

Water Cooled Inverter Screw Chillers



EWWD~VZ A 380V/60Hz

Nominal capacity range: 449 - 2068 kW
Best performances at full load and part loads
Full flexibility with 3 efficiency versions and low noise option
Designed for wide application range and compact footprint



Features and Benefits

Low operating cost High Flexibility and Reliability. The EWWD~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 EWWD~VZ A range is available with 3 different efficiency versions:

- EWWD~VZ A SS "SILVER": average EER 5,46 (up to 5,85) and average IPLV 9,47 (up to 9,70)
- EWWD~VZ A XS "GOLD": average EER 5,67 (up to 5,93) and average IPLV 9,64 (up to 9,82)
- EWWD~VZ A PS "PLATINUM": average EER 5,75 (up to 6,01) and average IPLV 9,73 (up to 9,92)

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

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

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

Application flexibility. The EWWD~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 EWWD~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 any 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.

Future readiness. The EWWD~VZ A series is designed for R134a refrigerant in order to achieve the highest possible unit efficiency. Additionally to this, it has been designed to be compatible for "drop in" of next generation refrigerants with lower GWP. Daikin is at full disposal to provide further information about this specific subject.

Superior control logic. The EWWD~VZ A series is enjoying MicroTech III 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.

Daikin on Site ready. The EWWD~VZ A series is compatible with the new Daikin cloud based platform allowing remote monitoring and optimization of the system.

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.

Low starting current. No any 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 EWWD~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 EWWD~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	Refrigerant type	Refrigerant GWP	No. of circuits	Refrigerant charge circuit 1 (kg)	Refrigerant charge circuit 1 (TCO2Eq)	Refrigerant charge circuit 2 (kg)	Refrigerant charge circuit 2 (TCO2Eq)
SILVER	EWWD600VZSSA1	R134a	1430	1	100	143	---	---
	EWWD700VZSSA1	R134a	1430	1	110	157	---	---
	EWWD760VZSSA1	R134a	1430	1	110	157	---	---
	EWWD890VZSSA1	R134a	1430	1	170	243	---	---
	EWWD10VZSSA1	R134a	1430	1	180	257	---	---
	EWWD12VZSSA2	R134a	1430	2	125	179	125	179
	EWWD13VZSSA2	R134a	1430	2	130	186	130	186
	EWWD14VZSSA2	R134a	1430	2	145	207	145	207
	EWWD16VZSSA2	R134a	1430	2	145	207	145	207
	EWWD17VZSSA2	R134a	1430	2	160	229	160	229
EWWD19VZSSA2	R134a	1430	2	160	229	160	229	
EWWD21VZSSA2	R134a	1430	2	175	250	175	250	
	Unit model	Refrigerant type	Refrigerant GWP	No. of circuits	Refrigerant charge circuit 1 (kg)	Refrigerant charge circuit 1 (TCO2Eq)	Refrigerant charge circuit 2 (kg)	Refrigerant charge circuit 2 (TCO2Eq)
GOLD	EWWD450VZXSA1	R134a	1430	1	95	136	---	---
	EWWD500VZXSA1	R134a	1430	1	95	136	---	---
	EWWD610VZXSA1	R134a	1430	1	100	143	---	---
	EWWD710VZXSA1	R134a	1430	1	110	157	---	---
	EWWD800VZXSA1	R134a	1430	1	170	243	---	---
	EWWD900VZXSA1	R134a	1430	1	170	243	---	---
	EWWD11VZXSA1	R134a	1430	1	180	257	---	---
	EWWD12VZXSA2	R134a	1430	2	125	179	125	179
	EWWD13VZXSA2	R134a	1430	2	130	186	130	186
	EWWD14VZXSA2	R134a	1430	2	145	207	145	207
	EWWD16VZXSA2	R134a	1430	2	145	207	145	207
	EWWD17VZXSA2	R134a	1430	2	160	229	160	229
	EWWD19VZXSA2	R134a	1430	2	160	229	160	229
EWWD21VZXSA2	R134a	1430	2	175	250	175	250	
	Unit model	Refrigerant type	Refrigerant GWP	No. of circuits	Refrigerant charge circuit 1 (kg)	Refrigerant charge circuit 1 (TCO2Eq)	Refrigerant charge circuit 2 (kg)	Refrigerant charge circuit 2 (TCO2Eq)
PLATINUM	EWWD505VZPSA1	R134a	1430	1	100	143	---	---
	EWWD715VZPSA1	R134a	1430	1	150	215	---	---
	EWWD910VZPSA1	R134a	1430	1	180	257	---	---
	EWWD12VZPSA2	R134a	1431	2	145	207	145	207
	EWWD16VZPSA2	R134a	1432	2	160	229	160	229
EWWD18VZPSA2	R134a	1430	2	175	250	175	250	

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

Cabinet and structure. The cabinet is made of galvanized steel and painted to provide high resistance to corrosion. 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 EWWD~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 EWWD~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 EWWD~VZ A series is designed for R134a refrigerant in order to achieve the highest possible unit efficiency. Additionally to this, it has been designed to be compatible for "drop in" of next generation refrigerants with lower GWP. Daikin is at full disposal to provide further information about this specific subject.

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. 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.

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 III Controller. The MicroTech III 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 III 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):

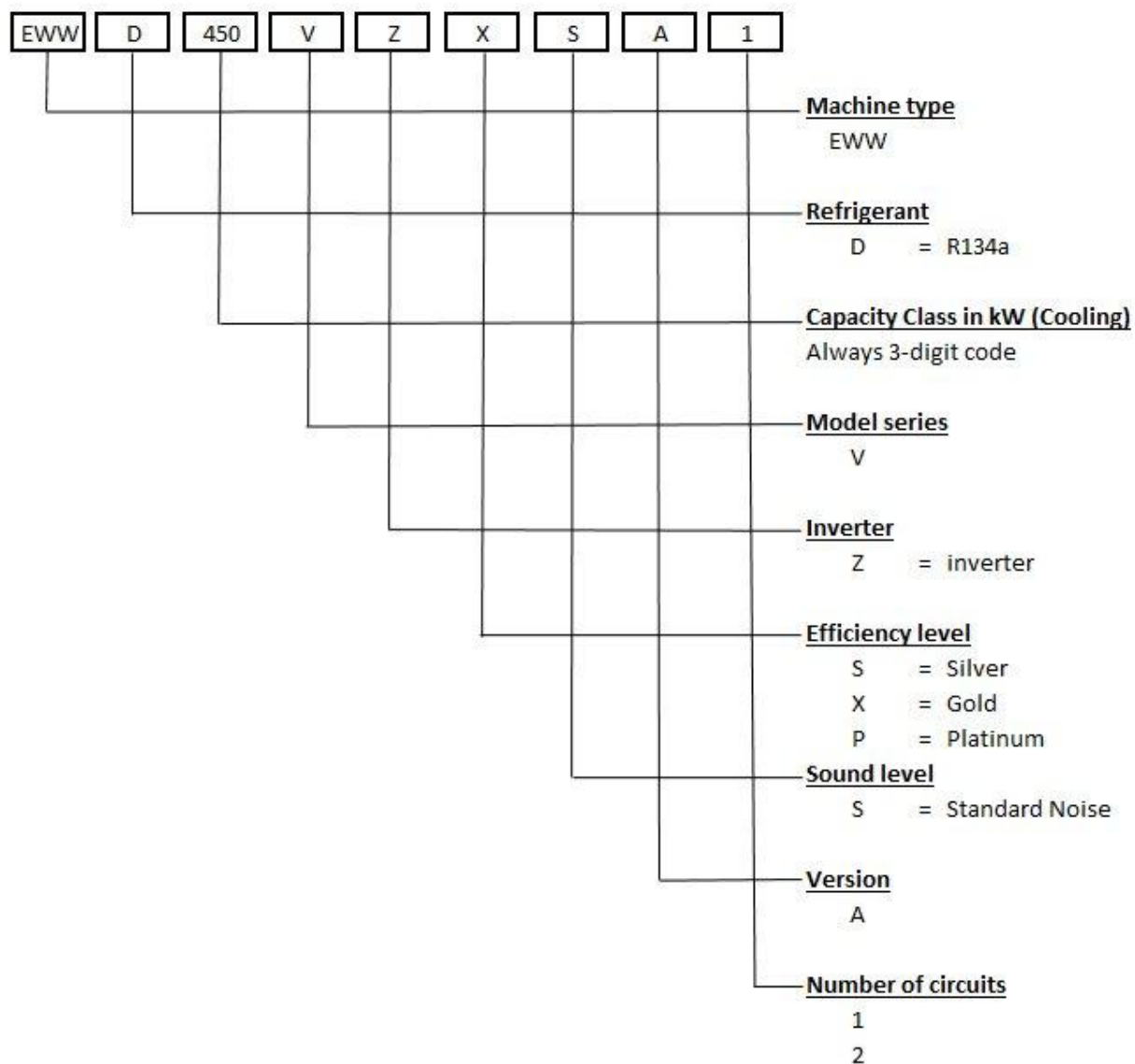
- Phase loss.
- Evaporator water flow loss.
- Evaporator water freezing protection.
- External alarm.
- Low evaporator refrigerant pressure.
- High refrigerant pressure (transducer).
- High refrigerant pressure (switch).
- Low pressure ratio.
- High refrigerant discharge temperature.
- High oil pressure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

Evaporator Victaulic kit (option 20 – STANDARD). Victaulic joints and counter-pipes.

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

20 mm evaporator insulation (option 29 – STANDARD). Thermal insulation of the evaporator shell.

Condenser Victaulic kit (option 36 - STANDARD). Victaulic joints and counter-pipes.

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

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

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).

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.

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.

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.

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

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

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

Options on request

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 III, unit controller will try to 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).

Brine Version (option 08 – ON REQUEST). Required in case of unit operation with chilled water temperatures below +4°C and down to -6°C (ethylene glycol) and down to 0°C (propylene glycol). 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.

Low Temperature Brine (option 08d – ON REQUEST). Required in case of unit operation with chilled water temperatures down to -12°C (ethylene glycol) and down to -8°C (propylene glycol). Unit will be fitted with double thermal insulation on evaporator (40 mm thickness). Low Temperature Brine option includes compressor thermal insulation option (option 146). Refer to the unit operating envelope for more information about minimum allowed evaporator leaving water temperatures.

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

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

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).

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).

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

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. High temperature kit option includes 20 mm condenser insulation (option 33) and heat pump version (option 07a).

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.

Knock down electrical panel (option 147 – ON REQUEST). Electrical panel dismantled from the unit and shipped separately.

Compressor thermal insulation (option 146 – ON REQUEST). 20 mm thermal insulation of compressor suction side. (Included with option 08 – Brine version).

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. 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.

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. Contact local Daikin office for more details.

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. Contact local Daikin office for more details.

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.

Daikin on Site modem with antenna (option 155 - ON REQUEST). 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.

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.

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.

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.

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

Container kit (option 71 – ON REQUEST).

Transport kit (option 112 – ON REQUEST).

EWWD~VZ-SS 380/60

MODEL		EWWD600V ZSSA1 380/60	EWWD700V ZSSA1 380/60	EWWD760V ZSSA1 380/60	EWWD890V ZSSA1 380/60	EWWD10V ZSSA1 380/60	EWWD12V ZSSA2 380/60
COOLING PERFORMANCE							
Capacity - Cooling	kW	613	709	761	900	1,046	1,178
Capacity control - Type		Stepless	Stepless	Stepless	Stepless	Stepless	Stepless
Capacity control - Minimum capacity	%	20	20	20	20	20	10
Unit power input - Cooling	kW	105	125	135	153	186	221
EER		5.81	5.64	5.61	5.85	5.60	5.32
ESEER		7.62	7.50	7.63	7.54	7.52	7.86
IPLV		9.43	9.36	9.37	9.37	9.40	9.52
CASING							
Colour *		IW	IW	IW	IW	IW	IW
Material *		GPSS	GPSS	GPSS	GPSS	GPSS	GPSS
DIMENSIONS							
Height	mm	2120	2120	2120	2290	2480	2290
Width	mm	1180	1180	1180	1240	1340	1480
Length	mm	3460	3460	3460	3690	3830	4550
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	m ² °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	29.2	33.8	36.3	42.9	49.9	56.2
Water pressure drop	kPa	79.0	106	88.0	98.0	102	69.0
Insulation material *		CC	CC	CC	CC	CC	CC
HEAT EXCHANGER - CONDENSER							
Type *		S&T	S&T	S&T	S&T	S&T	S&T
Fluid		Water	Water	Water	Water	Water	Water
Fouling Factor	m ² °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	35.3	41.0	44.1	51.9	60.6	69.1
Water pressure drop	kPa	31.0	29.0	33.0	29.0	33.0	44.0
COMPRESSOR							
Type		Single Screw	Single Screw	Single Screw	Single Screw	Single Screw	Single Screw
Oil charge	l	34.0	40.0	40.0	40.0	40.0	68.0
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 - Cooling	dB(A)	82	86	86	86	88	87
REFRIGERANT CIRCUIT							
Refrigerant type		R134a	R134a	R134a	R134a	R134a	R134a
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. (*) IW: Ivory White; GPSS: Galvanized and Painted Steel Sheet; 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.

EWWD~VZ-SS 380/60

MODEL		EWWD13V ZSSA2 380/60	EWWD14V ZSSA2 380/60	EWWD16V ZSSA2 380/60	EWWD17V ZSSA2 380/60	EWWD19V ZSSA2 380/60	EWWD21V ZSSA2 380/60
COOLING PERFORMANCE							
Capacity - Cooling	kW	1,295	1,387	1,560	1,730	1,886	2,061
Capacity control - Type		Stepless	Stepless	Stepless	Stepless	Stepless	Stepless
Capacity control - Minimum capacity	%	10	10	10	10	10	10
Unit power input - Cooling	kW	240	264	299	325	361	387
EER		5.39	5.25	5.22	5.32	5.22	5.32
ESEER		7.81	7.90	7.46	7.99	7.49	7.95
IPLV		9.56	9.57	9.36	9.70	9.38	9.65
CASING							
Colour *		IW	IW	IW	IW	IW	IW
Material *		GPSS	GPSS	GPSS	GPSS	GPSS	GPSS
DIMENSIONS							
Height	mm	2290	2290	2290	2350	2350	2500
Width	mm	1480	1480	1480	1580	1580	1720
Length	mm	4550	4550	4550	4560	4560	4570
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	m ² °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	61.7	66.1	74.4	82.5	89.9	98.2
Water pressure drop	kPa	84.0	70.0	89.0	78.0	92.0	80.0
Insulation material *		CC	CC	CC	CC	CC	CC
HEAT EXCHANGER - CONDENSER							
Type *		S&T	S&T	S&T	S&T	S&T	S&T
Fluid		Water	Water	Water	Water	Water	Water
Fouling Factor	m ² °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	75.8	81.5	91.8	101	111	120
Water pressure drop	kPa	39.0	45.0	66.0	42.0	55.0	37.0
COMPRESSOR							
Type		Single Screw	Single Screw	Single Screw	Single Screw	Single Screw	Single Screw
Oil charge	l	68.0	68.0	68.0	80.0	80.0	80.0
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 - Cooling	dB(A)	87	88	88	89	89	90
REFRIGERANT CIRCUIT							
Refrigerant type		R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge	kg	260	290	290	305	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. (*) IW: Ivory White; GPSS: Galvanized and Painted Steel Sheet; 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.

EWWD~VZ-XS 380/60

MODEL		EWWD450V ZXSA1 380/60	EWWD500V ZXSA1 380/60	EWWD610V ZXSA1 380/60	EWWD710V ZXSA1 380/60	EWWD800V ZXSA1 380/60	EWWD900V ZXSA1 380/60
COOLING PERFORMANCE							
Capacity - Cooling	kW	452	503	616	716	797	905
Capacity control - Type		Stepless	Stepless	Stepless	Stepless	Stepless	Stepless
Capacity control - Minimum capacity	%	20	20	20	20	20	20
Unit power input - Cooling	kW	76.9	85.9	104	124	141	152
EER		5.88	5.86	5.88	5.78	5.64	5.93
ESEER		7.51	7.92	8.10	8.20	8.22	7.92
IPLV		9.42	9.59	9.52	9.66	9.64	9.48
CASING							
Colour *		IW	IW	IW	IW	IW	IW
Material *		GPSS	GPSS	GPSS	GPSS	GPSS	GPSS
DIMENSIONS							
Height	mm	2090	2120	2120	2230	2290	2480
Width	mm	1180	1180	1180	1220	1240	1340
Length	mm	3460	3460	3690	3690	3690	3830
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	m ² °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	21.5	24.0	29.3	34.1	38.0	43.2
Water pressure drop	kPa	89.0	63.0	59.0	63.0	55.0	67.0
Insulation material *		CC	CC	CC	CC	CC	CC
HEAT EXCHANGER - CONDENSER							
Type *		S&T	S&T	S&T	S&T	S&T	S&T
Fluid		Water	Water	Water	Water	Water	Water
Fouling Factor	m ² °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	26.4	29.4	35.3	41.2	46.1	52.0
Water pressure drop	kPa	31.0	28.0	22.0	20.0	24.0	25.0
COMPRESSOR							
Type		Single Screw	Single Screw	Single Screw	Single Screw	Single Screw	Single Screw
Oil charge	l	34.0	34.0	40.0	40.0	40.0	40.0
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 distance - Cooling	dB(A)	78	80	82	86	86	86
REFRIGERANT CIRCUIT							
Refrigerant type		R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge	kg	95	95	125	110	135	185
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. (*) IW: Ivory White; GPSS: Galvanized and Painted Steel Sheet; 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.

EWWD~VZ-XS 380/60

MODEL		EWWD11V ZXSA1 380/60	EWWD12V ZXSA2 380/60	EWWD13V ZXSA2 380/60	EWWD14V ZXSA2 380/60	EWWD16V ZXSA2 380/60	EWWD17V ZXSA2 380/60
COOLING PERFORMANCE							
Capacity - Cooling	kW	1,057	1,198	1,310	1,412	1,600	1,755
Capacity control - Type		Stepless	Stepless	Stepless	Stepless	Stepless	Stepless
Capacity control - Minimum capacity	%	20	10	10	10	10	10
Unit power input - Cooling	kW	186	214	235	254	285	318
EER		5.68	5.58	5.57	5.55	5.61	5.51
ESEER		8.17	8.36	8.25	8.47	8.24	8.45
IPLV		9.58	9.66	9.67	9.76	9.74	9.82
CASING							
Colour *		IW	IW	IW	IW	IW	IW
Material *		GPSS	GPSS	GPSS	GPSS	GPSS	GPSS
DIMENSIONS							
Height	mm	2480	2320	2290	2290	2350	2500
Width	mm	1340	1490	1580	1580	1580	1610
Length	mm	3830	4550	4550	4560	4560	4570
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	m ² °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	50.4	57.1	62.5	67.3	76.3	83.6
Water pressure drop	kPa	59.0	52.0	62.0	52.0	67.0	58.0
Insulation material *		CC	CC	CC	CC	CC	CC
HEAT EXCHANGER - CONDENSER							
Type *		S&T	S&T	S&T	S&T	S&T	S&T
Fluid		Water	Water	Water	Water	Water	Water
Fouling Factor	m ² °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	61.0	69.8	76.3	82.2	93.2	102
Water pressure drop	kPa	25.0	28.0	28.0	21.0	32.0	27.0
COMPRESSOR							
Type		Single Screw	Single Screw	Single Screw	Single Screw	Single Screw	Single Screw
Oil charge	l	40.0	74.0	80.0	80.0	80.0	80.0
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 distance - Cooling	dB(A)	88	87	87	88	88	89
REFRIGERANT CIRCUIT							
Refrigerant type		R134a	R134a	R134a	R134a	R134a	R134a
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. (*) IW: Ivory White; GPSS: Galvanized and Painted Steel Sheet; 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.

EWWD~VZ-XS 380/60

MODEL		EWWD19V ZXSA2 380/60	EWWD21V ZXSA2 380/60
COOLING PERFORMANCE			
Capacity - Cooling	kW	1,918	2,081
Capacity control - Type		Stepless	Stepless
Capacity control - Minimum capacity	%	10	10
Unit power input - Cooling	kW	352	382
EER		5.44	5.45
ESEER		8.20	8.33
IPLV		9.68	9.70
CASING			
Colour *		IW	IW
Material *		GPSS	GPSS
DIMENSIONS			
Height	mm	2480	2490
Width	mm	1740	1770
Length	mm	4870	4870
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	m ² °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	91.4	99.2
Water pressure drop	kPa	49.0	58.0
Insulation material *		CC	CC
HEAT EXCHANGER - CONDENSER			
Type *		S&T	S&T
Fluid		Water	Water
Fouling Factor	m ² °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	112	121
Water pressure drop	kPa	37.0	28.0
COMPRESSOR			
Type		Single Screw	Single Screw
Oil charge	l	80.0	80.0
Quantity	No.	2	2
SOUND LEVEL**			
Sound Power - Cooling	dB(A)	109	110
Sound Pressure level@1m distance - Cooling	dB(A)	89	90
REFRIGERANT CIRCUIT			
Refrigerant type		R134a	R134a
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. (*) IW: Ivory White; GPSS: Galvanized and Painted Steel Sheet; 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.

EWWD~VZ-PS 380/60

MODEL		EWWD505V ZPSA1 380/60	EWWD715V ZPSA1 380/60	EWWD910V ZPSA1 380/60	EWWD12V ZPSA2 380/60	EWWD16V ZPSA2 380/60	EWWD18V ZPSA2 380/60
COOLING PERFORMANCE							
Capacity - Cooling	kW	507	720	911	1,205	1,609	1,762
Capacity control - Type		Stepless	Stepless	Stepless	Stepless	Stepless	Stepless
Capacity control - Minimum capacity	%	20	20	20	10	10	10
Unit power input - Cooling	kW	84.5	123	151	213	283	317
EER		6.00	5.84	6.01	5.65	5.68	5.55
ESEER		8.15	8.48	8.25	8.66	8.53	8.71
IPLV		9.61	9.68	9.57	9.79	9.82	9.92
CASING							
Colour *		IW	IW	IW	IW	IW	IW
Material *		GPSS	GPSS	GPSS	GPSS	GPSS	GPSS
DIMENSIONS							
Height	mm	2090	2430	2480	2290	2500	2490
Width	mm	1180	1330	1340	1580	1610	1770
Length	mm	3690	3690	3830	4560	4570	4870
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	m ² °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	24.2	34.3	43.4	57.5	76.7	84.0
Water pressure drop	kPa	55.0	42.0	44.0	38.0	49.0	41.0
Insulation material *		CC	CC	CC	CC	CC	CC
HEAT EXCHANGER - CONDENSER							
Type *		S&T	S&T	S&T	S&T	S&T	S&T
Fluid		Water	Water	Water	Water	Water	Water
Fouling Factor	m ² °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	29.6	41.5	52.3	70.1	93.4	102
Water pressure drop	kPa	16.0	17.0	19.0	21.0	21.0	28.0
COMPRESSOR							
Type		Single Screw	Single Screw	Single Screw	Single Screw	Single Screw	Single Screw
Oil charge	l	34.0	40.0	40.0	80.0	80.0	80.0
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		R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge	kg	130	195	185	290	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. (*) IW: Ivory White; GPSS: Galvanized and Painted Steel Sheet; 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.

EWWD~VZ-SS 380/60

MODEL		EWWD600V ZSSA1 380/60	EWWD700V ZSSA1 380/60	EWWD760V ZSSA1 380/60	EWWD890V ZSSA1 380/60	EWWD10V ZSSA1 380/60	EWWD12V ZSSA2 380/60
POWER SUPPLY							
Phases	No.	3	3	3	3	3	3
Frequency	Hz	60	60	60	60	60	60
Voltage	V	380	380	380	380	380	380
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	232	260	318	367
Maximum running current	A	272	314	350	365	515	574
Maximum current for wires sizing	A	299	346	385	402	567	632
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	272	314	350	365	515	314
Starting method		VFD	VFD	VFD	VFD	VFD	VFD

MODEL		EWWD13V ZSSA2 380/60	EWWD14V ZSSA2 380/60	EWWD16V ZSSA2 380/60	EWWD17V ZSSA2 380/60	EWWD19V ZSSA2 380/60	EWWD21V ZSSA2 380/60
POWER SUPPLY							
Phases	No.	3	3	3	3	3	3
Frequency	Hz	60	60	60	60	60	60
Voltage	V	380	380	380	380	380	380
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	398	435	491	534	595	635
Maximum running current	A	586	629	679	829	958	1030
Maximum current for wires sizing	A	644	691	747	912	1054	1133
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	293	314	365	515	479	515
Starting method		VFD	VFD	VFD	VFD	VFD	VFD

Allowed voltage tolerance $\pm 10\%$. Voltage unbalance between phases must be within $\pm 3\%$. 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.

EWWD~VZ-XS 380/60

MODEL		EWWD450V ZXSA1 380/60	EWWD500V ZXSA1 380/60	EWWD610V ZXSA1 380/60	EWWD710V ZXSA1 380/60	EWWD800V ZXSA1 380/60	EWWD900V ZXSA1 380/60
POWER SUPPLY							
Phases	No.	3	3	3	3	3	3
Frequency	Hz	60	60	60	60	60	60
Voltage	V	380	380	380	380	380	380
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	147	179	210	240	258
Maximum running current	A	191	260	272	314	365	365
Maximum current for wires sizing	A	210	286	299	346	402	402
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	191	260	272	314	365	365
Starting method		VFD	VFD	VFD	VFD	VFD	VFD

MODEL		EWWD11V ZXSA1 380/60	EWWD12V ZXSA2 380/60	EWWD13V ZXSA2 380/60	EWWD14V ZXSA2 380/60	EWWD16V ZXSA2 380/60	EWWD17V ZXSA2 380/60
POWER SUPPLY							
Phases	No.	3	3	3	3	3	3
Frequency	Hz	60	60	60	60	60	60
Voltage	V	380	380	380	380	380	380
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	314	356	372	400	448	499
Maximum running current	A	515	574	558	599	647	790
Maximum current for wires sizing	A	567	632	614	658	712	869
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	515	314	279	299	348	490
Starting method		VFD	VFD	VFD	VFD	VFD	VFD

Allowed voltage tolerance $\pm 10\%$. Voltage unbalance between phases must be within $\pm 3\%$. 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.

EWWD~VZ-XS 380/60

MODEL		EWWD19V ZXSA2 380/60	EWWD21V ZXSA2 380/60
POWER SUPPLY			
Phases	No.	3	3
Frequency	Hz	60	60
Voltage	V	380	380
Voltage tolerance Minimum	%	-10%	-10%
Voltage tolerance Maximum	%	10%	10%
UNIT			
Maximum inrush current	A	0	0
Nominal running current cooling	A	555	597
Maximum running current	A	912	981
Maximum current for wires sizing	A	1004	1079
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

Allowed voltage tolerance $\pm 10\%$. Voltage unbalance between phases must be within $\pm 3\%$. 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.

EWWD~VZ-PS 380/60

MODEL		EWWD505V ZPSA1 380/60	EWWD715V ZPSA1 380/60	EWWD910V ZPSA1 380/60	EWWD12V ZPSA2 380/60	EWWD16V ZPSA2 380/60	EWWD18V ZPSA2 380/60
POWER SUPPLY							
Phases	No.	3	3	3	3	3	3
Frequency	Hz	60	60	60	60	60	60
Voltage	V	380	380	380	380	380	380
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	138	199	245	338	445	497
Maximum running current	A	247	299	348	547	647	790
Maximum current for wires sizing	A	272	329	383	601	712	869
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

Allowed voltage tolerance $\pm 10\%$. Voltage unbalance between phases must be within $\pm 3\%$. 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.

EWWD~VZ-SS 380/60

MODEL	Sound pressure level at 1 m from the unit (rif. 2 x 10 ⁻⁵ Pa)								db(A)	Power db (A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		
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
760	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	108
C21	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.

EWWD~VZ-XS 380/60

MODEL	Sound pressure level at 1 m from the unit (rif. 2 x 10 ⁻⁵ Pa)									Power db (A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	db(A)	
450	58.4	66.2	76.0	73.2	73.9	72.0	62.9	53.7	78	97
500	60.4	68.2	78.0	75.2	75.9	74.0	64.9	55.7	80	99
610	65.7	67.5	74.5	82.2	75.8	73.8	65.7	58.3	82	101
710	69.7	71.5	78.5	86.2	79.8	77.8	69.7	62.3	86	105
800	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
C11	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
C21	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.

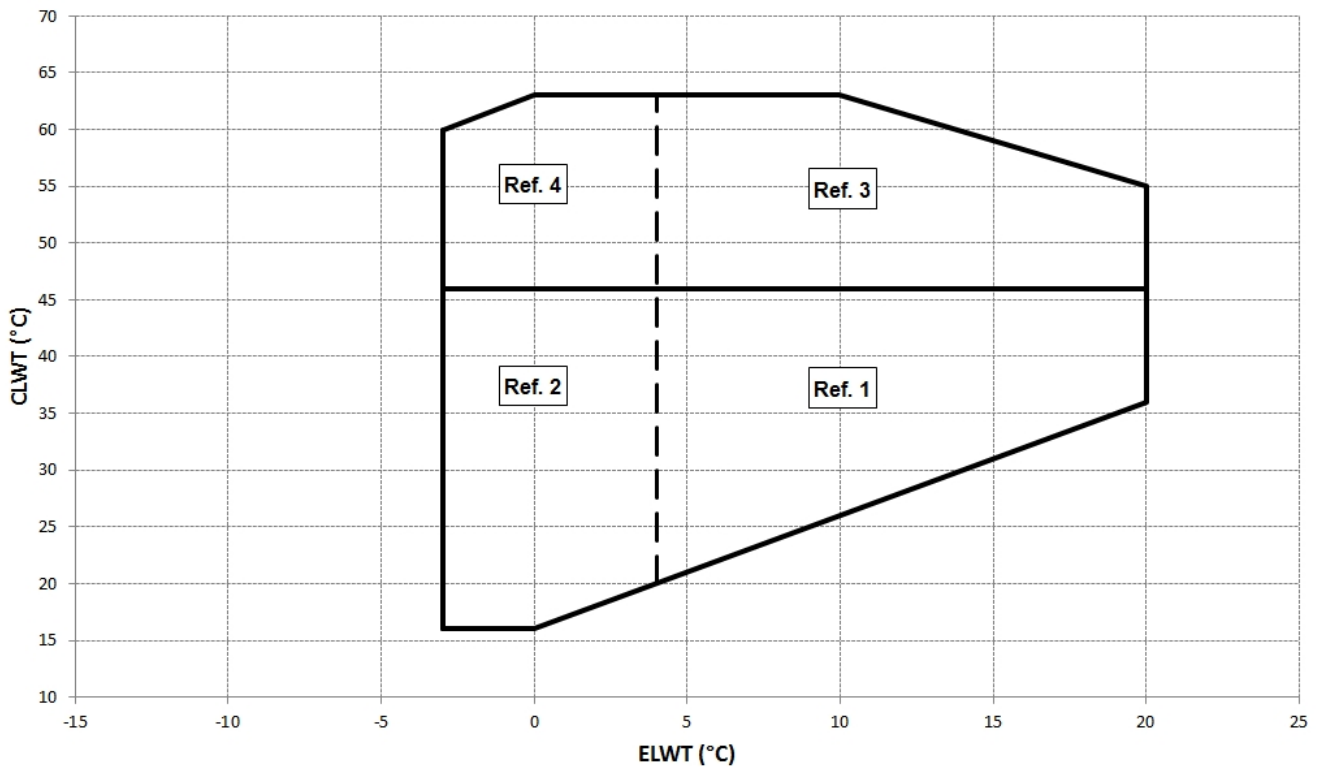
EWWD~VZ-PS 380/60

MODEL	Sound pressure level at 1 m from the unit (rif. 2 x 10 ⁻⁵ Pa)								db(A)	Power db (A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		
505	60.4	68.2	78.0	75.2	75.9	74.0	64.9	55.7	80	99
715	69.7	71.5	78.5	86.2	79.8	77.8	69.7	62.3	86	105
910	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
C18	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.

Operating Limits

EWWD-VZSS - Silver Version



Legend:

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

Ref. 1: Standard Unit.

Ref. 2: Standard Unit plus Brine Version (option 08 - on request).

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

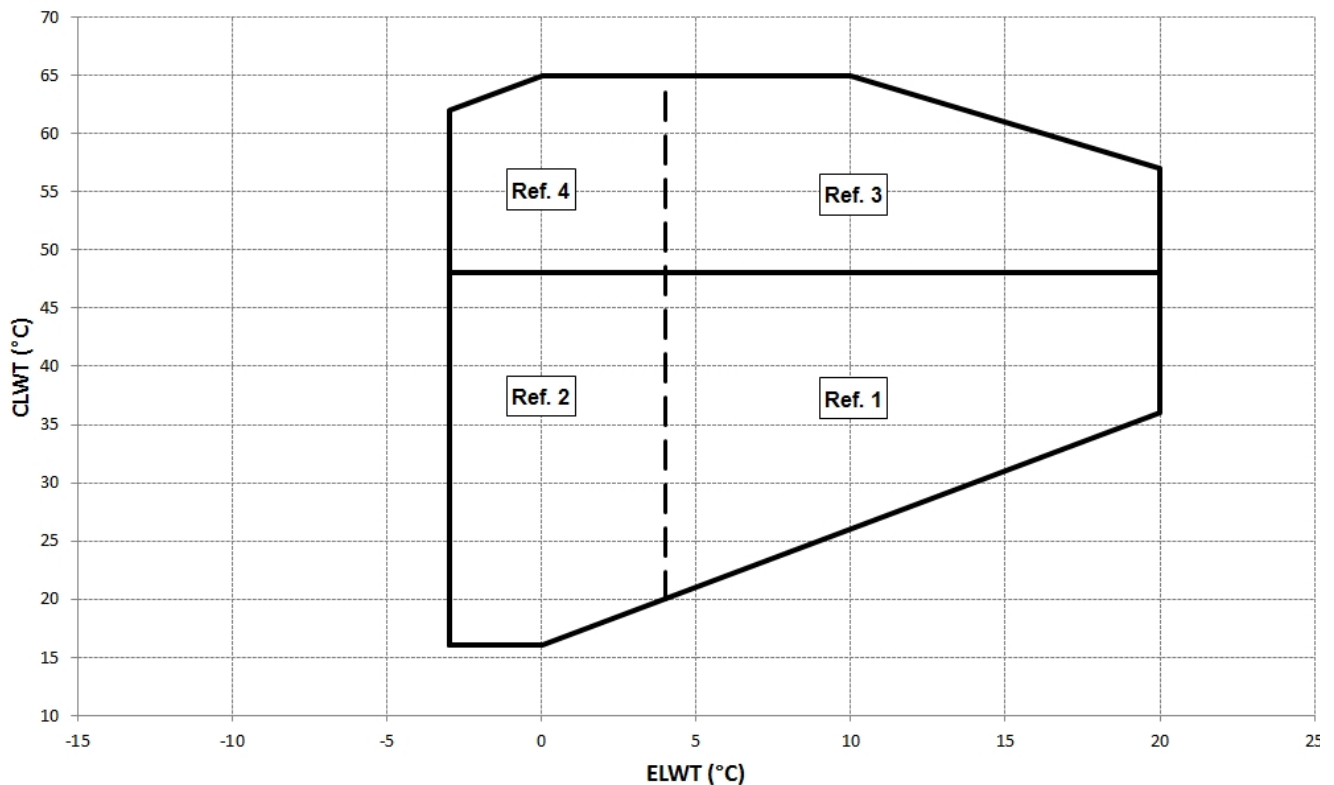
Ref. 4: Standard Unit plus High temperature kit (option 111 - on request) plus Brine Version (option 08 - on request).

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 ELWT 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.

Operating Limits

EWWD-VZXS & EWWD-VZPS - Gold & Platinum Version



Legend:

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

Ref. 1: Standard Unit.

Ref. 2: Standard Unit plus Brine Version (option 08 - on request).

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

Ref. 4: Standard Unit plus High temperature kit (option 111 - on request) plus Brine Version (option 08 - on request).

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 ELWT 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 conditions are respectively 4°C and 8°C. 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.

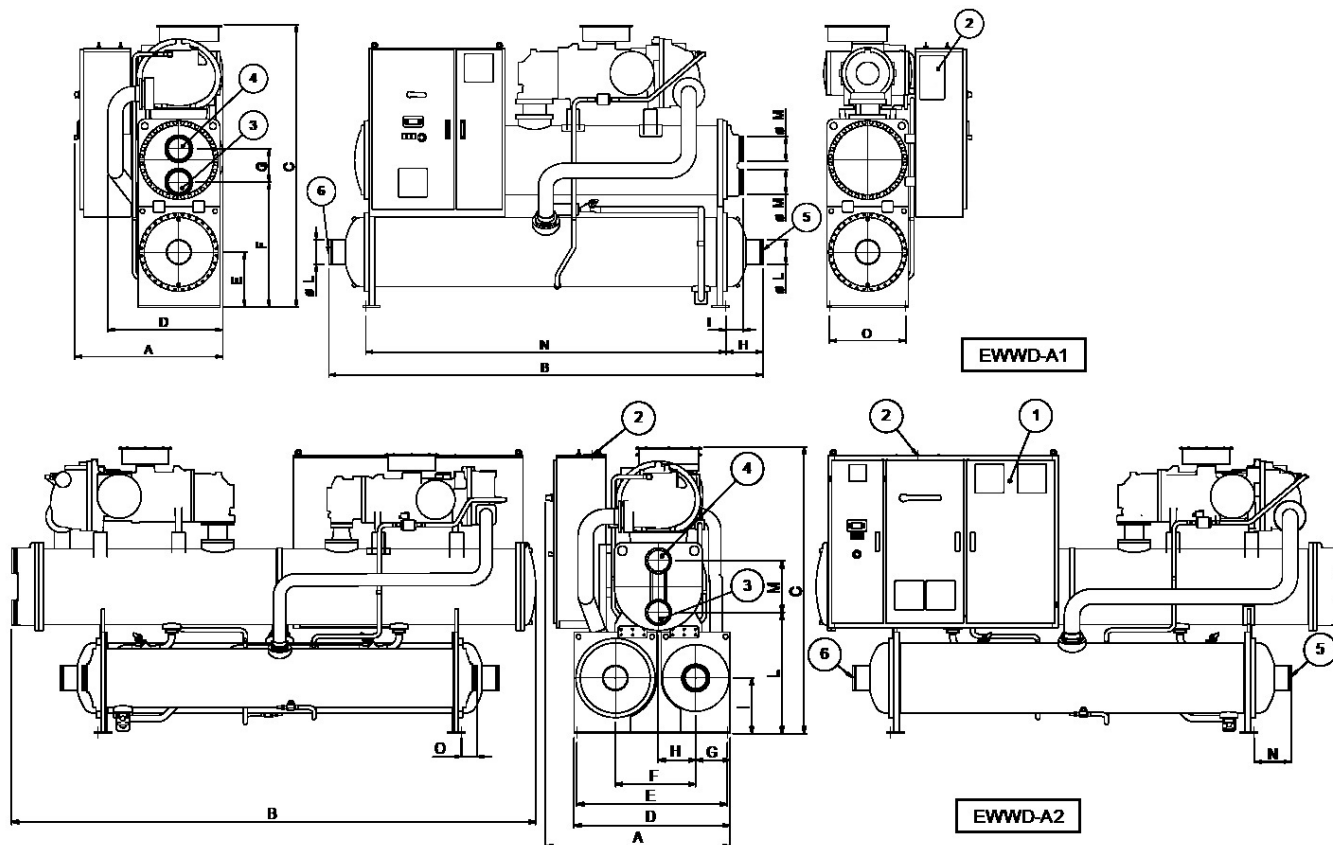
Water treatment

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.

Water charge, flow and quality

Items (1) (6)	Cooling System		Once Flow		Cooled Water		Low temperature		Heated water (2)		Tendency if out of criteria	
	Circulating water		Flowing water		Circulating water		Circulating water		Supply water (4)			
	Circulating water	Supply water (1) (4)	Flowing water		Circulating water [Below 20°C]	Supply water (4)	Circulating water [20°C ~ 60°C]	Supply water (4)	Circulating water [60°C ~ 80°C]	Supply water (4)		
Items to be controlled:	pH	6.5 ~ 8.2	6.0 ~ 8.0	6.0 ~ 8.0	6.0 ~ 8.0	6.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	Corrosion + Scale	
	Electrical conductivity	[mS/m] at 25°C	Below 80	Below 30	Below 40	Below 80	Below 80	Below 30	Below 30	Below 30	Below 30	Corrosion + Scale
		[µS/cm] at 25°C	(Below 800)	(Below 300)	(Below 400)	(Below 800)	(Below 800)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	Corrosion + Scale
	Chloride ion	[mgCl ⁻ /l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 50	Below 50	Corrosion
		[mgSO ₄ ⁻² /l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 50	Below 50	Corrosion
	Total hardness	[mgCaCO ₃ /l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
		[mgCaCO ₃ /l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium hardness	[mgCaCO ₃ /l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
		[mgSiO ₂ /l]	Below 50	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Scale
	Oxygen	(mg O ₂ /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Corrosion
		(mm)	Below 0.5	Below 0.5	Below 0.5	Below 0.5	Below 0.5	Below 0.5	Below 0.5	Below 0.5	Below 0.5	Erosion
	Total dissolved solids	(mg/l)	Below 1000	Below 1000	Below 1000	Below 1000	Below 1001	Below 1000	Below 1000	Below 1000	Below 1001	Erosion
		(Ethylene Glycol weight conc.)	Below 60%	Below 60%	---	Below 60%	Below 60%	Below 60%	Below 60%	Below 60%	Below 60%	---
	Nitrate ion	(mg NO ₃ ⁻ /l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 100	Below 100	Below 101	Corrosion
		(mg Fe/l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Scale
Copper	[mgCu/l]	Below 0.3	Below 0.3	Below 1.0	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Corrosion + Scale	
	[mgS ²⁻ /l]	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion	
Ammonium ion	[mgNH ₄ ⁺ /l]	Below 1.0	Below 0.1	Below 1.0	Below 1.0	Below 0.1	Below 0.3	Below 0.1	Below 0.1	Below 0.1	Corrosion	
	[mgCl ₂ /l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Corrosion	
Free carbonate	[mgCO ₃ /l]	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Corrosion	
	Stability index	6.0 ~ 7.0	---	---	---	---	---	---	---	---	Corrosion + Scale	

1 Names, definitions and units are according to JIS K 0101. Units and figures between brackets are old units published as reference only.
 2 In case of using heated water (more than 40°C), corrosion is generally noticeable.
 3 In the cooling water using hermetic cooling tower, case circuit water is according to heated water standard, and scattered water is according to cooling water standard.
 4 Supply water is considered drink water, industrial water and ground water except for genuine water, neutral water and soft water.
 5 The above mentioned items are representative items in corrosion and scale cases.
 6 The limits above have to be considered as a general prescription and can not totally assure the absence of corrosion and erosion.
 Some particular combinations of elements or the presence of components not listed in the table or factors not considered may trigger corrosion phenomena.

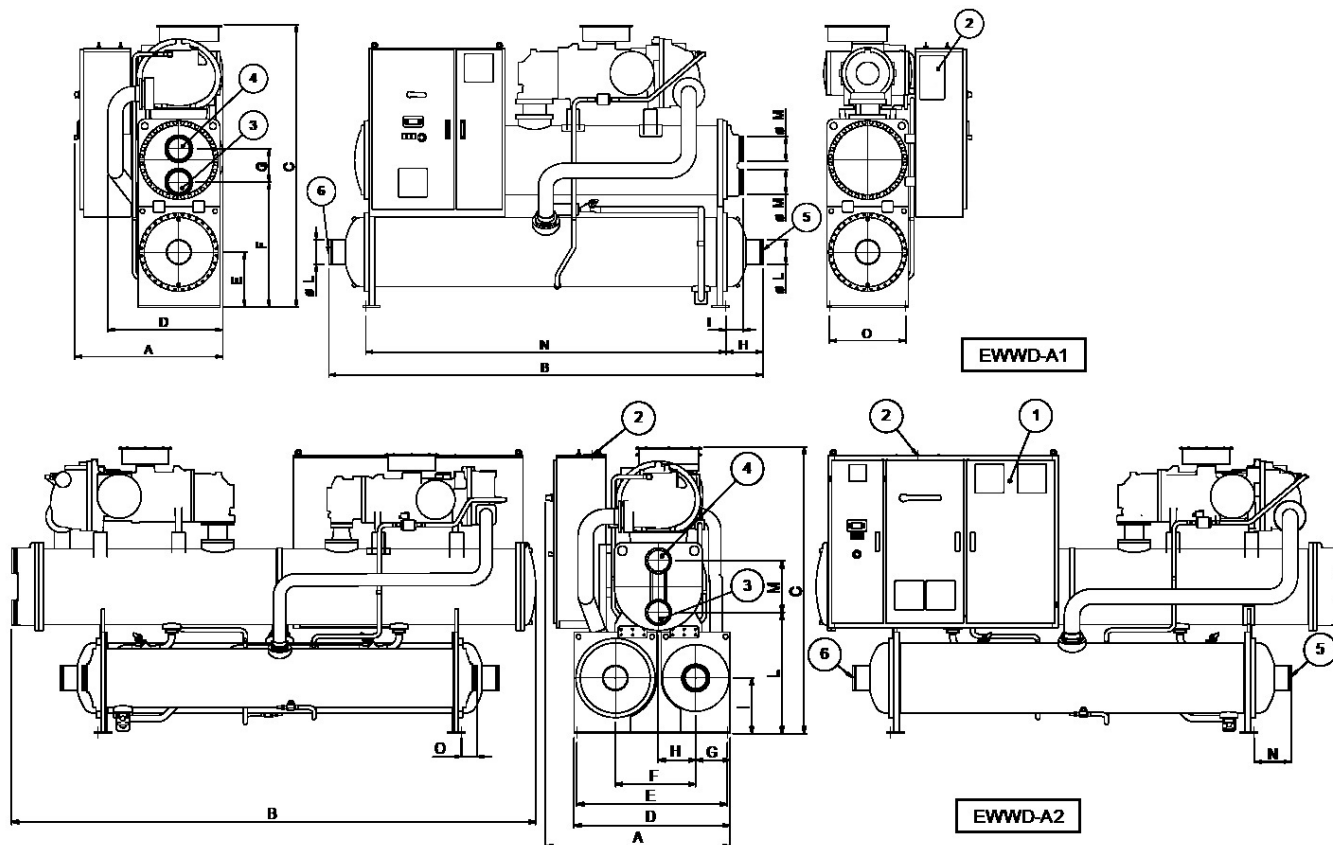


LEGEND

- 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

MODEL	A	B	C	D	E	F	G	H	I	L	M	N	O
EWWD600VZSSA1 380/60	1179	3634	2122	830	431	965	270	232	185	168.3	139.7	3170	490
EWWD700VZSSA1 380/60	1179	3634	2122	830	431	965	270	232	185	168.3	139.7	3170	490
EWWD760VZSSA1 380/60	1179	3634	2122	830	431	965	270	232	185	168.3	139.7	3170	490
EWWD890VZSSA1 380/60	1219	3510	2292	999	431	981	340	135	205	219.1	168.3	3170	550
EWWD10VZSSA1 380/60	1303	3822	2487	1013	485	1101	292	326	150	219.1	219.1	3170	670
EWWD12VZSSA2 380/60	1482	4545	2343	1140	1090	600	270	300	431	951	340	232	232
EWWD13VZSSA2 380/60	1482	4545	2343	1140	1090	600	270	300	431	951	340	232	232
EWWD14VZSSA2 380/60	1482	4545	2343	1140	1090	600	270	300	431	951	340	232	232
EWWD16VZSSA2 380/60	1482	4545	2343	1140	1090	600	270	300	431	951	340	232	232
EWWD17VZSSA2 380/60	1577	4560	2348	1250	1200	650	300	325	436	952	400	135	135
EWWD19VZSSA2 380/60	1577	4560	2348	1250	1200	650	300	325	436	952	400	135	135
EWWD21VZSSA2 380/60	1717	4565	2498	1470	1420	750	360	375	485	1056	450	326	326

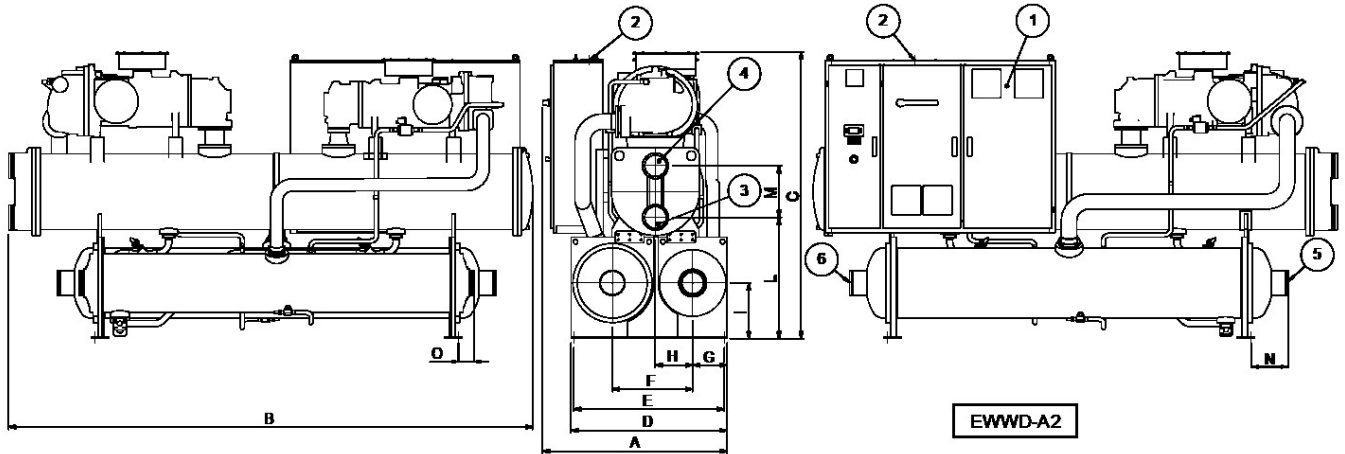
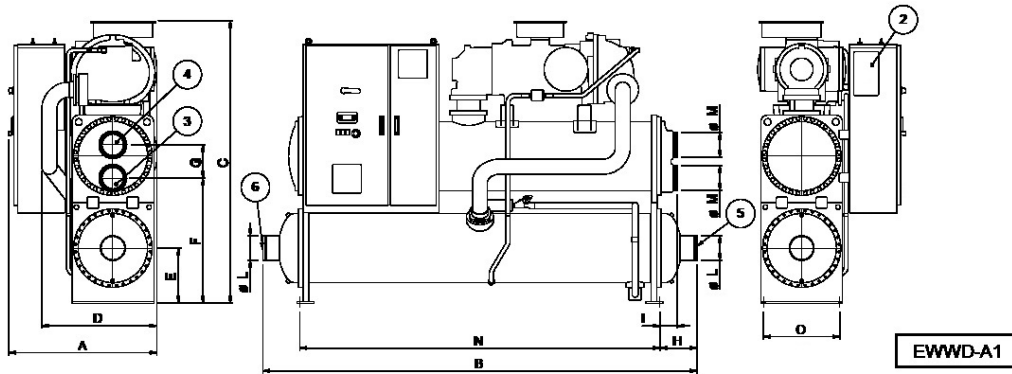


LEGEND

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- 4. EVAPORATOR WATER OUTLET
- 5. CONDENSER WATER INLET
- 6. CONDENSER WATER OUTLET

Unit dimensions below are in mm

MODEL	A	B	C	D	E	F	G	H	I	L	M	N	O
EWWD450VZXA1 380/60	1179	3634	2093	828	431	965	270	232	185	168.3	139.7	3170	490
EWWD500VZXA1 380/60	1179	3634	2093	828	431	965	270	232	185	168.3	139.7	3170	490
EWWD610VZXA1 380/60	1179	3490	2122	830	431	965	270	135	185	219.1	139.7	3170	550
EWWD710VZXA1 380/60	1219	3510	2234	762	431	981	340	135	205	219.1	168.3	3170	550
EWWD800VZXA1 380/60	1877	3510	2234	762	431	981	340	135	205	219.1	168.3	3170	550
EWWD900VZXA1 380/60	1303	3822	2487	1013	485	1101	292	326	150	219.1	219.1	3170	670
EWWD11VZXA1 380/60	1303	3822	2487	1013	485	1101	292	326	150	219.1	219.1	3170	670
EWWD12VZXA2 380/60	1482	4545	2343	1195	1145	625	270	300	431	951	340	135	232
EWWD13VZXA2 380/60	1537	4545	2348	1250	1200	650	300	325	436	956	340	135	135
EWWD14VZXA2 380/60	1577	4560	2348	1250	1200	650	300	325	436	952	400	135	135
EWWD16VZXA2 380/60	1577	4560	2348	1250	1200	650	300	325	436	952	400	135	135
EWWD17VZXA2 380/60	1607	4565	2498	1360	1310	700	300	325	485	1056	450	326	135
EWWD19VZXA2 380/60	1657	4866	2475	1250	1200	650	300	325	436	1000	413	135	135

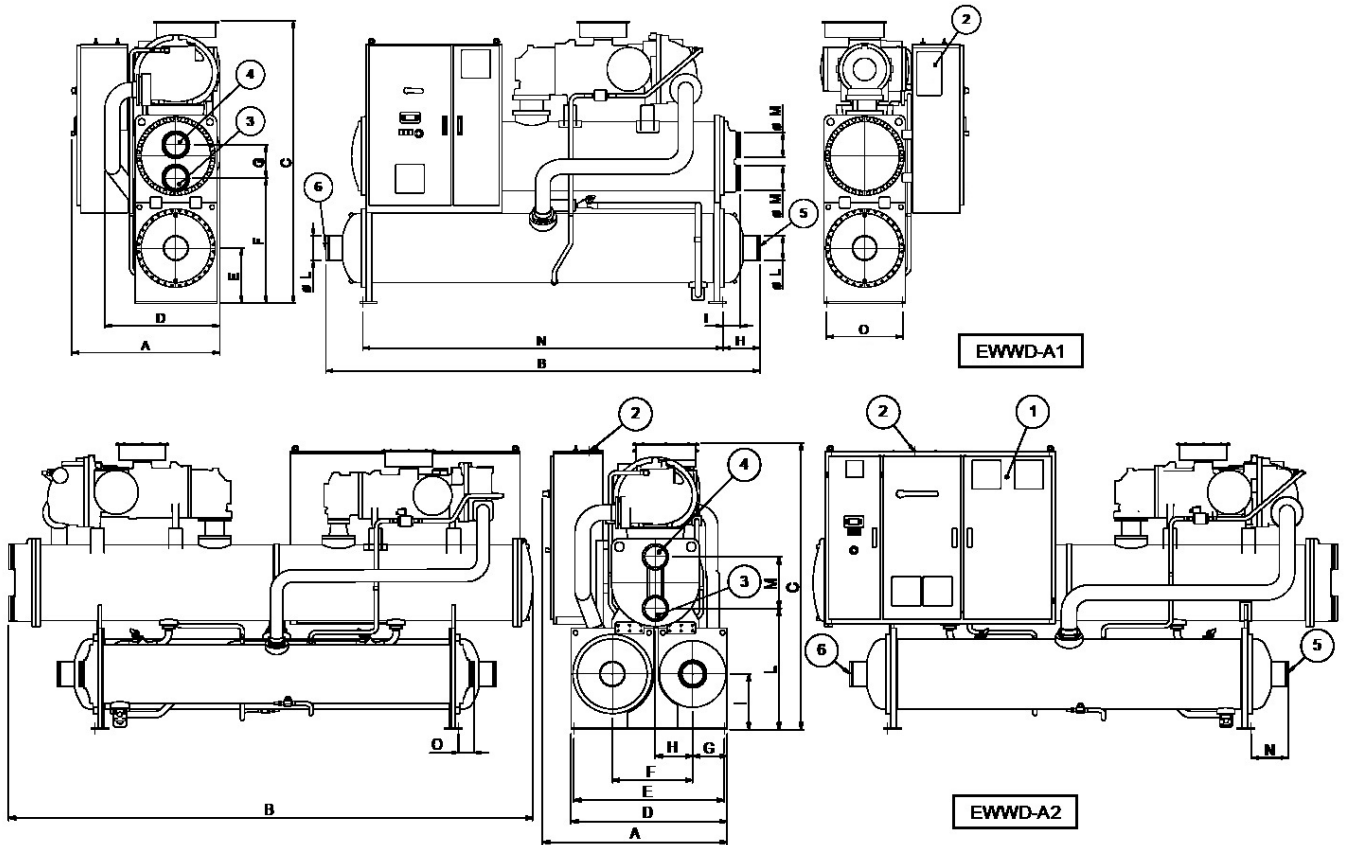


LEGEND

- 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

EWWDC21VZXA2 380/60	1767	4866	2493	1470	1420	750	360	375	485	1019	413	326	326
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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

MODEL	A	B	C	D	E	F	G	H	I	L	M	N	O
EWWD505VZPSA1 380/60	1179	3490	2093	757	431	965	270	135	185	219.1	139.7	3170	550
EWWD715VZPSA1 380/60	1276	3822	2429	822	485	1101	292	326	150	219.1	219.1	3170	670
EWWD910VZPSA1 380/60	1303	3822	2487	1013	485	1101	1101	326	150	219.1	219.1	3170	670
EWWD12VZPSA2 380/60	1577	4560	2348	1250	1200	650	300	325	436	952	400	135	135
EWWD16VZPSA2 380/60	1607	4565	2498	1360	1310	700	300	325	485	1056	450	326	135
EWWD18VZPSA2 380/60	1767	4866	2493	1470	1420	750	360	375	485	1019	413	326	326

Installation Notes

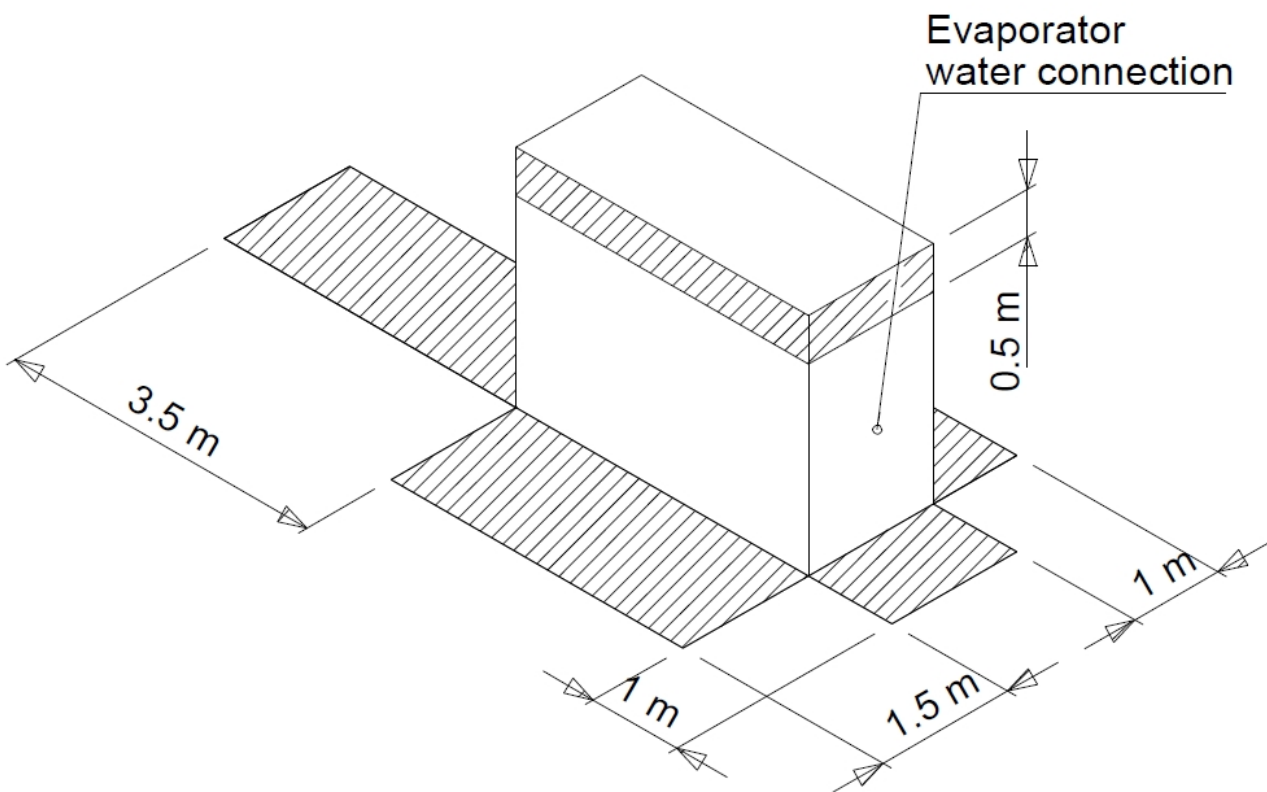
Warning Installation and maintenance of the unit must be performed only by qualified personnel who have knowledge with local codes and regulations, and experience with this type of equipment. Must be avoided the unit installation in places that could be considered dangerous for all the maintenance operations.

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 HFC 134a 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 380V \pm 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 exceeddB(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 $\pm 0,1^{\circ}\text{C}$.
- 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 and to balance the load between the units.

Remote monitoring The unit shall be accessible via LAN or via GSM Modem for remote monitoring and optimization.

Minimum set of functionalities are to be guaranteed:

- Read/Write access to data points
- Alarm history
- Alarm notification via e-mail
- Scheduling of alarm notification
- WEB access to local HMI
- Dynamic web graphic
- Possibility to upgrade firmware and software from remote
- History log for cloud based users interactions
- Scheduler application

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