# Databook

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# Water Cooled Inverter Screw Chillers

R-513A

## EWWS~VZ A

- **Nominal capacity range: 440 - 2046 kW**
- **Best performances at full load and part loads**
- **Full flexibility with 3 efficiency versions**
- **Low noise option Designed for wide application range and compact footprint**

### Performance according to EN14511-1 (2013)

EUROVENT CERTIFIED PERFORMANCE
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CE

ISO 14001 TÜV SÜD ISO 9001 OHSAS 18001

DAIKIN

# Features and Benefits

**Low operating cost High Flexibility and Reliability**. The EWWS~VZ A is the result of careful design, aimed to optimize the energy efficiency of the chiller and with the clear target to reduce operating costs. The chiller series features Daikin design single screw compressor driven by inverter. Heat exchangers are flooded type for optimized heat transfer.

The EWWS~VZ A range is available with 3 different efficiency versions:

- EWWS~VZ A SS "SILVER": average EER 4,68 (up to 5,02) and average IPLV 9,05 (up to 9,31)
- EWWS~VZ A XS "GOLD": average EER 4,97 (up to 5,19) and average IPLV 9,24 (up to 9,48)
- EWWS~VZ A PS "PLATINUM": average EER 5,21 (up to 5,48) and average IPLV 9,34 (up to 9,48)

Those three efficiency levels can be combined with numerous options resulting in several different available configurations.

**Leading class efficiency.** The EWWS~VZ A series is designed to achieve leading class efficiency at both full load and part load operations.

**Compactness.** The EWWS~VZ A series is designed to achieve the smallest possible footprint making the product the ideal solution to fit though the tightest doorways and consequently the perfect product for replacement projects.

**Application flexibility.** The EWWS~VZ A series can satisfy a large variety of applications not limited to traditional comfort cooling but also data centers, brine water, ice storage and high temperature heat pump (up to 65°C).

**Outstanding reliability.** Depending on capacity, the EWWS~VZ A series features one or two independent refrigerant circuits in order to guarantee highest possible redundancy and simplified maintenance activities. Units are equipped with rugged compressor design with advanced and robust composite compressor gate-rotors material. Units are factory tested before shipment for an on-site trouble free operation.

**Stepless capacity control.** Cooling capacity is controlled by means of inverter driving the compressor motor. Units are enjoying infinitely variable capacity control from 100% load down to minimum capacity which is variable depending on unit model. No mechanical unloading system is used. This advanced capacity control method allows the unit to perfectly match the cooling (or heating) load and consequently providing extremely accurate water temperature control.

**Variable Volume Ratio.** Compressors are enjoying the Variable Volume Ratio (VVR) technology. This innovative system allows the compressor to adapt the discharge pressure of the refrigerant to the specific operating conditions. In this way, it is possible to prevent energy losses deriving from under or over compression phenomena that are typical of traditional compressor technologies (with fixed volume ratio). The reduction of energy losses inside compressor brings to an increased unit efficiency.

**Superior control logic.** The EWWS~VZ A series is enjoying MicroTech 4 controller that provides an easy to use control environment. The control logic is designed to provide highest efficiency performances and continuous operation. Easy interface with LonWorks, Bacnet, TCP/IP or Modbus communication protocols.

**Quiet operation.** Very low sound levels are achieved at part loads thanks to the reduction of compressor rotational speed. Compressor sound proof cabinet option is available to further reduce sound level.

**No starting current.** No current spike is experienced at start up thanks to inverter driven compressor motors. The starting current is always lower than full load current (FLA).

**Displacement power factor always > 0,95.** Thanks to inverter driven compressors, the EWWS~VZ A series always operates with a displacement power factor > 0,95 allowing to avoid power factor penalties and decreasing electrical losses in cables and transformers.

**Codes and Certifications.** The EWWS~VZ A series is CE marked, complying with European directive in force concerning manufacturing and safety. Units are designed and manufactured in accordance with applicable selections of the following:

- Construction of pressure vessel 2014/68/EU Machinery Directive 2006/42/EC
- Low Voltage 2014/35/EU
- Electromagnetic Compatibility 2014/30/EU
- Electrical & Safety codes EN60204-1/EN61439-1/EN61439-2 Manufacturing & Quality Standards UNI EN ISO 9001:2008 Environmental Management System UNI EN ISO 14001:2004 Health & Safety Management System BS OHSAS 18001:2007

**Additional information related to F-GAS Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16th April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006.**

| Unit Model (Silver) | Refrigerant type | Refrigerant GWP | No. of circuits | Refrigerant charge circuit 1 (kg) | Refrigerant charge circuit 1 (kgCO2eq) | Refrigerant charge circuit 2 (kg) | Refrigerant charge circuit 2 (kgCO2eq) |
|---|---|---|---|---|---|---|---|
| EWWS600VZSSA1 | R513a | 630 | 1 | 100 | 63 | - | - |
| EWWS700VZSSA1 | R513a | 630 | 1 | 110 | 69 | - | - |
| EWWS740VZSSA1 | R513a | 630 | 1 | 110 | 69 | - | - |
| EWWS880VZSSA1 | R513a | 630 | 1 | 170 | 107 | - | - |
| EWWSC10VZSSA1 | R513a | 630 | 1 | 180 | 113 | - | - |
| EWWSC12VZSSA2 | R513a | 630 | 2 | 125 | 79 | 125 | 79 |
| EWWSC13VZSSA2 | R513a | 630 | 2 | 130 | 82 | 130 | 82 |
| EWWSC14VZSSA2 | R513a | 630 | 2 | 135 | 85 | 135 | 85 |
| EWWSC15VZSSA2 | R513a | 630 | 2 | 145 | 91 | 145 | 91 |
| EWWSC17VZSSA2 | R513a | 630 | 2 | 145 | 91 | 150 | 95 |
| EWWSC18VZSSA2 | R513a | 630 | 2 | 160 | 101 | 160 | 101 |
| EWWSC20VZSSA2 | R513a | 630 | 2 | 175 | 110 | 175 | 110 |

| Unit model (Gold) | Refrigerant type | Refrigerant GWP | No. of circuits | Refrigerant charge circuit 1 (kg) | Refrigerant charge circuit 1 (kgCO2eq) | Refrigerant charge circuit 2 (kg) | Refrigerant charge circuit 2 (kgCO2eq) |
|---|---|---|---|---|---|---|---|
| EWWS450VZXSA1 | R513a | 630 | 1 | 95 | 60 | - | - |
| EWWS490VZXSA1 | R513a | 630 | 1 | 95 | 60 | - | - |
| EWWS600VZXSA1 | R513a | 630 | 1 | 130 | 82 | - | - |
| EWWS700VZXSA1 | R513a | 630 | 1 | 110 | 69 | - | - |
| EWWS780VZXSA1 | R513a | 630 | 1 | 170 | 107 | - | - |
| EWWS890VZXSA1 | R513a | 630 | 1 | 210 | 132 | - | - |
| EWWSC10VZXSA1 | R513a | 630 | 1 | 185 | 117 | - | - |
| EWWSC12VZXSA2 | R513a | 630 | 2 | 125 | 79 | 125 | 79 |
| EWWSC13VZXSA2 | R513a | 630 | 2 | 130 | 82 | 130 | 82 |
| EWWSC14VZXSA2 | R513a | 630 | 2 | 145 | 91 | 145 | 91 |
| EWWSC16VZXSA2 | R513a | 630 | 2 | 145 | 91 | 145 | 91 |
| EWWSC17VZXSA2 | R513a | 630 | 2 | 160 | 101 | 160 | 101 |
| EWWSC19VZXSA2 | R513a | 630 | 2 | 160 | 101 | 160 | 101 |
| EWWSC20VZXSA2 | R513a | 630 | 2 | 175 | 110 | 175 | 110 |

| Unit model (Platinum) | Refrigerant type | Refrigerant GWP | No. of circuits | Refrigerant charge circuit 1 (kg) | Refrigerant charge circuit 1 (kgCO2eq) | Refrigerant charge circuit 2 (kg) | Refrigerant charge circuit 2 (TCO2Eq) |
|---|---|---|---|---|---|---|---|
| EWWS500VZPSA1 | R513a | 630 | 1 | 130 | 82 | - | - |
| EWWS710VZPSA1 | R513a | 630 | 1 | 180 | 113 | - | - |
| EWWS900VZPSA1 | R513a | 630 | 1 | 180 | 113 | - | - |
| EWWSC12VZPSA2 | R513a | 630 | 2 | 145 | 91 | 145 | 91 |
| EWWSC16VZPSA2 | R513a | 630 | 2 | 160 | 101 | 160 | 101 |
| EWWSC17VZPSA2 | R513a | 630 | 2 | 175 | 110 | 175 | 110 |

Note: Equipment contains fluorinated greenhouse gases. Actual refrigerant charge depends on the final unit construction, details can be found on the unit nameplate.

## General Characteristics

Product line up is made by single compressor models from 440 kW up to 1040 kW. From 1150 kW up to 2046 kW, models are with two compressors on two independent refrigerant circuits. In this case, all main components are duplicated per each circuit in order to have the highest redundancy*.

*Dual compressor unit are supplied with a single temperature probe for condensers outlet. The installing of the probe on the common line is an installer responsibility.

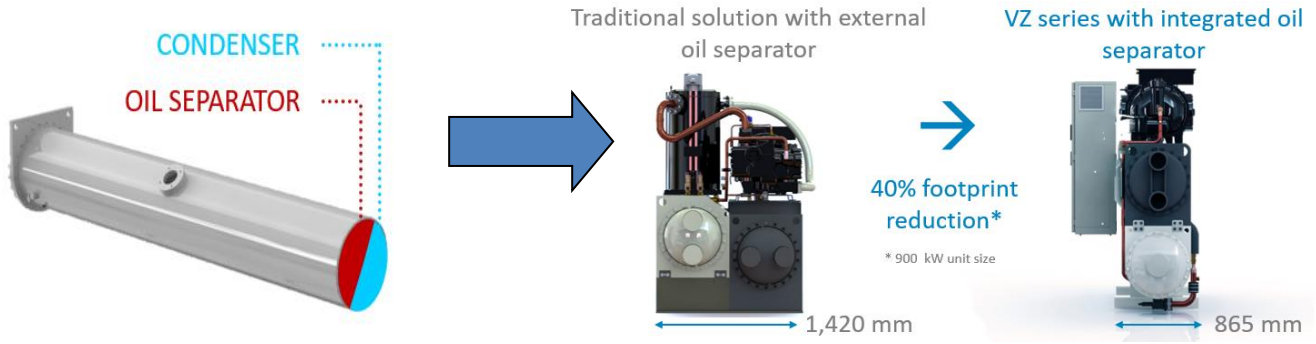
**Structure.** Color is Ivory White (Munsell code 5Y7.5/1, ± RAL7044). Unit is fitted with eyehook for lifting with ropes and for an easy handling. The weight is uniformly distributed along the base's profiles for a simplified unit installation.

**Inverter Driven Single Screw Compressor.** The EWWS~VZ A series is equipped with latest Daikin design Single Screw Compressors. This technology is enjoying highly balanced loads resulting in reduced mechanical stress for the main components. Lifetime and reliability are in this way improved and, at the same time, vibrations and noise emissions are reduced. The high volumetric efficiency of Daikin single screw compressors makes them the ideal solution for variable speed applications. Thanks to inverter technology the EWWS~VZ A screw compressors are able to match the cooling output of the unit to the actual load requirement. Compressor's rotational speed is continuously adjusted (stepless regulation) allowing excellent water temperature control and efficient capacity modulation.
Compressors are enjoying the Variable Volume Ratio (VVR) technology. This innovative system allows the compressor to adapt the discharge pressure of the refrigerant to the specific operating conditions. In this way, it is possible to prevent energy losses deriving from under or over compression phenomena that are typical of traditional compressor technologies (with fixed volume ratio). The reduction of energy losses inside compressor brings to an increased unit efficiency.
Oil separator is integrated within the Condenser shell.

**Refrigerant.** The EWWS~VZ A series is designed for R513a refrigerant in order to achieve the highest possible unit efficiency.

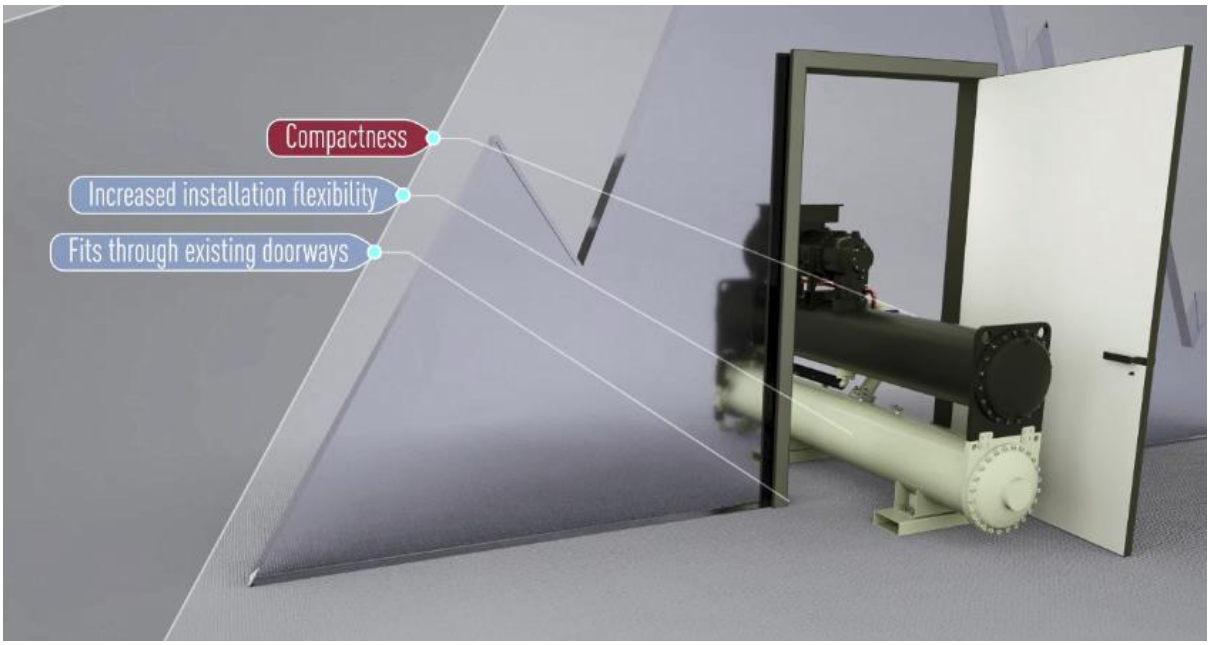
**Evaporator.** High efficiency flooded type shell and tube heat exchanger. Evaporator tubes have been selected in order to achieve the highest heat transfer. Optimized nucleate boiling is guaranteed by specifically designed cavities on the external tubes' surface. Internal tubes surface area has helical type design. The extremely high heat transfer coefficient allows the reduction of the temperature difference between chilled water and refrigerant thus resulting in higher overall unit efficiency. The evaporator is designed according to 2014/68/EU European standard (Construction of pressure vessel). The water side is designed for 10 bar maximum operating pressure; vents and drain are provided. Water connections are Victaulic type as standard, flanged connections are available as optional. As standard unit evaporator is two water passes design. Non- standard applications may require different number of water passes (contact Factory for further information). As standard, thermal insulation (20 mm thickness) is fitted on the external evaporator surface area.

**Condenser.** High efficiency shell and tube type heat exchanger. Condenser tubes have been selected in order to achieve the highest heat transfer. Optimized condensation is achieved by finned type tube external surface area. Internal tubes surface area has helical type design. The extremely high heat transfer coefficient allows the reduction of the temperature difference between condenser water and refrigerant thus resulting in higher overall unit efficiency.




The condenser is designed according to 2014/68/EU European standard (Construction of pressure vessel). The water side is designed for 10 bar maximum operating pressure; vents and drain are provided. Water connections are Victaulic type as standard, flanged connections are available as optional. As standard unit condenser is single water pass with counter-flow design for optimize heat transfer between water and refrigerant.
Within Condenser shell, specific section is dedicated to the oil separation, that allows very low oil carry over and extremely reduced refrigerant pressure drops.

Thanks to the new condenser technology VZ series is enjoying 40% reduced footprint if compared with our previous generation of water cooled chillers. The width of the units up to 900 Kw can be reduced below 900 mm (selecting opt.167, knock down electrical panel) allowing installation throughout the tightest doorways. This is great advantage especially for replacement projects.




**Electronic expansion valve.** Unit is equipped with latest technology electronic expansion valve to achieve precise control of refrigerant mass flow. As today's system requires improved energy efficiency, tighter temperature control and wide operating range, the application of electronic expansion valve is the recommended solution. Electronic expansion valve provides unique features such as short opening and closing times, high resolution, positive shut-off function eliminating the need for additional solenoid valve, continuous modulation of mass flow with reduced stress in the refrigerant circuit.

**Refrigerant Circuit.** Each unit has one or two independent refrigerant circuits and each of them includes:

- Single screw compressor inverter driven
- Refrigerant charge
- Independent refrigerant circuit into the evaporator
- Water cooled condenser
- Electronic expansion valve
- Liquid line shut off valve
- Sight glass with moisture indicator

- High pressure switch
- High pressure transducer
- Low pressure transducer
- Oil pressure transducer
- Suction temperature sensor

**Electrical Panel.** Power and control sections are located into the main electrical panel IP54 designed. The main panel doors are interlocked to the main switch (standard) in order guarantee safe operation when doors are opened. The power section includes compressor protection devices and compressor starters (inverter type).

**MicroTech 4 Controller.** The MicroTech 4 control system consists of a microprocessor-based controller and a number of extension modules, which vary depending on the unit size and configuration. The system provides the monitoring and control functions required for an efficient and trouble free operation of the chiller.
A display installed on the outside of the control panel's door allows easy access to chiller operating status including water temperatures and refrigerant pressures and temperatures.
A sophisticated software with predictive logic selects the most energy efficient combination of compressor load and electronic expansion valve position keeping stable operating conditions and maximizing chiller efficiency and reliability.
In addition to normal operating functionalities, MicroTech 4 controller will take corrective actions in case the chiller operating outside recommended working conditions.
Unit controller is able to protect critical unit components thanks to the signals received by the various unit sensors (such as motor temperature sensors, refrigerant and oil pressure/temperature sensors, pressure switches, etc.).

**Main control features** are (for more information refer to Unit Control Manual):

- Optimized management of compressors stepless capacity control through inverter drive.
- Display of evaporator entering/leaving water temperatures.
- Display of condenser entering/leaving water temperatures.
- Display of refrigerant condensing/evaporating temperatures and pressures.
- Regulation of leaving evaporator water (cooling mode) or condenser water (heating mode).
- Display of compressor working hours and number of compressor starts.
- Re-start in case of power failure (automatic or manual depending on failure type).
- Soft load (optimized management of the compressor load during the start-up).
- Set point reset.
- Master/Slave operation (up to 4 chillers connected).

**Alarms signaling** (for more information refer to Unit Control Manual):

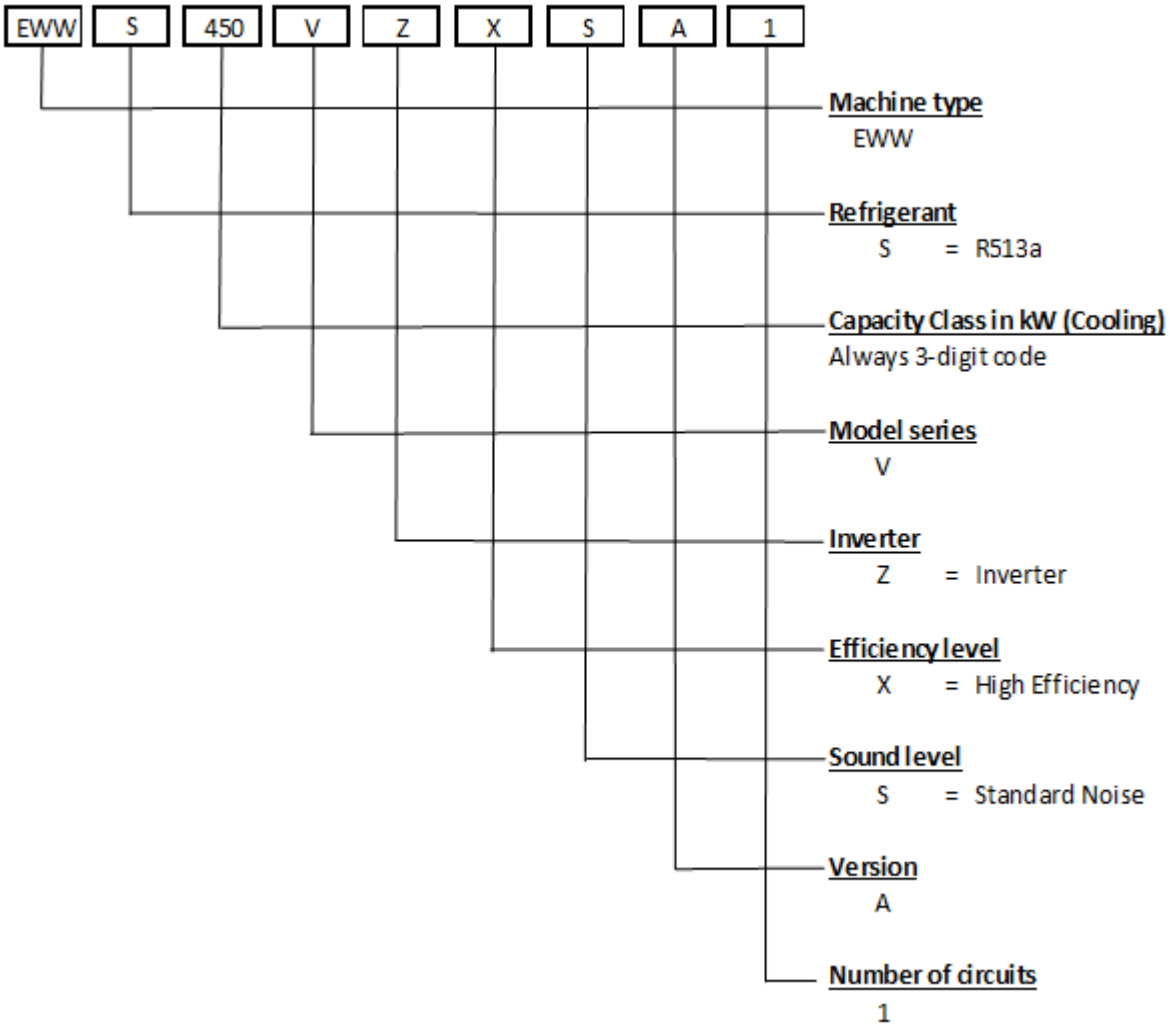
- Phase loss.
- Evaporator water flow loss.
- Evaporator water freezing protection.
- External alarm.
- Low evaporator refrigerant pressure.
- High refrigerant pressure (transducer).
- High refrigerant pressure (switch).
- Low pressure ratio.
- High refrigerant discharge temperature.
- High oil pressure differential.
- High motor temperature.

**Alarm logging**: when alarm occurs, the alarm type, date, time and main unit working parameters are recorder and stored into the controller memory. The last 25 alarms occurred are stored.

**Regulation type**: Proportional-Integral-Derivative (PID) type based on the evaporator leaving water temperature set point (cooling mode) or based on the condenser leaving water temperature set point (heating mode).

**Connection to BMS**: MicroTech 4 controlled is capable to communicate with BMS systems based on the most common protocols such as: Modbus, LonWorks, BacNet IP and MS/TP (class 4), Ethernet TCP/IP. Communication cards (optional) are to be selected according to the required communication protocol.

## Nomenclature



## Standard Options (Supplied on basic unit)

**Double set point (option 10 – STANDARD).** Possibility to pre-set two different chilled water temperature set points (cooling mode) or two different hot water temperature set points (heating mode).

**Compressor thermal overload relays (option 11 – STANDARD).** Functionality Included in the compressor inverter device - *Option incompatibility: 95*

**Phase monitor (option 13 – STANDARD).** Functionality Included in the compressor inverter device. Protect the unit in case of phase loss or phase reversal.

**Inverter compressor starter (option 14 – STANDARD).** Electronic device used as starter and for compressor capacity control.

**Under/over voltage control (option 15 – STANDARD).** Functionality Included in the compressor inverter device. Electronic device that monitors and displays input voltage, and stops the chiller in case of phase loss, wrong phase sequence, or voltage exceeding minimum and maximum allowed values.

**Evaporator Victaulic kit (option 20 - STANDARD).** Victaulic joints and counter-pipes - *Option incompatibility: 104.*

**Evaporator water design pressure 10 bar (option 27 – STANDARD).**

**20 mm evaporator insulation (option 29 – STANDARD).** Thermal insulation of the evaporator shell - *Option incompatibility: 08-174.*

**Condenser Victaulic kit (option 36 - STANDARD).** Victaulic joints and counter-pipes - *Option incompatibility: 26-50.*

**Condenser water design pressure 10 bar (option 47a – STANDARD).**

**Condenser single pass (option 51 – STANDARD).** Single pass water side design. Refer to unit dimensional drawing for water INLET/OUTLET details. Water connections cannot be reversed.

**Electronic expansion valve (option 60 – STANDARD)**.

**Hour run meter (option 68 – STANDARD).** Standard functionality of unit controller.

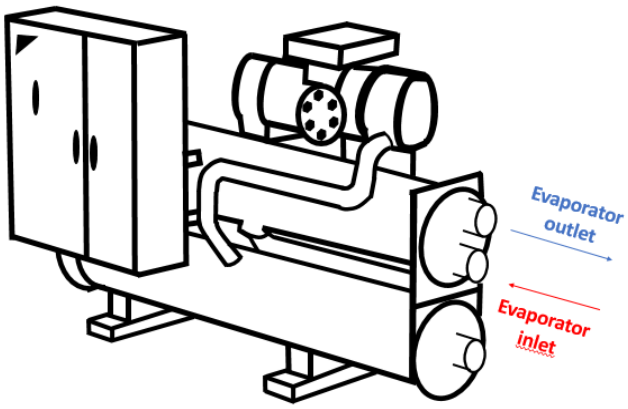
**General fault contactor (option 69 – STANDARD).** Standard functionality of unit controller.

**Set point reset, demand limit and alarm from an external device (option 90 – STANDARD).** Standard functionality of unit controller. Set point reset: possibility to re-set the water temperature set point by means of a 4-20 mA signal. Demand Limit: possibility to limit unit capacity by means of 4-20 mA signal. Alarm from external device: unit controller capability to receive an external alarm signal. The user can decide whether this alarm signal will stop the unit controller or not. Refer to unit control manual for more information.

**Double pressure relief valve with diverter (opt.91 – STANDARD).**

**Main switch interlocked doors (option 97 – STANDARD).** Electrical panel's doors are interlocked with the main switch isolator for safe operation.

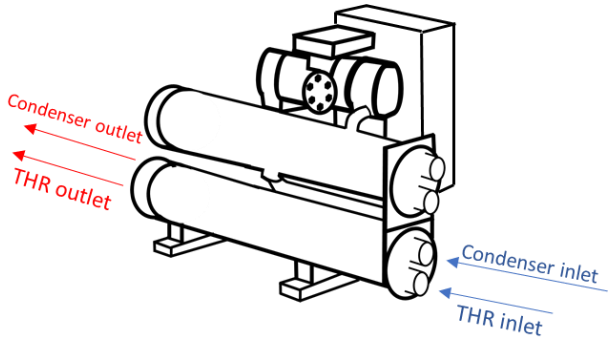
**Evaporator two passes (option 103a – STANDARD).** Two passes water side design. Refer to unit dimensional drawing for water INLET/OUTLET details - *Option incompatibility: 103-103b.*




**Master/Slave (option 128 – STANDARD).** Standard controller functionality allowing to connect up to 4 units (of the same series) and providing basic sequencing functionalities such as: balancing of working hours of unit & compressors. An additional probe (PT1000 or NTC10K, not provided by Factory) must be installed on the common water header and connected to the master unit.

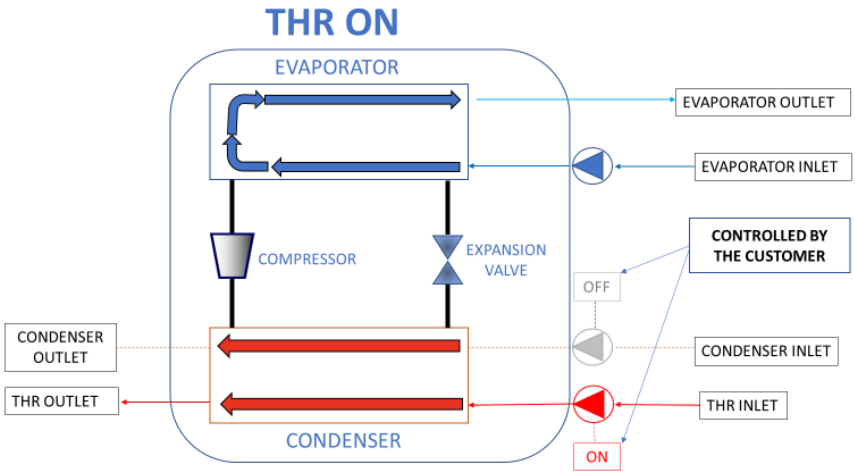
# Options on request

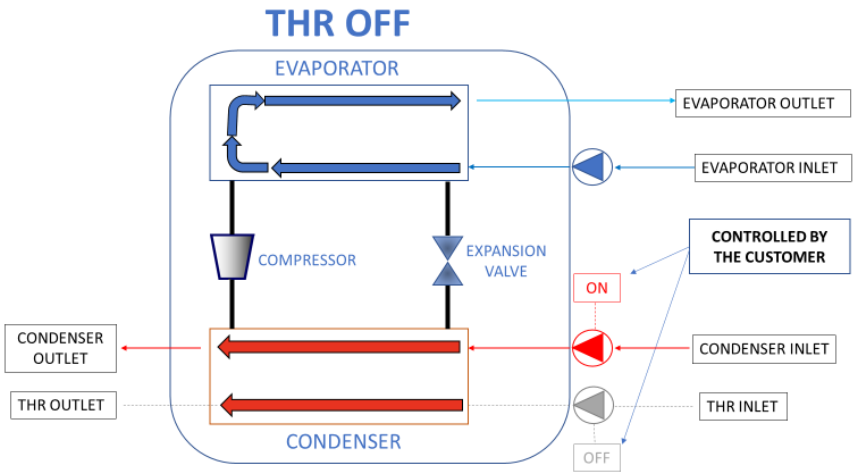
## MECHANICAL OPTIONS




**Total heat recovery (option 01 – ON REQUEST).** Unit is equipped with a double tube bundle in the condenser (one for cooling water, one for heat recovery water). Heat exchanger heads are provided with 2 connections for entering/leaving heat recovery water and 2 separate connections for condensing water. An additional temperature probe (not provided by the factory) must to be installed at the inlet of total heat recovery exchanger (customer side). Total heat recovery option is available only for GOLD version - *Option incompatibility: 07a-33-111-149-150.*

Total heat recovery operation has to be managed on site. When heat recovery is needed, customer controller needs to turn on total heat recovery pumps and to switch off the condensing pumps.
Note the heat recovery is available only when cooling load is requested and capacity available is result of the cooling demand.




**Heat Pump Version – including Pursuit Mode (option 07a – ON REQUEST).** Reversibility on the water side. Unit capability to follow two different set points (cooling mode or heating mode). During "cooling mode operation", unit microprocessor is following evaporator leaving water temperature set point. When the machine is switched to "heating mode operation", the unit microprocessor is following condenser leaving water temperature set point. Cooling or heating mode operation can be selected by means of a dedicated switch installed on the unit electrical panel. If communication card is selected, cooling or heating mode operation can be managed by BMS. Heat Pump Version option includes 20 mm condenser insulation (option 33).
In case pursuit mode operation is enabled via Microtech 4, unit controller will follow both set points (cooling and heating). When the first set point is satisfied, either the cold or the hot one, the unit will maintain that set point. Ideal applications are when cooling and heating loads are balanced. Pursuit mode operation is not recommended in case of unbalanced loads (e.g. 80% of nominal cooling load and 20% of nominal heating load) - *Option incompatibility: 33-111.*

**Brine Version (option 08 – ON REQUEST).** Required in case of unit operation with chilled water temperatures below +4°C. Unit will be fitted with double thermal insulation on evaporator (40 mm thickness). Brine Version option includes compressor thermal insulation option (option 146). Refer to the unit operating envelope for more information about minimum allowed evaporator leaving water temperatures. - *Option incompatibility: 146-174-29.*

**Low Brine Version (option 174 – ON REQUEST).** Required in case of unit operation with chilled water below -6°C with Ethylene glycol and 0°C with Propylene glycol. Option includes a dedicated tubes selection to allow operation at low temperature. Unit will be fitted with double thermal insulation on evaporator (40 mm thickness) and compressor thermal insulation (opt.146). Refer to the unit operating envelope for more information about minimum allowed evaporator leaving water temperatures. To select unit with opt.174 refer to CSS web. Unit selected with opt.174 needs to be ordered with such option. Is not possible on site to retrofit units with op.174 - *Option incompatibility: 146-08-29.*

**Condenser double flanges kit (option 26 – ON REQUEST).** Victaulic-to-flange adapter (shipped loose and including counter-flanges, gaskets and bolts) - *Option incompatibility: 36.*

**20 mm condenser insulation (option 33 – ON REQUEST).** Thermal insulation of the condenser shell (included with option 07a – Heat Pump Version and with option 111 – High temperature kit). *Option incompatibility: 07a-111.*

**Cu-Ni 90-10 condenser tubes (option 50 – ON REQUEST).** Condenser tubes made of Cu-Ni 90-10 material and Cu-Ni 90-10 tube sheets cladding. Epoxy ceramic coating of water headers and sacrificial anodes. Cupronickel is highly resistance to corrosion in seawater; for this reason it is used for piping in seawater system. Unit performances may differ from standard. Contact local Daikin office for more details. When selecting option 50, condenser double flanges kit option (option 26) must be selected as well - *Option incompatibility: 36.*

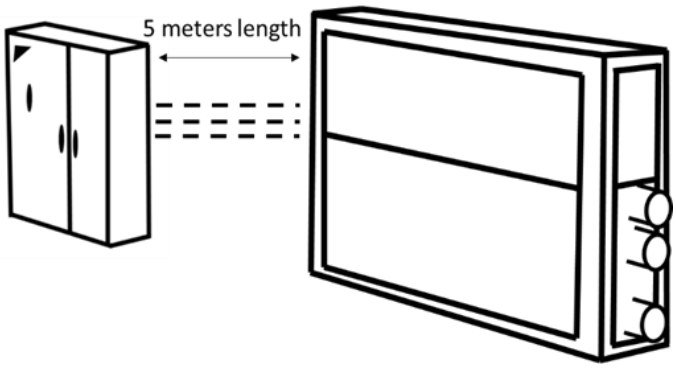
**Discharge line shut off valve (option 61 – ON REQUEST)**. Installed on the discharge line of the compressor to facilitate maintenance operations.

**Suction line shut off valve (option 62 – ON REQUEST)**. Installed on the suction line of the compressor to facilitate maintenance operations.

**High-pressure side manometers (option 63 – ON REQUEST)**.

**Low-pressure side manometers (option 64 – ON REQUEST)**.

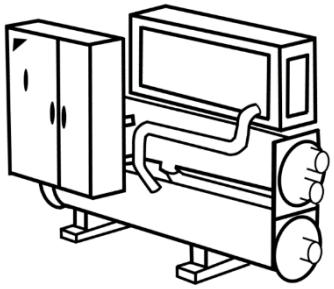
**Soundproof system - Integral (option 76-a – ON REQUEST)**. High performance soundproof cabinet made in pre-coated galvanized steel installed around the entire unit. The profile (in natural aluminum) is designed for indoor installations and allow the unit to work without a bottom panel/base frame. Panels in mineral wool are installed in order to minimize unit sound level (~-12 dB(A)). Electrical panel is installed outside the Sound proof cabinet to ensure the proper ventilation. Sound proof cabinet will be supplied dismounted (shipped loose) with mounting instructions. Mounting of the cabinet and the cuttings of the cabinet in proximity of the rear part of electrical panel and in correspondence of the water connections of the heat exchangers has to be done on site (customer responsibility).




Factory provided the electrical panel dismounted and shipped loose. Electrical panel has to be installed on-site considering the following specifications:

- Remote panel must be visible from the unit;
- Remote panel has to be positioned lifted from the ground, in order to guarantee adequate ventilation;
- Remote panel assembly activity has to be done on site and is a responsibility of the customer.

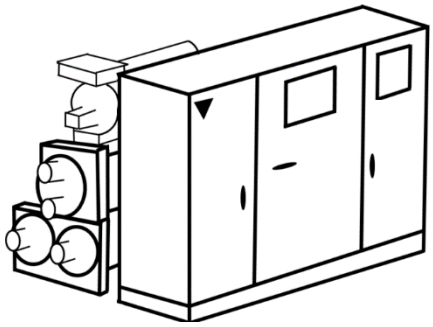
**Compressor soundproof system (option 76-b – ON REQUEST)**. High performance soundproof cabinet installed around compressor and specifically designed in order to decrease unit sound levels (~-3dB(A)).



**Compressor and evaporator soundproof system (option 76-d – ON REQUEST)**. Compressor acoustic enclosure (same as per current option 76-b) plus acoustic insulation on evaporator and suction pipe, in order to reduce unit sound power by ~-5 dB(A).

**Evaporator double flanges kit (option 104 – ON REQUEST).** Victaulic-to-flange adapter (shipped loose and including counter-flanges, gaskets and bolts).

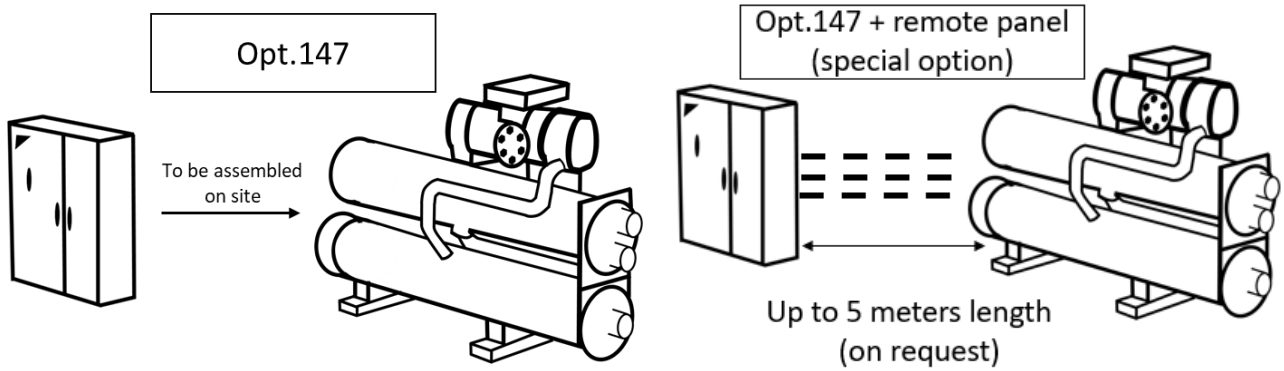
**Refrigerant leak detection (option 121 – ON REQUEST).** Electronic device (shipped loose) for automatic detection of refrigerant leak. The leak detection device should be installed within the machinery room in the most appropriate location (refer to the leak detection device installation manual). When leak above a pre-set concentration of refrigerant (2000 ppm) is detected, signal is sent to unit controller (a specific alarm is visualized on the unit microprocessor's display). The Factory does not supply interconnecting cables between leak detection device and unit controller.



**High temperature kit (option 111 – ON REQUEST).** Required in case of condenser leaving water temperature higher than approximately 48°C (note: this limit may change depending on evaporator water temperature and on specific unit version/size. Refer to operating envelope and to chiller selection software for detailed information). Specifically selected components are used in order to allow the unit to operate at such conditions. Unit dimensions and weight may change from standard. For the biggest size electrical panel could be installed on ground, refer to the unit dimensional confirmed drawing. High temperature kit option includes 20 mm condenser insulation (option 33) and heat pump version (option 07a). Unit selected with opt.111 needs to be ordered with such option. Is not possible on site to retrofit units with op.111 - *Option incompatibility: 07a-33-149-150.*

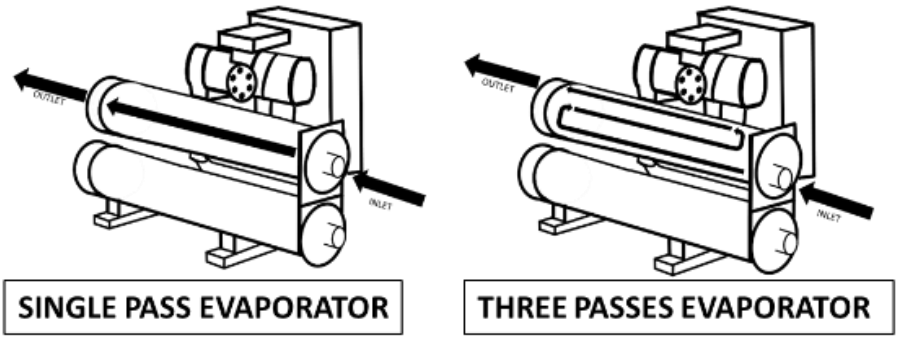
**Compressor thermal insulation (option 146 – ON REQUEST).** 20 mm thermal insulation of compressor suction side. (Included with option 08 – Brine version) - *Option incompatibility: 08-174.*

**Knock down electrical panel (option 147 – ON REQUEST).** Electrical panel dismounted from the unit and shipped separately, in order to reduce dimensions of the unit during the delivery and the installation. The mounting of the electrical panel is in charge of the customer. In case of remote control panel required (max. 5 mt additional cable length), please contact the factory. The unit must be visible from electrical panel position. Remote electrical panel must be installed lifted from ground, in order to ensure the proper ventilation.

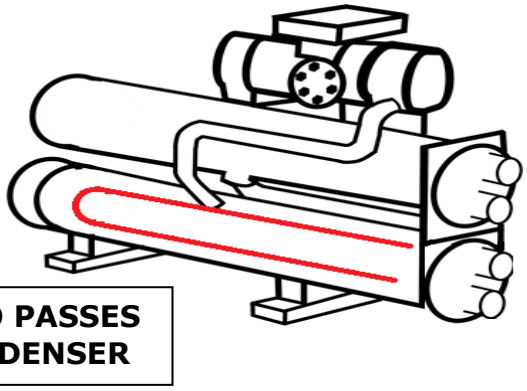



**Evaporator 3 passes (option 103b – ON REQUEST).** Three passes water side evaporator. May be required in case of evaporator water temperature difference higher than 8°C. Unit performances may differ from standard. Refer to CSS WEB for more details. Opt. incompatibility 103, 103a.

**Evaporator single pass (option 103 – ON REQUEST).** Single pass water side evaporator. May be required in case of evaporator water temperature difference lower than 4°C. Unit performances may differ from standard. Refer to CSS WEB for more details. Opt. incompatibility 103b, 103a.




**Condenser two passes (option 52 – ON REQUEST).** Condenser with two passes water side design, to have water connection on same side and to run the unit with higher condenser water ΔT (Contact the factory for more details). Water connections cannot be reversed.



## ELECTRICAL OPTIONS

**Energy meter – including current limit (option 16a – ON REQUEST).** Electronic device installed within unit electrical panel. Measures and display supply line individual phase voltage and current, active and reactive power input, active and reactive energy consumption. An integrated RS485 module allows Modbus communication to BMS. It includes current limit functionality.

**Evaporator flow switch (option 58 – ON REQUEST).** Paddle flow switch shipped loose. Refer to unit installation manual for more details.

**Condenser flow switch (option 59 – ON REQUEST).** Paddle flow switch shipped loose. Refer to unit installation manual for more details.

**Compressor circuit breakers (option 95 – ON REQUEST).** Protection device including protection from current overload and overcurrent. In case this option is selected, compressor fuses are removed - *Option incompatibility: 11.*

**Ground fault relay (option 102 – ON REQUEST).** Unit shuts down in case of ground fault is detected.

**Rapid restart (option 110 – ON REQUEST).** Ideal solution for those critical applications that cannot afford the loose of cooling or heating. In case of power failure unit will re-start as fast as 15 seconds from power restoration. Unit will reach full load within 160 seconds and 180 seconds respectively for single compressor and dual compressors unit models. Refer to unit control manual for more information about this option.

**Automatic transfer switch – free standing (option 149 – ON REQUEST).** Free standing panel separate from the unit allowing to connect two separate power supply lines (e.g. main supply line and secondary line from backup generator). In case of failure of main power supply line, the automatic transfer switch device will automatically switch to the secondary line if power is detected - *Option incompatibility: 111.*

**Inverter EN61800-3 Class C2 compliant (option 150 – ON REQUEST).** Additional RFI filters on the unit power supply line. Reduces electromagnetic interferences. Increases the inverter immunity level according to residential environment and allows its compliancy with emissions level required in C2 category - *Option incompatibility: 111.*

**Daikin on site modem with antenna (opt. code 155).** Whenever LAN connection to the unit will not be available, connecting the unit to Daikin on Site will be possible through a dedicated 3G M2M modem that can be ordered from Factory. When ordered, the modem will be installed on the unit before leaving the Factory.

## INSTALLATION OPTIONS

**Rubber pads (option 152 – ON REQUEST).** Rubber pad mounts to be installed under the unit base frame during installation.

## OTHER OPTIONS

**Container kit (option 71 – ON REQUEST).** This option consists in dedicated metallic beams on the four sides of the unit, supplied for the shipment of the unit (to be removed before installation on site). Forklift use not allowed in this case. *Option incompatibility: 112.*

**Transport kit (option 112 – ON REQUEST).** This option consists in dedicated metallic beams supplied for the shipment of the unit (to be removed before installation on site). It is a STANDARD option for EWWS-VZ single circuit. Forklift use not allowed in this case. *Option incompatibility: 71.*

### Marine Version (option 167 – on request).

In marine applications, chillers may be exposed to specific operating conditions (depending on the installation), such as:

- Pitch and roll conditions can affect the refrigerant and oil circuits operation;
- Vibrations, with impact on the mechanical parts of the unit;
- Sea water (on condenser side).

Marine Version is composed by a set of solutions in order to meet every specific need (as standard, included in opt. 167):

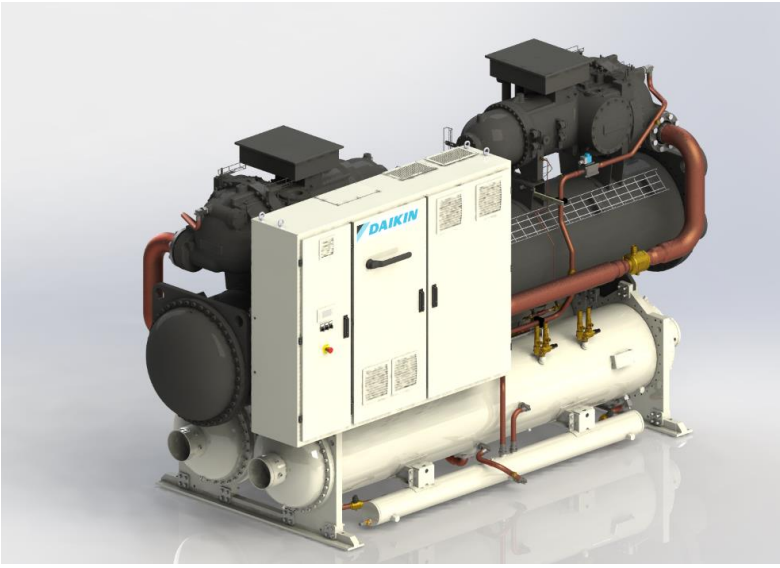
- *Special cross-flow condenser specifically designed to operate in pitch and roll conditions;*
- *Oil sump to ensure proper oil return, in pitch and roll operation;*
- *Accelerometer activating dedicated EEXV control specifically designed for marine applications;*
- *Dedicated Circuit breaker in order to improve electrical protection of the auxiliary circuits;*
- *Running lamps and digital outputs signal;*
- *Cable trays in stainless steel, specific for corrosive environment.*

To select unit with opt. 167 refer to CSS web.

In addition to the above further customization are possible, such as:

- Cu-Ni condenser (Option 50 in price list) – to prevent damages on condenser due to sea water application. Performance of the unit will be different than VZ standard. To select unit with opt. 50 refer to CSS web;
- Halogen free cables and insulation;
- Power Supply 690V/60Hz;
- Power Supply 440V/60Hz;
- IT-system for the Inverter;
- Nitrogen charge in heat exchangers before shipment, to preserve reliability for long term storage period of the unit;
- Marine certification for heat exchangers (i.e. DNVGL, Lloyd's, RINA, Bureau Veritas, ecc…);
- Marine water box (evaporator-opt.25; condenser-opt.41). This option consists of a cylindrical box installed at one of the two vessel heads (customer can decide which one of the heads, basing on the installation site layout). It is available with Victaulic or flanged connection.

Contact factory for feasibility analysis and quotations.



## EWWS~VZ-SS

| MODEL | | EWWS600VZSSA1 | EWWS700VZSSA1 | EWWS740VZSSA1 | EWWS880VZSSA1 | EWWSC10VZSSA1 | EWWSC12VZSSA2 |
|---|---|---|---|---|---|---|---|
| **COOLING PERFORMANCE** | | | | | | | |
| Capacity - Cooling | kW | 600 | 694 | 744 | 880 | 1020 | 1149 |
| Capacity control - Type | | Stepless | Stepless | Stepless | Stepless | Stepless | Stepless |
| Capacity control - Minimum | % | 20 | 20 | 20 | 20 | 20 | 10 |
| Unit power input - Cooling | kW | 120.1 | 143.3 | 154.7 | 175.2 | 212.7 | 251.8 |
| EER | | 4.99 | 4.84 | 4.81 | 5.02 | 4.80 | 4.56 |
| SEPR | | 10.2 | 10 | 9.96 | 9.75 | 9.43 | 9.32 |
| IPLV | | 9.02 | 9.15 | 9.15 | 8.84 | 8.88 | 9.06 |
| **SEASONAL ENERGY EFFICIENCY ****** | | | | | | | |
| SEER (12/7°C) | | 8.1 | 8.06 | 8.03 | 8.2 | 8.03 | 8.23 |
| ηs cool(12/7°C) | % | 316 | 314 | 313 | 320 | 313 | 321 |
| **DIMENSIONS** | | | | | | | |
| Height | mm | 2123 | 2123 | 2123 | 2292 | 2487 | 2296 |
| Width | mm | 1178 | 1179 | 1179 | 1233 | 1303 | 1484 |
| Length | mm | 3722 | 3750 | 3750 | 3690 | 3822 | 4792 |
| **WEIGHT** | | | | | | | |
| Unit Weight | kg | 2892 | 2928 | 2941 | 3451 | 4237 | 5570 |
| Operating Weight | kg | 2977 | 3033 | 3053 | 3611 | 4488 | 5980 |
| **HEAT EXCHANGER - EVAPORATOR** | | | | | | | |
| Type * | | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T |
| Fluid | | Water | Water | Water | Water | Water | Water |
| Fouling Factor | m2°C/W | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Volume | l | 88 | 88 | 96 | 134 | 156 | 230 |
| Water temperature in | °C | 12 | 12 | 12 | 12 | 12 | 12 |
| Water temperature out | °C | 7 | 7 | 7 | 7 | 7 | 7 |
| Water flow rate | l/s | 28.7 | 33.3 | 35.7 | 42.2 | 48.9 | 55 |
| Water pressure drop | kPa | 80 | 108 | 89 | 100 | 103 | 69 |
| Insulation material * | | CC | CC | CC | CC | CC | CC |
| **HEAT EXCHANGER - CONDENSER** | | | | | | | |
| Type * | | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T |
| Fluid | | Water | Water | Water | Water | Water | Water |
| Fouling Factor | m2°C/W | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Volume | l | 81 | 102 | 102 | 126 | 217 | 180 |
| Water temperature in | °C | 30 | 30 | 30 | 30 | 30 | 30 |
| Water temperature out | °C | 35 | 35 | 35 | 35 | 35 | 35 |
| Water flow rate | l/s | 34.5 | 40.1 | 43.2 | 50.6 | 59.3 | 67.1 |
| Water pressure drop | kPa | 31 | 29 | 32 | 29 | 33 | 43 |
| **COMPRESSOR** | | | | | | | |
| Oil charge | l | 36 | 36 | 36 | 50 | 50 | 68 |
| Quantity | No. | 1 | 1 | 1 | 1 | 1 | 2 |
| **SOUND LEVEL**** | | | | | | | |
| Sound Power - Cooling | dB(A) | 101 | 105 | 105 | 105 | 107 | 106 |
| Sound Pressure level@1m distance - | dB(A) | 82 | 86 | 86 | 86 | 88 | 87 |
| **REFRIGERANT CIRUIT** | | | | | | | |
| Refrigerant type | | R513A | R513A | R513A | R513A | R513A | R513A |
| Refrigerant charge | kg | 100 | 110 | 110 | 170 | 180 | 250 |
| N. of circuits | No. | 1 | 1 | 1 | 1 | 1 | 2 |
| **PIPING CONNECTIONS** | | | | | | | |
| Evaporator water inlet/outlet | mm | 139.7 | 139.7 | 139.7 | 168.3 | 219.1 | 219.1 |
| Condenser water inlet/outlet | mm | 168.3 | 168.3 | 168.3 | 219.1 | 219.1 | 168.3/168.3 |

*All the performances (Cooling capacity, unit power input and EER) are based on the following conditions: evaporator 12.0/7.0°C; condenser 30.0/35.0°C, unit at full load operation; operating fluid: Water; fouling factor = 0. S&T: Single Pass Shell & Tube; CC:Closed Cell; (**) The values are according to ISO 3744 and are referred to: evaporator 12/7° C, condenser 30/35° C, full load operation. The minimum capacity indicated is referred to unit operating at standard Eurovent conditions. Dimensions and weights are for indication only and not considered binding. Before designing the installation, consult the official drawings available from the factory at request. All the data are referred to standard unit without options. All data are subject to change without notice. (***) The value refers to the pressure drops in the evaporator/condenser only). (****) In accordance with standard EN14825:2013, comfort low temperature, average climate. SEER and ηs values applicable Ecodesign regulation: (EU) No 2016/2281.*

Eurovent certified values

## EWWS~VZ-SS

| MODEL | | EWWSC13VZ SSA2 | EWWSC14VZ SSA2 | EWWSC15VZ SSA2 | EWWSC17VZ SSA2 | EWWSC18VZ SSA2 | EWWSC20VZ SSA2 |
|---|---|---|---|---|---|---|---|
| **COOLING PERFORMANCE** | | | | | | | |
| Capacity - Cooling | kW | 1263 | 1352 | 1515 | 1690 | 1832 | 2013 |
| Capacity control - Type | | Stepless | Stepless | Stepless | Stepless | Stepless | Stepless |
| Capacity control - Minimum | % | 10 | 10 | 10 | 10 | 10 | 10 |
| Unit power input - Cooling | kW | 273.9 | 301 | 343 | 367.4 | 413.5 | 437.2 |
| EER | | 4.61 | 4.49 | 4.42 | 4.60 | 4.43 | 4.61 |
| SEPR | | 9.6 | 9.37 | 8.62 | 9.27 | 8.65 | 9.21 |
| IPLV | | 9.31 | 9.23 | 8.90 | 9.18 | 8.88 | 9.05 |
| **SEASONAL ENERGY EFFICIENCY ****** | | | | | | | |
| SEER (12/7°C) | | 8.07 | 8 | 7.64 | 8.04 | 7.8 | 8.16 |
| ηs cool(12/7°C) | % | 315 | 312 | 298 | 314 | 304 | 318 |
| **DIMENSIONS** | | | | | | | |
| Height | mm | 2296 | 2296 | 2296 | 2350 | 2338 | 2498 |
| Width | mm | 1487 | 1487 | 1484 | 1580 | 1627 | 1753 |
| Length | mm | 4792 | 4792 | 4792 | 4508 | 4508 | 4750 |
| **WEIGHT** | | | | | | | |
| Unit Weight | kg | 5790 | 5820 | 6220 | 6890 | 7260 | 8260 |
| Operating Weight | kg | 6220 | 6290 | 6690 | 7480 | 7830 | 9070 |
| **HEAT EXCHANGER - EVAPORATOR** | | | | | | | |
| Type * | | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T |
| Fluid | | Water | Water | Water | Water | Water | Water |
| Fouling Factor | m2°C/W | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Volume | l | 230 | 270 | 270 | 320 | 320 | 380 |
| Water temperature in | °C | 12 | 12 | 12 | 12 | 12 | 12 |
| Water temperature out | °C | 7 | 7 | 7 | 7 | 7 | 7 |
| Water flow rate | l/s | 60.6 | 64.7 | 72.6 | 80.9 | 87.8 | 96.4 |
| Water pressure drop | kPa | 85 | 70 | 89 | 79 | 92 | 81 |
| Insulation material * | | CC | CC | CC | CC | CC | CC |
| **HEAT EXCHANGER - CONDENSER** | | | | | | | |
| Type * | | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T |
| Fluid | | Water | Water | Water | Water | Water | Water |
| Fouling Factor | m2°C/W | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Volume | l | 200 | 200 | 200 | 270 | 250 | 430 |
| Water temperature in | °C | 30 | 30 | 30 | 30 | 30 | 30 |
| Water temperature out | °C | 35 | 35 | 35 | 35 | 35 | 35 |
| Water flow rate | l/s | 73.7 | 79.2 | 89 | 98.7 | 107 | 117 |
| Water pressure drop | kPa | 38 | 44 | 64 | 41 | 53 | 36 |
| **COMPRESSOR** | | | | | | | |
| Oil charge | l | 72 | 72 | 86 | 86 | 100 | 100 |
| Quantity | No. | 2 | 2 | 2 | 2 | 2 | 2 |
| **SOUND LEVEL**** | | | | | | | |
| Sound Power - Cooling | dB(A) | 106 | 107 | 107 | 108 | 108 | 110 |
| Sound Pressure level@1m distance - | dB(A) | 87 | 88 | 88 | 89 | 89 | 90 |
| **REFRIGERANT CIRUIT** | | | | | | | |
| Refrigerant type | | R513A | R513A | R513A | R513A | R513A | R513A |
| Refrigerant charge | kg | 260 | 270 | 290 | 295 | 320 | 350 |
| N. of circuits | No. | 2 | 2 | 2 | 2 | 2 | 2 |
| **PIPING CONNECTIONS** | | | | | | | |
| Evaporator water inlet/outlet | mm | 219.1 | 219.1 | 219.1 | 219.1 | 219.1 | 219.1 |
| Condenser water inlet/outlet | mm | 168.3/168.3 | 168.3/168.3 | 168.3/168.3 | 219.1/219.1 | 219.1/219.1 | 219.1/219.1 |

*All the performances (Cooling capacity, unit power input and EER) are based on the following conditions: evaporator 12.0/7.0°C; condenser 30.0/35.0°C, unit at full load operation; operating fluid: Water; fouling factor = 0. S&T: Single Pass Shell & Tube; CC:Closed Cell; (**) The values are according to ISO 3744 and are referred to: evaporator 12/7° C, condenser 30/35° C, full load operation. The minimum capacity indicated is referred to unit operating at standard Eurovent conditions. Dimensions and weights are for indication only and not considered binding. Before designing the installation, consult the official drawings available from the factory at request. All the data are referred to standard unit without options. All data are subject to change without notice. (***) The value refers to the pressure drops in the evaporator/condenser only). (****) In accordance with standard EN14825:2013, comfort low temperature, average climate. SEER and ηs values applicable Ecodesign regulation: (EU) No 2016/2281.*

Eurovent certified values

## EWWS~VZ-XS

| MODEL | | EWWS450VZ XSA1 | EWWS490VZX SA1 | EWWS600VZ XSA1 | EWWS700VZ XSA1 | EWWS780VZ XSA1 | EWWS890VZ XSA1 |
|---|---|---|---|---|---|---|---|
| **COOLING PERFORMANCE** | | | | | | | |
| Capacity - Cooling | kW | 441 | 493 | 605 | 705 | 783 | 889 |
| Capacity control - Type | | Stepless | Stepless | Stepless | Stepless | Stepless | Stepless |
| Capacity control - Minimum | % | 20 | 20 | 20 | 20 | 20 | 20 |
| Unit power input - Cooling | kW | 87.8 | 96.8 | 116.8 | 138.6 | 157.7 | 171.3 |
| EER | | 5.02 | 5.10 | 5.18 | 5.09 | 4.97 | 5.19 |
| SEPR | | 9.62 | 9.89 | 10.7 | 10.6 | 10.4 | 10.1 |
| IPLV | | 8.87 | 9.01 | 9.29 | 9.43 | 9.39 | 8.96 |
| **SEASONAL ENERGY EFFICIENCY ****** | | | | | | | |
| SEER (12/7°C) | | 7.86 | 8.04 | 8.41 | 8.43 | 8.4 | 8.41 |
| ηs cool(12/7°C) | % | 306 | 314 | 328 | 329 | 328 | 328 |
| **DIMENSIONS** | | | | | | | |
| Height | mm | 2135 | 2135 | 2123 | 2235 | 2235 | 2487 |
| Width | mm | 1178 | 1178 | 1179 | 1189 | 1189 | 1303 |
| Length | mm | 3722 | 3722 | 3750 | 3690 | 3690 | 3822 |
| **WEIGHT** | | | | | | | |
| Unit Weight | kg | 2968 | 2911 | 3102 | 3470 | 3451 | 4257 |
| Operating Weight | kg | 3098 | 3006 | 3274 | 3648 | 3611 | 4518 |
| **HEAT EXCHANGER - EVAPORATOR** | | | | | | | |
| Type * | | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T |
| Fluid | | Water | Water | Water | Water | Water | Water |
| Fouling Factor | m2°C/W | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Volume | l | 70 | 88 | 136 | 134 | 134 | 168 |
| Water temperature in | °C | 12 | 12 | 12 | 12 | 12 | 12 |
| Water temperature out | °C | 7 | 7 | 7 | 7 | 7 | 7 |
| Water flow rate | l/s | 21.2 | 23.6 | 29 | 33.7 | 37.5 | 42.6 |
| Water pressure drop | kPa | 91 | 64 | 61 | 65 | 57 | 69 |
| Insulation material * | | CC | CC | CC | CC | CC | CC |
| **HEAT EXCHANGER - CONDENSER** | | | | | | | |
| Type * | | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T |
| Fluid | | Water | Water | Water | Water | Water | Water |
| Fouling Factor | m2°C/W | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Volume | l | 81 | 92 | 126 | 145 | 126 | 217 |
| Water temperature in | °C | 30 | 30 | 30 | 30 | 30 | 30 |
| Water temperature out | °C | 35 | 35 | 35 | 35 | 35 | 35 |
| Water flow rate | l/s | 25.8 | 28.7 | 34.5 | 40.4 | 45.1 | 50.8 |
| Water pressure drop | kPa | 31 | 27 | 22 | 20 | 24 | 25 |
| **COMPRESSOR** | | | | | | | |
| Oil charge | l | 32 | 32 | 36 | 36 | 50 | 50 |
| Quantity | No. | 1 | 1 | 1 | 1 | 1 | 1 |
| **SOUND LEVEL**** | | | | | | | |
| Sound Power - Cooling | dB(A) | 97 | 99 | 101 | 105 | 105 | 105 |
| Sound Pressure level@1m | dB(A) | 78 | 80 | 82 | 86 | 86 | 86 |
| **REFRIGERANT CIRCUIT** | | | | | | | |
| Refrigerant type | | R513A | R513A | R513A | R513A | R513A | R513A |
| Refrigerant charge | kg | 95 | 95 | 130 | 110 | 170 | 210 |
| N. of circuits | No. | 1 | 1 | 1 | 1 | 1 | 1 |
| **PIPING CONNECTIONS** | | | | | | | |
| Evaporator water inlet/outlet | mm | 139.7 | 139.7 | 139.7 | 168.3 | 168.3 | 219.1 |
| Condenser water inlet/outlet | mm | 168.3 | 168.3 | 219.1 | 219.1 | 219.1 | 219.1 |

*All the performances (Cooling capacity, unit power input and EER) are based on the following conditions: evaporator 12.0/7.0°C; condenser 30.0/35.0°C, unit at full load operation; operating fluid: Water; fouling factor = 0. S&T: Single Pass Shell & Tube; CC:Closed Cell; (**) The values are according to ISO 3744 and are referred to: evaporator 12/7° C, condenser 30/35° C, full load operation. The minimum capacity indicated is referred to unit operating at standard Eurovent conditions. Dimensions and weights are for indication only and not considered binding. Before designing the installation, consult the official drawings available from the factory at request. All the data are referred to standard unit without options. All data are subject to change without notice. (***) The value refers to the pressure drops in the evaporator/condenser only). (****) In accordance with standard EN14825:2013, comfort low temperature, average climate. SEER and ηs values applicable Ecodesign regulation: (EU) No 2016/2281.*

Eurovent certified values

## EWWS~VZ-XS

| MODEL | | EWWSC10VZ XSA1 | EWWSC12VZ XSA2 | EWWSC13VZ XSA2 | EWWSC14VZ XSA2 | EWWSC16VZ XSA2 | EWWSC17VZ XSA2 |
|---|---|---|---|---|---|---|---|
| **COOLING PERFORMANCE** | | | | | | | |
| Capacity - Cooling | kW | 1039 | 1179 | 1287 | 1390 | 1570 | 1725 |
| Capacity control - Type | | Stepless | Stepless | Stepless | Stepless | Stepless | Stepless |
| Capacity control - Minimum | % | 20 | 10 | 10 | 10 | 10 | 10 |
| Unit power input - Cooling | kW | 207.8 | 239.2 | 263.6 | 282.6 | 319.6 | 354.3 |
| EER | | 5.00 | 4.93 | 4.88 | 4.92 | 4.91 | 4.87 |
| SEPR | | 9.95 | 9.98 | 10.1 | 10.2 | 9.85 | 9.82 |
| IPLV | | 9.27 | 9.24 | 9.48 | 9.43 | 9.39 | 9.29 |
| **SEASONAL ENERGY EFFICIENCY ****** | | | | | | | |
| SEER (12/7°C) | | 8.42 | 8.48 | 8.36 | 8.43 | 8.48 | 8.36 |
| ηs cool(12/7°C) | % | 329 | 331 | 326 | 329 | 331 | 326 |
| **DIMENSIONS** | | | | | | | |
| Height | mm | 2487 | 2296 | 2296 | 2301 | 2350 | 2500 |
| Width | mm | 1303 | 1484 | 1639 | 1579 | 1580 | 1610 |
| Length | mm | 3822 | 4792 | 4792 | 4508 | 4508 | 4750 |
| **WEIGHT** | | | | | | | |
| Unit Weight | kg | 4552 | 5860 | 6240 | 6520 | 6920 | 7530 |
| Operating Weight | kg | 4860 | 6370 | 6760 | 7130 | 7530 | 8300 |
| **HEAT EXCHANGER - EVAPORATOR** | | | | | | | |
| Type * | | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T |
| Fluid | | Water | Water | Water | Water | Water | Water |
| Fouling Factor | m2°C/W | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Volume | l | 199 | 270 | 270 | 320 | 320 | 380 |
| Water temperature in | °C | 12 | 12 | 12 | 12 | 12 | 12 |
| Water temperature out | °C | 7 | 7 | 7 | 7 | 7 | 7 |
| Water flow rate | l/s | 49.7 | 56.4 | 61.6 | 66.5 | 75.2 | 82.6 |
| Water pressure drop | kPa | 60 | 53 | 64 | 53 | 68 | 59 |
| Insulation material * | | CC | CC | CC | CC | CC | CC |
| **HEAT EXCHANGER - CONDENSER** | | | | | | | |
| Type * | | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T |
| Fluid | | Water | Water | Water | Water | Water | Water |
| Fouling Factor | m2°C/W | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Volume | l | 241 | 240 | 250 | 290 | 290 | 390 |
| Water temperature in | °C | 30 | 30 | 30 | 30 | 30 | 30 |
| Water temperature out | °C | 35 | 35 | 35 | 35 | 35 | 35 |
| Water flow rate | l/s | 59.8 | 68 | 74.4 | 80.2 | 90.7 | 99.8 |
| Water pressure drop | kPa | 25 | 28 | 28 | 21 | 32 | 27 |
| **COMPRESSOR** | | | | | | | |
| Oil charge | l | 50 | 68 | 72 | 72 | 86 | 86 |
| Quantity | No. | 1 | 2 | 2 | 2 | 2 | 2 |
| **SOUND LEVEL**** | | | | | | | |
| Sound Power - Cooling | dB(A) | 107 | 106 | 106 | 107 | 107 | 108 |
| Sound Pressure level@1m | dB(A) | 88 | 87 | 87 | 88 | 88 | 89 |
| **REFRIGERANT CIRCUIT** | | | | | | | |
| Refrigerant type | | R513A | R513A | R513A | R513A | R513A | R513A |
| Refrigerant charge | kg | 185 | 250 | 260 | 290 | 290 | 320 |
| N. of circuits | No. | 1 | 2 | 2 | 2 | 2 | 2 |
| **PIPING CONNECTIONS** | | | | | | | |
| Evaporator water inlet/outlet | mm | 219.1 | 219.1 | 219.1 | 219.1 | 219.1 | 219.1 |
| Condenser water inlet/outlet | mm | 219.1 | 168.3/219.1 | 219.1/219.1 | 219.1/219.1 | 219.1/219.1 | 219.1/219.1 |

*All the performances (Cooling capacity, unit power input and EER) are based on the following conditions: evaporator 12.0/7.0°C; condenser 30.0/35.0°C, unit at full load operation; operating fluid: Water; fouling factor = 0. S&T: Single Pass Shell & Tube; CC:Closed Cell; (**) The values are according to ISO 3744 and are referred to: evaporator 12/7° C, condenser 30/35° C, full load operation. The minimum capacity indicated is referred to unit operating at standard Eurovent conditions. Dimensions and weights are for indication only and not considered binding. Before designing the installation, consult the official drawings available from the factory at request. All the data are referred to standard unit without options. All data are subject to change without notice. (***) The value refers to the pressure drops in the evaporator/condenser only). (****) In accordance with standard EN14825:2013, comfort low temperature, average climate. SEER and ηs values applicable Ecodesign regulation: (EU) No 2016/2281.*

Eurovent certified values

## EWWS~VZ-XS

| MODEL | | EWWSC19VZ XSA2 | EWWSC20VZ XSA2 |
|---|---|---|---|
| **COOLING PERFORMANCE** | | | |
| Capacity - Cooling | kW | 1876 | 2046 |
| Capacity control - Type | | Stepless | Stepless |
| Capacity control - Minimum | % | 10 | 10 |
| Unit power input - Cooling | kW | 396.6 | 425.5 |
| EER | | 4.73 | 4.81 |
| SEPR | | 9.42 | 9.58 |
| IPLV | | 9.15 | 9.15 |
| **SEASONAL ENERGY EFFICIENCY ****** | | | |
| SEER (12/7°C) | | 8.28 | 8.37 |
| ηs cool(12/7°C) | % | 323 | 327 |
| **DIMENSIONS** | | | |
| Height | mm | 2469 | 2493 |
| Width | mm | 1704 | 1769 |
| Length | mm | 4874 | 4874 |
| **WEIGHT** | | | |
| Unit Weight | kg | 7790 | 8670 |
| Operating Weight | kg | 8560 | 9630 |
| **HEAT EXCHANGER - EVAPORATOR** | | | |
| Type * | | Flooded S&T | Flooded S&T |
| Fluid | | Water | Water |
| Fouling Factor | m2°C/W | 0 | 0 |
| Water Volume | l | 480 | 480 |
| Water temperature in | °C | 12 | 12 |
| Water temperature out | °C | 7 | 7 |
| Water flow rate | l/s | 89.7 | 97.9 |
| Water pressure drop | kPa | 50 | 60 |
| Insulation material * | | CC | CC |
| **HEAT EXCHANGER - CONDENSER** | | | |
| Type * | | Flooded S&T | Flooded S&T |
| Fluid | | Water | Water |
| Fouling Factor | m2°C/W | 0 | 0 |
| Water Volume | l | 290 | 480 |
| Water temperature in | °C | 30 | 30 |
| Water temperature out | °C | 35 | 35 |
| Water flow rate | l/s | 108 | 118 |
| Water pressure drop | kPa | 36 | 27 |
| **COMPRESSOR** | | | |
| Oil charge | l | 100 | 100 |
| Quantity | No. | 2 | 2 |
| **SOUND LEVEL**** | | | |
| Sound Power - Cooling | dB(A) | 109 | 110 |
| Sound Pressure level@1m | dB(A) | 89 | 90 |
| **REFRIGERANT CIRCUIT** | | | |
| Refrigerant type | | R513A | R513A |
| Refrigerant charge | kg | 320 | 350 |
| N. of circuits | No. | 2 | 2 |
| **PIPING CONNECTIONS** | | | |
| Evaporator water inlet/outlet | mm | 273 | 273 |
| Condenser water inlet/outlet | mm | 219.1/219.1 | 219.1/219.1 |

*All the performances (Cooling capacity, unit power input and EER) are based on the following conditions: evaporator 12.0/7.0°C; condenser 30.0/35.0°C, unit at full load operation; operating fluid: Water; fouling factor = 0. S&T: Single Pass Shell & Tube; CC:Closed Cell; (**) The values are according to ISO 3744 and are referred to: evaporator 12/7° C, condenser 30/35° C, full load operation. The minimum capacity indicated is referred to unit operating at standard Eurovent conditions. Dimensions and weights are for indication only and not considered binding. Before designing the installation, consult the official drawings available from the factory at request. All the data are referred to standard unit without options. All data are subject to change without notice. (***) The value refers to the pressure drops in the evaporator/condenser only). (****) In accordance with standard EN14825:2013, comfort low temperature, average climate. SEER and ηs values applicable Ecodesign regulation: (EU) No 2016/2281.*

Eurovent certified values

## EWWS~VZ-PS

| MODEL | | EWWS500VZPSA1 | EWWS710VZPSA1 | EWWS900VZPSA1 | EWWSC12VZPSA2 | EWWSC16VZPSA2 | EWWSC17VZPSA2 |
|---|---|---|---|---|---|---|---|
| **COOLING PERFORMANCE** | | | | | | | |
| Capacity - Cooling | kW | 500 | 710 | 898 | 1188 | 1586 | 1735 |
| Capacity control - Type | | Stepless | Stepless | Stepless | Stepless | Stepless | Stepless |
| Capacity control - Minimum capacity | % | 20 | 20 | 20 | 10 | 10 | 10 |
| Unit power input - Cooling | kW | 91.3 | 133.8 | 165.1 | 235.4 | 313.7 | 350.7 |
| EER | | 5.48 | 5.31 | 5.44 | 5.05 | 5.05 | 4.95 |
| SEPR | | 10.3 | 10.8 | 10.3 | 10.2 | 10.1 | 9.97 |
| IPLV | | 9.13 | 9.48 | 9.17 | 9.36 | 9.48 | 9.40 |
| **SEASONAL ENERGY EFFICIENCY ****** | | | | | | | |
| SEER (12/7°C) | | 8.24 | 8.55 | 8.58 | 8.61 | 8.61 | 8.45 |
| ηs cool(12/7°C) | % | 322 | 334 | 335 | 336 | 336 | 330 |
| **DIMENSIONS** | | | | | | | |
| Height | mm | 2108 | 2430 | 2487 | 2302 | 2500 | 2493 |
| Width | mm | 1179 | 1287 | 1303 | 1579 | 1610 | 1769 |
| Length | mm | 3750 | 3822 | 3822 | 4508 | 4750 | 4874 |
| **WEIGHT** | | | | | | | |
| Unit Weight | kg | 3247 | 4082 | 4346 | 6310 | 7530 | 8250 |
| Operating Weight | kg | 3375 | 4349 | 4660 | 6900 | 8300 | 9200 |
| **HEAT EXCHANGER - EVAPORATOR** | | | | | | | |
| Type * | | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T |
| Fluid | | Water | Water | Water | Water | Water | Water |
| Fouling Factor | m2°C/W | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Volume | l | 96 | 168 | 199 | 320 | 380 | 480 |
| Water temperature in | °C | 12 | 12 | 12 | 12 | 12 | 12 |
| Water temperature out | °C | 7 | 7 | 7 | 7 | 7 | 7 |
| Water flow rate | l/s | 23.9 | 34 | 43 | 56.8 | 75.8 | 83 |
| Water pressure drop | kPa | 57 | 44 | 46 | 39 | 50 | 42 |
| Insulation material * | | CC | CC | CC | CC | CC | CC |
| **HEAT EXCHANGER - CONDENSER** | | | | | | | |
| Type * | | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T | Flooded S&T |
| Fluid | | Water | Water | Water | Water | Water | Water |
| Fouling Factor | m2°C/W | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Volume | l | 126 | 217 | 241 | 270 | 390 | 470 |
| Water temperature in | °C | 30 | 30 | 30 | 30 | 30 | 30 |
| Water temperature out | °C | 35 | 35 | 35 | 35 | 35 | 35 |
| Water flow rate | l/s | 28.9 | 40.6 | 51.1 | 68.3 | 91.1 | 100 |
| Water pressure drop | kPa | 16 | 17 | 19 | 21 | 21 | 27 |
| **COMPRESSOR** | | | | | | | |
| Oil charge | l | 36 | 40 | 50 | 68 | 86 | 86 |
| Quantity | No. | 1 | 1 | 1 | 2 | 2 | 2 |
| **SOUND LEVEL**** | | | | | | | |
| Sound Power - Cooling | dB(A) | 99 | 105 | 105 | 106 | 107 | 109 |
| Sound Pressure level@1m distance - Cooling | dB(A) | 80 | 86 | 86 | 87 | 88 | 89 |
| **REFRIGERANT CIRCUIT** | | | | | | | |
| Refrigerant type | | R513a | R513a | R513a | R513a | R513a | R513a |
| Refrigerant charge | kg | 130 | 180 | 180 | 190 | 320 | 350 |
| N. of circuits | No. | 1 | 1 | 1 | 2 | 2 | 2 |
| **PIPING CONNECTIONS** | | | | | | | |
| Evaporator water inlet/outlet | mm | 139.7 | 219.1 | 219.1 | 219.1 | 219.1 | 273 |
| Condenser water inlet/outlet | mm | 219.1 | 219.1 | 219.1 | 219.1/219.1 | 219.1/219.1 | 219.1/219.1 |

*All the performances (Cooling capacity, unit power input and EER) are based on the following conditions: evaporator 12.0/7.0°C; condenser 30.0/35.0°C, unit at full load operation; operating fluid: Water; fouling factor = 0. S&T: Single Pass Shell & Tube; CC:Closed Cell; (**) The values are according to ISO 3744 and are referred to: evaporator 12/7° C, condenser 30/35° C, full load operation. The minimum capacity indicated is referred to unit operating at standard Eurovent conditions. Dimensions and weights are for indication only and not considered binding. Before designing the installation, consult the official drawings available from the factory at request. All the data are referred to standard unit without options. All data are subject to change without notice. (***) The value refers to the pressure drops in the evaporator/condenser only). (****) In accordance with standard EN14825:2013, comfort low temperature, average climate. SEER and ηs values applicable Ecodesign regulation: (EU) No 2016/2281.*

Eurovent certified values

## EWWS~VZ-SS

| MODEL | | EWWS600VZSSA1 | EWWS700VZSSA1 | EWWS740VZSSA1 | EWWS880VZSSA1 | EWWSC10VZSSA1 | EWWSC12VZSSA2 |
|---|---|---|---|---|---|---|---|
| **POWER SUPPLY** | | | | | | | |
| Phases | No. | 3 | 3 | 3 | 3 | 3 | 3 |
| Frequency | Hz | 50 | 50 | 50 | 50 | 50 | 50 |
| Voltage | V | 400 | 400 | 400 | 400 | 400 | 400 |
| Voltage tolerance Minimum | % | -10% | -10% | -10% | -10% | -10% | -10% |
| Voltage tolerance Maximum | % | 10% | 10% | 10% | 10% | 10% | 10% |
| **UNIT** | | | | | | | |
| Maximum inrush current | A | 0 | 0 | 0 | 0 | 0 | 0 |
| Nominal running current cooling | A | 182 | 212 | 233 | 261 | 319 | 370 |
| Maximum running current | A | 246 | 293 | 315 | 358 | 437 | 492 |
| Maximum current for wires sizing | A | 271 | 322 | 347 | 394 | 481 | 542 |
| **COMPRESSORS** | | | | | | | |
| Phases | No. | 3 | 3 | 3 | 3 | 3 | 3 |
| Voltage | V | 400 | 400 | 400 | 400 | 400 | 400 |
| Voltage tolerance Minimum | % | -10% | -10% | -10% | -10% | -10% | -10% |
| Voltage tolerance Maximum | % | 10% | 10% | 10% | 10% | 10% | 10% |
| Maximum running current | A | 259 | 299 | 335 | 348 | 490 | 299 |
| Starting method | | VFD | VFD | VFD | VFD | VFD | VFD |

| MODEL | | EWWSC13VZSSA2 | EWWSC14VZSSA2 | EWWSC15VZSSA2 | EWWSC17VZSSA2 | EWWSC18VZSSA2 | EWWSC20VZSSA2 |
|---|---|---|---|---|---|---|---|
| **POWER SUPPLY** | | | | | | | |
| Phases | No. | 3 | 3 | 3 | 3 | 3 | 3 |
| Frequency | Hz | 50 | 50 | 50 | 50 | 50 | 50 |
| Voltage | V | 400 | 400 | 400 | 400 | 400 | 400 |
| Voltage tolerance Minimum | % | -10% | -10% | -10% | -10% | -10% | -10% |
| Voltage tolerance Maximum | % | 10% | 10% | 10% | 10% | 10% | 10% |
| **UNIT** | | | | | | | |
| Maximum inrush current | A | 0 | 0 | 0 | 0 | 0 | 0 |
| Nominal running current cooling | A | 401 | 439 | 496 | 536 | 600 | 637 |
| Maximum running current | A | 537 | 585 | 651 | 730 | 795 | 875 |
| Maximum current for wires sizing | A | 591 | 644 | 716 | 803 | 875 | 962 |
| **COMPRESSORS** | | | | | | | |
| Phases | No. | 3 | 3 | 3 | 3 | 3 | 3 |
| Voltage | V | 400 | 400 | 400 | 400 | 400 | 400 |
| Voltage tolerance Minimum | % | -10% | -10% | -10% | -10% | -10% | -10% |
| Voltage tolerance Maximum | % | 10% | 10% | 10% | 10% | 10% | 10% |
| Maximum running current | A | 279 | 299 | 348 | 490 | 456 | 490 |
| Starting method | | VFD | VFD | VFD | VFD | VFD | VFD |

*Fluid: Water;*
*Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%. In case of inverter driven units, no inrush current at start up is experienced. Nominal running current in cooling is referred to the following conditions: evaporator 12/7°C; condenser 30/35°C. Maximum running current is based on max compressor absorbed current in its envelope. Maximum current for wires sizing is based on minimum allowed voltage. Maximum current for wires sizing: compressors full load ampere x 1,1. The data are referred to the standard unit without options.*
*All data are subject to change without notice. Please refer to unit nameplate data.*

## EWWS~VZ-XS

| MODEL | | EWWS450VZ XSA1 | EWWS490VZ XSA1 | EWWS600VZ XSA1 | EWWS700VZ XSA1 | EWWS780VZ XSA1 | EWWS890VZ XSA1 |
|---|---|---|---|---|---|---|---|
| **POWER SUPPLY** | | | | | | | |
| Phases | No. | 3 | 3 | 3 | 3 | 3 | 3 |
| Frequency | Hz | 50 | 50 | 50 | 50 | 50 | 50 |
| Voltage | V | 400 | 400 | 400 | 400 | 400 | 400 |
| Voltage tolerance Minimum | % | -10% | -10% | -10% | -10% | -10% | -10% |
| Voltage tolerance Maximum | % | 10% | 10% | 10% | 10% | 10% | 10% |
| **UNIT** | | | | | | | |
| Maximum inrush current | A | 0 | 0 | 0 | 0 | 0 | 0 |
| Nominal running current cooling | A | 131 | 146 | 179 | 209 | 239 | 258 |
| Maximum running current | A | 179 | 200 | 246 | 293 | 331 | 358 |
| Maximum current for wires sizing | A | 197 | 220 | 271 | 322 | 364 | 394 |
| **COMPRESSORS** | | | | | | | |
| Phases | No. | 3 | 3 | 3 | 3 | 3 | 3 |
| Voltage | V | 400 | 400 | 400 | 400 | 400 | 400 |
| Voltage tolerance Minimum | % | -10% | -10% | -10% | -10% | -10% | -10% |
| Voltage tolerance Maximum | % | 10% | 10% | 10% | 10% | 10% | 10% |
| Maximum running current | A | 182 | 247 | 259 | 299 | 348 | 348 |
| Starting method | | VFD | VFD | VFD | VFD | VFD | VFD |

| MODEL | | EWWSC10VZ XSA1 | EWWSC12VZ XSA2 | EWWSC13VZ XSA2 | EWWSC14VZ XSA2 | EWWSC16VZ XSA2 | EWWSC17VZ XSA2 |
|---|---|---|---|---|---|---|---|
| **POWER SUPPLY** | | | | | | | |
| Phases | No. | 3 | 3 | 3 | 3 | 3 | 3 |
| Frequency | Hz | 50 | 50 | 50 | 50 | 50 | 50 |
| Voltage | V | 400 | 400 | 400 | 400 | 400 | 400 |
| Voltage tolerance Minimum | % | -10% | -10% | -10% | -10% | -10% | -10% |
| Voltage tolerance Maximum | % | 10% | 10% | 10% | 10% | 10% | 10% |
| **UNIT** | | | | | | | |
| Maximum inrush current | A | 0 | 0 | 0 | 0 | 0 | 0 |
| Nominal running current cooling | A | 313 | 355 | 389 | 418 | 469 | 521 |
| Maximum running current | A | 437 | 492 | 537 | 585 | 651 | 730 |
| Maximum current for wires sizing | A | 481 | 542 | 591 | 644 | 716 | 803 |
| **COMPRESSORS** | | | | | | | |
| Phases | No. | 3 | 3 | 3 | 3 | 3 | 3 |
| Voltage | V | 400 | 400 | 400 | 400 | 400 | 400 |
| Voltage tolerance Minimum | % | -10% | -10% | -10% | -10% | -10% | -10% |
| Voltage tolerance Maximum | % | 10% | 10% | 10% | 10% | 10% | 10% |
| Maximum running current | A | 490 | 299 | 279 | 299 | 348 | 490 |
| Starting method | | VFD | VFD | VFD | VFD | VFD | VFD |

*Fluid: Water;*
*Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%. In case of inverter driven units, no inrush current at start up is experienced. Nominal running current in cooling is referred to the following conditions: evaporator 12/7°C; condenser 30/35°C. Maximum running current is based on max compressor absorbed current in its envelope. Maximum current for wires sizing is based on minimum allowed voltage. Maximum current for wires sizing: compressors full load ampere x 1,1. The data are referred to the standard unit without options. All data are subject to change without notice. Please refer to unit nameplate data.*

## EWWS~VZ-XS

| MODEL | | EWWSC19VZXSA2 | EWWSC20VZXSA2 |
|---|---|---|---|
| **POWER SUPPLY** | | | |
| Phases | No. | 3 | 3 |
| Frequency | Hz | 50 | 50 |
| Voltage | V | 400 | 400 |
| Voltage tolerance Minimum | % | -10% | -10% |
| Voltage tolerance Maximum | % | 10% | 10% |
| **UNIT** | | | |
| Maximum inrush current | A | 0 | 0 |
| Nominal running current cooling | A | 584 | 624 |
| Maximum running current | A | 795 | 875 |
| Maximum current for wires sizing | A | 875 | 962 |
| **COMPRESSORS** | | | |
| Phases | No. | 3 | 3 |
| Voltage | V | 400 | 400 |
| Voltage tolerance Minimum | % | -10% | -10% |
| Voltage tolerance Maximum | % | 10% | 10% |
| Maximum running current | A | 456 | 490 |
| Starting method | | VFD | VFD |

*Fluid: Water;*
*Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%. In case of inverter driven units, no inrush current at start up is experienced. Nominal running current in cooling is referred to the following conditions: evaporator 12/7°C; condenser 30/35°C. Maximum running current is based on max compressor absorbed current in its envelope. Maximum current for wires sizing is based on minimum allowed voltage. Maximum current for wires sizing: compressors full load ampere x 1,1. The data are referred to the standard unit without options. All data are subject to change without notice. Please refer to unit nameplate data.*

## EWWS~VZ-PS

| MODEL | | EWWS500VZ PSA1 | EWWS710VZ PSA1 | EWWS900VZ PSA1 | EWWSC12VZ PSA2 | EWWSC16VZ PSA2 | EWWSC17VZ PSA2 |
|---|---|---|---|---|---|---|---|
| **POWER SUPPLY** | | | | | | | |
| Phases | No. | 3 | 3 | 3 | 3 | 3 | 3 |
| Frequency | Hz | 50 | 50 | 50 | 50 | 50 | 50 |
| Voltage | V | 400 | 400 | 400 | 400 | 400 | 400 |
| Voltage tolerance Minimum | % | -10% | -10% | -10% | -10% | -10% | -10% |
| Voltage tolerance Maximum | % | 10% | 10% | 10% | 10% | 10% | 10% |
| **UNIT** | | | | | | | |
| Maximum inrush current | A | 0 | 0 | 0 | 0 | 0 | 0 |
| Nominal running current cooling | A | 143 | 208 | 255 | 352 | 464 | 519 |
| Maximum running current | A | 200 | 293 | 358 | 492 | 651 | 730 |
| Maximum current for wires sizing | A | 220 | 322 | 394 | 542 | 716 | 803 |
| **COMPRESSORS** | | | | | | | |
| Phases | No. | 3 | 3 | 3 | 3 | 3 | 3 |
| Voltage | V | 400 | 400 | 400 | 400 | 400 | 400 |
| Voltage tolerance Minimum | % | -10% | -10% | -10% | -10% | -10% | -10% |
| Voltage tolerance Maximum | % | 10% | 10% | 10% | 10% | 10% | 10% |
| Maximum running current | A | 247 | 299 | 348 | 299 | 348 | 490 |
| Starting method | | VFD | VFD | VFD | VFD | VFD | VFD |

*Fluid: Water;*
*Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%. In case of inverter driven units, no inrush current at start up is experienced. Nominal running current in cooling is referred to the following conditions: evaporator 12/7°C; condenser 30/35°C. Maximum running current is based on max compressor absorbed current in its envelope. Maximum current for wires sizing is based on minimum allowed voltage. Maximum current for wires sizing: compressors full load ampere x 1,1. The data are referred to the standard unit without options. All data are subject to change without notice. Please refer to unit nameplate data.*

## EWWS~VZ-SS

| | Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa) | | | | | | | | | Power db |
|---|---|---|---|---|---|---|---|---|---|---|
| **MODEL** | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz | **db(A)** | **(A)** |
| **600** | 65.7 | 67.5 | 74.5 | 82.2 | 75.8 | 73.8 | 65.7 | 58.3 | **82** | **101** |
| **700** | 69.7 | 71.5 | 78.5 | 86.2 | 79.8 | 77.8 | 69.7 | 62.3 | **86** | **105** |
| **740** | 69.7 | 71.5 | 78.5 | 86.2 | 79.8 | 77.8 | 69.7 | 62.3 | **86** | **105** |
| **880** | 69.7 | 71.5 | 78.5 | 86.2 | 79.8 | 77.8 | 69.7 | 62.3 | **86** | **105** |
| **C10** | 71.7 | 73.5 | 80.5 | 88.2 | 81.8 | 79.8 | 71.7 | 64.3 | **88** | **107** |
| **C12** | 70.2 | 73.2 | 81.3 | 86.5 | 81.3 | 79.3 | 70.9 | 63.2 | **87** | **106** |
| **C13** | 70.2 | 73.2 | 81.3 | 86.5 | 81.3 | 79.3 | 70.9 | 63.2 | **87** | **106** |
| **C14** | 71.7 | 73.5 | 80.5 | 88.2 | 81.8 | 79.8 | 71.7 | 64.3 | **88** | **107** |
| **C15** | 71.7 | 73.5 | 80.5 | 88.2 | 81.8 | 79.8 | 71.7 | 64.3 | **88** | **107** |
| **C17** | 72.7 | 74.5 | 81.5 | 89.2 | 82.8 | 80.8 | 72.7 | 65.3 | **89** | **108** |
| **C18** | 72.7 | 74.5 | 81.5 | 89.2 | 82.8 | 80.8 | 72.7 | 65.3 | **89** | **108** |
| **C20** | 73.7 | 75.5 | 82.5 | 90.2 | 83.8 | 81.8 | 73.7 | 66.3 | **90** | **110** |

*The values are according to ISO 3744 and are referred to: evaporator 12/7° C, condenser 30/35° C, full load operation.*
*The sound data in the Octave band spectrum is for intended for reference only and not considering binding.*
*The data are referred to the standard unit without options.*

## EWWS~VZ-XS

| | Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa) | | | | | | | | | Power db |
|---|---|---|---|---|---|---|---|---|---|---|
| **MODEL** | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz | **db(A)** | **(A)** |
| **450** | 58.4 | 66.2 | 76.0 | 73.2 | 73.9 | 72.0 | 62.9 | 53.7 | **78** | **97** |
| **490** | 60.4 | 68.2 | 78.0 | 75.2 | 75.9 | 74.0 | 64.9 | 55.7 | **80** | **99** |
| **600** | 65.7 | 67.5 | 74.5 | 82.2 | 75.8 | 73.8 | 65.7 | 58.3 | **82** | **101** |
| **700** | 69.7 | 71.5 | 78.5 | 86.2 | 79.8 | 77.8 | 69.7 | 62.3 | **86** | **105** |
| **780** | 69.7 | 71.5 | 78.5 | 86.2 | 79.8 | 77.8 | 69.7 | 62.3 | **86** | **105** |
| **890** | 69.7 | 71.5 | 78.5 | 86.2 | 79.8 | 77.8 | 69.7 | 62.3 | **86** | **105** |
| **C10** | 71.7 | 73.5 | 80.5 | 88.2 | 81.8 | 79.8 | 71.7 | 64.3 | **88** | **107** |
| **C12** | 70.2 | 73.2 | 81.3 | 86.5 | 81.3 | 79.3 | 70.9 | 63.2 | **87** | **106** |
| **C13** | 70.2 | 73.2 | 81.3 | 86.5 | 81.3 | 79.3 | 70.9 | 63.2 | **87** | **106** |
| **C14** | 71.7 | 73.5 | 80.5 | 88.2 | 81.8 | 79.8 | 71.7 | 64.3 | **88** | **107** |
| **C16** | 71.7 | 73.5 | 80.5 | 88.2 | 81.8 | 79.8 | 71.7 | 64.3 | **88** | **107** |
| **C17** | 72.7 | 74.5 | 81.5 | 89.2 | 82.8 | 80.8 | 72.7 | 65.3 | **89** | **108** |
| **C19** | 72.7 | 74.5 | 81.5 | 89.2 | 82.8 | 80.8 | 72.7 | 65.3 | **89** | **109** |
| **C20** | 73.7 | 75.5 | 82.5 | 90.2 | 83.8 | 81.8 | 73.7 | 66.3 | **90** | **110** |

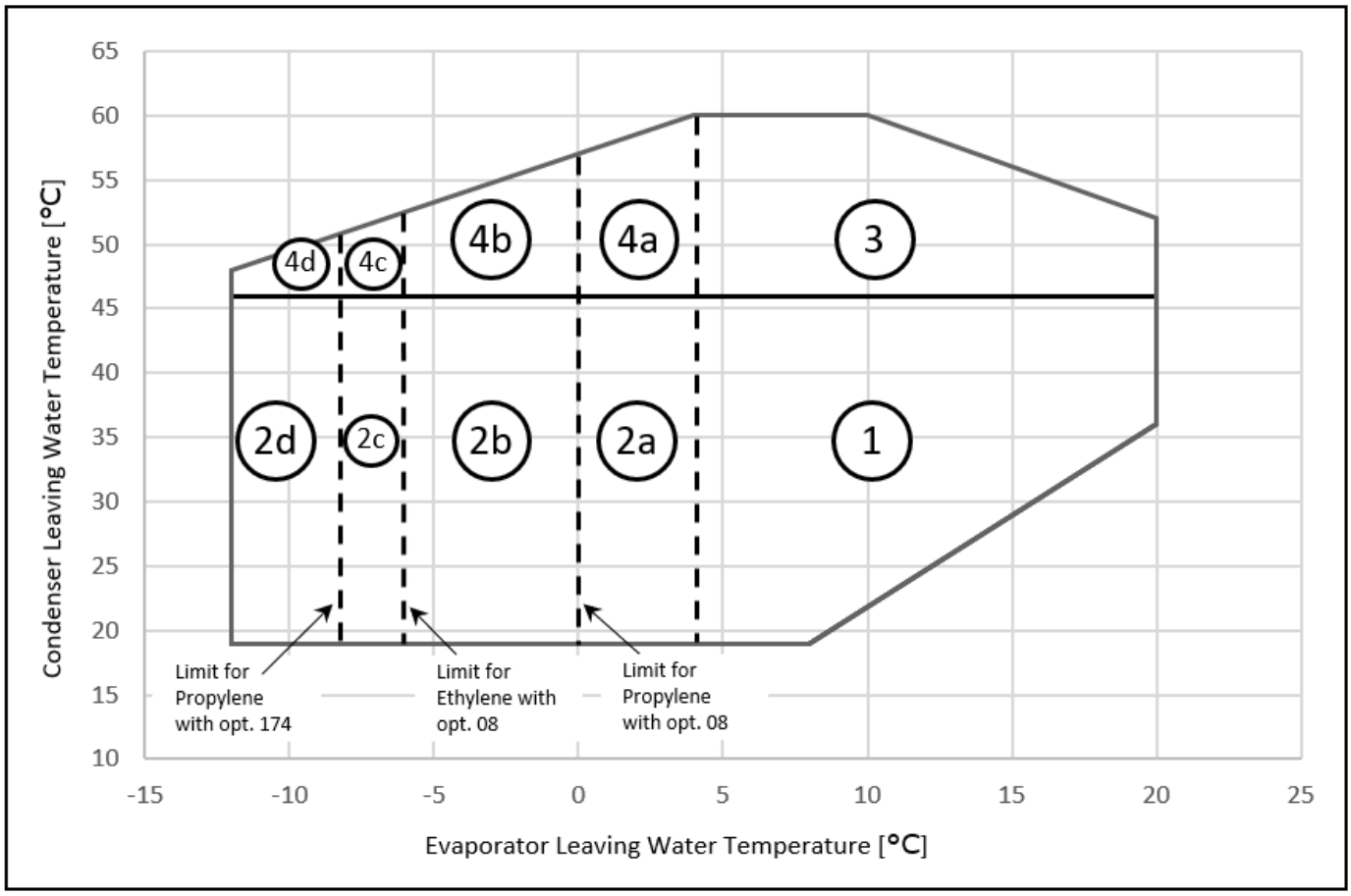
*The values are according to ISO 3744 and are referred to: evaporator 12/7° C, condenser 30/35° C, full load operation.*
*The sound data in the Octave band spectrum is for intended for reference only and not considering binding.*
*The data are referred to the standard unit without options.*

## EWWS~VZ-PS

| | Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa) | | | | | | | | | Power db (A) |
|---|---|---|---|---|---|---|---|---|---|---|
| **MODEL** | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz | **db(A)** | |
| **500** | 60.4 | 68.2 | 78.0 | 75.2 | 75.9 | 74.0 | 64.9 | 55.7 | **80** | **99** |
| **710** | 69.7 | 71.5 | 78.5 | 86.2 | 79.8 | 77.8 | 69.7 | 62.3 | **86** | **105** |
| **900** | 69.7 | 71.5 | 78.5 | 86.2 | 79.8 | 77.8 | 69.7 | 62.3 | **86** | **105** |
| **C12** | 70.2 | 73.2 | 81.3 | 86.5 | 81.3 | 79.3 | 70.9 | 63.2 | **87** | **106** |
| **C16** | 71.7 | 73.5 | 80.5 | 88.2 | 81.8 | 79.8 | 71.7 | 64.3 | **88** | **107** |
| **C17** | 72.7 | 74.5 | 81.5 | 89.2 | 82.8 | 80.8 | 72.7 | 65.3 | **89** | **109** |

*The values are according to ISO 3744 and are referred to: evaporator 12/7° C, condenser 30/35° C, full load operation.*
*The sound data in the Octave band spectrum is for intended for reference only and not considering binding.*
*The data are referred to the standard unit without options.*

# Operating Limits - EWWS-VZSS - Silver Version




**Legend**:

ELWT: Evaporator Leaving Water Temperature (°C) CLWT: Condenser Leaving Water Temperature (°C)

**Ref. 1**: Standard Unit.

**Ref. 2a**: Standard Unit plus Brine Version (option 08 - on request). Limit for Propylene Glycol: ELWT = 0°C

**Ref. 2b**: Standard Unit plus Brine Version (option 08 - on request). Limit for Ethylene Glycol: ELWT = -6°C

**Ref. 2c**: Standard Unit plus Low Brine Version (option 174 - on request). Limit for Propylene Glycol: ELWT = -8°C

**Ref. 2d**: Standard Unit plus Low Brine Version (option 174 - on request). Limit for Ethylene Glycol: ELWT = -12°C

**Ref. 3**: Standard Unit plus High temperature kit (option 111 - on request).

**Ref. 4a**: Standard Unit plus High temperature kit (option 111 - on request) plus Brine Version (option 08 - on request). Limit for Propylene Glycol: ELWT = 0°C

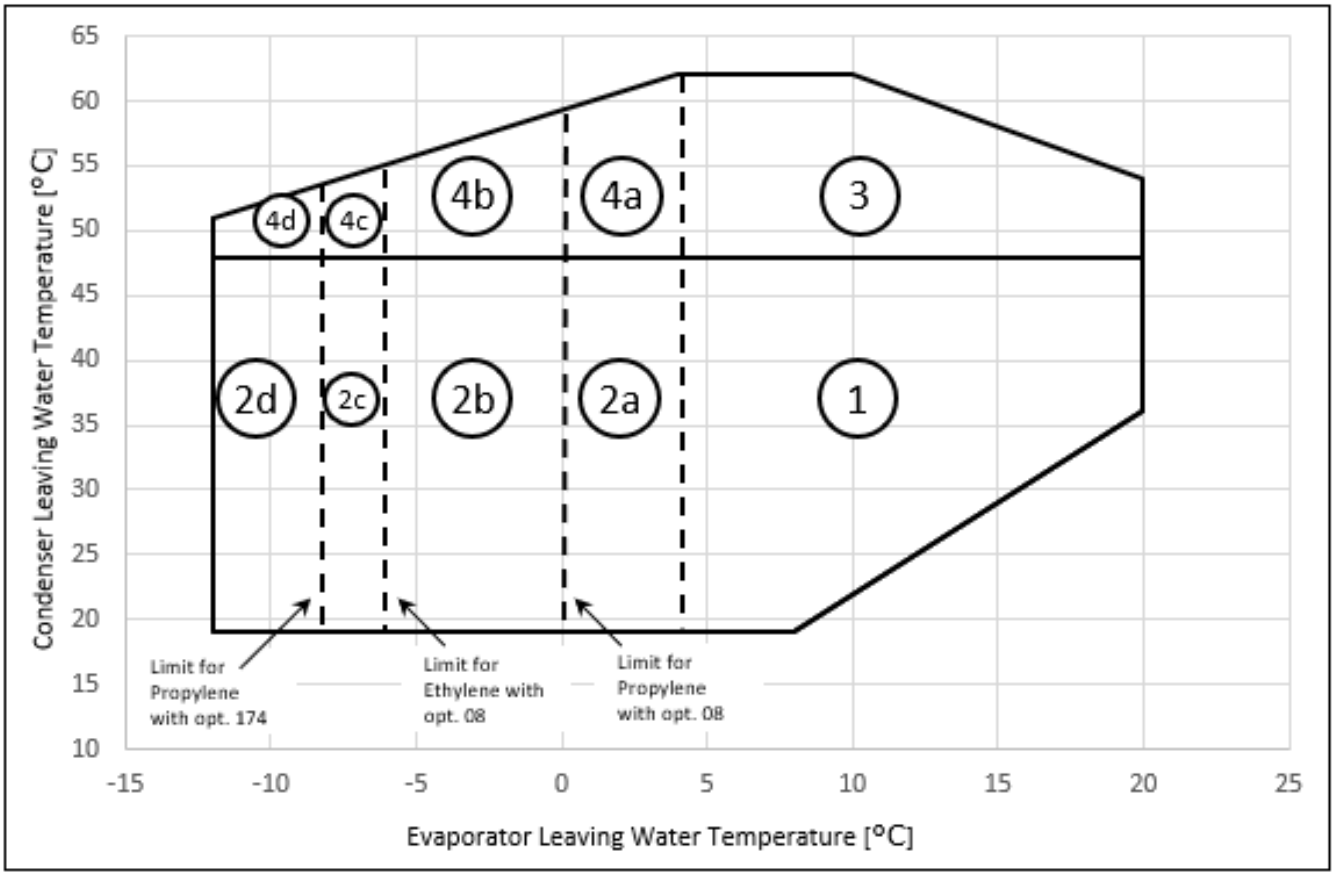
**Ref. 4b**: Standard Unit plus High temperature kit (option 111 - on request) plus Brine Version (option 08 - on request). Limit for Ethylene Glycol: ELWT = -6°C

**Ref. 4c**: Standard Unit plus High temperature kit (option 111 - on request) plus Low Brine Version (option 174 - on request). Limit for Propylene Glycol: ELWT = -8°C

**Ref. 4d**: Standard Unit plus High temperature kit (option 111 - on request) plus Low Brine Version (option 174 - on request). Limit for Ethylene Glycol: ELWT = -12°C.

Note: Unit selected with opt.174 either opt.111 needs to be ordered with such options. Is not possible on site to retrofit units with op.174/111.

# Operating Limits - EWWS-VZXS & EWWS-VZPS - Gold & Platinum Version




**Legend**:

ELWT: Evaporator Leaving Water Temperature (°C) CLWT: Condenser Leaving Water Temperature (°C)

**Ref. 1**: Standard Unit.

**Ref. 2a**: Standard Unit plus Brine Version (option 08 - on request). Limit for Propylene Glycol: ELWT = 0°C

**Ref. 2b**: Standard Unit plus Brine Version (option 08 - on request). Limit for Ethylene Glycol: ELWT = -6°C

**Ref. 2c**: Standard Unit plus Low Brine Version (option 174 - on request). Limit for Propylene Glycol: ELWT = -8°C

**Ref. 2d**: Standard Unit plus Low Brine Version (option 174 - on request). Limit for Ethylene Glycol: ELWT = -12°C

**Ref. 3**: Standard Unit plus High temperature kit (option 111 - on request).

**Ref. 4a**: Standard Unit plus High temperature kit (option 111 - on request) plus Brine Version (option 08 - on request). Limit for Propylene Glycol: ELWT = 0°C

**Ref. 4b**: Standard Unit plus High temperature kit (option 111 - on request) plus Brine Version (option 08 - on request). Limit for Ethylene Glycol: ELWT = -6°C

**Ref. 4c**: Standard Unit plus High temperature kit (option 111 - on request) plus Low Brine Version (option 174 - on request). Limit for Propylene Glycol: ELWT = -8°C

**Ref. 4d**: Standard Unit plus High temperature kit (option 111 - on request) plus Low Brine Version (option 174 - on request). Limit for Ethylene Glycol: ELWT = -12°C.

Note: Unit selected with opt.174 either opt.111 needs to be ordered with such options. Is not possible on site to retrofit units with op.174/111.

## Notes:

- The above graph refers to the unit operating at full load. Unit may be able to operate outside the above envelope with compressors unloading. Please contact factory for further details.

- For operation with EWLT below 4°C, the unit must operate with glycol mixture. The glycol percentage must be provided according to the minimum ELWT needed.

- The above graphic represents a guideline about the operating limits of the range. Please refer to the latest Chiller Selection Software (CSS) for real operating limits working conditions for each size.

- In areas 2, 3 and 4 chiller may not unload to the minimum capacity. Please refer to chiller selection software.

**Water heat exchangers - maximum/maximum water Δt**
The minimum and maximum allowed Δt at full load standard conditions are respectively 4°C and 15°C. These values represent a guideline, please refer to the latest Chiller Selection Software (CSS) for real minimum and maximum allowed Δt each size. Contact factory in case lower or higher Δt are required.

**Requirements for operation and storage**
Unit is designed for indoor installation only.
Environmental conditions must be within the following limits:

Limits for operation:
- Maximum ambient temperature: 42°C
- Minimum ambient temperature: 5°C
- Maximum relative humidity: 95% not condensing

Limits for storage:
- Maximum ambient temperature 50°C
- Minimum ambient temperature: -20°C
- Maximum relative humidity: 95% not condensing

Storage below the minimum temperature may cause damage to components.
Storage above the maximum temperature causes opening of safety valves.
Storage in condensing atmosphere may damage electronic components.

**Water treatment**
Before putting the unit into operation, clean the water circuit. Dirt, scales, corrosion debris and other materials can accumulate inside the heat exchanger and reduce its heat exchanging capacity. Pressure drops can increase as well, thus reducing water flow. Proper water treatment therefore reduces the risk of corrosion, erosion, scaling, etc.. The most appropriate water treatment must be determined locally, according to the type of system and water characteristics. The manufacturer is not responsible for damage to or malfunctioning of equipment caused by improperly treated water.

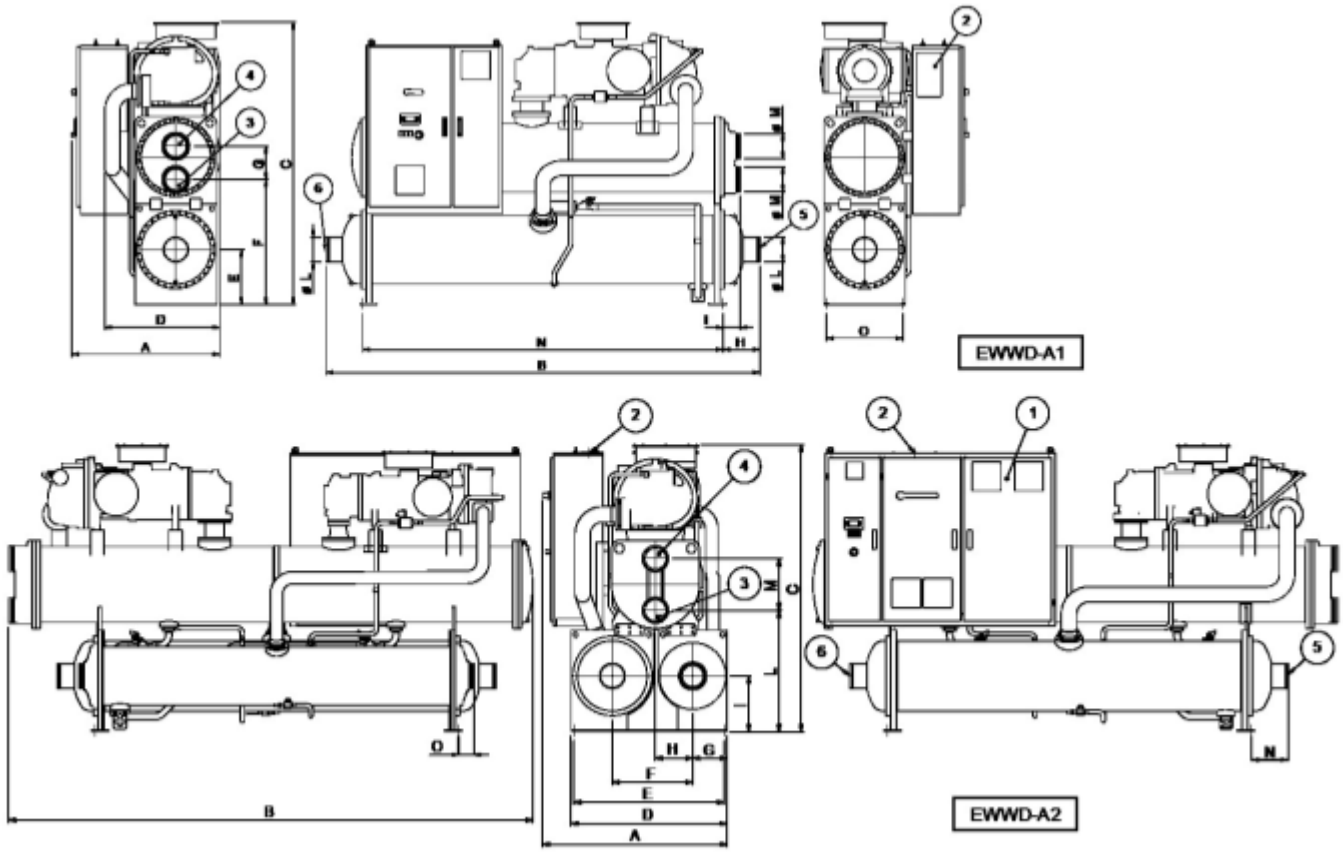
## ACCEPTABLE WATER QUALITY LIMITS

| Water quality requirements | Flooded S&T |
|---|---|
| Ph (25 °C) | 6.8 ÷ 8.4 |
| Electrical conductivity [µS/cm] (25°C) | < 800 |
| Chloride ion [mg $Cl^-$ / l] | < 150 |
| Sulphate ion [mg $SO_4^{2-}$ / l] | < 100 |
| Alkalinity [mg $CaCO_3$ / l] | < 100 |
| Total Hardness [mg $CaCO_3$ / l] | < 200 |
| Iron [mg Fe / l] | < 1 |
| Ammonium ion [mg $NH^{4+}$ / l] | < 1 |
| Silica [mg $SiO_2$ / l] | < 50 |
| Chlorine molecular (mg $Cl_2$/l) | < 5 |

Water-glycol mixture with the passing of time decays and it gives rise to acid products that can start corrosion processes. Also, the degradation of products in the water-glycol mixture may allow biological proliferation and thus bacteria formation can give rise to corrosion. For these reasons' glycol has to be used with suitable corrosion inhibitors.
The corrosion inhibitors have a lifespan (1 or 2 years) so it is important to periodically verify the percentage of the water-glycol mixture

Inhibitors may become insufficient due to "top ups" of water in the circuit (if water is added to the mixture due to low level, the percentage of glycol must remain as per requirements therefore the correct % of glycol should also be integrated.

The parameters to be checked regularly are the antifreeze concentration and the pH of water-glycol mixture

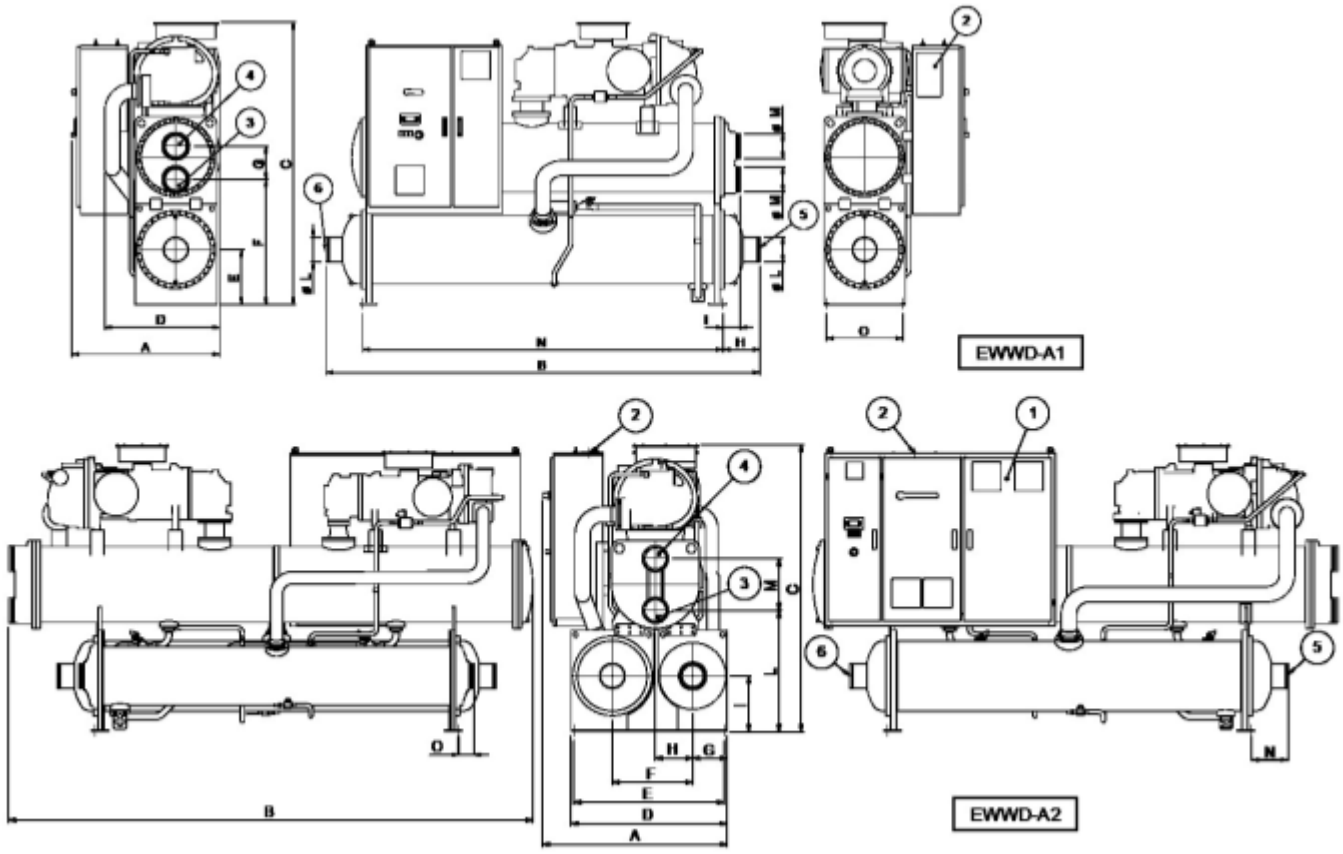



LEGEND

1. ELECTRICAL PANEL
2. POWER SUPPLY CABLE ENTRY
3. EVAPORATOR WATER INLET
4. EVAPORATOR WATER OUTLET
5. CONDENSER WATER INLET
6. CONDENSER WATER OUTLET

Unit dimensions below are in mm- note: the above drawings are not contractually binding. For the design of installation refer to the dedicated dimensional drawing available from the factory on request. The data are subject to change without notice.

| MODEL | A | B | C |
|---|---|---|---|
| EWWS600VZSSA1 | 1178 | 3722 | 2123 |
| EWWS700VZSSA1 | 1179 | 3750 | 2123 |
| EWWS740VZSSA1 | 1179 | 3750 | 2123 |
| EWWS880VZSSA1 | 1233 | 3690 | 2292 |
| EWWSC10VZSSA1 | 1303 | 3822 | 2487 |
| EWWSC12VZSSA2 | 1484 | 4792 | 2296 |
| EWWSC13VZSSA2 | 1487 | 4792 | 2296 |
| EWWSC14VZSSA2 | 1487 | 4792 | 2296 |
| EWWSC15VZSSA2 | 1484 | 4792 | 2296 |
| EWWSC17VZSSA2 | 1580 | 4508 | 2350 |
| EWWSC18VZSSA2 | 1627 | 4508 | 2338 |
| EWWSC20VZSSA2 | 1753 | 4750 | 2498 |




LEGEND

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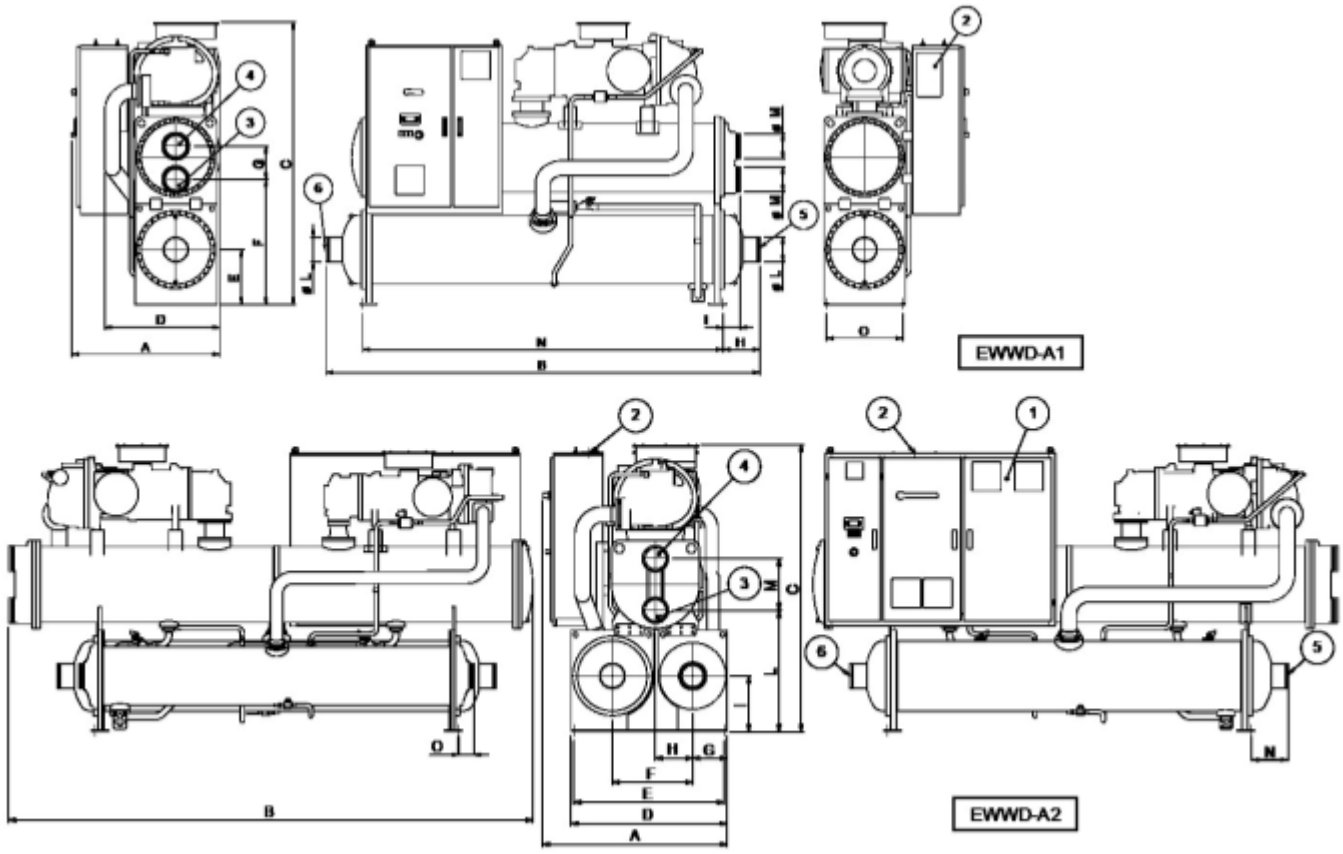
Unit dimensions below are in mm- note: the above drawings are not contractually binding. For the design of installation refer to the dedicated dimensional drawing available from the factory on request. The data are subject to change without notice.

| MODEL | A | B | C |
|---|---|---|---|
| EWWS450VZXSA1 | 1178 | 3722 | 2135 |
| EWWS490VZXSA1 | 1178 | 3722 | 2135 |
| EWWS600VZXSA1 | 1179 | 3750 | 2123 |
| EWWS700VZXSA1 | 1189 | 3690 | 2235 |
| EWWS780VZXSA1 | 1189 | 3690 | 2235 |
| EWWS890VZXSA1 | 1303 | 3822 | 2487 |
| EWWSC10VZXSA1 | 1303 | 3822 | 2487 |
| EWWSC12VZXSA2 | 1484 | 4792 | 2296 |
| EWWSC13VZXSA2 | 1639 | 4792 | 2296 |
| EWWSC14VZXSA2 | 1579 | 4508 | 2301 |
| EWWSC16VZXSA2 | 1580 | 4508 | 2350 |
| EWWSC17VZXSA2 | 1610 | 4750 | 2500 |
| EWWSC19VZXSA2 | 1704 | 4874 | 2469 |
| EWWSC20VZXSA2 | 1769 | 4874 | 2493 |




LEGEND

1. ELECTRICAL PANEL
2. POWER SUPPLY CABLE ENTRY
3. EVAPORATOR WATER INLET
4. EVAPORATOR WATER OUTLET
5. CONDENSER WATER INLET
6. CONDENSER WATER

OUTLET

Unit dimensions below are in mm- note: the above drawings are not contractually binding. For the design of installation refer to the dedicated dimensional drawing available from the factory on request. The data are subject to change without notice.

| MODEL | A | B | C |
|---|---|---|---|
| EWWS500VZPSA1 | 1179 | 3750 | 2108 |
| EWWS710VZPSA1 | 1287 | 3822 | 2430 |
| EWWS900VZPSA1 | 1303 | 3822 | 2487 |
| EWWSC12VZPSA2 | 1579 | 4508 | 2302 |
| EWWSC16VZPSA2 | 1610 | 4750 | 2500 |
| EWWSC17VZPSA2 | 1769 | 4874 | 2493 |

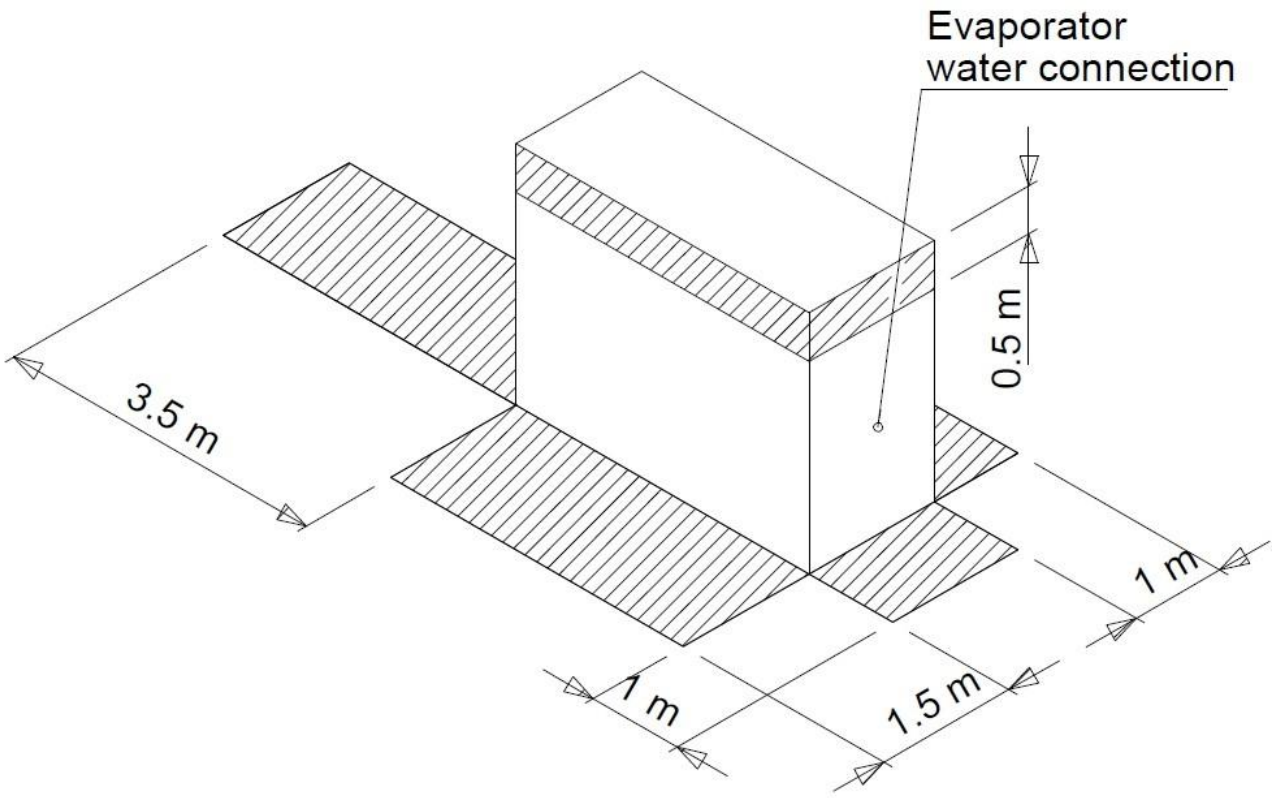
# Installation Notes

**Warning** Installation and maintenance of the unit must be performed only by qualified personnel who have knowledge with local codes and regulations, and experience with this type of equipment. Must be avoided the unit installation in places that could be considered dangerous for all the maintenance operations.

**Handling** Avoid bumping and/or jolting during loading/unloading unit from the truck and moving it. Secure the unit inside the truck to prevent it from moving and causing damages. Do not allow any part of the unit to fall during transportation or loading/unloading.
Use extreme caution when handling the unit to prevent damage to the control or the refrigerant piping. The unit must be lifted by attaching cables or chains at the lifting holes in each corner. For more information please refer to the unit Installation Manual.

**Location** Unit is designed for indoor installation only. The unit must be mounted on a leveled base of concrete or steel. The unit must be installed on a robust and perfectly leveled foundation; it might be necessary to use weight distribution beams. Rubber mounts/pads as well as vibration isolators in all water piping connected to the chiller are recommended to avoid transmission of vibration and noise.

**Space requirements** Every side of the machine must be accessible for all post installation maintenance activities. The minimum space required is shown on the following drawing:




**Acoustic protection** When noise level must meet special requirements, it is necessary to pay the maximum attention to ensure the perfect insulation of the unit from the support base by applying appropriate anti-vibration devices on the unit, on the water pipes and on the electrical connections.

**Storage** The environment conditions have to be in the following limits:

- Maximum ambient temperature 50°C

- Minimum ambient temperature: - 20°C

- Maximum relative humidity: 95% not condensing

Storage below the minimum temperature may cause damage to components. Storage above the maximum temperature causes opening of safety valves. Storage in condensing atmosphere may damage electronic components

# Technical Specifications

**General** The chiller will be designed and manufactured in accordance with the following European directives:

- Construction of pressure vessel 2014/68/EU
- Machinery Directive 2006/42/EC
- Low Voltage 2014/35/EU
- Electromagnetic Compatibility 2014/30/EU
- Electrical & Safety codes EN60204-1/EN61439-1/EN61439-2
- Manufacturing & Quality Standards UNI EN ISO 9001:2008
- Environmental Management System UNI EN ISO 14001:2004
- Health & Safety Management System BS OHSAS 18001:2007

To avoid any losses, the unit will be tested at full load in the factory (at the nominal working conditions and water temperatures). The chiller will be delivered to the job site completely assembled and charged with refrigerant and oil. The installation of the chiller must comply with the manufacturer's instructions for rigging and handling equipment.

The unit will be able to start up and operate (as standard) at full load with:

- evaporator leaving fluid temperature between..... °C and..... °C
- condenser leaving fluid temperature between..... °C and..... °C

**Refrigerant** Only HFO 513a can be used.

**Performance** Chiller shall supply the following performances:

- Number of chiller(s): ..... unit(s)
- Cooling capacity for single chiller: ..... kW
- Power input for single chiller in cooling mode:..... kW
- Evaporator heat exchanger entering water temperature in cooling mode: .....°C
- Evaporator heat exchanger leaving water temperature in cooling mode: .....°C
- Evaporator heat exchanger water flow: ..... l/s
- Condenser heat exchanger entering water temperature in cooling mode: .....°C
- Condenser heat exchanger leaving water temperature in cooling mode:..... °C
- Condenser heat exchanger water flow: .....l/s

Operating voltage range should be 400V ±10%, 3ph, 50Hz (or 380V ±10%, 3ph, 60Hz), voltage unbalance maximum 3%, without neutral conductor and shall only have one power connection point.

**Unit description Sound level and vibrations** Sound pressure level at 1 meter distance in free field, semispherical conditions, shall not exceed ……dB(A). The sound pressure levels must be rated in accordance to ISO 3744. Vibration on the base frame should not exceed 2 mm/s.

**Dimensions** Unit dimensions shall not exceed following indications:

Unit length..... mm

Unit width..... mm

Unit height..... mm

**Compressors** The unit shall be equipped with:

- Semi-hermetic, single-screw type with one main helical rotor and two gate rotors. The gate rotors will be constructed of a carbon impregnated engineered composite material. The gate rotor supports will be constructed of cast iron.

- Compressor's rotational speed shall be continuously adjusted by means of inverter (stepless regulation) allowing accurate water temperature control and efficient capacity modulation.

- Compressor shall be able to adapt the discharge pressure of the refrigerant to any operating conditions by means of variable volume ratio system.

- Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not acceptable.

- The compressor's oil cooling must be realized, when necessary, by refrigerant liquid injection. External oil cooling system will not be accepted.
- The oil separator shall be integrated within the condenser and shall not require oil pump

- The compressor shall be direct driven type, without gear transmission between the screw and the electrical motor.

- Compressor shall be equipped with two thermal protections realized by means of thermistors for high temperature protection: one temperature sensor to protect electrical motor and another sensor to protect unit and lubricating oil from high discharge gas temperature.

- No any oil-crankcase heater will be accepted on the unit.

- Compressor shall be fully field serviceable.

**Evaporator** The units shall be equipped with a flooded shell & tube evaporator with water flowing inside the tubes and refrigerant boiling outside. The tubes are enhanced for maximum heat transfer and rolled into steel tube sheet and sealed. The tubes are individually replaceable.

- The external shell shall be insulated with flexible, closed cell polyurethane insulation material (20-mm thick).

- The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.

- The evaporator will be manufactured in accordance to PED standard (2014/68/EU).

- The water side shall be designed for 10 bar of maximum operating pressure; vents and drain shall be provided.

**Condenser** The unit shall be equipped with single-pass counter-flow shell & tube heat exchanger with water flowing inside the tubes and refrigerant condensing outside.
The lower side of the condenser shall be provided with subcooling section for improved unit performances. The tubes shall be enhanced for maximum heat transfer and rolled into steel tube sheet and sealed. The tubes shall be individually replaceable.

- The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.

- The condenser will be manufactured in accordance to PED standard (2014/68/EU).

- The water side shall be designed for 10 bar of maximum operating pressure; vents and drain shall be provided.

- The oil separating section shall be integrated within the condenser.

**Refrigerant circuit** The unit shall have one independent refrigerant circuit and one variable frequency driver per compressor (Inverter).
The circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, compressor discharge shut-off valve, liquid line shut-off valve, sight glass with moisture indicator, replaceable filter drier, charging valves, high pressure switch, high and low pressure transducers, oil pressure transducer and insulated suction line.

**Condensation control** The compressor automatically unloads when high condensing pressure is detected. This to prevent the shutdown of the refrigerant circuit (shutdown of the unit) due to a high-pressure fault.

**Low sound unit configurations (on request)** The chiller shall be provided with an acoustical compressor enclosure. This enclosure shall be realized with a light, corrosion resistant aluminum structure and metal panels. The compressor sound- proof enclosure shall be internally fitted with flexible, multi-layer, high density materials.

**Electrical control panel** Power and control shall be located in the main panel that will be manufactured to ensure protection against all weather conditions.

- The electrical panel shall be IP54 and (with the doors opened) internally protected against possible accidental contact with electrical components (IP20).

- The main panel shall be fitted with a main switch interlocked door.

- The power section will include compressors protection devices, compressors starters and control circuit power supply.

**Controller** The controller will be installed as standard and it will be used to modify unit set-points and check control parameters.
A display installed on the outside of the control panel's door will allow easy access to chiller operating status including water temperatures and refrigerant pressures and temperatures.
A sophisticated software with predictive logic will select the most energy efficient combination of compressor load and electronic expansion valve position keeping stable operating conditions and maximizing chiller efficiency and reliability.

In addition to normal operating functionalities, unit controller will take corrective actions in case the chiller operating outside recommended working conditions.
Unit controller shall be able to protect critical unit components thanks to the signals received by the various unit sensors (such as motor temperature sensors, refrigerant and oil pressure/temperature sensors, pressure switches…..etc..).

Controller main features Controller shall guarantee following minimum functions:
- Optimized management of compressors stepless capacity control through inverter drive.
- Display of evaporator entering/leaving water temperatures.
- Display of condenser entering/leaving water temperatures.
- Display of refrigerant condensing/evaporating temperatures and pressures.
- Regulation of leaving evaporator water (cooling mode) or condenser water (heating mode). Temp. tolerance ±0,1°C.
- Display of compressor working hours and number of compressor starts.
- Re-start in case of power failure (automatic or manual depending on failure type).
- Soft load (optimized management of the compressor load during the start-up).
- Set point reset.
- Master/Slave operation (up to 4 chillers connected).

Controller shall guarantee following minimum alarms signaling:
- Phase loss.
- Evaporator water flow loss.
- Evaporator water freezing protection.
- External alarm.
- Low evaporator refrigerant pressure.
- High refrigerant pressure (transducer).
- High refrigerant pressure (switch).
- Low pressure ratio.
- High refrigerant discharge temperature.
- High oil pressure differential.
- High motor temperature.

High Level Communications Interface (on request) The chiller shall be able to communicate to BMS (Building Management System) based on the most common protocols such as:
- ModbusRTU
- LonWorks
- BacNet BTP certified over IP and MS/TP (class 4) (Native)
- Ethernet TCP/IP.

Master/Slave the unit shall be able to operate in Master / Slave mode in order to be connected with other similar unit (up to 4). The master unit shall manage the slave units connected in series on the hydraulic plant with the aim of optimize the running hours of each compressor.

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