Multifunction heat pump with water-cooled inverter technology with simultaneous hot/cold water production for indoor installation

SCREWLINE^{4}-i

SERIE WiDHN-KSL1 PL 140.2-360.2

TECHNICAL BULLETIN

ErP 2021 COMPLIANT

R-513A

Screw INVERTER

SIZE	140.2	185.2	220.2	260.2	320.2	360.2
COOLING CAPACITY [kW]	440	531	621	710	841	946
COOLING CAPACITY [kW]	500	600	700	800	943	1047

Page

Clivet participates in the ECP Programme for "Liquid Chillers and Hydronic Heat Pumps".
Check ongoing validity of certificate on www.eurovent-certification.com"

Features and benefits

SCREWLINE: Screw technology for an efficient and versatile product

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

WiDHN-KSL1 PL

Multifunction heat pump with water-cooled inverter technology with simultaneous hot/cold water production

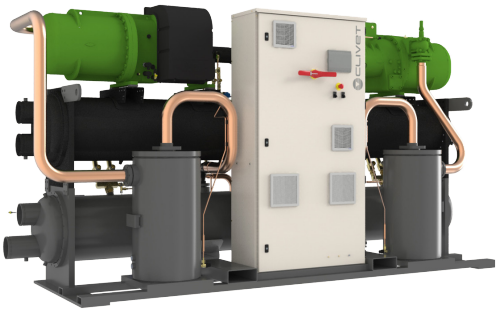
- Range 440 ÷ 946 kW
- Continuous capacity control
- Operation for 4-pipe system
- Seasonal efficiency up to 7.85
- Hot water production up to 55 °C
- Super silent version with integral casing

R-513A

WDH-iK4

Water Cooled Liquid Chiller with inverter technology

- Range 340 ÷ 1440 kW
- Spray shell & tube evaporator
- Continuous capacity control
- Seasonal efficiency up to 8,60
- Cooling only, heating only or operation with water circuit change-over
- Operation up to + 55°C outlet water temperature to the condenser
- High water temperature +65°C version



R-513A

Unit capable of simultaneously supplying hot and chilled water regardless of the season, according to the following functions:
- simultaneous production of chilled water and hot water;
- production of hot water only with disposal of the cooling capacity on the source side exchanger;
- production of cold water only with disposal of the thermal energy on the source side exchanger.

The control logic ensures that the unit operates under intermediate load conditions.
Built to ISO 9001 quality standards, it consists of:

Compressor
Compact semi-hermetic dual screw compressors with integrated high efficiency oil separator. Start-up with limited current consumption is achieved by progressively accelerating the compressor with the inverter. The inverter is cooled with refrigerant taken from the liquid line. The liquid flow is enabled by a solenoid valve and is sent to the inverter cooling plate by a thermostatic valve. The steam generated by the heat exchange is then drawn by the screws into a closed chamber at medium pressure without reducing the suction capacity of the compressor. The inverter houses the circuit boards which, in addition to managing the inverter and the rotation speed of the electric motor, also carry out all compressor protection, monitoring and control functions: oil level, oil temperature, motor temperature, oil heater activation when required, liquid injection to cool the compressor and inverter, control of operating limits through HP and LP pressure transducers, communication via MODBUS, operating times, alarm management.
The electric motor and inverter power supply is three-phase, the auxiliary circuits are powered with a single-phase line.
A non return valve is fitted at the discharge of the compressor to prevent counter-rotation at shut-down. The internal emergency overpressure valve connects the compressor discharge with the suction in case of excessive pressure differential.

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.

Cold side exchanger
Independent shell-and-tube exchanger on the refrigerant side for each compressor. The exchanger is made of a carbon steel casing. The tubes, anchored to the tube plate by a mechanical expansion process, are copper, highly efficient, internally ribbed in order to optimise heat exchange and specifically designed for use with modern ecological refrigerants. it is also fitted with a differential pressure switch to protect the water side and a coating of closed cell heat insulating material, which prevents condensation and heat exchange with the outside. The exchanger has quick hydraulic connections with grooved joint (Victaulic).

Hot side exchanger
Independent shell-and-tube exchanger on the refrigerant side for each compressor. The exchanger is made of a carbon steel casing. The tubes, anchored to the tube plate by a mechanical expansion process, are copper, highly efficient, internally ribbed in order to optimise heat exchange and specifically designed for use with modern ecological refrigerants. it is also fitted with a differential pressure switch to protect the water side and a coating of closed cell heat insulating material, which prevents condensation and heat exchange with the outside. The exchanger has quick hydraulic connections with grooved joint (Victaulic).

Source side exchanger
Independent shell-and-tube exchanger on the refrigerant side for each compressor. The exchanger is made of a carbon steel casing. The tubes, anchored to the tube plate by a mechanical expansion process, are copper, highly efficient, internally ribbed in order to optimise heat exchange and specifically designed for use with modern ecological refrigerants. it is also fitted with a differential pressure switch to protect the water side and a coating of closed cell heat insulating material, which prevents condensation and heat exchange with the outside. The exchanger has quick hydraulic connections with grooved joint (Victaulic).

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;
- non-return valve;
- 4-way cycle inversion valve;
- solenoid valve;
- high pressure safety valve;
- low pressure safety valves;
- liquid flow and humidity indicator;
- shut-off valve on compressor supply and suction;
- 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.

Standard unit technical specifications

Electrical panel

Completely made and wired in accordance with EN 60204.
The power section includes:

- door locking main circuit breaker;
- isolation transformer to power the auxiliary circuit;
- compressor protection fuses;
- electrical panel ventilation.

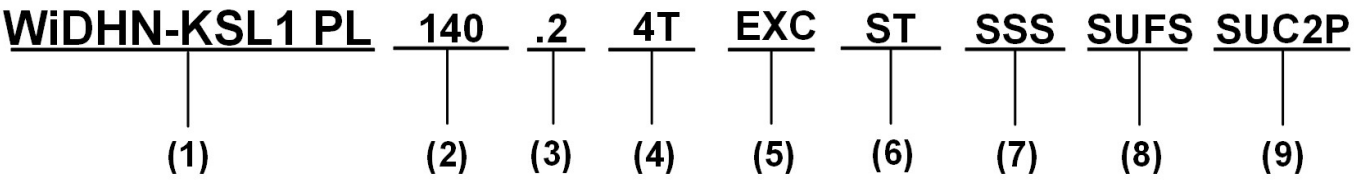
The control section includes:

- interface terminal with graphic display;
- view of values set, failure codes and parameters index;
- ON/OFF keys and alarm reset;
- proportional-integral-derivative water temperature control;
- anti-freeze protection water side;
- 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;
- visualisation of no. of hours of compressor operation;
- multifunction phase monitor;
- remote ON/OFF control;
- input to enable/disable hot or cold water production;
- digital input for enabling double set point;
- automatic rotation control of compressor starts;
- relay for remoting cumulative alarm signalling;
- high refrigerant gas pressure pre-alarm mode that often prevents shutdown of the unit;
- demand limit input (absorbed power limit depending on external signal 0÷10V or 4÷20 mA);
- electrical socket (max 400W)

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. All electrical cables are coloured and numbered in conformity with the wiring diagram.

Test

Unit subjected to factory-tested in specific steps and test pressure of the piping of the refrigerant circuit (with nitrogen and hydrogen), before shipping them.



(1) Range
WiDHN = Reversible heat pump with inverter-driven screw compressors
KSL1 PL = SCREWLINE[4] multifunction series with R-513A refrigerant

(2) Size
140 = Nominal compressor capacity (HP)

(3) Compressors
2 = Number of compressors

(4) System configuration
4T = configuration for 4-pipe system

(5) Energy version
EXC = EXCELLENCE Version

(6) Acoustic configuration
ST = Standard acoustic configuration (standard)
EN = Super-silenced acoustic configuration

(7) Source side exchanger
SSS = Source side exchanger standard flowrate (Standard)

(8) Cold side exchanger
SUFS = Cold side exchanger standard flowrate (Standard)

(9) Hot side exchanger
SUC2P = 2-pass hot side exchanger (Standard)

Built-in options

EN	**Super silent acoustic configuration** Configuration used to increase the unit's silence level by acting on the source of the noise. It consists of suitable steel casings lined with high-intensity material designed to provide sound insulation. The casings are painted with RAL 9001. To assess the benefit of soundproofing, refer to the “Sound levels” tables.
PSS16	**Source side water pressure 16 bar** Shell-and-tube heat exchanger sized for a maximum source side operating pressure of 16 bar.
PSUF16	**Cold side water pressure 16 bar** Shell-and-tube heat exchanger sized for a maximum cold side operating pressure of 16 bar.
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 serial line do not exceed 1200 meters and the line must be connected in bus typology (in/out)
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 on 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).
SPC1	**Set-point compensation with 4-20 mA signal** This device enables the set-point to be varied which is pre-set using an external 4÷20 mA signal. The device is installed and wired on the unit.
SCP4	**Set-point compensation with 0-10 V signal** This device enables the set-point to be varied which is pre-set using an external 0÷10 V signal. The device is installed and wired on the unit.
SPC2	**Set-point compensation with outdoor air 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.

RPR **Refrigerant leak detector**

Leak detector device, installed on the unit, detects leaks in the internal refrigerant circuit.

ECS **ECOSHARE function for the automatic management of a group of units**

The device allows automatic management of units that operate on the same hydraulic circuit, by creating a local communication network.

The device allows for rotation based on the criterion of minimum wear and management of units in stand-by. The Ecoshare network coordinates the thermoregulation of the system in such a way that all the Slaves receive from the Master, the on/off status command, and the offset for scaling the SetPoints of the individual Slaves (which will work with their own thermoregulator) , according to wear, state of sleep in progress, and presence of alarms which would prevent the activation of the single Slave.
There are various unit sizes. Every unit must have ECOSHARE mode. The group control is by a Master unit.
The local network can be extended up to 7 units (1 Master and 6 Slave).
For units in ECOSHARE, the minimum water content of the system is equal to that of the largest unit increased by +25% for each additional unit connected.

⚠ The unit fitted with this device can be also fitted with the RCMRX option and one of the CMSC9 / CMSC11 options.

IVFSDT **Source side inverter variable flow-rate control based on the temperature difference**

Allows control of the water flow-rate to the unit under partial load conditions, keeping the temperature difference at the inlet to and outlet from the source side exchanger constant. Flow-rate control is managed by the on-board electronics via the water temperature probes built into the unit.
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 operating modes described in the IVFCDT option can be selected for the pumps.

IVFSDTS **Source side inverter variable flow-rate control based on the temperature difference with pressure drop sensor**

Allows control of the water flow-rate to the unit under partial load conditions, keeping the temperature difference at the inlet to and outlet from the source side exchanger constant. Flow-rate control is managed by the on-board electronics via the water temperature probes built into the unit and the differential pressure transducer that monitors the flow-rate of the source side exchanger.
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 operating modes described in the IVFCDT option can be selected for the pumps.

IVFCDT **Variable flow rate control cold side by inverter according to the temperature differential**

Allows control of the water flow-rate to the unit under partial load conditions, keeping the temperature difference at the inlet to and outlet from the cold side exchanger constant. Flow-rate control is managed by the on-board electronics via the water temperature probes built into the unit.
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 available with cool side inverter pumps.

Unit configuration

IVFCDTS **Variable flow control cold side by inverter according to the temperature differential with pressure drop sensor**
Allows control of the water flow-rate to the unit under partial load conditions, keeping the temperature difference at the inlet to and outlet from the cold side exchanger constant. Flow-rate control is managed by the on-board electronics via the water temperature probes built into the unit and the differential pressure transducer that monitors the flow-rate of the cold side exchanger.
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 operating modes described in the IVFCDT option can be selected for the pumps.

IVFCDTF **Variable flow rate control cold side by inverter according to the temperature differential with a flow meter**
Allows control of the water flow-rate to the unit under partial load conditions, keeping the temperature difference at the inlet to and outlet from the cold side exchanger constant. Flow-rate control is managed by the on-board electronics via the water temperature probes built into the unit and the flow meter that monitors the flow-rate of the cold side exchanger.
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 operating modes described in the IVFCDT option can be selected for the pumps.

Device available with cool side inverter pumps.

⚠ Option available only in conjunction with FMCHX option

IVFHDT **Variable flow rate control hot side by inverter according to the temperature differential**
Allows control of the water flow-rate to the unit under partial load conditions, keeping the temperature difference at the inlet to and outlet from the hot side exchanger constant. Flow-rate control is managed by the on-board electronics via the water temperature probes built into the unit.
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 operating modes described in the IVFCDT option can be selected for the pumps.

Device available with hot side inverter pumps.

IVFHDTS **Variable flow control heating side by inverter according to the temperature differential with pressure drop sensor**
Allows control of the water flow-rate to the unit under partial load conditions, keeping the temperature difference at the inlet to and outlet from the hot side exchanger constant. Flow-rate control is managed by the on-board electronics via the water temperature probes built into the unit and the differential pressure transducer that monitors the flow-rate of the hot side exchanger.
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 operating modes described in the IVFCDT option can be selected for the pumps.

Device available with hot side inverter pumps.

IVFHDTF **Variable flow rate control hot side by inverter according to the temperature differential with a flow meter**
Allows control of the water flow-rate to the unit under partial load conditions, keeping the temperature difference at the inlet to and outlet from the hot side exchanger constant. Flow-rate control is managed by the on-board electronics via the water temperature probes built into the unit and the flow meter that monitors the flow-rate of the hot side exchanger.
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 operating modes described in the IVFCDT option can be selected for the pumps.

Device available with hot side inverter pumps.

⚠ Option available only in conjunction with FMCHX option

CONTA3 **MODBUS total electric energy meters**

It allows to view and keep a record of the unit's main electrical parameters. The data can be displayed with the user interface on the unit or via the supervisor through the variable protocol specifications. The following can be monitored: supply voltage (V), current input (A), frequency (Hz), cosfi, power input (kW), energy input (kWh), electrical parameters of the built-in pumping units. The device is installed and wired on the unit.

CONTA4 **Total electricity meters and m-bus pump group**

It allows to view and keep a record of the unit's main electrical parameters. The data can be displayed with the user interface on the unit or via the supervisor through the variable protocol specifications. The following can be monitored: supply voltage (V), current input (A), frequency (Hz), cosfi, power input (kW), energy input (kWh), electrical parameters of the built-in pumping units. The device is installed and wired on the unit.

MISTER1 **Indirect energy meter through pressure drops and unit probes temperature differential**

The temperature probes measure the instantaneous capacity of the unit through indirect reading of the flow-rates and temperature differential.

⚠ Option only available in combination with the IVFCDTS and IVFHDTS options.

MISTER2 **Direct energy meter by flow rate and temperature differential with unit probes**

The temperature probes measure the instantaneous capacity of the unit through direct reading of the flow-rates and temperature differential.

⚠ Option available only in conjunction with FMCHX option

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 of more than 350 m and in any case less than 700 m, the "PSX - Network capacity output" accessory must be installed on the line.
- 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.

AMRX **Rubber antivibration mounts**

Thermoplastic elastomer mat consisting of 4 internal layers. Hardness 45 ShA, thickness 37.5 mm.
Thermoplastic elastomer is ideal for operating temperatures between -45°C and +110°C.
It has a high resistance to ageing, pollutants, hydrocarbons, salt spray, UV rays and detergents and is made of recyclable material.
High level of thermal and electrical insulation.

- 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-sismic 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.

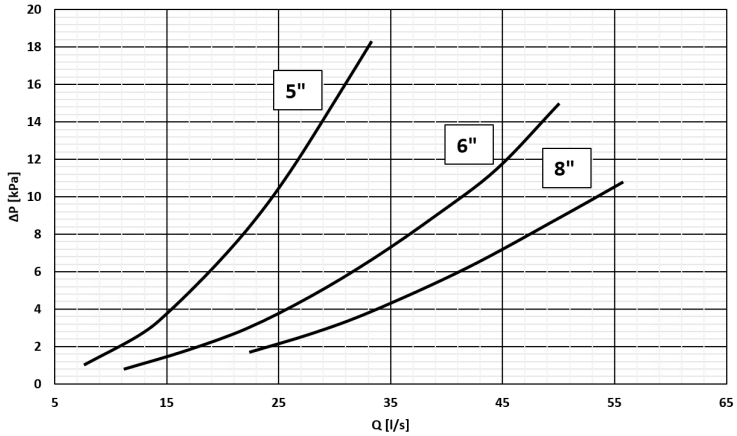
- Installation is a responsibility of the Customer.

IFWX **Steel mesh strainer on the water side**

The device prevents the exchanger from being dirtied by any impurities in the water circuit. The mechanical stainless steel mesh filter must be placed on the water inlet line. It can be easily removed for periodic maintenance and cleaning. The option includes 3 filters: 1 filter for the source side, 1 filter for the cold side and 1 filter for the hot side.
The following are also included:

- cast-iron butterfly shut-off valve with quick-release connections and operating lever with mechanical calibration stop;
- quick-release connections with insulating casing.

Steel mesh filter pressure drops



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.

CSVX

Couple of manually operated shut-off valves

The kit allows to isolated the input and output water circuit for the source side, the cold user side and the hot user side. It includes:

- no. 6 of cast-iron shut-off butterfly valves with fast fittings and activation lever with a mechanical setting lock
- no. 6 of victaulic connections

⚠ Installation is a responsibility of the Customer, outside the unit.

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 350 m from the unit and allows to extend the length to 700 m 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.

FMCHX

Cold and hot side flow meters

Measures the water flow-rate in the cold side and hot side exchangers.

⚠ The pipe section before the meter must respect a length from the center of the measuring pipe equal to 3 times the nominal diameter of the sensor and that the pipe after the meter has a straight section equal to 3 times the nominal diameter.
⚠ Installation is a responsibility of the Customer, outside the unit.

IVMSX

Source side modulating valve

Option recommended for applications with disposable water at relatively low temperatures (well, groundwater, water supply system). The motorised two-way modulating valve is located on the source side and is controlled by the unit.
Its operation is combined with that of the refrigerant circuit: modulation by a 0-10V signal based on the refrigerant pressure in the source side exchanger reduces water consumption and keeps the unit within its intended operating range.

⚠ Caution: for correct opening and closing, the differential pressure must have a maximum value of 200 kPa.
⚠ Option to be installed outside the unit on the water outlet pipe on the source side. Hydraulic and electrical connections performed by Customer. 230V AC power supply performed by Customer.

IVMS3X

Source side 3-way modulating valve

Option recommended for closed circuit applications. The motorised three-way modulating valve is located on the source side and is controlled by the unit.
Its operation is combined with that of the refrigerant circuit: modulation by a 0-10V signal based on the refrigerant pressure in the source side exchanger reduces water consumption and keeps the unit within its intended operating range.

⚠ Caution: for correct opening and closing, the differential pressure must have a maximum value of 200 kPa.
⚠ Option to be installed outside the unit on the water outlet pipe on the source side. Hydraulic and electrical connections performed by Customer. 230V AC power supply performed by Customer.

Accessories separately supplied

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.

Performances

Standard acoustic configuration (ST) - Super silenced (EN)

SIZE			140.2	185.2	220.2	260.2	320.2	360.2
Cooling 100% - Heating 0%								
Cooling capacity	1	kW	440	531	621	710	841	946
Compressor power input	1	kW	94,6	119	134	160	187	224
Total power input	2	kW	95,1	119	134	160	188	224
EER	1	-	4,63	4,46	4,63	4,44	4,47	4,22
Water flow-rate cold side	1	l/s	21,0	25,4	29,7	33,9	40,2	45,2
Cold side pressure drops	1	kPa	29,6	40,6	34,4	43,1	38,0	46,2
Cooling capacity (EN14511:2022)	3	kW	440	531	621	709	840	945
Total power input (EN14511:2022)	3	kW	97,4	123	138	165	193	230
EER (EN14511:2022)	3	-	4,51	4,33	4,51	4,30	4,36	4,10
SEER	6	-	7,72	7,50	7,85	7,56	7,75	7,53
SEPR	6	-	8,18	8,00	8,87	8,15	8,49	8,00
Cooling capacity (AHRI 550/590)	4	kW	438	529	618	708	838	943
Total power input (AHRI 550/590)	4	kW	94,2	118	133	159	186	222
COP_R	4	-	4,65	4,48	4,66	4,45	4,51	4,25
IPLV	4	-	8,55	8,04	8,94	8,29	8,98	8,51
Cooling 0% - Heating 100%								
Heating capacity	7	kW	500	600	700	800	943	1047
Compressor power input	7	kW	117	145	157	182	208	238
Total power input	2	kW	117	145	158	183	209	239
COP	7	-	4,28	4,14	4,43	4,37	4,51	4,37
Hot side water flow rate	7	l/s	23,9	28,7	33,4	38,2	45,1	50,0
Hot side pressure drop	7	kPa	26,4	36,8	28,9	36,8	27,7	33,4
Heating capacity (EN14511:2022)	8	kW	500	600	700	801	944	1048
Total power input (EN14511:2022)	8	kW	120	149	163	190	215	246
COP (EN14511:2022)	8	-	4,18	4,02	4,31	4,23	4,39	4,25
SCOP - AVERAGE Climate - W55	5	-	4,44	4,33	4,58	4,50	4,67	4,59
Cooling 100% - Heating 100%								
Cooling capacity	9	kW	401	481	560	641	755	861
Heating capacity	9	kW	518	629	719	825	962	1106
Total power input	9	kW	117	148	159	184	207	245
TER	10	-	7,85	7,50	8,04	7,97	8,29	8,03
Cooling capacity (EN14511:2022)	11	kW	401	481	560	640	754	860
Heating capacity (EN14511:2022)	11	kW	518	629	719	826	963	1107
Total power input (EN14511:2022)	11	kW	119	151	162	189	211	251
TER (EN14511:2022)	10	-	7,70	7,33	7,88	7,77	8,12	7,84

The Product is compliant with the Erp (Energy Related Products) European Directive, It includes the Commission delegated Regulation (UE) N. 813/2013 Commission (nominal heating capacity ≤400 kW at specified reference conditions) and the Commission delegated Regulation (EU) No 2016/2281, also known as Ecodesign LOT21
Contains fluorinated greenhouse gases (GWP 631)

1. Data referring to the following conditions: Cold side exchanger water temperature = 12/7°C. Source side exchanger water temperature = 30/35°C. Evaporator fouling factor = 0.44 x 10^(-4) m^2 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. Data calculated in accordance with EN 14511:2022 under the following conditions: Cold side exchanger water temperature = 12/7°C. Source side exchanger water temperature = 30/35°C
4. Data calculated in accordance with AHRI 550/590 under the following conditions: Cold side exchanger water temperature = 12.22/6.7°C. Water flow-rate 0.043 l/s per kW. Source side exchanger water temperature = 29.44/34.61°C. Evaporator fouling factor = 0.18 x 10^(-4) m^2 K/W
5. Data compliant according to EU regulation 813/2013
6. Data compliant according to EU regulation 2016/2281
7. Data referring to the following conditions: Hot side exchanger water temperature = 40/45°C. Source side exchanger water temperature = 10/7°C. Evaporator fouling factor = 0.44 x 10^(-4) m^2 K/W
8. Data calculated in accordance with EN 14511:2022 under the following conditions: Hot side exchanger water temperature = 40/45°C. Source side exchanger water temperature = 10/7°C.
9. Data referring to the following conditions: Cold side exchanger water temperature = */7 °C. Hot side exchanger water temperature = */45 °C. Heat exchanger fouling factor = 0.44 x 10^(-4) m^2 K/W.
10. TER = (Cooling capacity + Heating capacity) / Total power input
11. Data calculated in accordance with EN 14511:2022: Cold side exchanger water temperature = */7°C. Hot side exchanger water temperature = */45°C Exchanger fouling factor = 0.44 x 10^(-4) m^2 K/W

General technical data

Construction

SIZE			140.2	185.2	220.2	260.2	320.2	360.2
Compressor								
Type of compressors	1		ISW					
Refrigerant			R513A					
N° compressors		Nr	2	2	2	2	2	2
Rated power (C1)		HP	125	125	160	160	240	240
Rated power (C2)		HP	125	125	160	160	240	240
Std Capacity control steps			STEPLESS					
Oil charge (C1)		l	18	18	18	18	35	35
Oil charge (C2)		l	18	18	18	18	35	35
Refrigerant charge (C1)		kg	60	60	98	98	122	122
Refrigerant charge (C2)		kg	60	60	98	98	122	122
Refrigeration circuits		Nr	2					
Cold side exchanger								
Type of internal exchanger	2		S&T					
N. of internal exchanger		Nr	1					
Water content		l	292	292	518	518	537	537
Minimum system water content		l	2500	2500	3200	3100	5600	5500
Hot side exchanger								
Type of internal exchanger	2		S&T					
N. of internal exchanger		Nr	1					
Water content		l	128	128	175	175	213	213
Minimum system water content		l	2500	2500	3200	3100	5600	5500
Souce exchanger								
Type of internal exchanger	2		S&T					
N. of internal exchanger		Nr	1					
Water content			292	292	518	518	537	537
Connections								
Attacchi acqua lato freddo			6"	6"	8"	8"	8"	8"
Attacchi acqua lato caldo			5"	5"	6"	6"	8"	8"
Source side water fittings			6"	6"	8"	8"	8"	8"
Power supply								
Standard power supply			400/3/50					
Electrical data (ST/EN)								
F.L.A. - Total		A	368	368	450	450	806	806
F.L.I. - Total		kW	226	226	281	281	500	500
M.I.C. - Value	3	A	204	204	245	245	423	423

1. ISW = Double inverter screw compressor
2. S&T = Shell and tube
3. M.I.C.= Maximum unit starting current.
   The M.I.C. value is obtained adding the max. compressor starting current of the highest size to the power input at max. admissible conditions (F.L.A.) of the remaining electric components.

Unbalance between phase max 2%.
Voltage variation: max +/- 10%.
Electrical data refer to standard units; according to the installed accessories, the data can suffer some variations.

Sound level

Standard acoustic configuration (ST)

SIZE	Sound power level (dB) - Octave band (Hz)								Sound pressure level	Sound power level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
140.2	58	68	83	90	95	88	77	79	77	97
185.2	68	74	77	93	95	86	75	76	77	97
220.2	74	82	83	89	97	90	80	77	79	98
260.2	81	83	78	94	96	89	79	75	79	98
320.2	84	82	93	96	99	91	86	82	81	101
360.2	92	84	87	101	98	87	84	81	81	101

Super-silenced acoustic configuration (EN)

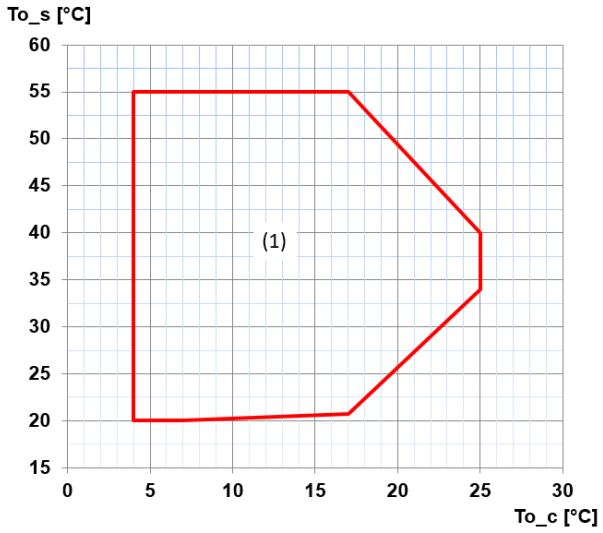
SIZE	Sound power level (dB) - Octave band (Hz)								Sound pressure level	Sound power level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
140.2	58	59	72	74	76	73	51	53	60	79
185.2	68	64	65	77	76	70	49	49	60	79
220.2	74	72	72	73	78	74	54	50	60	80
260.2	82	74	67	77	77	73	53	48	60	80
320.2	86	73	82	80	80	75	61	56	63	83
360.2	94	74	75	84	79	71	58	54	63	83

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 9614-1 regulations, with respect to the EUROVENT 8/1 certification.

Data referred to the following conditions:
Cold side exchanger water temperature = 12/7 °C
Source side exchanger water temperature = 30/35 °C

Operating range

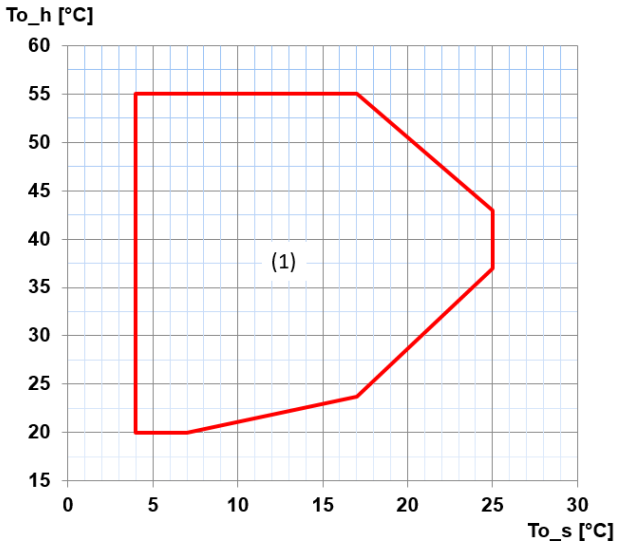
Cooling



To_s [°C] = Source side exchanger outlet water temperature
To_c [°C] = Cold side exchanger outlet water temperature

1. Standard unit operating range

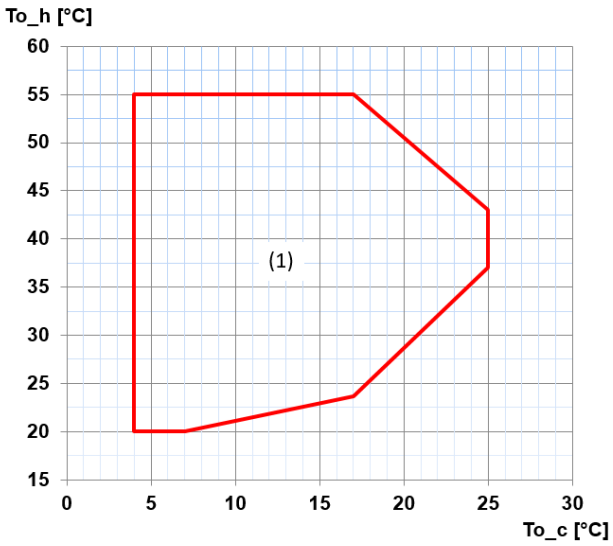
Heating



To_s [°C] = Source side exchanger outlet water temperature
To_h [°C] = Hot side exchanger outlet water temperature

1. Standard unit operating range

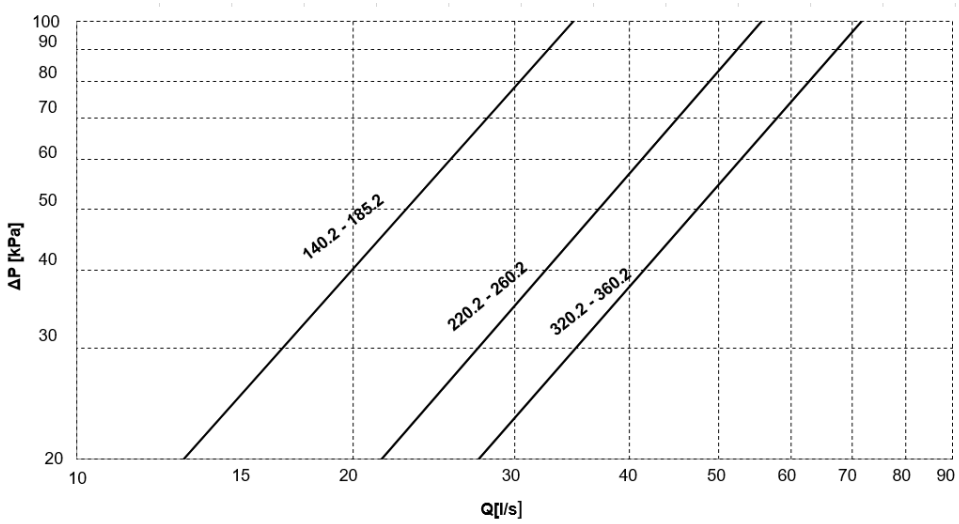
Cooling 100% - Heating 100%



To_h = Hot side exchanger outlet water temperature
To_c = Cold side exchanger outlet water temperature

1, Standard unit operating range

Cold side exchanger pressure drop (Standard)



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 x DT)

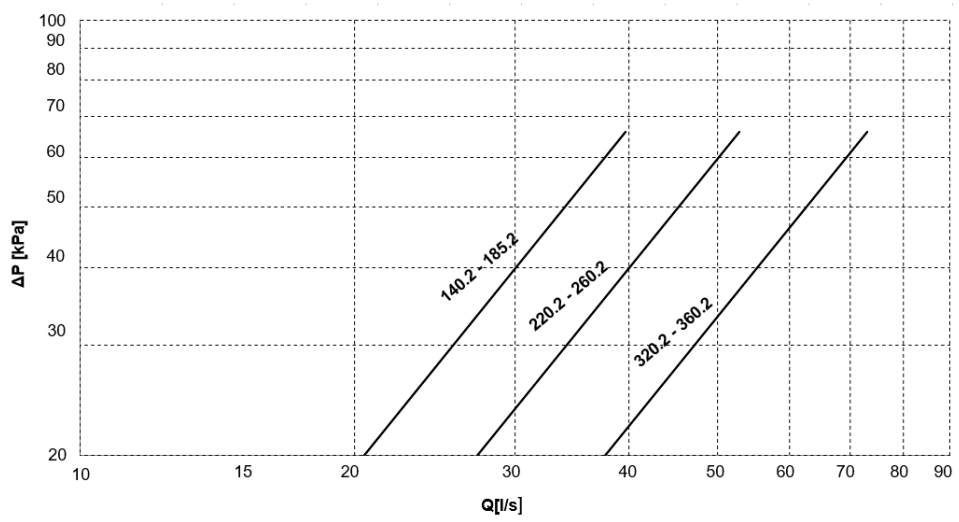
kWf = cooling capacity in kW
DT = Temperature difference between inlet / outlet water

Admissible water flow-rates

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

SIZE		140.2	185.2	220.2	260.2	320.2	360.2
Qmin	[l/s]	8,6	8,6	13,4	13,4	18,1	18,1
Qmax	[l/s]	36,4	36,4	56,5	56,5	76,7	76,7

Hot side exchanger pressure drop (Standard)



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 x DT)

kWf = cooling capacity in kW
DT = Temperature difference between inlet / outlet water

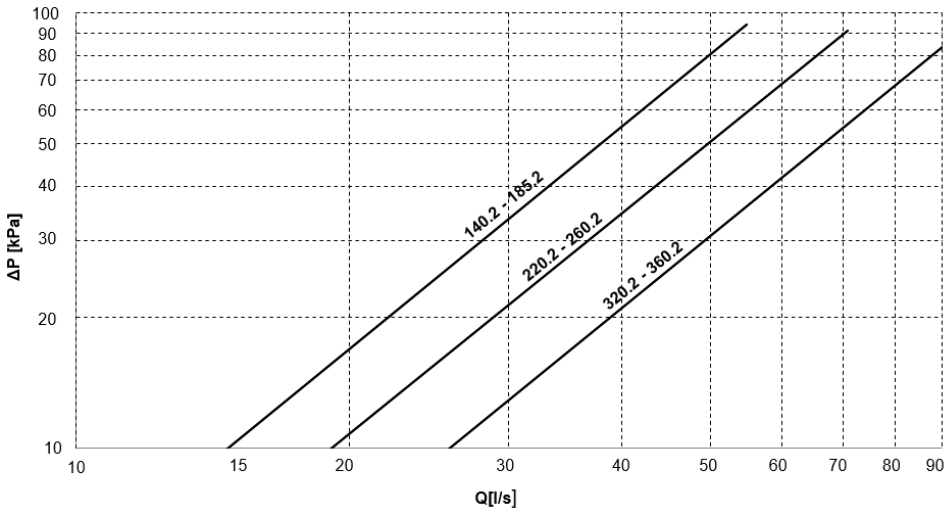
Admissible water flow-rates

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

SIZE		140.2	185.2	220.2	260.2	320.2	360.2
Qmin	[l/s]	15,9	15,9	21,1	21,1	29,2	29,2
Qmax	[l/s]	39,7	39,7	52,9	52,9	73,0	73,0

General technical data

Source side exchanger pressure drops (Standard)



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 x DT)

kWf = cooling capacity in kW
DT = Temperature difference between inlet / outlet water

Admissible water flow-rates

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

SIZE		140.2	185.2	220.2	260.2	320.2	360.2
Qmin	[l/s]	12,9	12,9	16,8	16,8	24,3	24,3
Qmax	[l/s]	54,9	54,9	70,8	70,8	102,5	102,5

Correction factors for ethylene glycol use

% ETHYLENE GLYCOL BY WEIGHT		5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Freezing temperature	°C	-2,0	-3,9	-6,5	-8,9	-11,8	-15,6	-19	-23,4	-27,8	-32,7
Safety temperature	°C	3	1	-1	-4	-6	-10	-14	-19	-23,8	-29,4
Cold side exchanger cooling capacity Factor	-	0,995	0,989	0,983	0,977	0,971	0,964	0,956	0,949	0,941	0,933
Compressor power input Factor (cold side)	-	0,998	0,997	0,995	0,994	0,992	0,990	0,989	0,987	0,986	0,984
Cold side exchanger pressure drop factor	-	1,041	1,085	1,131	1,180	1,231	1,285	1,341	1,400	1,461	1,525
Cooling capacity Factor (hot side)	-	0,998	0,996	0,994	0,992	0,990	0,988	0,986	0,984	0,982	0,980
Compressor power input Factor (hot side)	-	1,003	1,006	1,009	1,012	1,015	1,018	1,021	1,024	1,027	1,030
Hot side exchanger heating capacity Factor	-	0,999	0,998	0,997	0,996	0,995	0,994	0,993	0,992	0,991	0,990
Hot side exchanger pressure drop factor	-	1,037	1,077	1,118	1,162	1,208	1,257	1,307	1,360	1,415	1,473

Correction factors for propylene glycol use

% PROPYLENE GLYCOL BY WEIGHT		5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Freezing temperature	°C	-2,0	-3,9	-6,5	-8,9	-11,8	-15,6	-19	-23,4	-27,8	-32,7
Safety temperature	°C	3	1	-1	-4	-6	-10	-14	-19	-23,8	-29,4
Cold side exchanger cooling capacity Factor	-	0,993	0,985	0,977	0,968	0,958	0,947	0,936	0,925	0,912	0,899
Compressor power input Factor (cold side)	-	0,998	0,995	0,993	0,990	0,987	0,983	0,980	0,976	0,972	0,968
Cold side exchanger pressure drop factor	-	1,052	1,108	1,170	1,237	1,309	1,386	1,467	1,554	1,646	1,743
Cooling capacity Factor (hot side)	-	0,996	0,992	0,987	0,982	0,977	0,971	0,965	0,959	0,952	0,945
Compressor power input Factor (hot side)	-	1,004	1,007	1,011	1,014	1,018	1,021	1,025	1,028	1,032	1,035
Hot side exchanger heating capacity Factor	-	0,998	0,996	0,994	0,991	0,988	0,984	0,980	0,976	0,971	0,966
Hot side exchanger pressure drop factor	-	1,047	1,098	1,153	1,213	1,278	1,347	1,421	1,499	1,581	1,669

Exchanger operating range

		Cold side exchanger		Hot side exchanger		Source side exchanger	
		DPR	DPW	DPR	DPW	DPR	DPW
PED (CE)	140.2	2400	1050	3500	1600	2400	1000
	185.2						
	220.2						
	260.2						
	320.2			2450	1000		
	360.2						

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	2100	1500	
Antifreeze protection	°C	3	5,5	
High pressure safety valve	kPa			2400
Low pressure safety valve	kPa			1500
Max no. of compressor starts per hour	n°			6
Discharge safety thermostat	°C			120

General technical data

Fouling Correction Factors - Cooling

	Cold side exchanger		Hot side exchanger		Source side exchanger	
M2 °C/W	**F1**	**FK1**	**F2**	**FK2**	**F3**	**FK3**
0,44 X 10 (-4)	1	1	-	-	1	1
0,88 X 10 (-4)	0,97	0,99	-	-	0,97	1,08
1,76 X 10 (-4)	0,94	0,98	-	-	0,92	1,05

F1 = Cooling capacity correction factors
FK1 = Compressor power input correction factor
F2 = Cooling capacity correction factors
FK2 = Compressor power input correction factor
F3 = Cooling power correction factor
FK3 = Compressor power input correction factor

Fouling Correction Factors - Heating

	Cold side exchanger		Hot side exchanger		Source side exchanger	
M2 °C/W	**F1**	**FK1**	**F2**	**FK2**	**F3**	**FK3**
0,44 X 10 (-4)	-	-	1	1	1	1
0,88 X 10 (-4)	-	-	0,97	1,08	0,97	0,99
1,76 X 10 (-4)	-	-	0,92	1,05	0,94	0,98

F1 = Cooling capacity correction factors
FK1 = Compressor power input correction factor
F2 = Cooling capacity correction factors
FK2 = Compressor power input correction factor
F3 = Cooling power correction factor
FK3 = Compressor power input correction factor

Fouling Correction Factors - Cooling 100% - Heating 100%

	Cold side exchanger		Hot side exchanger		Source side exchanger	
M2 °C/W	**F1**	**FK1**	**F2**	**FK2**	**F3**	**FK3**
0,44 X 10 (-4)	1	1	1	1	-	-
0,88 X 10 (-4)	0,97	0,99	0,97	1,08	-	-
1,76 X 10 (-4)	0,94	0,98	0,92	1,05	-	-

F1 = Cooling capacity correction factors
FK1 = Compressor power input correction factor
F2 = Cooling capacity correction factors
FK2 = Compressor power input correction factor
F3 = Cooling power correction factor
FK3 = Compressor power input correction factor

Cooling

SIZE	To_c	Source side exchanger inlet/outlet water temperature (°C)											
		25/30		30/35		35/40		40/45		45/50		50/55	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
140.2	5	431	83,7	408	95,7	382	109	355	124	326	140	-	-
	6	448	83,4	424	95,4	398	109	370	124	340	140	-	-
	7	465	83,0	440	95,1	413	109	385	123	355	140	-	-
	10	515	82,0	488	94,3	460	108	430	123	398	140	364	158
	15	610	80,1	579	92,7	547	107	513	123	478	140	441	159
	18	673	78,8	639	91,7	605	106	569	122	531	140	-	-
185.2	5	520	105	492	120	462	137	430	155	397	174	361	194
	6	540	105	511	120	480	136	448	154	413	174	377	194
	7	560	104	531	119	499	136	466	154	430	174	393	195
	10	621	103	589	118	555	135	555	135	482	174	442	195
	15	736	100	698	116	660	134	620	153	578	174	533	196
	18	814	97,9	773	114	731	133	687	152	642	174	-	-
220.2	5	608	120	576	134	542	150	505	166	466	183	-	-
	6	631	119	598	134	563	150	525	166	485	184	-	-
	7	655	119	621	134	585	150	546	167	505	184	462	203
	10	725	118	688	133	649	150	608	168	564	186	519	206
	15	856	116	814	133	769	150	723	169	675	190	624	211
	18	944	115	898	132	850	151	800	171	748	192	-	-
260.2	5	696	144	659	161	620	178	578	197	534	216	487	236
	6	723	143	685	161	644	179	601	197	556	217	508	238
	7	750	143	710	160	669	179	624	198	578	218	529	239
	10	830	142	787	160	742	179	694	199	644	220	592	242
	15	982	140	932	160	880	180	824	202	768	225	710	249
	18	1084	139	1029	159	972	181	913	204	852	228	-	-
320.2	5	825	166	783	187	737	210	690	235	640	262	588	290
	6	855	166	812	187	765	211	717	236	666	262	613	291
	7	886	166	841	188	793	211	743	236	691	263	637	291
	10	977	168	929	190	878	213	824	238	768	265	710	294
	15	1144	171	1089	193	1031	218	971	243	909	271	843	299
	18	1254	172	1194	195	1133	220	1068	247	1001	274	-	-
360.2	5	930	198	882	223	831	249	778	278	722	308	664	340
	6	963	199	914	223	862	250	807	279	750	309	691	341
	7	997	199	946	224	893	251	837	280	779	310	718	342
	10	1099	202	1044	227	986	255	926	283	864	314	798	346
	15	1287	205	1224	232	1157	261	1089	290	1018	321	946	354
	18	1412	207	1344	234	1273	263	1200	294	1124	326	-	-

kWf = cooling capacity in kW
kWe = Total absorbed electrical power in kW
To_c = Cold side exchanger outlet water temperature
Performances in function of the inlet/outlet water temperature differential = 5°C

Performances

Cooling at part load

SIZE	Load %	Source side exchanger inlet/outlet water temperature (°C)											
		25/30			30/35			35/40			40/45		
		kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER
140.2	100	465	83,0	5,60	440	95,1	4,63	413	109	3,81	385	123	3,12
	80	381	65,5	5,83	360	75,2	4,79	337	86,3	3,90	312	98,7	3,16
	60	286	46,9	6,10	268	54,6	4,91	248	63,6	3,89	226	74,1	3,05
	40	194	29,7	6,52	177	35,9	4,93	159	43,6	3,66	140	52,6	2,66
	Min	96,8	15,1	6,41	88,7	18,2	4,87	79,7	22,0	3,62	70,0	26,5	2,64
185.2	100	560	104	5,38	531	119	4,44	499	136	3,66	466	154	3,02
	80	469	83,0	5,65	444	95,1	4,67	417	109	3,84	389	123	3,15
	60	351	58,8	5,98	331	67,7	4,89	309	78,0	3,96	285	89,7	3,18
	40	232	36,4	6,38	215	43,1	4,99	196	51,2	3,83	175	60,7	2,89
	Min	116	18,4	6,29	107	21,8	4,93	98,0	25,8	3,79	87,7	30,6	2,87
220.2	100	655	119	5,51	621	134	4,63	585	150	3,90	546	167	3,28
	80	541	94,1	5,75	512	107	4,79	482	121	3,99	449	135	3,32
	60	411	68,3	6,02	387	79,2	4,89	362	90,9	3,98	334	104	3,22
	40	275	42,6	6,45	255	51,9	4,91	233	62,2	3,75	209	73,3	2,85
	Min	137	21,5	6,38	128	26,2	4,86	117	31,3	3,72	105	36,9	2,83
260.2	100	750	143	5,25	710	160	4,43	669	179	3,74	624	198	3,16
	80	620	112	5,55	588	126	4,66	553	141	3,91	517	157	3,28
	60	470	80,3	5,86	445	92,0	4,83	417	105	3,99	387	118	3,28
	40	310	49,4	6,28	290	59,1	4,90	267	69,7	3,83	242	81,2	2,98
	Min	155	25,0	6,21	145	29,8	4,86	133	35,1	3,80	121	40,8	2,97
320.2	100	886	166	5,32	841	188	4,47	793	211	3,76	743	236	3,15
	80	728	127	5,72	690	145	4,77	650	164	3,96	607	185	3,28
	60	546	88,9	6,15	515	103	5,00	480	119	4,04	444	136	3,26
	40	370	54,6	6,78	343	66,2	5,17	313	79,5	3,93	281	94,5	2,97
	Min	185	27,5	6,72	171	33,4	5,14	156	40,0	3,91	140	47,5	2,96
360.2	100	997	199	5,00	946	224	4,22	893	251	3,55	837	280	2,99
	80	826	151	5,47	784	171	4,58	739	193	3,84	692	216	3,21
	60	612	102	5,98	578	117	4,92	542	134	4,03	503	153	3,29
	40	411	62,3	6,60	383	74,4	5,15	352	88,2	4,00	319	104	3,08
	Min	206	31,4	6,55	192	37,5	5,11	176	44,3	3,97	160	52,1	3,07

Load = % of cooling capacity compared to the value at full load
kWf = cooling capacity in kW
kWe_tot = unit total power input in kW
Cold side exchanger water temperature = leaving 7°C / entering 12°C / variable flow-rate with source side exchanger water temperature

Heating

SIZE	To_h	Source side exchanger inlet/outlet water temperature (°C)											
		10/5		11/6		12/7		15/10		20/15		23/18	
		kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe
140.2	30	504	79,1	519	78,7	535	78,4	584	77,4	675	75,6	735	74,4
	35	493	90,1	508	89,8	524	89,5	571	88,7	658	87,2	716	86,3
	40	482	103	497	102	512	102	558	102	641	101	697	99,9
	45	471	117	485	116	501	116	544	116	625	115	679	115
	50	459	132	473	132	486	132	529	132	608	132	660	132
	55	446	149	460	149	473	149	515	149	591	150	-	-
185.2	30	601	97,9	620	97,4	639	97,0	697	95,7	804	93,2	-	-
	35	590	112	608	112	626	111	682	110	785	108	-	-
	40	578	127	596	127	613	127	666	126	766	125	-	-
	45	566	144	583	144	601	144	651	144	747	143	811	142
	50	553	163	570	163	586	163	636	163	727	163	789	163
	55	540	182	556	183	571	183	619	183	707	184	-	-
220.2	30	707	112	730	111	752	111	820	110	947	107	1033	105
	35	693	126	714	126	736	125	802	124	925	122	1007	121
	40	676	141	697	141	718	141	782	140	900	139	980	139
	45	658	157	679	157	701	157	761	157	876	157	953	157
	50	639	174	659	174	679	174	738	175	850	177	924	178
	55	618	191	637	191	656	192	715	194	823	198	-	-
260.2	30	810	131	835	130	861	130	940	128	1085	126	-	-
	35	793	147	818	147	843	146	918	145	1059	143	-	-
	40	774	164	798	164	822	164	895	163	1029	163	-	-
	45	754	182	777	182	802	182	870	182	1001	183	1089	183
	50	731	200	754	201	776	201	844	203	970	205	1054	207
	55	707	220	729	220	751	221	816	224	939	228	-	-
320.2	30	949	144	979	144	1009	144	1100	144	1269	144	1381	143
	35	930	163	959	164	988	164	1077	164	1239	164	1348	164
	40	910	184	939	185	967	185	1053	186	1209	187	1314	187
	45	890	207	917	207	945	208	1027	209	1180	210	1280	211
	50	869	232	895	232	921	233	1000	234	1147	236	1244	238
	55	847	259	872	259	897	259	973	261	1113	264	-	-
360.2	30	1052	166	1084	166	1117	166	1218	167	1403	166	1527	165
	35	1032	188	1063	188	1095	188	1192	189	1372	190	1491	190
	40	1011	212	1042	212	1073	212	1166	213	1339	215	1455	215
	45	989	237	1019	238	1049	238	1140	239	1307	241	1419	242
	50	967	265	996	265	1024	266	1111	268	1271	271	1379	272
	55	944	295	972	295	999	296	1082	297	1236	301	-	-

kWt = Heating capacity kW
kWe = Total absorbed electrical power in kW
To_h = Hot side exchanger outlet water temperature
Performances in function of the inlet/outlet water temperature differential = 5°C

Performances

Heating at partial load

GR.	Load %	Source side exchanger inlet/outlet water temperature (°C)											
		10/5			12/7			15/10			20/15		
		kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP	kWt	kWe	COP
140.2	100	471	117	4,04	501	116	4,32	544	116	4,69	625	115	5,42
	80	382	92,6	4,13	406	92,2	4,40	443	91,9	4,82	510	91,3	5,59
	60	557	51,2	10,9	300	68,1	4,40	328	67,5	4,86	379	66,5	5,70
	40	182	50,0	3,65	245	49,2	4,98	215	48,0	4,49	252	45,7	5,51
	Min	91,2	25,3	3,61	122	24,9	4,93	108	24,2	4,45	126	23,1	5,45
185.2	100	566	144	3,92	601	144	4,17	651	144	4,54	747	143	5,23
	80	469	115	4,09	498	114	4,35	542	114	4,75	623	113	5,49
	60	351	83,8	4,19	373	83,4	4,48	407	83,0	4,91	469	82,3	5,70
	40	445	36,9	12,0	445	36,9	12,0	445	36,9	12,0	304	52,5	5,78
	Min	222	18,7	11,9	222	18,7	11,9	222	18,7	11,9	152	26,5	5,72
220.2	100	658	157	4,20	701	157	4,46	761	157	4,84	876	157	5,58
	80	540	127	4,25	574	127	4,53	625	126	4,94	721	126	5,72
	60	406	96,8	4,19	432	96,2	4,49	471	95,3	4,95	544	93,6	5,81
	40	516	34,5	15,0	516	34,5	15,0	516	34,5	15,0	355	61,9	5,75
	Min	258	17,5	14,8	258	17,5	14,8	258	17,5	14,8	178	31,2	5,70
260.2	100	754	182	4,15	802	182	4,41	870	182	4,78	1001	183	5,48
	80	615	144	4,27	653	144	4,54	711	144	4,95	819	144	5,70
	60	474	111	4,28	504	110	4,57	550	110	5,01	634	109	5,84
	40	598	44,4	13,5	598	44,4	13,5	356	73,1	4,86	411	70,3	5,85
	Min	299	22,4	13,3	299	22,4	13,3	178	36,8	4,83	205	35,4	5,81
320.2	100	890	207	4,30	945	208	4,54	1027	209	4,92	1180	210	5,61
	80	742	169	4,40	788	169	4,66	858	169	5,06	986	170	5,81
	60	545	124	4,39	580	124	4,69	632	123	5,13	729	122	5,97
	40	712	48,0	14,8	712	48,0	14,8	712	48,0	14,8	712	48,0	14,8
	Min	356	24,3	14,7	356	24,3	14,7	356	24,3	14,7	356	24,3	14,7
360.2	100	989	237	4,17	1049	238	4,41	1140	239	4,77	1307	241	5,42
	80	806	186	4,33	855	186	4,59	930	187	4,98	1069	188	5,69
	60	613	139	4,40	652	139	4,68	710	139	5,10	818	139	5,89
	40	788	58,1	13,6	788	58,1	13,6	788	58,1	13,6	534	90,2	5,92
	Min	394	29,3	13,4	394	29,3	13,4	394	29,3	13,4	267	45,4	5,89

Load = % of heating capacity compared to the value at full load
kWt = Heating capacity kW
kWe_tot = unit total power input in kW
Hot side exchanger water temperature = leaving 45°C / entering 40°C / variable flow-rate with source side exchanger water temperature.

Cooling 100% - Heating 100%

Gr.	To_c (°C)	Hot side exchanger outlet water temperature (°C)																							
		30				35				40				45				50				55			
		kWf	kWe	kWt	TER	kWf	kWe	kWt	TER	kWf	kWe	kWt	TER	kWf	kWe	kWt	TER	kWf	kWe	kWt	TER	kWf	kWe	kWt	TER
140.2	5	442	79,7	521	12,1	420	91,1	511	10,2	396	104	499	8,65	371	118	488	7,31	345	133	477	6,20	316	150	465	5,22
	6	458	79,4	537	12,5	436	90,8	526	10,6	412	104	515	8,96	386	118	503	7,57	359	133	491	6,42	330	150	479	5,41
	7	475	79,1	554	13,0	452	90,5	542	11,0	428	104	531	9,27	401	118	518	7,82	373	133	505	6,63	343	150	492	5,59
	10	527	78,1	605	14,5	502	89,8	591	12,2	475	103	577	10,3	446	118	563	8,59	416	133	548	7,28	384	150	533	6,13
	15	621	76,3	697	17,3	592	88,3	680	14,4	562	102	663	12,1	530	117	646	10,1	497	134	630	8,44	461	152	612	7,08
	18	685	75,1	760	19,2	654	87,4	741	16,0	620	102	721	13,2	586	117	702	11,1	550	134	683	9,24	-	-	-	-
185.2	5	537	104	640	11,4	511	119	629	9,62	482	136	617	8,11	451	154	604	6,87	419	173	591	5,86	384	194	577	4,97
	6	558	103	660	11,9	530	119	648	9,94	500	136	635	8,38	469	154	622	7,11	436	173	608	6,05	400	194	593	5,13
	7	578	103	680	12,3	550	119	668	10,3	519	136	654	8,66	481	149	629	7,47	447	167	613	6,37	412	188	599	5,39
	10	634	98	731	14,0	602	113	714	11,7	570	130	699	9,80	535	148	682	8,25	499	167	665	6,99	460	188	647	5,90
	15	749	95	843	16,8	713	111	823	13,9	675	129	803	11,5	635	147	781	9,67	594	167	760	8,13	550	189	738	6,83
	18	827	93	920	18,8	788	110	897	15,4	746	128	873	12,7	703	147	849	10,6	659	168	826	8,87	-	-	-	-
220.2	5	607	110	716	12,1	579	123	701	10,4	547	138	684	8,95	514	153	666	7,74	478	168	645	6,70	440	185	624	5,77
	6	630	110	739	12,5	601	123	723	10,8	568	138	705	9,26	535	153	687	8,01	497	169	665	6,90	459	186	644	5,95
	7	653	109	761	13,0	623	123	745	11,2	590	138	727	9,58	560	160	719	8,02	521	177	697	6,90	482	195	676	5,95
	10	730	113	842	14,0	696	128	823	11,9	660	144	803	10,2	622	160	781	8,80	580	179	758	7,50	538	197	734	6,47
	15	863	111	973	16,6	824	126	949	14,1	781	144	924	11,9	739	161	899	10,2	691	181	871	8,65	643	202	844	7,38
	18	952	110	1061	18,4	910	125	1034	15,6	862	143	1004	13,1	817	161	977	11,2	765	183	947	9,38	-	-	-	-
260.2	5	696	134	829	11,4	663	150	812	9,87	626	168	793	8,47	588	185	772	7,37	546	204	749	6,36	503	223	725	5,52
	6	723	134	856	11,8	689	150	838	10,2	650	168	817	8,76	611	185	795	7,62	568	205	772	6,55	524	224	747	5,69
	7	750	134	883	12,2	714	150	863	10,5	675	168	842	9,06	641	185	825	7,95	596	205	800	6,83	550	225	774	5,90
	10	839	132	970	13,8	800	149	948	11,8	756	168	923	10,0	712	186	897	8,67	663	207	869	7,42	613	228	840	6,39
	15	992	130	1121	16,3	947	147	1093	13,9	895	167	1061	11,7	846	187	1032	10,1	789	210	998	8,53	731	233	963	7,29
	18	1095	128	1222	18,2	1046	146	1191	15,4	988	167	1154	12,9	935	188	1122	11,0	872	212	1083	9,24	-	-	-	-
320.2	5	845	151	995	12,2	806	170	975	10,5	764	191	954	9,02	721	214	934	7,75	674	239	912	6,65	626	266	891	5,71
	6	875	151	1025	12,6	835	170	1004	10,8	793	192	984	9,28	749	215	963	7,98	701	240	940	6,85	651	266	916	5,90
	7	907	151	1057	13,0	865	171	1035	11,1	822	192	1013	9,58	755	208	962	8,27	707	232	938	7,11	658	258	915	6,11
	10	974	146	1119	14,4	930	166	1095	12,2	885	187	1071	10,5	837	209	1045	9,03	785	234	1018	7,72	732	260	991	6,64
	15	1144	146	1289	16,7	1094	166	1259	14,2	1042	188	1229	12,1	989	211	1199	10,4	929	237	1165	8,85	869	263	1131	7,62
	18	1257	145	1401	18,4	1203	166	1368	15,5	1147	189	1335	13,2	1090	212	1301	11,3	1025	239	1263	9,59	-	-	-	-
360.2	5	928	173	1100	11,8	885	196	1080	10,1	838	220	1057	8,63	791	246	1036	7,44	739	274	1012	6,40	686	303	988	5,53
	6	962	173	1134	12,2	917	196	1112	10,4	870	220	1089	8,92	821	246	1066	7,69	768	275	1042	6,59	713	304	1016	5,70
	7	996	174	1169	12,5	950	196	1145	10,7	901	221	1121	9,17	861	246	1106	8,01	806	275	1080	6,87	749	304	1052	5,93
	10	1112	174	1285	13,8	1062	197	1258	11,8	1009	222	1230	10,1	955	248	1202	8,72	894	277	1170	7,46	833	306	1138	6,45
	15	1307	174	1480	16,1	1248	198	1445	13,6	1187	224	1410	11,6	1127	250	1376	10,0	1058	281	1338	8,54	989	311	1299	7,37
	18	1436	174	1609	17,6	1372	199	1570	14,8	1307	225	1531	12,6	1242	252	1493	10,9	1166	283	1448	9,25	-	-	-	-

kWf = Cold side exchanger heating capacity (kW)
kWt = Hot side exchanger heating capacity (kW)
kWe = Total absorbed electrical power in kW
TER = (Cooling capacity + Heating capacity) / Total power input
To_c = Cold side exchanger outlet water temperature
Data 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.

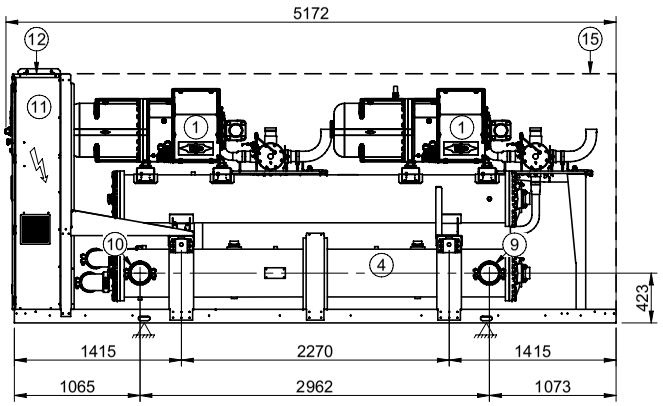
Option compatibility

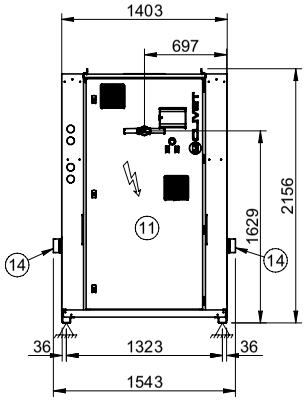
REF	DESCRIPTION	140.2	185.2	220.2	260.2	320.2	360.2
	IVFCDTF - Cold side inverter variable flow-rate control based on the temperature differential with flow meter						
-	Flow meters: not required	-	-	-	-	-	-
FMCHX	Cold and hot side flow meters	o	o	o	o	o	o
	IVFHDTF - Cold side inverter variable flow-rate control based on the temperature differential with flow meter						
-	Flow meters: not required	-	-	-	-	-	-
FMCHX	Cold and hot side flow meters	o	o	o	o	o	o
	MISTER1 - Indirect energy meter via pressure drop and temperature differential with unit probes						
-	Integrated variable primary flow, chilled water side: not required	-	-	-	-	-	-
IVFCDT	Cold side variable flow-rate control based on the temperature difference	-	-	-	-	-	-
IVFCDTS	Cold side variable flow-rate control based on the temperature difference with pressure drop sensor	o	o	o	o	o	o
IVFCDTF	Cold side variable flow-rate control based on the temperature difference with compound flow meter	-	-	-	-	-	-
-	Integrated variable primary flow, hot water side: not required	-	-	-	-	-	-
IVFHDT	Hot side variable flow-rate control based on the temperature difference	-	-	-	-	-	-
IVFHDTS	Hot side variable flow-rate control based on the temperature difference with pressure drop sensor	o	o	o	o	o	o
IVFHDTF	Hot side variable flow-rate control based on the temperature difference with compound flow meter	-	-	-	-	-	-
-	Source side variable flow-rate: not required	-	-	-	-	-	-
IVFSDT	Source side variable flow-rate control based on the temperature difference	-	-	-	-	-	-
IVFSDTS	Source side variable flow-rate control based on the temperature difference with pressure drop sensor	o	o	o	o	o	o
	MISTER2 - Direct energy meter via flow-rate and temperature differential with unit probes						
-	Integrated variable primary flow, chilled water side: not required	-	-	-	-	-	-
IVFCDT	Cold side inverter variable flow-rate control based on the temperature differential	-	-	-	-	-	-
IVFCDTS	Cold side inverter variable flow-rate control based on the temperature differential with pressure drop sensor	-	-	-	-	-	-
IVFCDTF	Cold side inverter variable flow-rate control based on the temperature differential with flow meter	o	o	o	o	o	o
-	Integrated variable primary flow, hot water side: not required	-	-	-	-	-	-
IVFHDT	Hot side inverter variable flow-rate control based on the temperature differential	-	-	-	-	-	-
IVFHDTS	Hot side inverter variable flow-rate control based on the temperature differential with pressure drop sensor	-	-	-	-	-	-
IVFHDTF	Cold side inverter variable flow-rate control based on the temperature differential with flow meter	o	o	o	o	o	o
-	Source side variable flow-rate: not required	-	-	-	-	-	-
IVFSDT	Source side variable flow-rate control based on the temperature difference	-	-	-	-	-	-
IVFSDTS	Source side variable flow-rate control based on the temperature difference with pressure drop sensor	-	-	-	-	-	-
	Construction configurations and main accessories						
IVMSX	Source side modulating valve	o	o	o	o	-	-
IVMS3X	Source side 3-way modulating valve	o	o	o	o	o	o
PSUF16	Cold use side water pressure 16 bar	o	o	o	o	o	o
PSS16	Source side water pressure 16 bar	o	o	o	o	o	o

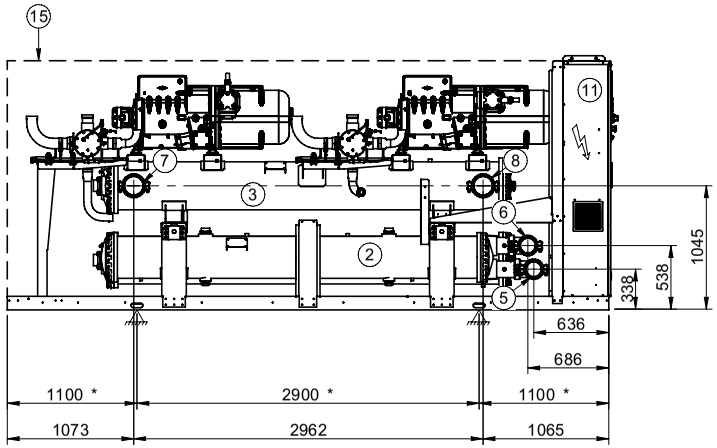
o Option

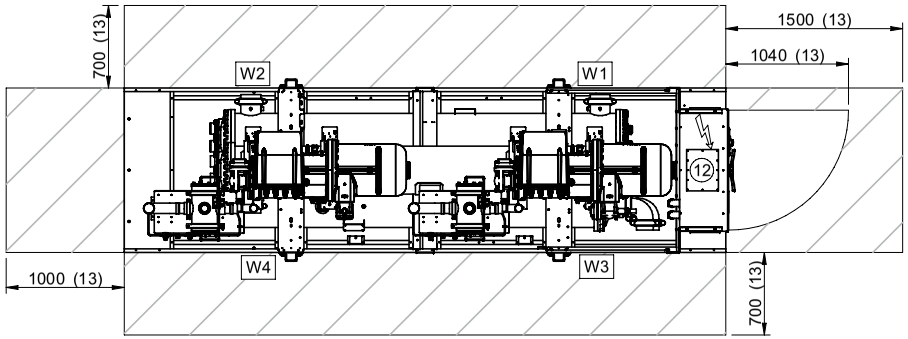
Not avilable

Dimensional drawings









1. Compressor
2. Hot side exchanger
3. Cold side exchanger
4. Source side exchanger
5. Hot side exchanger water inlet 5"
6. Hot side exchanger water outlet 5"
7. Cold side exchanger water inlet 5"
8. Cold side exchanger water outlet 5"
9. Source side exchanger water inlet 5"
10. Source side exchanger water outlet 5"
11. Electrical panel
12. Power input
13. Functional spaces
14. Lifting bracket (removed)
15. EN version frame size (optional)

(*) Vibration mounts position

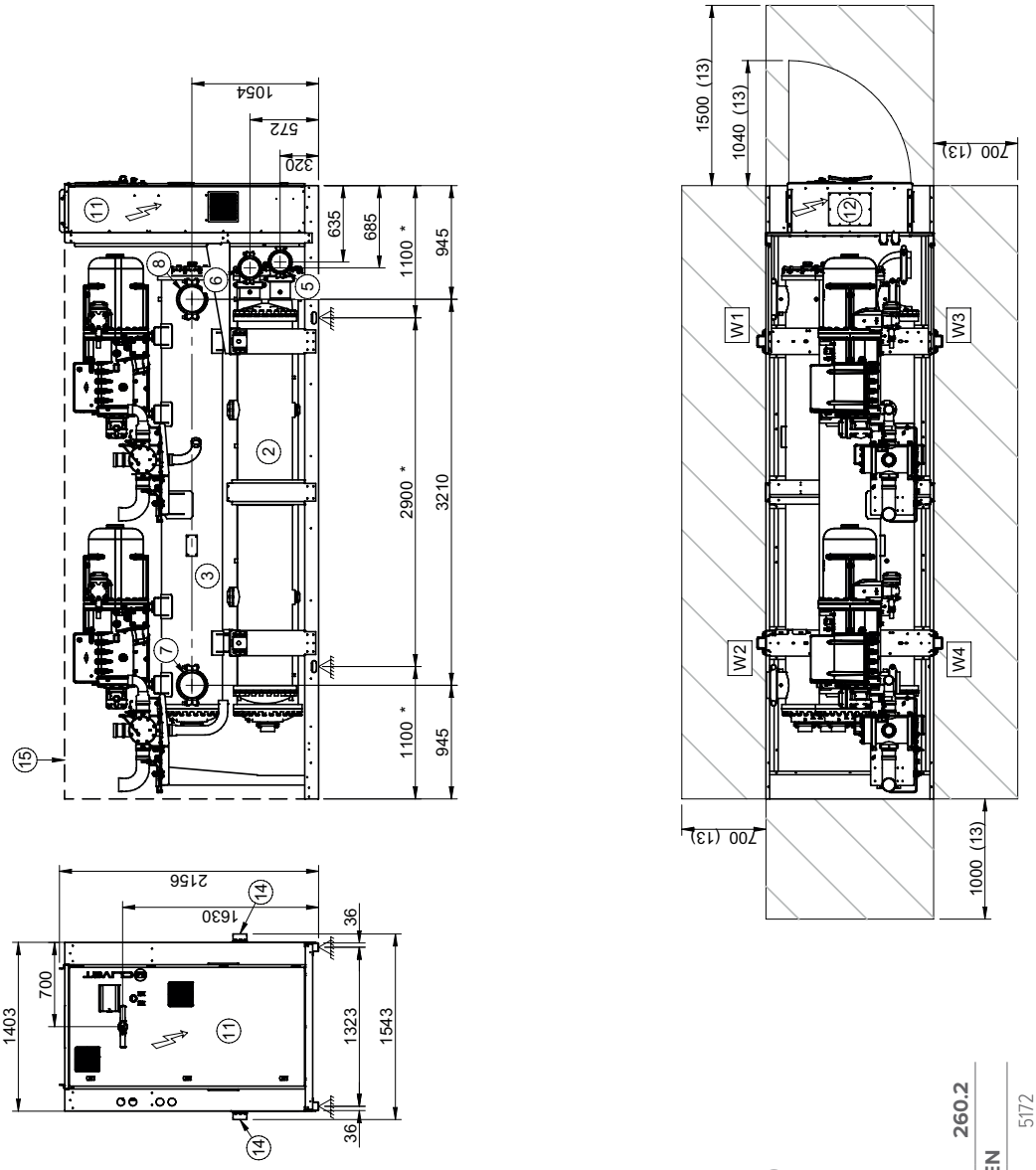
SIZE		140.2	185.2	140.2	185.2
		ST		EN	
Length	mm	5172	5172	5172	5172
Depth	mm	1543	1543	1543	1543
Height	mm	2156	2156	2156	2156
W1 Supporting point	kg	1371	1371	1570	1570
W2 Supporting point	kg	1278	1278	1477	1477
W3 Supporting point	kg	1431	1431	1630	1630
W4 Supporting point	kg	1334	1334	1537	1537
Operating weight	kg	5417	5417	6214	6214
Shipping weight	kg	4712	4712	5509	5509

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

Dimensional drawings

Size 220.2 - 260.2

DAA2Y0002_00
DATA/DATE: 15/12/2022



1. Compressor
2. Hot side exchanger
3. Cold side exchanger
4. Source side exchanger
5. Hot side exchanger water inlet 6"
6. Hot side exchanger water outlet 6"
7. Cold side exchanger water inlet 8"
8. Cold side exchanger water outlet 8"
9. Source side exchanger water inlet 8"
10. Source side exchanger water outlet 8"
11. Electrical panel
12. Power input
13. Functional spaces
14. Lifting bracket (removed)
15. EN version frame size (optional)

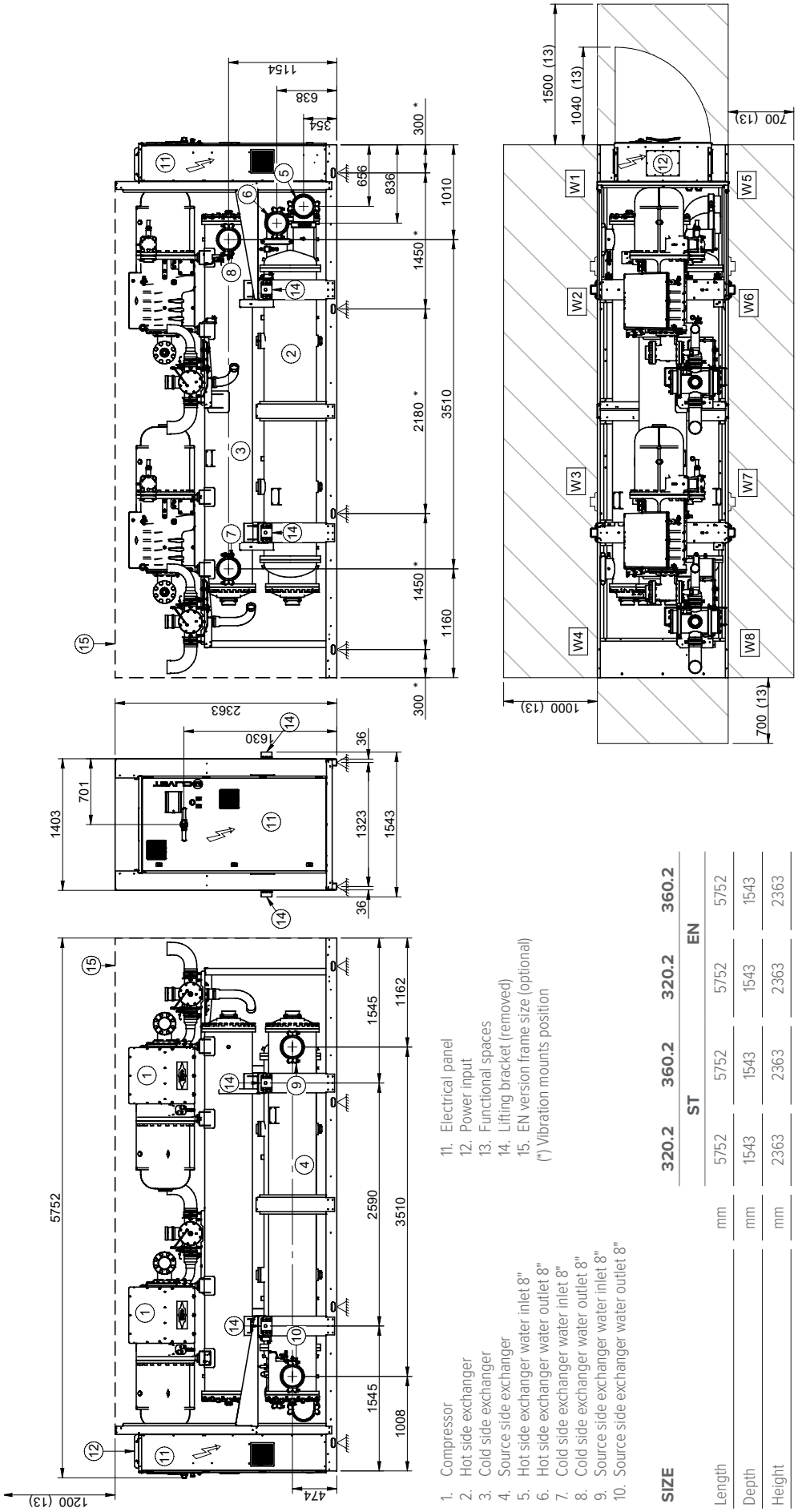
(*) Vibration mounts position

SIZE		220.2	260.2	220.2	260.2
		ST		EN	
Length	mm	5172	5172	5172	5172
Depth	mm	1543	1543	1543	1543
Height	mm	2156	2156	2156	2156
W1 Supporting point	kg	1781	1781	1980	1980
W2 Supporting point	kg	1711	1711	1910	1910
W3 Supporting point	kg	1800	1800	1999	1999
W4 Supporting point	kg	1730	1730	1929	1929
Operating weight	kg	7022	7022	7819	7819
Shipping weight	kg	5822	5822	6619	6619

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

Size 320.2 - 360.2

DAA2Y0003-00
DATA/DATE: 15/12/2022



1. Compressor
2. Hot side exchanger
3. Cold side exchanger
4. Source side exchanger
5. Hot side exchanger water inlet 8"
6. Hot side exchanger water outlet 8"
7. Cold side exchanger water inlet 8"
8. Cold side exchanger water outlet 8"
9. Source side exchanger water inlet 8"
10. Source side exchanger water outlet 8"
11. Electrical panel
12. Power input
13. Functional spaces
14. Lifting bracket (removed)
15. EN version frame size (optional)

(*) Vibration mounts position

SIZE		320.2	360.2	320.2	360.2
		ST		EN	
Length	mm	5752	5752	5752	5752
Depth	mm	1543	1543	1543	1543
Height	mm	2363	2363	2363	2363
W1 Supporting point	kg	473	473	540	540
W2 Supporting point	kg	1796	1796	1964	1964
W3 Supporting point	kg	1897	1897	2065	2065
W4 Supporting point	kg	237	237	304	304
W5 Supporting point	kg	512	512	579	579
W6 Supporting point	kg	1993	1993	216	216
W7 Supporting point	kg	1966	1966	2134	2134
W8 Supporting point	kg	294	294	362	362
Operating weight	kg	9168	9168	10110	10110
Shipping weight	kg	7818	7818	8760	8760

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

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