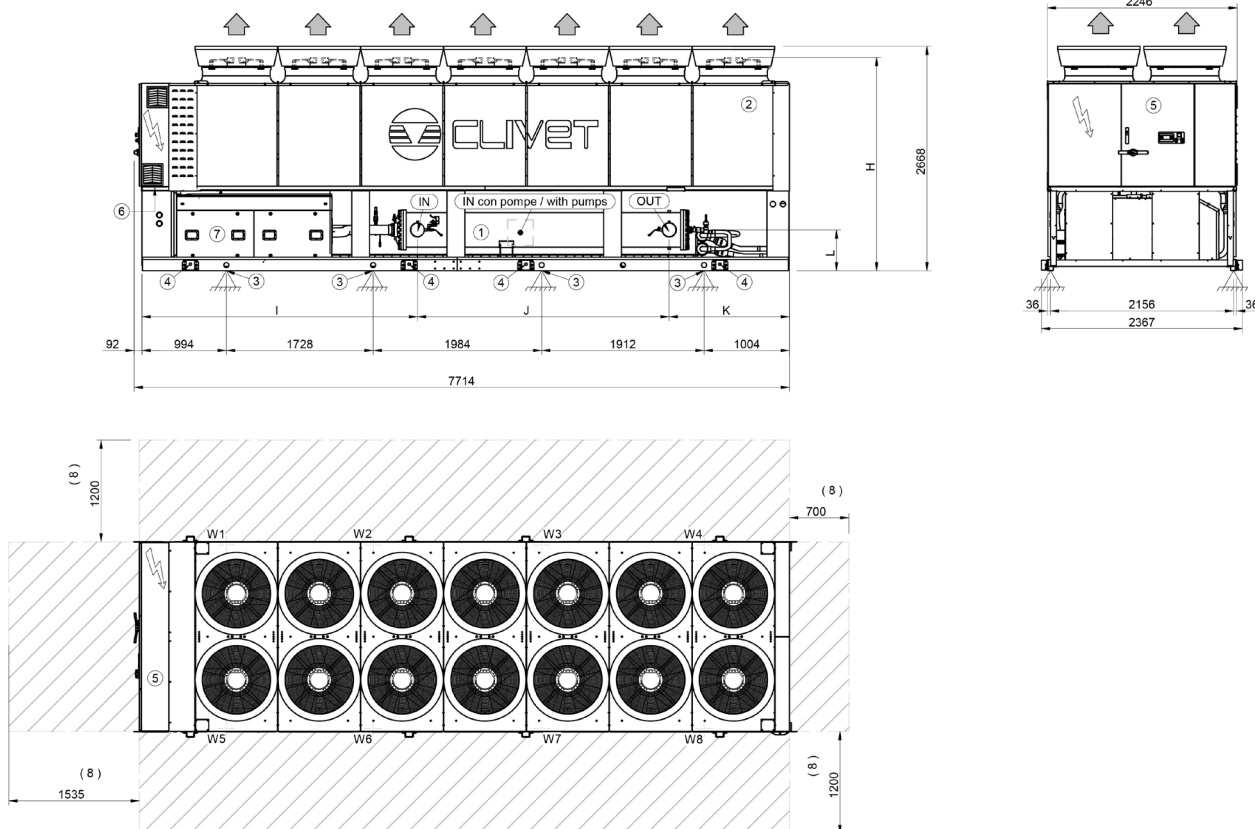
Size		SC-PRM
		320.2
I	mm	2900
J	mm	2962
K	mm	784
L	mm	480
OD	mm	6"
A - Length	mm	6738
B - Depth	mm	2246
C - Height	mm	2484
C - Height with AXITOP	mm	2668
W1 Supporting Point	kg	1570
W2 Supporting Point	kg	1108
W3 Supporting Point	kg	502
W4 Supporting Point	kg	1559
W5 Supporting point	kg	1101
W6 Supporting point	kg	499
Shipping weight	kg	6031
Operating weight	kg	6339

1. Internal exchanger (Evaporator)
2. External exchanger (condenser)
3. Unit fixing holes
4. Lifting brackets (removable, if required, after the unit positioning)
5. Electrical panel
6. Power input
7. Sound proof enclosure (only in the relevant versions)
8. Clearance access recommended

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Size 360.2 - Acoustic configuration: compressor soundproofing (SC)

DAA4Z360.2_PRM_SC_1_01
DATA/DATE 26/03/2018



Size		SC-PRM
		360.2
I	mm	3245
J	mm	2962
K	mm	1415
L	mm	480
OD	mm	6"
A - Length	mm	7714
B - Depth	mm	2246
C - Height	mm	2484
C - Height with AXITOP	mm	2668
W1 Supporting Point	kg	1630
W2 Supporting Point	kg	540
W3 Supporting Point	kg	1007
W4 Supporting Point	kg	520
W5 Supporting point	kg	1617
W6 Supporting point	kg	536
W7 Supporting point	kg	958
W8 Supporting point	kg	495
Shipping weight	kg	7024
Operating weight	kg	7303

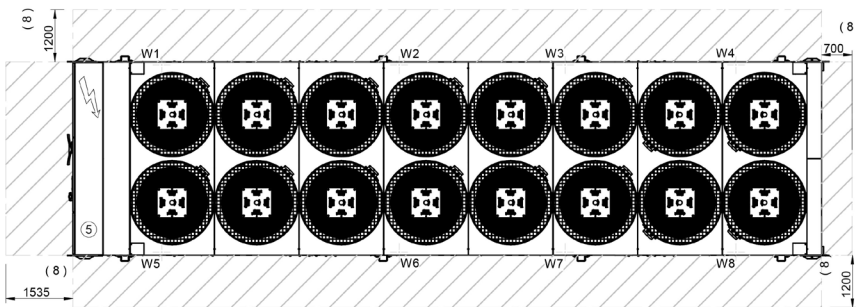
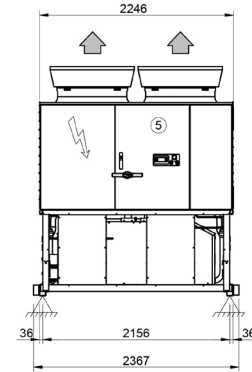
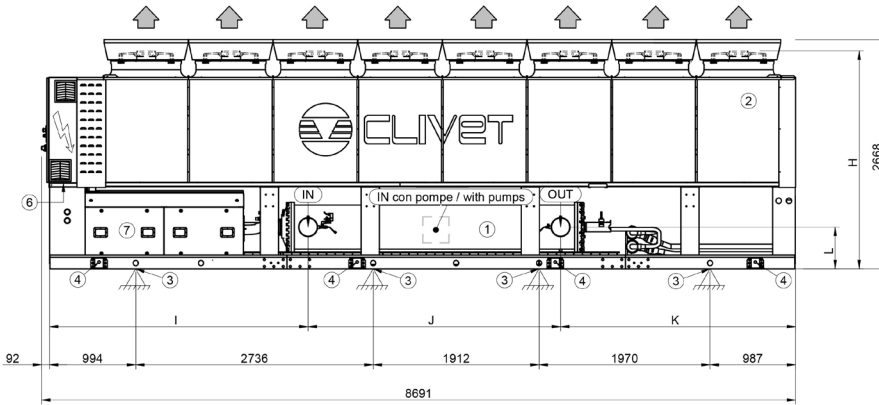
1. Internal exchanger (Evaporator)
2. External exchanger (condenser)
3. Unit fixing holes
4. Lifting brackets (removable, if required, after the unit positioning)
5. Electrical panel
6. Power input
7. Sound proof enclosure (only in the relevant versions)
8. Clearance access recommended

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Dimensional drawings

Size 400.2 - Acoustic configuration: compressor soundproofing (SC)

DAA4Z400.2_PRM_SC_1_01
DATA/DATE 26/03/2018



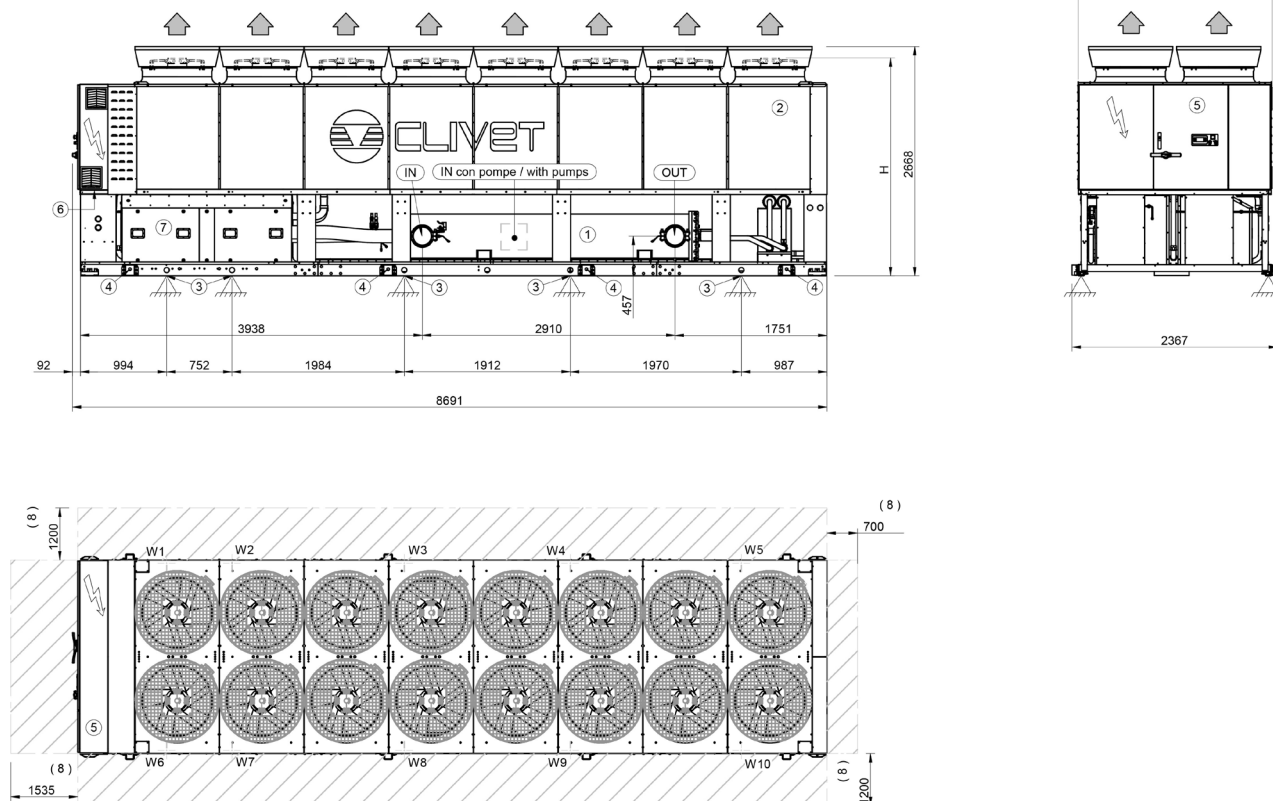
Size		SC-PRM
		400.2
I	mm	2980
J	mm	2910
K	mm	2709
L	mm	480
OD	mm	8"
A - Length	mm	8691
B - Depth	mm	2246
C - Height	mm	2484
C - Height with AXITOP	mm	2668
W1 Supporting Point	kg	1449
W2 Supporting Point	kg	943
W3 Supporting Point	kg	978
W4 Supporting Point	kg	555
W5 Supporting point	kg	1423
W6 Supporting point	kg	925
W7 Supporting point	kg	935
W8 Supporting point	kg	530
Shipping weight	kg	7257
Operating weight	kg	7738

1. Internal exchanger (Evaporator)
2. External exchanger (condenser)
3. Unit fixing holes
4. Lifting brackets (removable, if required, after the unit positioning)
5. Electrical panel
6. Power input
7. Sound proof enclosure (only in the relevant versions)
8. Clearance access recommended

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Size 420.2 - 440.2 - Acoustic configuration: compressor soundproofing (SC)

DAA4Z420.2_440.2_PRM_SC_1_01
DATA/DATE 23/03/2018



Size	SC-PRM		
	420.2	440.2	
OD	mm	8"	8"
A - Length	mm	8691	8691
B - Depth	mm	2246	2246
C - Height	mm	2484	2484
C - Height with AXITOP	mm	2668	2668
W1 Supporting Point	kg	1137	1361
W2 Supporting Point	kg	706	548
W3 Supporting Point	kg	742	758
W4 Supporting Point	kg	856	851
W5 Supporting point	kg	615	628
W6 Supporting point	kg	1035	1516
W7 Supporting point	kg	997	854
W8 Supporting point	kg	777	795
W9 Supporting point	kg	809	805
W10 Supporting point	kg	577	582
Shipping weight	kg	7611	8057
Operating weight	kg	8251	8698

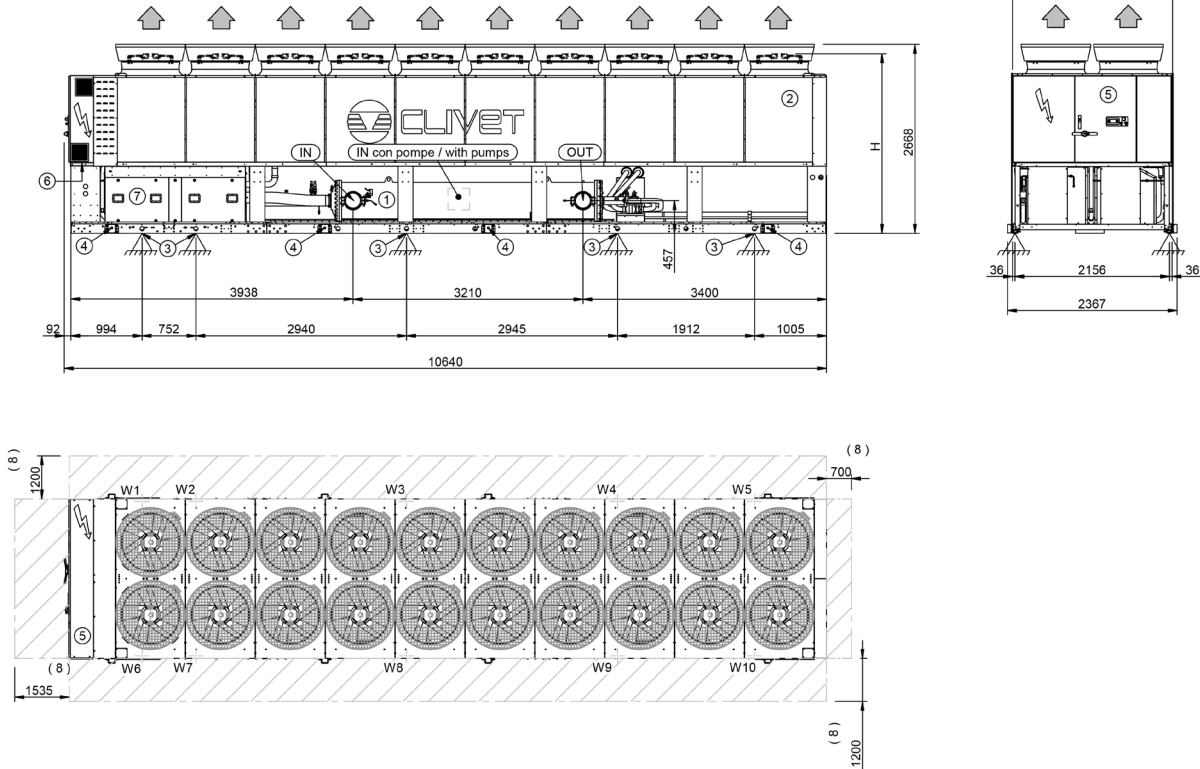
1. Internal exchanger (Evaporator)
2. External exchanger (condenser)
3. Unit fixing holes
4. Lifting brackets (removable, if required, after the unit positioning)
5. Electrical panel
6. Power input
7. Sound proof enclosure (only in the relevant versions)
8. Clearance access recommended

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Dimensional drawings

Size 480.2 - 540.2 - 580.2 - Acoustic configuration: compressor soundproofing (SC)

DAA4Z480.2_540.2_580.2_PRM_SC_1_01
DATA/DATE 23/03/2018



Size		SC-PRM		
		480.2	540.2	580.2
OD	mm	8"	8"	8"
A - Length	mm	10640	10640	10640
B - Depth	mm	2246	2246	2246
C - Height	mm	2484	2484	2484
C - Height with AXITOP	mm	2668	2668	2668
W1 Supporting Point	kg	1322	1322	1322
W2 Supporting Point	kg	725	725	725
W3 Supporting Point	kg	1320	1320	1320
W4 Supporting Point	kg	830	830	830
W5 Supporting point	kg	439	439	439
W6 Supporting point	kg	1554	1554	1554
W7 Supporting point	kg	939	939	939
W8 Supporting point	kg	1294	1294	1294
W9 Supporting point	kg	771	771	771
W10 Supporting point	kg	416	416	416
Shipping weight	kg	8896	8896	8896
Operating weight	kg	9610	9610	9610

1. Internal exchanger (Evaporator)
2. External exchanger (condenser)
3. Unit fixing holes
4. Lifting brackets (removable, if required, after the unit positioning)
5. Electrical panel
6. Power input
7. Sound proof enclosure (only in the relevant versions)
8. Clearance access recommended

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

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For over 35 years we have been offering solutions to ensure sustainable comfort and the well-being of people and the environment

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