DAIKIN

Applied Systems

Technical Data

Water cooled chiller, standard efficiency

EEDEN13-413

EWWD-J-SS

TABLE OF CONTENTS

EWWD-J-SS

1 Features

- Compact design to allow easy indoor installation or retrofit operations
- Daikin semi-hermetic single screw stepless compressor
- High efficiency at full and partial load
- Chilled water temperatures down to -10ºC on standard unit
- Optimised for use with R-134a
- MicroTech III controller with superior control logic and easy interface

2 Specifications

2-1 Technical Specifications					EWWD120J-SS	EWWD140J-SS	EWWD150J-SS	EWWD180J-SS	EWWD210J-SS	EWWD250J-SS	EWWD280J-SS	EWWD310J-SS
Cooling capacity	Nom.			kW	120 (1)	146 (1)	154 (1)	177 (1)	207 (1)	255 (1)	284 (1)	309 (1)
Heating capacity	Nom.			kW	142 (2)	172 (2)	188 (2)	216 (2)	249 (2)	305 (2)	340 (2)	377 (2)
Capacity control	Method				Stepless							
	Minimum capacity			%	25							12.5
Power input	Cooling	Nom.		kW	28.0 (1)	33.9 (1)	39.5 (1)	45.3 (1)	50.5 (1)	60.0 (1)	70.1 (1)	78.6 (1)
	Heating	Nom.		kW	32.9 (2)	40.1 (2)	46.4 (2)	53.5 (2)	59.57 (2)	71.68 (2)	80.75 (2)	92.88 (2)
EER					4.28 (1)	4.29 (1)	3.91 (1)	3.92 (1)	4.11 (1)	4.25 (1)	4.05 (1)	3.93 (1)
ESEER					4.51	4.20			4.28	4.68	4.01	4.32
COP					4.32 (2)	4.29 (2)	4.05 (2)	4.04 (2)	4.18 (2)	4.26 (2)	4.21 (2)	4.06 (2)
Casing	Colour				Ivory white							
	Material				Galvanized and painted steel sheet							
Dimensions	Unit	Height		mm	1,020							2,000
		Width		mm	913							
		Depth		mm	2,684							
Weight	Unit			kg	1,177	1,233	1,334	1,366	1,416	1,600	1,607	2,668
	Operation weight			kg	1,211	1,276	1,378	1,415	1,473	1,663	1,675	2,755
Water heat exchanger	Type				Brazed plate, one per circuit							
Water heat exchanger - evaporator	Water volume			l	14	18	14	17	20	26		29
	Water flow rate	Nom.		l/s	5.73	6.98	7.41	8.50	9.94	12.25	13.63	14.81
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	15	13	40	38	36	28	33	40
	Insulation material				Closed cell							
Water heat exchanger - condenser	Type				Double pass shell and tube							
	Water flow rate	Nom.		l/s	7.04	8.57	9.25	10.62	12.30	15.06	16.89	18.49
	Nominal water pressure drop	Cooling		kPa	20	12	11			16	26	11
	Insulation material				Closed cell							
	Model	Quantity			1							
Sound power level	Cooling	Nom.		dBA	88.6 (3)					87.2 (3)		92.4 (3)
Sound pressure level	Cooling	Nom.		dBA	71.4 (3)					70.0 (3)		74.4 (3)
Compressor	Type				Semi-hermetic single screw compressor							
	Quantity				1							2
	Oil	Charged volume		l	13				-			
Operation range	Evaporator	Cooling	Min.	ºCDB	-10							
			Max.	ºCDB	15							
	Condenser	Cooling	Min.	ºCDB	23							
			Max.	ºCDB	60							
Refrigerant	Type				R-134a							
	Charge			kg	18	20	33	34	36	38		66
	Circuits	Quantity			1							2
Piping connections	Evaporator water inlet/outlet			mm	76.2							
	Condenser water inlet/outlet (OD)				2" 1/2	4"						
Safety devices	Item	01			High discharge pressure (pressure switch)							
		02			High discharge pressure (pressure transducer)							
		03			Low suction pressure (pressure transducer)							
		04			Compressor motor protection							
		05			High discharge temperature							
		06			Low oil pressure							
		07			Low pressure ratio							
		08			High oil filter pressure drop							
		09			Phase monitor							
		10			Emergency stop button							
		11			Water freeze protection controller							

2 Specifications

2-2 Technical Specifications					EWWD330J-SS	EWWD360J-SS	EWWD380J-SS	EWWD400J-SS	EWWD450J-SS	EWWD500J-SS	EWWD530J-SS	EWWD560J-SS
Cooling capacity	Nom.			kW	333 (1)	356 (1)	385 (1)	415 (1)	463 (1)	512 (1)	540 (1)	568 (1)
Heating capacity	Nom.			kW	405 (2)	432 (2)	466 (2)	499 (2)	554 (2)	610 (2)	645 (2)	681 (2)
Capacity control	Method				Stepless							
	Minimum capacity			%	12.5							
Power input	Cooling	Nom.		kW	84.4 (1)	90 (1)	100 (1)		110 (1)	119 (1)	129 (1)	140 (1)
	Heating	Nom.		kW	99.9 (2)	107 (2)	113 (2)	119 (2)	131 (2)	143 (2)	152 (2)	162 (2)
EER					3.94 (1)	3.95 (1)	3.83 (1)	4.13 (1)	4.20 (1)	4.29 (1)	4.18 (1)	4.06 (1)
ESEER					4.35	4.50	4.31	4.65	4.74	4.83	4.73	4.33
COP					4.05 (2)	4.04 (2)	4.12 (2)	4.19 (2)	4.22 (2)	4.26 (2)	4.23 (2)	4.22 (2)
Casing	Colour				Ivory white							
	Material				Galvanized and painted steel sheet							
Dimensions	Unit	Height		mm	2,000							
		Width		mm	913							
		Depth		mm	2,684							
Weight	Unit			kg	2,700	2,732	2,782	2,832	3,016	3,200	3,207	3,215
	Operation weight			kg	2,792	2,830	2,888	2,946	3,136	3,327	3,338	3,350
Water heat exchanger	Type				Brazed plate, one per circuit							
Water heat exchanger - evaporator	Water volume			l	31	33	37	41	46	52		
	Water flow rate	Nom.		l/s	15.96	17.06	18.44	19.88	22.17	24.51	25.85	27.23
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	40	38		36		28		33
	Insulation material				Closed cell							
Water heat exchanger - condenser	Type				Double pass shell and tube							
	Water flow rate	Nom.		l/s	19.91	21.28	23.15	24.59	27.33	30.10	31.92	33.78
	Nominal water pressure drop	Cooling		kPa	11					16		26
	Insulation material				Closed cell							
	Model	Quantity			1							
Sound power level	Cooling	Nom.		dBA	92.4 (3)				91.8 (3)	91.0 (3)		
Sound pressure level	Cooling	Nom.		dBA	74.4 (3)				73.8 (3)	73.0 (3)		
Compressor	Type				Semi-hermetic single screw compressor							
	Quantity				2							
	Oil	Charged volume		l	26				29	32		
Operation range	Evaporator	Cooling	Min.	ºCDB	-10							
			Max.	ºCDB	15							
	Condenser	Cooling	Min.	ºCDB	23							
			Max.	ºCDB	60							
Refrigerant	Type				R-134a							
	Charge			kg	67	68	70	72	74	76		
	Circuits	Quantity			2							
Piping connections	Evaporator water inlet/outlet			mm	76.2							
	Condenser water inlet/outlet (OD)				4"							
Safety devices	Item	01			High discharge pressure (pressure switch)							
		02			High discharge pressure (pressure transducer)							
		03			Low suction pressure (pressure transducer)							
		04			Compressor motor protection							
		05			High discharge temperature							
		06			Low oil pressure							
		07			Low pressure ratio							
		08			High oil filter pressure drop							
		09			Phase monitor							
		10			Emergency stop button							
		11			Water freeze protection controller							

2 Specifications

2-3 Electrical Specifications				EWWD120J-SS	EWWD140J-SS	EWWD150J-SS	EWWD180J-SS	EWWD210J-SS	EWWD250J-SS	EWWD280J-SS	EWWD310J-SS
Compressor	Phase			3~							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
	Maximum running current		A	80	96	107	121	145	161	182	107
	Starting method			Wye-delta							
Compressor 2	Maximum running current		A	-							107
Power supply	Phase			3~							
	Frequency		Hz	50							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
Unit	Maximum starting current		A	151		195			288		281
	Nominal running current (RLA)	Cooling	A	47 (6)	57 (6)	68 (6)	75 (6)	85 (6)	99 (6)	113 (6)	135 (6)
	Maximum running current		A	80	96	107	121	145	161	182	214
	Max unit current for wires sizing		A	88	106	118	133	160	177	200	235

2-4 Electrical Specifications				EWWD330J-SS	EWWD360J-SS	EWWD380J-SS	EWWD400J-SS	EWWD450J-SS	EWWD500J-SS	EWWD530J-SS	EWWD560J-SS
Compressor	Phase			3~							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
	Maximum running current		A	107	121		145		161		182
	Starting method			Wye-delta							
Compressor 2	Maximum running current		A	121		145		161		182	
Power supply	Phase			3~							
	Frequency		Hz	50							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
Unit	Maximum starting current		A	292		311		404	417	434	
	Nominal running current (RLA)	Cooling	A	143 (6)	150 (6)	160 (6)	169 (6)	183 (6)	197 (6)	212 (6)	226 (6)
	Maximum running current		A	228	242	266	290	306	322	343	364
	Max unit current for wires sizing		A	251	266	293	319	337	354	377	400.4

Notes

(1) Cooling: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; entering condenser water temp. 30ºC; leaving condenser water temp. 35ºC; full load operation.

(2) Heating: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; entering condenser water temp. 40ºC; leaving condenser water temp. 45ºC; unit at full load operation

(3) Sound level data are measured at entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; entering condenser water temp. 30ºC; leaving condenser water temp. 35ºC; full load operation; standard: ISO3744

(4) Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.

(5) Maximum starting current: starting current of biggest compressor + current of the other compressor at 75 % of maximum load

(6) Nominal current in cooling mode: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; entering condenser water temp. 30ºC; leaving condenser water temp. 35ºC; compressors.

(7) Maximum running current is based on max compressor absorbed current in its envelope

(8) Maximum unit current for wires sizing is based on minimum allowed voltage.

(9) Maximum current for wires sizing: compressor full load ampere x 1.1

(10) Maximum starting current: starting current of biggest compressor + current of the other compressor at 75 % of maximum load + fans current

3 Features and advantages

3 - 1 Features and Advantages

Features and advantages

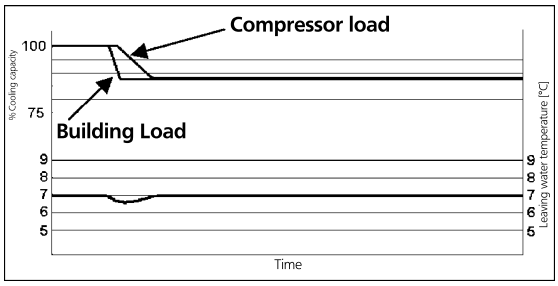
The EWWD-J- water cooled chillers, featuring 1 or 2 single screw compressors, are manufactured to satisfy the requirements of the consultants and the end user. Units are designed to minimise energy costs while maximising the refrigeration capacities.
Daikin's chiller design experience, combined with outstanding features makes the EWWD-J- chiller unmatched in the industry.

Seasonal quietness

The compressor design with a single screw and twin rotors allows a constant gas flow. This compression process completely eliminates gas pulsations. The oil injection also results in significant mechanical noise reduction.
The twin gas compressor discharge chambers are designed to act as attenuators, based on the harmonic wave principle with destructive interference, thus always resulting equal to zero. The extremely low noise compressor performance affords the use of EWWD-J- chiller for all applications.
The reduced number of vibrations produced from the EWWD-J- chiller offers a surprisingly quiet operation eliminating the noise transmission through the structure and the chilled water piping system.

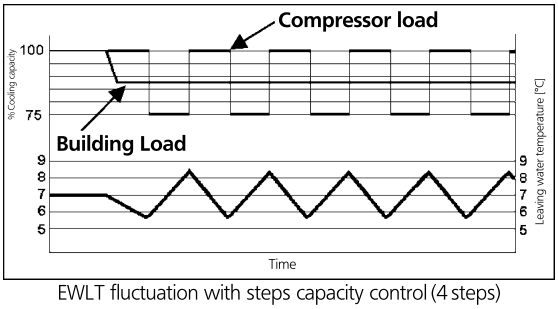
Infinitely capacity control

Cooling capacity control is infinitely variable by means of a screw compressor controlled by microprocessor system.
Each unit has infinitely variable capacity control from 100% down to 25% (one compressor unit), down to 12,5% (two compressors units).
This modulation allows the compressor capacity to exactly match the building cooling load without any leaving evaporator water temperature fluctuation.
This chilled water temperature fluctuation is avoided only with a stepless control.



EWLT fluctuation with stepless capacity control

With a compressor load step control in fact, the compressor capacity, at partial loads, will be too high or too low compared to the building cooling load.
The result is an increase in chiller energy costs, particularly at the part-load conditions at which the chiller operates most of the time.



EWLT fluctuation with steps capacity control (4 steps)

Units with stepless regulation offer benefits that the units with step regulation are unable to match. The ability to follow the system energy demand at any time and the possibility to provide steady outlet water temperature without deviations from the set-point, are the two points that allow you to understand how the optimum operating conditions of a system can be met only through the use of a unit with step-less regulation.

Code requirements - Safety and observant of laws/directives

All water cooled units are designed and manufactured in accordance with applicable selections of the following:

Construction of pressure vessel	97/23/EC (PED)
Machinery Directive	2006/42/EC
Low Voltage	2006/95/EC
Electromagnetic Compatibility	2004/108/EC
Electrical & Safety Codes	EN 60204-1/EN 60335-2-40
Manufacturing Quality Stds	UNI - EN ISO 9001:2004

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3 Features and advantages

3 - 1 Features and Advantages

Certifications

All units manufactured are CE marked, complying with European directives in force, concerning manufacturing and safety. On request units can be produced complying with laws in force in non European countries (ASME, GOST, etc.), and with other applications, such as naval (RINA, etc.).

Versions

EWWD-J- is available in standard efficiency version:

S: Standard Efficiency
16 sizes, covering a cooling capacity range from 121 up to 571 kW, EER up to 4.41 and ESEER up to 5.37.

The EER (Energy Efficiency Ratio) is the ratio of the Cooling Capacity to the Power Input of the unit. The Power Input includes: the power input for operation of the compressor, the power input of all control and safety devices.

The ESEER (European Seasonal Energy Efficiency Ratio) is a weighed formula enabling to take into account the variation of EER with the load rate and the variation of water inlet condenser temperature.

$$ESEER = A \times EER_{100\%} + B \times EER_{75\%} + C \times EER_{50\%} + D \times EER_{25\%}$$

	A	B	C	D
Coefficient	0.03 (3%)	0.33 (33%)	0.41 (41%)	0.23 (23%)
Condenser water inlet temperature (°C)	30	26	22	18

Sound configuration

EWWD-J- is available in standard sound level configuration:

S: Standard Noise

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4 General Characteristics

4 - 1 General characteristics

General characteristics

Cabinet and structure

The cabinet is made of galvanized steel sheet and painted to provide a high resistance to corrosion. Colour Ivory White (Munsell code 5Y7.5/1) (±RAL7044). The base frame has eye-hook for lifting the unit with ropes for an easy installation. The weight is uniformly distributed along the profiles of the base and this facilitates the arrangement of the unit.

Screw compressors

The compressor is semi-hermetic, single-screw type with gate-rotors made of carbon impregnated engineered composite material. The compressor has one slide managed by the unit microprocessor for infinitely modulating the capacity between 100% to 25%. An integrated high efficiency oil separator maximizes the oil separation and standard start is Wye-delta (Y-△) type.

Ecological HFC 134a refrigerant

The compressors have been designed to operate with R-134a, ecological refrigerant with zero ODP (Ozone Depletion Potential) and very low GWP (Global Warming Potential) that means low TEWI (Total Equivalent Warming Impact).

Evaporator

The units are equipped with direct expansion plate to plate type evaporator, one per circuit. This heat exchanger is made of stainless steel brazed plates and is covered with a 10mm closed cell insulation material. The evaporator is manufactured in accordance to PED approval. The evaporator water outlet connections are provided with Victaulic Kit (as standard).

Condenser

The units are equipped with Direct Expansion shell & tube condenser, with copper tubes rolled into steel tube sheets. The unit has independent condensers, one per circuit. The condenser is manufactured in accordance to PED approval.

Condensers are provided with liquid shut-off valve and spring loaded relief valve.

The condenser water outlet connections are provided with Victaulic Kit (as standard).

Electronic expansion valve

The unit is equipped with the most advanced electronic expansion valves to achieve precise control of refrigerant mass flow. As today's system requires improved energy efficiency, tighter temperature control, wider range of operating conditions and incorporate features like remote monitoring and diagnostics, the application of electronic expansion valves becomes mandatory.

Electronic expansion valve proposes features that makes it unique: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, highly linear flow capacity, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.

EEV strength point is the capacity to work with lower △P between high and low pressure side, than a thermostatic expansion valve. The electronic expansion valve allows the system to work with low condenser pressure (winter time) without any refrigerant flow problems and with a perfect chilled water leaving temperature control.

Refrigerant circuit

Each unit has independent refrigerant circuits and each one includes:

- Single screw compressor with integrated oil separator
- Brazed plate evaporator
- Shell & tube condenser
- Oil pressure transducer
- High pressure switches
- High pressure transducer
- Low pressure transducer
- Moisture liquid indicator
- Replaceable core filter-drier
- Electronic expansion valve

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4 General Characteristics

4 - 1 General characteristics

Electrical control panel

Power and control are located in the main panel that is manufactured to ensure protection against all weather conditions.
The electrical panel is IP54 and (when opening the doors) internally protected with Plexiglas panel against possible accidental contact with electrical components (IP20). The main panel is fitted with a main switch interlocked door.

Power section

The power section includes compressors fuses and control circuit transformer.

MicroTech III controller

MicroTech III controller is installed as standard; it can be used to modify unit set-points and check control parameters. A built-in display shows chiller operating status plus temperatures and pressures of water, refrigerant, programmable values, set-points.
A sophisticated software with predictive logic, selects the most energy efficient combination of compressors and electronic expansion valve to keep stable operating conditions to maximise chiller energy efficiency and reliability. MicroTech III is able to protect critical components based on external signs from its system (such as motor temperatures, refrigerant gas and oil pressures, correct phase sequence, pressure switches and evaporator). The input coming from the high pressure switch cuts all digital output from the controller in less than 50ms, this is an additional security for the equipment.
Fast program cycle (200ms) for a precise monitoring of the system. Floating point calculations supported for increased accuracy in P/T conversions.

Control section - main features:

- Management of the compressor stepless capacity.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - High thermal load
  - High evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheating temperature for each circuit.
- Leaving water evaporator temperature regulation. Temperature tolerance = 0,1°C.
- Compressor and evaporator pumps hour counters.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Re-start in case of power failure (Automatic / Manual).
- Soft Load (optimized management of the compressor load during the start-up).
- Start at high evaporator water temperature.
- Return Reset (Set Point Reset based on return water temperature).
- Setpoint Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy restore.

Safety device / logic for each refrigerant circuit

- High pressure (pressure switch).
- High pressure (transducer).
- Low pressure (transducer).
- High compressor discharge temperature.
- High motor winding temperature.
- Phase monitor.
- Low pressure ratio.
- High oil pressure drop.
- Low oil pressure.
- No pressure change at start.

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4 General Characteristics

4 - 1 General characteristics

System security
- Phase monitor.
- Low Ambient temperature lock-out.
- Freeze protection.

Regulation type

Proportional + integral + derivative regulation on the evaporator leaving water output probe.

Microtech III

MicroTech III built-in terminal has the following features.
- 164x44 dots liquid crystal display with white back lighting. Supports Unicode fonts for multi-lingual.
- Key-pad consisting of 3 keys.
- Push'n'Roll control for an increased usability.
- Memory to protect the data.
- General faults alarm relays.
- Password access to modify the setting.
- Application security to prevent application tampering or hardware usability with third party applications.
- Service report displaying all running hours and general conditions.
- Alarm history memory to allow an easy fault analysis.

Supervising systems (on request)

MicroTech III remote control

MicroTech III is able to communicate to BMS (Building Management System) based on the most common protocols as:
- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology.
- BacNet BTP certifief over IP and MS/TP (class 4) (Native).

Chiller Sequencing

MicroTech III controller allows an easy plug-in sequencing technology based on digital or serial panel

Digital Sequencing Panel

This panel is basically a step inserter that switches ON/OFF up to 11 units (chillers or heat pumps operating in the same cooling/heating mode) depending on the selected set point, the units are connected with the panel through standard cables and no serial card is requested.

Serial Sequencing Panel

Basically this panel sequences a chiller plant by switching on/off the units (up to 7 chillers) taking into account their running hours and the requested plant load, in order to optimise the number of working units for each condition; serial cards and shielded cables are requested to connect the panel with the units and, if installed, a BMS.

Standard accessories (supplied on basic unit)

Evaporator Victaulic Kit - Hydraulic joint with gasket for an easy and quick water connection.
20mm Evaporator Insulation
Condenser Victaulic kit
Condenser Water side design pressure 16 bar
Condenser 2 passes (△t 4-8°C)
Suction line shut off valve - Suction shut-off valve installed on the suction of the compressor to facilitate maintenance operation.
Discharge line shut-off valves - Discharge shut-off valve installed on the discharge of the compressor to facilitate maintenance operations.
Electronic expansion valve

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4 General Characteristics

4 - 1 General characteristics

High Pressure Side Manometers

Y-D starter - Star Delta starter is the standard type

Double set-point - Dual leaving water temperature set-points.

Phase monitor - The phase monitor controls that phases sequence is correct and controls phase loss.

Evaporator flow switch for the water piping.

Hour run meter - Digital compressors hour run meter.

General fault contactor - Contactor for alarm warning.

Main switch interlock

Emergency stop

Options (on request)

Heat pump version

Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).

Compressor thermal overload relays - Safety devices against compressor motor overloading in addition to the normal protection envisaged by the electrical windings.

Evaporator Water side design pressure 16 bar

20mm Condenser insulation

Condenser double flanges kit

Water pressure differential switch on evaporator

Sound Proof System - Compressor sound enclosure.

Rubber type antivibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal to reduce the vibrations when the unit is floor mounted.

Fork lift kit

Low pressure side manometers

Dual Pressure Relief Valve on evaporator

Under/Over Voltage - This device control the voltage value of power supply and stop the chiller if the value exceeds the allowed operating limits.

Energy Meter - This device allows to measure the energy absorbed by the chiller during its life.
It is installed inside the control box mounted on a DIN rail and show on a digital display: Line-to-Line Voltage, Phase and Average Current, Active and Reactive Power, Active Energy, Frequency.

Condenser power factor correction - Installed on the electrical control panel to ensure it complies with the plant rules. (Daikin advises maximum 0,9).

Current limit display

Witness test - Every unit is always tested at the test bench prior to the shipment. On request, a second test can be carried out, at customer's presence, in accordance with the procedures indicated on the test form. (Not available for units with glycol mixtures)

Acoustic test - On request, a test can be carried out, at customer's presence (please contact the factory) (This test is not available for units with glycol mixtures).

Set-point reset, demand limit and alarm from external device - The leaving water temperature set-point can be overwritten with the following options: 4-20mA from external source (by user), outside ambient temperature; evaporator water temperature $\triangle t$. Moreover the device allow the user to limit the load of the unit by 4-20mA signal or by network system and the microprocessor is able to receive an alarm signal from an external device (pump etc... - user can decide if this alarm signal will stop or not the unit).

Automatic circuit breakers

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5 Nomenclature

5 - 1 Nomenclature

E	W	W	D	1	2	0	J	-	S	S	0	0	1
1	2	3	4	5	6	7	8	9	10	11	12	13	14

Machine type

EWA = Air-cooled chiller, Cooling only
EWY = Air-cooled chiller, Heat pump
EWL = Remote condenser chiller
ERA = Air Cooled Condensing Unit
EWW = Water-cooled chiller, Cooling only
EWC = Air-cooled chiller, cooling only with centrifugal fan
EWT = Air-cooled chiller, cooling only with heat recovery

Refrigerant

D = R-134a
P = R-407c
Q = R-410a

Capacity class in kW (Cooling)

Always 3-digit code
Idem as previous

Model series

Letter A, B, . . . : major modification

Inverter

- = Non inverter
Z = Inverter

Efficiency level

S = Standard Efficiency
X = High Efficiency (N.A. for this range)
P = Premium efficiency (N.A. for this range)

Sound level

S = Standard Noise
L = Low noise (N.A. for this range)
R = Reduced noise (N.A. for this range)
X = Extra low noise (N.A. for this range)
C = Cabinet (N.A. for this range)

Warranty

0 = 1 year of warranty
B = 2 years of warranty
C = 3 years of warranty
... = ... years of warranty

Sequential number

000 = Base model
001 = First order for this model (1 or more units)
002 = Second order for this model (1 or more units)
... = ...order for this model
B01 = First order for this model + 1 year of warranty
B02 = Second order for this model (1 or more units)
... = ...order for this model

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6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD120-310J-SS

Twe: Evaporator leaving water temperature (Δt 5°C); Twc: Condenser leaving water temperature (Δt 5°C);
CC: Cooling capacity; PI: Power input; qwe: Fluid flow rate at evaporator; dpwe: Fluid pressure drop at evaporator;
HC: Heat capacity at condenser; qwc: Fluid flow rate at condenser; dpwc: Fluid pressure drop at condenser

	Twc	Twe																						
		5							7							9								
		CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc		
Size		kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa		
120	30	117	24.9	5.6	14	141	6.8	18	125	25.5	6.0	16	150	7.2	20	133	26.2	6.4	18	159	7.6	22		
	35	112	27.3	5.3	13	139	6.7	17	120	28.0	5.7	15	147	7.1	19	128	28.7	6.1	17	156	7.5	21		
	40	107	30.0	5.1	12	136	6.6	17	114	30.6	5.5	14	145	7.0	19	122	31.3	5.9	16	153	7.4	21		
	45	101	32.8	4.8	*11*	134	6.5	16	109	33.5	5.2	13	142	6.9	18	116	34.2	5.6	14	150	7.3	20		
	50	95.4	36.0	4.6	*10*	131	6.4	16	103	36.7	4.9	*11*	139	6.7	18	110	37.4	5.3	13	147	7.1	19		
	55	89.4	39.4	4.3	*9*	128	6.2	15	96.2	40.1	4.6	*10*	136	6.6	17	103	40.8	5.0	*12*	144	7.0	19		
140	30	142	30.2	6.8	13	172	8.3	11	152	31.0	7.3	15	183	8.8	13	162	31.9	7.8	17	194	9.3	14		
	35	136	33.2	6.5	12	169	8.1	11	146	34.0	7.0	14	179	8.6	12	156	34.8	7.5	16	190	9.2	14		
	40	130	36.4	6.2	*11*	166	8.0	11	139	37.2	6.6	13	176	8.5	12	149	38.1	7.1	15	187	9.0	13		
	45	123	39.9	5.9	*10*	163	7.9	10	132	40.7	6.3	*12*	172	8.3	11	142	41.6	6.8	13	183	8.8	13		
	50	116	43.7	5.5	*9*	159	7.7	10	125	44.6	6.0	*11*	169	8.2	11	134	45.4	6.4	12	179	8.7	12		
	55	108	47.9	5.2	*8*	156	7.6	10	117	48.7	5.6	*9*	165	8.0	11	126	49.6	6.0	*11*	175	8.5	12		
150	30	151	35.2	7.2	41	186	8.9	11	160	36.0	7.7	46	196	9.4	12	169	36.8	8.1	51	206	9.9	13		
	35	145	38.7	7.0	38	184	8.9	10	154	39.5	7.4	43	193	9.3	12	163	40.4	7.8	48	203	9.8	13		
	40	139	42.5	6.7	35	181	8.8	10	148	43.3	7.1	40	191	9.2	11	157	44.2	7.5	44	201	9.7	12		
	45	132	46.6	6.3	32	179	8.6	10	142	47.5	6.8	37	189	9.1	11	150	48.4	7.2	41	198	9.6	12		
	50	125	51.1	6.0	29	176	8.5	10	134	52.0	6.4	33	186	9.0	11	143	52.9	6.9	38	196	9.5	12		
	55	118	56.0	5.6	26	174	8.4	9	126	56.9	6.0	30	183	8.9	10	135	57.8	6.5	34	193	9.4	11		
180	30	173	40.3	8.3	38	213	10.3	11	184	41.3	8.8	43	225	10.8	12	195	42.3	9.4	48	237	11.4	13		
	35	167	44.3	8.0	36	211	10.2	11	177	45.3	8.5	40	222	10.7	12	188	46.3	9.0	45	234	11.3	13		
	40	159	48.6	7.6	33	208	10.0	10	170	49.6	8.1	37	219	10.6	11	181	50.7	8.7	42	231	11.2	12		
	45	151	53.4	7.2	30	205	9.9	10	162	54.4	7.8	34	216	10.5	11	173	55.4	8.3	38	228	11.0	12		
	50	143	58.5	6.9	27	202	9.8	10	153	59.5	7.3	31	213	10.3	11	164	60.6	7.9	35	224	10.9	12		
	55	135	64.2	6.5	25	199	9.7	10	144	65.1	6.9	28	209	10.2	10	155	66.2	7.4	31	220	10.7	11		
210	30	203	45.0	9.7	34	247	11.9	10	215	46.0	10.3	38	261	12.5	11	228	47.1	10.9	42	275	13.2	13		
	35	195	49.4	9.3	32	244	11.8	10	207	50.4	9.9	35	257	12.4	11	220	51.5	10.5	39	271	13.1	12		
	40	186	54.1	8.9	29	240	11.6	10	199	55.2	9.5	33	254	12.3	11	211	56.3	10.1	37	267	12.9	12		
	45	177	59.5	8.5	27	236	11.4	10	189	60.6	9.1	30	249	12.1	11	202	61.7	9.7	34	263	12.7	12		
	50	167	65.6	8.0	24	232	11.2	9	178	66.7	8.5	27	244	11.8	10	190	67.9	9.1	30	257	12.5	11		
	55	153	72.6	7.3	20	225	10.9	9	164	73.8	7.9	23	238	11.6	10	176	75.0	8.4	26	250	12.2	11		
250	30	250	52.6	11.9	27	302	14.5	15	266	53.2	12.7	30	319	15.3	16	282	53.9	13.5	34	335	16.1	18		
	35	239	59.1	11.4	25	298	14.4	15	255	59.9	12.2	28	315	15.2	16	272	60.8	13.0	32	332	16.0	18		
	40	228	66.2	10.9	23	294	14.2	14	244	67.1	11.7	26	311	15.0	16	260	68.0	12.5	29	327	15.8	17		
	45	217	73.9	10.4	21	291	14.1	14	232	74.8	11.1	24	307	14.8	16	248	75.7	11.9	27	323	15.6	17		
	50	205	82.1	9.8	19	287	13.9	14	220	83.0	10.5	22	302	14.7	15	235	84.0	11.3	24	318	15.4	17		
	55	193	91.0	9.2	17	283	13.8	14	207	91.9	9.9	19	298	14.5	15	221	92.9	10.6	22	314	15.2	16		
280	30	279	61.4	13.3	33	339	16.3	24	294	62.1	14.1	36	356	17.1	26	311	62.9	14.9	40	373	17.9	28		
	35	268	69.1	12.8	30	336	16.2	23	284	70.0	13.6	34	353	17.0	26	300	70.8	14.4	37	370	17.8	28		
	40	256	77.4	12.2	28	333	16.1	23	273	78.4	13.1	32	350	16.9	25	289	79.3	13.8	35	367	17.7	28		
	45	244	86.3	11.6	26	329	15.9	23	260	87.3	12.4	29	347	16.8	25	277	88.4	13.3	32	364	17.6	27		
	50	230	95.9	11.0	23	326	15.8	22	247	97.0	11.8	26	343	16.6	24	263	98.2	12.6	30	360	17.5	27		
	55	216	106	10.3	21	322	15.6	22	232	107	11.1	24	339	16.4	24	248	109	11.9	27	356	17.3	26		
310	30	302	70.2	14.5	41	372	8.9 8.9	11 11	320	71.8	15.3	46	391	9.4 9.4	12 12	339	73.4	16.3	51	412	9.9 9.9	13 13		
	35	291	77.1	13.9	38	368	8.9 8.9	10 10	309	78.8	14.8	43	387	9.3 9.3	12 12	327	80.5	15.7	48	407	9.8 9.8	13 13		
	40	279	84.7	13.3	35	363	8.8 8.8	10 10	297	86.4	14.2	40	382	9.2 9.2	11 11	315	88.1	15.1	44	402	9.7 9.7	12 12		
	45	265	93.0	12.7	32	357	8.6 8.6	10 10	283	94.7	13.6	37	378	9.1 9.1	11 11	301	96.4	14.4	41	397	9.6 9.6	12 12		
	50	251	102	12.0	29	352	8.5 8.5	10 10	268	104	12.8	33	372	9.0 9.0	11 11	287	106	13.7	38	392	9.5 9.5	12 12		
	55	236	112	11.3	26	347	8.4 8.4	9 9	253	114	12.1	30	365	8.9 8.9	10 10	271	115	13.0	34	385	9.4 9.4	11 11		

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6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD120-310J-SS

Twe: Evaporator leaving water temperature (Δt 5°C); Twc: Condenser leaving water temperature (Δt 5°C);
CC: Cooling capacity; PI: Power input; qwe: Fluid flow rate at evaporator; dpwe: Fluid pressure drop at evaporator;
HC: Heat capacity at condenser; qwc: Fluid flow rate at condenser; dpwc: Fluid pressure drop at condenser

	Twc	Twe																						
		11							13							15								
		CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc		
Size		kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa		
120	30	141	26.9	6.8	20	168	8.1	24	150	27.7	7.2	23	177	8.5	27	159	28.4	7.6	25	187	9.0	30		
	35	136	29.4	6.5	19	165	8.0	24	145	30.1	6.9	21	174	8.4	26	153	30.9	7.4	24	184	8.8	29		
	40	130	32.1	6.3	18	162	7.8	23	139	32.8	6.7	20	171	8.3	25	147	33.6	7.1	22	180	8.7	28		
	45	124	34.9	6.0	16	159	7.7	22	133	35.7	6.4	18	168	8.1	25	141	36.5	6.8	20	177	8.6	27		
	50	118	38.1	5.6	15	156	7.5	22	126	38.9	6.0	17	164	8.0	24	134	39.7	6.4	19	173	8.4	26		
	55	111	41.5	5.3	13	152	7.4	21	119	42.3	5.7	15	161	7.8	23	127	43.1	6.1	17	170	8.2	25		
140	30	173	32.7	8.3	19	205	9.9	15	184	33.6	8.8	21	217	10.4	17	195	34.6	9.4	24	229	11.0	19		
	35	166	35.7	8.0	18	202	9.7	15	177	36.6	8.5	20	213	10.3	17	188	37.5	9.0	22	225	10.8	18		
	40	159	38.9	7.6	17	198	9.5	14	170	39.9	8.1	19	209	10.1	16	180	40.8	8.6	21	220	10.6	18		
	45	151	42.5	7.3	15	194	9.4	14	162	43.4	7.8	17	205	9.9	15	172	44.4	8.3	19	216	10.5	17		
	50	143	46.3	6.9	14	189	9.2	13	153	47.2	7.4	16	200	9.7	15	164	48.2	7.9	17	212	10.3	16		
	55	135	50.5	6.5	12	185	9.0	13	145	51.4	6.9	14	196	9.5	14	155	52.4	7.4	16	207	10.0	16		
150	30	179	37.7	8.6	56	216	10.4	14	189	38.6	9.1	62	227	10.9	15	199	39.6	9.6	68	238	11.5	17		
	35	173	41.2	8.3	53	214	10.3	14	183	42.1	8.8	58	224	10.8	15	193	43.1	9.3	64	235	11.3	16		
	40	166	45.1	8.0	49	211	10.2	13	176	46.0	8.5	55	222	10.7	15	186	47.0	8.9	60	232	11.2	16		
	45	160	49.3	7.7	46	208	10.1	13	169	50.2	8.1	51	219	10.6	14	178	51.2	8.6	56	229	11.1	16		
	50	152	53.8	7.3	42	206	10.0	13	161	54.8	7.8	47	216	10.5	14	171	55.8	8.2	52	226	11.0	15		
	55	144	58.8	6.9	38	203	9.8	13	153	59.8	7.4	42	213	10.3	14	162	60.8	7.8	47	223	10.8	15		
180	30	207	43.3	9.9	53	250	12.0	14	219	44.4	10.5	59	263	12.6	16	231	45.6	11.1	65	276	13.3	17		
	35	199	47.3	9.6	50	246	11.9	14	211	48.4	10.1	55	259	12.5	15	223	49.6	10.7	61	272	13.1	17		
	40	192	51.7	9.2	46	243	11.7	14	203	52.8	9.8	51	255	12.3	15	215	54.0	10.3	57	268	13.0	16		
	45	183	56.5	8.8	43	240	11.6	13	195	57.6	9.4	48	252	12.2	15	206	58.8	9.9	53	264	12.8	16		
	50	175	61.7	8.4	39	236	11.4	13	186	62.8	8.9	44	248	12.0	14	197	64.0	9.5	49	260	12.6	15		
	55	165	67.4	7.9	35	232	11.3	13	176	68.5	8.5	40	244	11.9	14	187	69.7	9.0	44	256	12.4	15		
210	30	241	48.2	11.6	47	289	13.9	14	255	49.4	12.2	52	304	14.6	15	269	50.7	12.9	57	319	15.3	16		
	35	233	52.7	11.2	44	285	13.7	13	246	53.8	11.8	48	299	14.4	15	260	55.1	12.5	54	314	15.2	16		
	40	224	57.5	10.7	41	281	13.6	13	237	58.6	11.4	45	295	14.3	14	250	59.9	12.0	50	310	15.0	16		
	45	214	62.9	10.3	38	276	13.4	13	227	64.1	10.9	42	290	14.0	14	240	65.4	11.5	46	305	14.7	15		
	50	202	69.1	9.7	34	271	13.1	12	215	70.3	10.3	38	284	13.8	13	227	71.7	10.9	42	298	14.5	15		
	55	187	76.3	9.0	30	263	12.8	12	200	77.6	9.6	33	277	13.5	13	212	78.9	10.2	37	290	14.1	14		
250	30	297	54.6	14.3	37	351	16.9	20	313	55.2	15.0	41	368	17.7	21	329	55.9	15.8	45	384	18.5	23		
	35	287	61.5	13.8	35	348	16.8	19	303	62.2	14.5	39	364	17.6	21	319	63.0	15.3	42	381	18.4	23		
	40	276	68.9	13.3	33	345	16.6	19	292	69.7	14.0	36	361	17.4	21	307	70.6	14.8	40	377	18.2	22		
	45	264	76.7	12.7	30	340	16.5	19	280	77.7	13.4	34	357	17.3	20	295	78.6	14.2	37	373	18.0	22		
	50	251	85.1	12.0	28	335	16.3	18	267	86.1	12.8	31	352	17.1	20	282	87.2	13.6	34	369	17.9	22		
	55	236	94.0	11.3	25	330	16.0	18	252	95.1	12.1	28	347	16.8	19	268	96.3	12.9	31	364	17.7	21		
280	30	327	63.7	15.7	44	390	18.8	31	344	64.5	16.5	48	408	19.6	33	362	65.3	17.4	53	426	20.5	36		
	35	316	71.7	15.2	41	387	18.6	30	333	72.6	16.0	45	404	19.5	33	350	73.5	16.8	50	422	20.4	35		
	40	305	80.2	14.6	39	384	18.5	30	321	81.2	15.4	43	401	19.4	32	338	82.3	16.2	47	419	20.2	35		
	45	293	89.4	14.0	36	381	18.4	29	309	90.5	14.8	40	398	19.3	32	325	91.6	15.6	44	415	20.1	34		
	50	280	99.3	13.4	33	378	18.3	29	295	100	14.2	37	395	19.1	31	311	102	15.0	40	412	20.0	34		
	55	265	110	12.7	30	373	18.1	29	281	111	13.5	33	391	19.0	31	297	112	14.3	37	408	19.8	33		
310	30	358	75.1	17.2	56	433	10.4 10.4	14 14	378	77.0	18.2	62	454	10.9 10.9	15 15	398	78.9	19.2	68	476	11.5 11.5	17 17		
	35	346	82.2	16.6	53	427	10.3 10.3	14 14	365	84.1	17.6	58	449	10.8 10.8	15 15	385	86.0	18.5	64	470	11.3 11.3	16 16		
	40	333	89.9	16.0	49	422	10.2 10.2	13 13	352	91.8	16.9	55	443	10.7 10.7	15 15	372	93.7	17.9	60	464	11.2 11.2	16 16		
	45	319	98.3	15.3	46	417	10.1 10.1	13 13	338	100	16.2	51	437	10.6 10.6	14 14	357	102	17.2	56	458	11.1 11.1	16 16		
	50	305	107	14.6	42	411	10.0 10.0	13 13	323	109	15.5	47	431	10.5 10.5	14 14	342	111	16.4	52	452	11.0 11.0	15 15		
	55	289	117	13.9	38	405	9.8 9.8	13 13	307	119	14.7	42	425	10.3 10.3	14 14	325	121	15.6	47	446	10.8 10.8	15 15		

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6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD330-450J-SS

Twe: Evaporator leaving water temperature (Δt 5°C); Twc: Condenser leaving water temperature (Δt 5°C);
CC: Cooling capacity; PI: Power input; qwe: Fluid flow rate at evaporator; dpwe: Fluid pressure drop at evaporator;
HC: Heat capacity at condenser; qwc: Fluid flow rate at condenser; dpwc: Fluid pressure drop at condenser

	Twc	Twe																						
		5							7								9							
		CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc
Size		kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa
330	30	326	75.3	15.6	39	400	9.0 10.3	11 11	346	77.0	16.5	43	422	9.4 10.9	12 12	366	78.9	17.5	48	444	9.9 11.4	13 13
	35	313	82.8	15.0	36	395	8.9 10.2	10 11	333	84.6	15.9	40	417	9.3 10.7	12 12	353	86.4	16.9	45	439	9.8 11.3	13 13
	40	300	90.9	14.3	33	390	8.8 10.1	10 10	319	92.7	15.3	37	411	9.3 10.6	11 11	339	94.6	16.3	42	433	9.7 11.2	12 12
	45	285	99.8	13.6	30	384	8.7 9.9	10 10	305	102	14.6	34	406	9.2 10.5	11 11	324	104	15.5	39	427	9.6 11.0	12 12
	50	270	109	12.9	28	379	8.6 9.8	10 10	289	111	13.8	31	399	9.0 10.3	11 11	309	113	14.8	35	421	9.5 10.9	12 12
	55	254	120	12.1	25	374	8.5 9.7	9 10	272	122	13.0	28	393	8.9 10.2	10 10	291	124	13.9	32	414	9.4 10.7	11 11
360	30	348	80.4	16.6	38	428	10.3 10.3	11 11	370	82.3	17.7	43	451	10.9 10.9	12 12	392	84.3	18.8	48	475	11.4 11.4	13 13
	35	335	88.4	16.0	36	422	10.2 10.2	11 11	356	90.3	17.0	40	445	10.7 10.7	12 12	378	92.4	18.1	45	469	11.3 11.3	13 13
	40	320	97.1	15.3	33	416	10.1 10.1	10 10	341	99.0	16.3	37	439	10.6 10.6	11 11	363	101	17.4	42	463	11.2 11.2	12 12
	45	304	107	14.5	30	410	9.9 9.9	10 10	325	109	15.6	34	433	10.5 10.5	11 11	347	111	16.6	38	456	11.0 11.0	12 12
	50	288	117	13.7	27	404	9.8 9.8	10 10	308	119	14.7	31	426	10.3 10.3	11 11	329	121	15.8	35	450	10.9 10.9	12 12
	55	271	128	13.0	25	399	9.7 9.7	10 10	290	130	13.9	28	419	10.2 10.2	10 10	310	132	14.9	31	442	10.7 10.7	11 11
380	30	376	89.7	18.0	35	465	10.5 11.8	11 10	399	91.8	19.1	39	490	11.1 12.5	12 11	423	94.0	20.3	44	517	11.7 13.1	13 13
	35	362	98.6	17.3	33	460	10.4 11.7	11 10	385	101	18.4	37	485	11.0 12.4	12 11	408	103	19.6	41	510	11.6 13.0	13 12
	40	346	108	16.5	30	454	10.3 11.6	10 10	369	110	17.7	34	479	10.9 12.2	11 11	392	113	18.8	38	504	11.5 12.9	12 12
	45	329	119	15.7	28	447	10.2 11.4	10 10	352	121	16.8	31	472	10.8 12.1	11 11	375	123	17.9	35	497	11.3 12.7	12 12
	50	310	131	14.8	25	440	10.1 11.3	10 9	332	133	15.9	28	464	10.6 11.9	11 10	354	135	17.0	32	489	11.2 12.5	12 11
	55	288	144	13.8	22	432	10.0 11.0	10 9	309	147	14.8	25	455	10.5 11.6	10 10	331	149	15.8	28	479	11.0 12.2	11 11
400	30	406	89.8	19.4	34	495	11.9 11.9	10 10	430	91.8	20.6	38	521	12.5 12.5	11 11	456	94.0	21.8	42	549	13.2 13.2	13 12
	35	390	98.5	18.6	32	488	11.8 11.8	10 10	415	101	19.8	35	515	12.4 12.4	11 11	440	103	21.1	39	542	13.1 13.1	12 12
	40	373	108	17.8	29	480	11.6 11.6	10 10	398	110	19.1	33	508	12.3 12.3	11 11	423	112	20.3	37	534	12.9 12.9	12 12
	45	355	119	16.9	27	473	11.4 11.4	10 10	379	121	18.1	30	499	12.1 12.1	11 11	404	123	19.3	34	526	12.7 12.7	12 12
	50	334	131	15.9	24	464	11.2 11.2	9 9	356	133	17.0	27	488	11.8 11.8	10 10	380	135	18.2	30	515	12.5 12.5	11 11
	55	306	145	14.6	20	450	10.9 10.9	9 9	329	147	15.7	23	476	11.6 11.6	10 10	352	150	16.8	26	501	12.2 12.2	11 11
450	30	453	97.3	21.6	30	549	11.9 14.6	10 15	481	99.0	23.0	33	579	12.5 15.4	11 16	510	101	24.4	37	610	13.2 16.2	13 18
	35	434	108	20.7	27	542	11.7 14.4	10 15	463	110	22.1	31	572	12.4 15.2	11 16	492	112	23.5	34	603	13.0 16.0	12 18
	40	415	120	19.8	25	534	11.6 14.2	10 14	443	122	21.2	29	564	12.2 15.0	11 16	472	124	22.6	32	595	12.9 15.9	12 17
	45	395	133	18.8	23	527	11.4 14.1	10 14	422	135	20.2	26	556	12.0 14.9	11 16	450	137	21.5	29	586	12.7 15.7	12 17
	50	372	148	17.8	21	519	11.2 13.9	9 14	398	150	19.0	23	547	11.8 14.7	10 15	425	152	20.4	26	576	12.4 15.5	11 17
	55	346	164	16.5	18	508	10.9 13.8	9 14	371	166	17.8	21	536	11.5 14.5	10 15	397	168	19.0	23	564	12.1 15.3	11 16

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6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD330-450J-SS

Twe: Evaporator leaving water temperature (Δt 5°C); Twc: Condenser leaving water temperature (Δt 5°C);
CC: Cooling capacity; PI: Power input; qwe: Fluid flow rate at evaporator; dpwe: Fluid pressure drop at evaporator;
HC: Heat capacity at condenser; qwc: Fluid flow rate at condenser; dpwc: Fluid pressure drop at condenser

		Twe																						
	Twc	11							13							15								
		CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc		
Size		kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa		
330	30	387	80.8	18.6	53	467	10.4 12.1	14 14	409	82.8	19.7	59	491	11.0 12.7	15 16	431	84.9	20.8	65	515	11.5 13.3	17 17		
	35	374	88.3	17.9	50	461	10.3 11.9	14 14	395	90.3	19.0	55	485	10.8 12.5	15 15	417	92.5	20.1	61	509	11.4 13.2	16 17		
	40	359	96.6	17.3	47	455	10.2 11.8	13 14	380	98.6	18.3	52	478	10.7 12.4	15 15	402	101	19.3	57	502	11.2 13.0	16 16		
	45	344	106	16.5	43	449	10.1 11.6	13 13	365	108	17.5	48	472	10.6 12.2	14 15	386	110	18.6	53	495	11.1 12.8	16 16		
	50	328	115	15.7	39	443	10.0 11.5	13 13	348	117	16.7	44	465	10.5 12.1	14 14	369	120	17.7	49	488	11.0 12.7	15 15		
	55	311	126	14.9	36	436	9.9 11.3	13 13	331	128	15.9	40	458	10.3 11.9	14 14	351	130	16.9	45	480	10.8 12.5	15 15		
360	30	415	86.4	19.9	53	500	12.0 12.0	14 14	439	88.6	21.1	59	526	12.7 12.7	16 16	463	90.9	22.3	65	553	13.3 13.3	17 17		
	35	400	94.4	19.2	50	494	11.9 11.9	14 14	424	96.6	20.4	55	519	12.5 12.5	15 15	448	99.0	21.5	61	545	13.1 13.1	17 17		
	40	385	103	18.5	46	487	11.8 11.8	14 14	408	105	19.6	51	512	12.4 12.4	15 15	431	108	20.7	57	538	13.0 13.0	16 16		
	45	368	113	17.7	43	480	11.6 11.6	13 13	391	115	18.8	48	505	12.2 12.2	15 15	414	117	19.9	53	530	12.8 12.8	16 16		
	50	351	123	16.8	39	473	11.5 11.5	13 13	373	125	17.9	44	497	12.0 12.0	14 14	395	128	19.0	49	522	12.6 12.6	15 15		
	55	332	135	15.9	35	466	11.3 11.3	13 13	353	137	17.0	40	489	11.9 11.9	14 14	375	139	18.0	44	513	12.5 12.5	15 15		
380	30	448	96.3	21.5	48	543	12.3 13.8	14 14	474	98.7	22.8	54	571	13.0 14.5	16 15	500	101	24.0	59	600	13.6 15.2	17 16		
	35	433	105	20.8	45	537	12.2 13.7	14 13	458	108	22.0	50	564	12.8 14.4	15 15	483	110	23.2	56	592	13.5 15.1	17 16		
	40	416	115	20.0	42	530	12.1 13.5	14 13	440	117	21.1	47	557	12.7 14.2	15 14	466	120	22.4	52	584	13.3 14.9	16 16		
	45	398	126	19.1	39	523	11.9 13.4	13 13	422	128	20.2	43	549	12.5 14.0	15 14	446	131	21.4	48	576	13.1 14.7	16 15		
	50	377	138	18.1	35	514	11.8 13.2	13 12	400	140	19.2	40	540	12.4 13.8	14 13	424	143	20.4	44	566	13.0 14.5	15 15		
	55	353	151	16.9	31	504	11.6 12.8	13 12	376	154	18.1	35	529	12.2 13.5	14 13	399	157	19.2	39	555	12.8 14.1	15 14		
400	30	482	96.3	23.1	47	578	13.9 13.9	14 14	510	98.6	24.5	52	607	14.6 14.6	15 15	538	101	25.8	57	637	15.3 15.3	16 16		
	35	466	105	22.3	44	570	13.7 13.7	13 13	493	107	23.7	48	599	14.4 14.4	15 15	520	110	25.0	54	629	15.2 15.2	16 16		
	40	448	115	21.5	41	562	13.6 13.6	13 13	474	117	22.8	45	590	14.3 14.3	14 14	501	120	24.1	50	620	15.0 15.0	16 16		
	45	428	126	20.5	38	553	13.4 13.4	13 13	454	128	21.8	42	581	14.0 14.0	14 14	480	131	23.1	46	609	14.7 14.7	15 15		
	50	405	138	19.4	34	542	13.1 13.1	12 12	429	140	20.6	38	569	13.8 13.8	13 13	455	143	21.8	42	597	14.5 14.5	15 15		
	55	375	152	18.0	30	527	12.8 12.8	12 12	400	155	19.2	33	554	13.5 13.5	13 13	424	158	20.4	37	581	14.1 14.1	14 14		
450	30	539	103	25.8	41	640	13.9 16.9	14 20	568	104	27.3	45	671	14.6 17.7	15 21	598	106	28.7	49	703	15.3 18.5	16 23		
	35	520	114	24.9	38	633	13.7 16.8	13 19	549	116	26.4	42	664	14.4 17.6	15 21	579	118	27.8	46	695	15.1 18.4	16 23		
	40	501	126	24.0	36	626	13.5 16.7	13 19	529	128	25.4	39	656	14.2 17.5	14 21	558	130	26.8	43	687	14.9 18.2	16 22		
	45	478	139	22.9	33	617	13.3 16.5	13 19	507	142	24.3	36	647	14.0 17.3	14 20	535	144	25.7	40	678	14.7 18.1	15 22		
	50	453	154	21.7	30	606	13.1 16.3	12 18	482	156	23.1	33	637	13.7 17.1	13 20	510	159	24.5	37	667	14.4 17.9	15 22		
	55	424	170	20.3	26	593	12.8 16.1	12 18	452	173	21.7	30	624	13.4 16.9	13 19	480	175	23.1	33	654	14.1 17.7	14 21		

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6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD500-560J-SS

Twe: Evaporator leaving water temperature (Δt 5°C); Twc: Condenser leaving water temperature (Δt 5°C);
CC: Cooling capacity; PI: Power input; qwe: Fluid flow rate at evaporator; dpwe: Fluid pressure drop at evaporator;
HC: Heat capacity at condenser; qwc: Fluid flow rate at condenser; dpwc: Fluid pressure drop at condenser

	Twc	Twe																						
		5							7							9								
		CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc
Size		kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa
500	30	501	105	23.9	27	604	14.5 14.5	15 15	533	106	25.5	30	638	15.4 15.4	16 16	565	108	27.1	34	671	16.2 16.2	18 18
	35	480	118	22.9	25	597	14.4 14.4	15 15	512	120	24.5	28	630	15.2 15.2	16 16	544	121	26.1	32	664	16.0 16.0	18 18
	40	458	132	21.9	23	589	14.2 14.2	14 14	489	134	23.4	26	622	15.0 15.0	16 16	521	136	25.0	29	656	15.8 15.8	17 17
	45	435	147	20.8	21	582	14.1 14.1	14 14	466	149	22.3	24	614	14.8 14.8	16 16	497	151	23.8	27	647	15.7 15.7	17 17
	50	412	164	19.7	19	575	13.9 13.9	14 14	441	166	21.1	22	606	14.7 14.7	15 15	471	168	22.6	24	638	15.5 15.5	17 17
	55	386	182	18.4	17	567	13.8 13.8	14 14	414	184	19.8	19	597	14.5 14.5	15 15	444	186	21.2	22	628	15.3 15.3	16 16
530	30	529	114	25.3	30	641	14.6 16.3	15 24	561	115	26.8	33	674	15.4 17.0	16 26	593	117	28.4	37	708	16.2 17.8	18 28
	35	507	128	24.2	28	634	14.4 16.1	15 23	540	130	25.8	31	668	15.3 16.9	16 26	572	132	27.4	35	702	16.1 17.7	18 28
	40	485	144	23.1	26	627	14.3 16.0	14 23	517	145	24.7	29	661	15.1 16.8	16 25	549	147	26.3	32	695	15.9 17.6	17 28
	45	461	160	22.0	23	620	14.2 15.8	14 23	493	162	23.6	26	653	14.9 16.7	16 25	525	164	25.1	30	688	15.7 17.5	17 27
	50	436	178	20.8	21	613	14.0 15.7	14 22	467	180	22.3	24	645	14.8 16.5	15 24	498	182	23.9	27	679	15.5 17.4	17 27
	55	409	198	19.5	19	606	13.9 15.6	14 22	439	200	21.0	21	637	14.6 16.4	15 24	470	202	22.5	24	670	15.3 17.2	16 26
560	30	558	123	26.6	33	679	16.3 16.3	24 24	589	125	28.2	36	712	17.1 17.1	26 26	621	126	29.8	40	746	17.9 17.9	28 28
	35	535	139	25.6	30	672	16.2 16.2	23 23	568	140	27.2	34	707	17.0 17.0	26 26	600	142	28.7	37	740	17.8 17.8	28 28
	40	512	155	24.5	28	666	16.1 16.1	23 23	546	157	26.1	32	701	16.9 16.9	25 25	578	159	27.7	35	735	17.7 17.7	28 28
	45	487	173	23.3	26	659	15.9 15.9	23 23	520	175	24.9	29	694	16.8 16.8	25 25	554	177	26.5	32	730	17.7 17.7	27 27
	50	461	193	22.0	23	652	15.8 15.8	22 22	493	195	23.6	26	686	16.6 16.6	24 24	526	197	25.2	30	722	17.5 17.5	27 27
	55	433	214	20.7	21	645	15.7 15.7	22 22	464	216	22.2	24	678	16.5 16.5	24 24	496	218	23.8	27	713	17.3 17.3	26 26

NOTES - ANMERKUNGEN - Σημειώσεις - NOTAS - REMARQUES - NOTE - OPMERKINGEN - примечания

1 Fluid: Water
Fluid: Wasser
Υγρό: Νερό
Líquido: agua
Liquide: Eau
Fluido: Acqua
Vloeistof: Water
Жидкость: Вода

2 For working conditions where dpw values are in italic, please contact factory.
Für Arbeitsbedingungen mit kursiv gedruckten dpw-Werten, wenden Sie sich bitte an den Hersteller.
Για τις συνθήκες εργασίας όπου οι τιμές dpw είναι σε πλάγια γραφή, παρακαλούμε επικοινωνήστε με το εργοστάσιο.
Para las condiciones de funcionamiento en las que los valores dpw están en cursiva, póngase en contacto con la fábrica.
Pour les conditions de travail lorsque les valeurs dpw sont en italique, veuillez contacter l'usine.
Per le condizioni d'esercizio in cui i valori dpw sono riportati in corsivo, contattare il produttore.
Voor bedrijfsomstandigheden met schuingedrukte dpw-waarden, gelieve contact op te nemen met de fabriek.
Если условия работы соответствуют значениям dpw, указанным курсивом, обратитесь на завод-изготовитель.

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6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD500-560J-SS

Twe: Evaporator leaving water temperature (Δt 5°C); Twc: Condenser leaving water temperature (Δt 5°C);
CC: Cooling capacity; PI: Power input; qwe: Fluid flow rate at evaporator; dpwe: Fluid pressure drop at evaporator;
HC: Heat capacity at condenser; qwc: Fluid flow rate at condenser; dpwc: Fluid pressure drop at condenser

	Twc	Twe																						
		11							13							15								
		CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc	CC	PI	qwe	dpwe	HC	qwc	dpwc		
Size		kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa	kW	kW	l/s	kPa	kW	l/s	kPa		
500	30	596	109	28.6	37	703	16.9	20	628	110	30.1	41	736	17.7	21	660	111	31.7	45	770	18.5	23		
							16.9	20						17.7	21						18.5	23		
	35	576	123	27.6	35	697	16.8	19	607	124	29.1	39	729	17.6	21	639	126	30.7	42	763	18.4	23		
							16.8	19						17.6	21						18.4	23		
	40	554	137	26.6	33	690	16.7	19	585	139	28.0	36	722	17.4	21	616	141	29.6	40	755	18.2	22		
							16.7	19						17.4	21						18.2	22		
	45	529	153	25.4	30	681	16.5	19	561	155	26.9	34	715	17.3	20	592	157	28.4	37	747	18.1	22		
							16.5	19						17.3	20						18.1	22		
	50	503	170	24.1	28	671	16.3	18	535	172	25.7	31	705	17.1	20	566	174	27.2	34	739	17.9	22		
							16.3	18						17.1	20						17.9	22		
	55	474	188	22.7	25	660	16.0	18	506	190	24.2	28	694	16.9	19	538	192	25.8	31	728	17.7	21		
							16.0	18						16.9	19						17.7	21		
530	30	625	118	30.0	41	741	17.0	20	658	120	31.6	45	775	17.8	21	691	121	33.2	49	810	18.6	23		
							18.7	31						19.5	33						20.4	36		
	35	604	133	28.9	38	735	16.9	19	636	135	30.5	42	769	17.6	21	669	136	32.1	46	803	18.5	23		
							18.6	30						19.4	33						20.3	35		
	40	581	149	27.9	36	729	16.7	19	613	151	29.4	39	762	17.5	21	645	153	31.0	43	796	18.3	22		
							18.5	30						19.3	32						20.1	35		
	45	557	166	26.7	33	721	16.6	19	589	168	28.3	37	755	17.4	20	621	170	29.8	40	789	18.2	22		
							18.3	29						19.2	32						20.0	34		
	50	531	184	25.4	30	714	16.4	18	562	187	27.0	34	747	17.2	20	594	189	28.5	37	781	18.0	22		
							18.2	29						19.0	31						19.9	34		
	55	501	204	24.0	27	704	16.1	18	534	206	25.6	31	738	17.0	19	565	209	27.1	34	772	17.8	21		
							18.0	29						18.9	31						19.7	33		
560	30	655	128	31.4	44	780	18.8	31	689	129	33.1	48	816	19.6	33	724	131	34.8	53	852	20.5	36		
							18.8	31						19.6	33						20.5	36		
	35	633	144	30.3	41	774	18.7	30	666	146	32.0	45	809	19.5	33	700	147	33.7	50	845	20.4	35		
							18.7	30						19.5	33						20.4	35		
	40	610	161	29.2	39	769	18.6	30	643	163	30.8	43	803	19.4	32	676	165	32.5	47	839	20.2	35		
							18.6	30						19.4	32						20.2	35		
	45	586	179	28.1	36	763	18.5	29	618	182	29.6	40	797	19.3	32	650	184	31.2	44	832	20.1	34		
							18.5	29						19.3	32						20.1	34		
	50	560	199	26.8	33	757	18.3	29	591	201	28.4	37	790	19.2	31	623	204	29.9	40	824	20.0	34		
							18.3	29						19.2	31						20.0	34		
	55	529	220	25.4	30	748	18.2	29	562	223	27.0	33	783	19.0	31	594	225	28.5	37	816	19.8	33		
							18.2	29						19.0	31						19.8	33		

NOTES - ANMERKUNGEN - Σημειώσεις - NOTAS - REMARQUES - NOTE - OPMERKINGEN - примечания

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Fluid: Wasser
Υγρό: Νερό
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2 For working conditions where dpw values are in italic, please contact factory.
Für Arbeitsbedingungen mit kursiv gedruckten dpw-Werten, wenden Sie sich bitte an den Hersteller.
Για τις συνθήκες εργασίας όπου οι τιμές dpw είναι σε πλάγια γραφή, παρακαλούμε επικοινωνήστε με το εργοστάσιο.
Para las condiciones de funcionamiento en las que los valores dpw están en cursiva, póngase en contacto con la fábrica.
Pour les conditions de travail lorsque les valeurs dpw sont en italique, veuillez contacter l'usine.
Per le condizioni d'esercizio in cui i valori dpw sono riportati in corsivo, contattare il produttore.
Voor bedrijfsomstandigheden met schuingedrukte dpw-waarden, gelieve contact op te nemen met de fabriek.
Если условия работы соответствуют значениям dpw, указанным курсивом, обратитесь на завод-изготовитель.

SRC_1-2_Rev.01_2_(6_6)

7 Pressure drops

7 - 1 Evaporator Pressure Drops

Evaporator and Condenser Pressure Drops

EWWD~J-SS

	120	140	150	180	210	250	280	310	330	360
Cooling capacity (kW)	120	146	155	178	208	256	285	310	334	357
Water flow (l/s) - Evaporator	5.73	6.98	7.41	8.50	9.94	12.25	13.63	14.81	15.96	17.06
Evaporator Pressure Drops (kPa)	15	13	40	38	36	28	33	40	40	38
Water flow (l/s) - Condenser	7.04	8.57	9.25	10.62	12.30	15.06	16.89	18.49	19.91	21.28
Condenser Pressure Drops (kPa)	20	12	11	11	11	16	26	11	11	11

NOTES

Water flow and pressure drop referred to nominal condition: evaporator water in/out: 12/7°C - condenser water in/out: 30/35°C

	380	400	450	500	530	560
Cooling capacity (kW)	386	416	464	513	541	570
Water flow (l/s) - Evaporator	18.44	19.88	22.17	24.51	25.85	27.23
Evaporator Pressure Drops (kPa)	38	36	36	28	28	33
Water flow (l/s) - Condenser	23.15	24.59	27.33	30.10	31.92	33.78
Condenser Pressure Drops (kPa)	11	11	11	16	16	26

NOTES

Water flow and pressure drop referred to nominal condition: evaporator water in/out: 12/7°C - condenser water in/out: 30/35°C

Evaporator and Condenser Pressure Drops

To determinate the evaporator or condenser pressure drop for different versions or at different working condition, please refer to the following formula:

$$PD_2\,(kPa) = PD_1\,(kPa) \times \left[\frac{Q_2\,(l/s)}{Q_1\,(l/s)} \right]^{1.8}$$

where:

PD_2	Pressure drop to be determinated (kPa)
PD_1	Pressure drop at nominal condition (kPa)
Q_2	water flow at new working condition (l/s)
Q_1	water flow at nominal condition (l/s)

How to use the fomula: Example (Evaporator)

The unit EWWD280J-SS has been selected for working at the following conditions:
- evaporator water in/out: 11/6°C
- condenser water in/out: 30/35°C

The cooling capacity at these working conditions is: 277 kW
The evaporator water flow at these working conditions is: 13.23 l/s

The unit EWWD280J-SS at nominal working conditions has the following data:
- evaporator water in/out: 12/7°C
- condenser water in/out: 30/35°C

The cooling capacity at these working conditions is: 285 kW
The evaporator water flow at these working conditions is: 13.62 l/s
The evaporator pressure drop at these working conditions is: 33 kPa

The evaporator pressure drop at the selected working condition will be:

$$PD_2\,(kPa) = \mathbf{33}\,(kPa) \times \left[\frac{\mathbf{13{,}23}\,(l/s)}{\mathbf{13.62}\,(l/s)} \right]^{1.8}$$

$$PD_2\,(kPa) = \mathbf{31}\,(kPa)$$

Note: If the calculated evaporator water pressure drop is below 10 kPa or above 100 kPa please contact the factory for dedicated evaporator..

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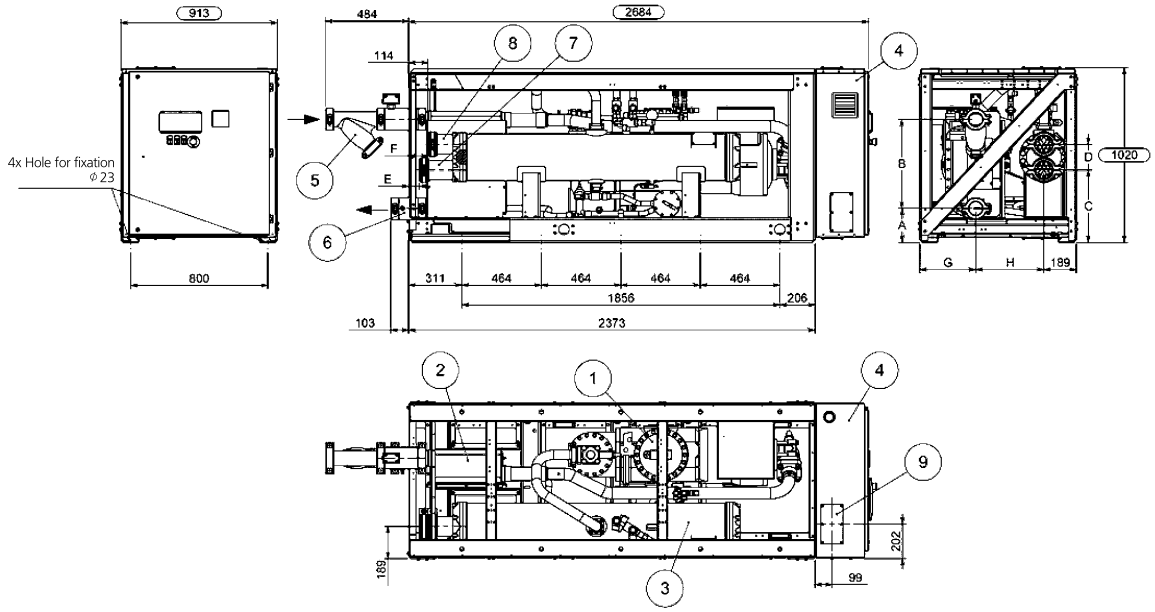
8 Dimensional drawings

8 - 1 Dimensional Drawings

EWWD~J-SS / 1 circuit



Models	Dimensions (mm)							
EWWD~J -SS	A	B	C	D	E	F	G	H
120	198	519	445	115	54	104	326	398
140	198	519	422	150	64	114	326	398
150	198	568	422	150	64	114	311	413
180	198	568	422	150	64	114	311	413
210	198	568	422	150	64	114	311	413
250	198	568	422	150	64	114	311	413
280	198	568	422	150	64	114	311	413

Legend

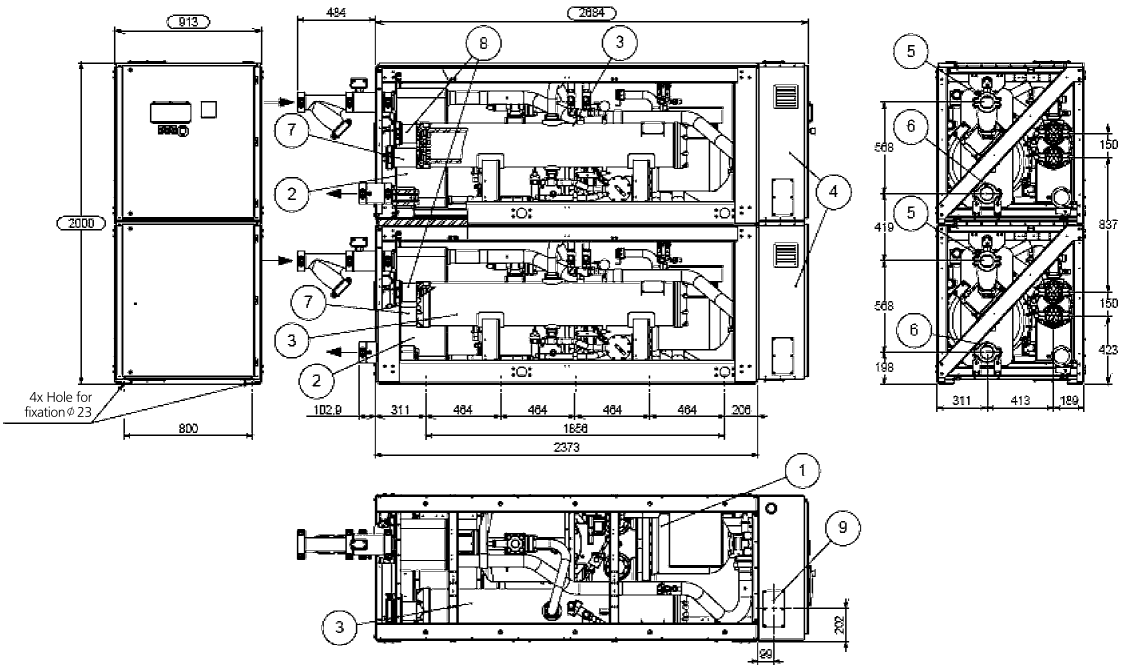
1 Compressor
2 Evaporator
3 Condenser
4 Electrical panel
5 Evaporator water inlet
6 Evaporator water outlet
7 Condenser water inlet connection
8 Condenser water outlet connection
9 Power connections slot

DMN_1-2_Rev.00_1

8 Dimensional drawings

8 - 1 Dimensional Drawings

EWWD~J-SS / 2 Circuits



Note: Dimension refers to 2 circuit units (size from 310-560).

Legend

1 Compressor
2 Evaporator
3 Condenser
4 Electrical panel
5 Evaporator water inlet
6 Evaporator water outlet
7 Condenser water inlet connection
8 Condenser water outlet connection
9 Power connections slot

DMN_1-2_Rev.00_2

9 Sound data

9 - 1 Sound Level Data

EWWD~J-SS

Unit size	Sound pressure level at 1 m from the unit in semispheric free field (rif.2 x 10^{-5} Pa)									Power
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
120	64.6	69.1	74.1	78.5	73.6	71.2	58.6	55.7	**79.0**	**88.9**
140	64.6	69.1	74.1	78.5	73.6	71.2	58.6	55.7	**79.0**	**88.9**
150	64.6	69.1	74.1	78.5	73.6	71.2	58.6	55.7	**79.0**	**88.9**
180	64.6	69.1	74.1	78.5	73.6	71.2	58.6	55.7	**79.0**	**88.9**
210	64.6	69.1	74.1	78.5	73.6	71.2	58.6	55.7	**79.0**	**88.9**
250	67.3	67.3	72.8	77.8	72.3	73.3	62.3	58.8	**79.0**	**88.9**
280	67.3	67.3	72.8	77.8	72.3	73.3	62.3	58.8	**79.0**	**88.9**
310	67.6	72.1	77.1	81.5	76.6	74.2	61.6	58.7	**82.0**	**94.4**
330	67.6	72.1	77.1	81.5	76.6	74.2	61.6	58.7	**82.0**	**94.4**
360	67.6	72.1	77.1	81.5	76.6	74.2	61.6	58.7	**82.0**	**94.4**
380	67.6	72.1	77.1	81.5	76.6	74.2	61.6	58.7	**82.0**	**94.4**
400	67.6	72.1	77.1	81.5	76.6	74.2	61.6	58.7	**82.0**	**94.4**
450	69.2	71.3	76.5	81.2	76.0	75.4	63.8	60.5	**82.0**	**94.4**
500	70.3	70.3	75.8	80.8	75.3	76.3	65.3	61.8	**82.0**	**94.4**
530	70.3	70.3	75.8	80.8	75.3	76.3	65.3	61.8	**82.0**	**94.4**
560	70.3	70.3	75.8	80.8	75.3	76.3	65.3	61.8	**82.0**	**94.4**

NOTE

1. The values are according to ISO 3744 and are referred to: evaporator 12/7°C, condenser 30/35°C, full load operation.
2. The above sound pressure levels will decrease by 4dB(A) when a compressor sound enclosure (option) is installed.

NSL_1a-2a_Rev.01_1a

Sound pressure level correction for different distances

EWWD-J-SS

Unit size	Distance					
	1m	5m	10m	15m	20m	25m
120	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
140	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
150	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
180	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
210	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
250	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
280	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
310	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
330	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
360	0.0	-7.9	-12.7	-15.8	-18.1	-19.8
380	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
400	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
450	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
500	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
530	0.0	-7.5	-12.2	-15.3	-17.5	-19.3
560	0.0	-7.5	-12.2	-15.3	-17.5	-19.3

NOTE

1. The values are dB(A) (pressure level).

NSL_1a-2a_Rev.01_2a

10 Installation

10 - 1 Installation Method

Installation notes

Warning

Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations, and who are experienced with this type of equipment. Must be avoided the unit installation in places that could be considered dangerous for all the maintenance operations.

Handling

The chiller is mounted on heavy wooden skids to protect the unit from accidental damage and to permit easy handling and moving. It is recommended that all moving and handling be performed with the skids under the unit when possible and that the skids not be removed until the unit is in the final location.

If the unit must be hoisted, it is necessary to lift the unit by attaching cables or chains at the lifting holes in the evaporator tube sheets. Spreader bars must be used to protect the control cabinet and the other areas of the chiller.

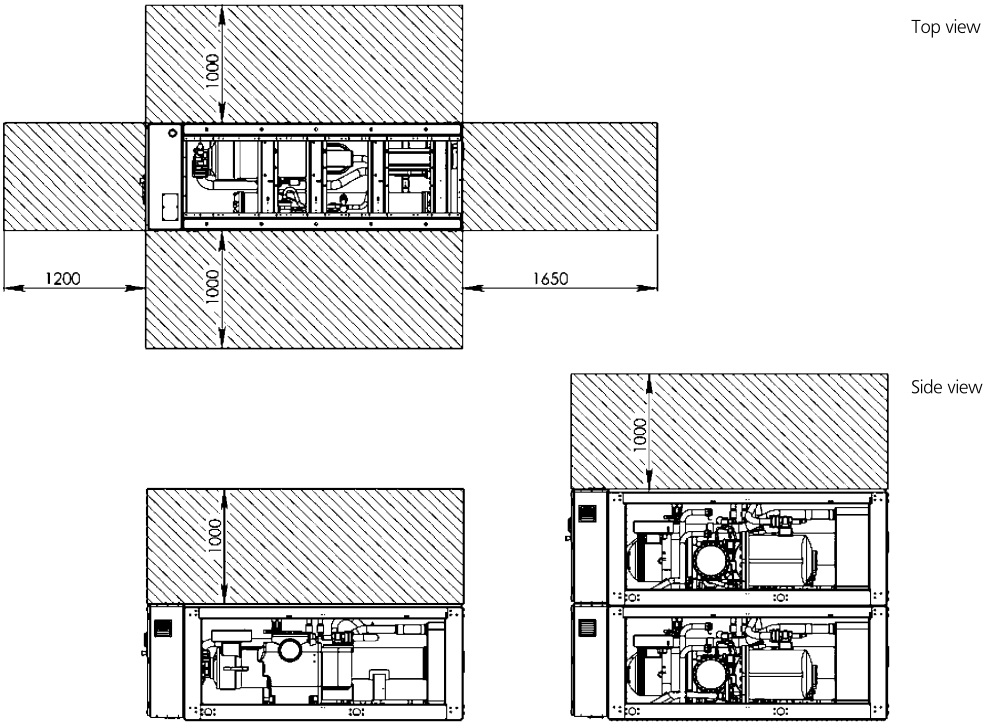
Location

A levelled and sufficiently strong floor is required. If necessary, additional structural members should be provided to transfer the weight of the unit to the nearest beams.

Rubber-in-shear isolators are furnished and field placed under each corner of the package. A rubber anti-skid pad should be used under isolators if hold-down bolts are not used. Vibration isolator in all water piping connected to the chiller are recommended to avoid straining the piping and transmitting vibration and noise.

Minimum 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



Minimum clearance requirements for machine maintenance

INN_1_Rev.00_1

10 Installation

10 - 2 Water Charge, Flow and Quality

Water charge, flow and quality

ITEMS(1) (5)			Cooling water			Cooled water		Heated water(2)				Tendency if out of criteria
			Circulating system		Once flow			Low temperature		High temperature		
			Circulating water	Supply water(4)	Flowing water	Circulating water [Below 20°C]	Supply water(4)	Circulating water [20°C ~ 60°C]	Supply water(4)	Circulating water [80°C~80°C]	Supply water(4)	
Items to be controlled:	ph	at 25°C	6.5 ~ 8.2	6.0 ~ 8.0	6.0 ~ 8.0	6.8 ~ 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 30	Below 30	Corrosion
	Sulfate ion	[mgSO^{2-}_4/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mg$CaCO_3$/l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mg$CaCO_3$/l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium hardness	[mg$CaCO_3$/l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Silica ion	[mgSiO_2/l]	Below 50	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Scale
	Oxygen	[mgO2 /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
	Particole size	(mm)	Below 0.5	Below 0.5	Below 0.5	Below 0.5	Below 0.6	Below 0.5	Below 0.6	Below 0.5	Below 0.6	Erosion
	Total dissolved solids	(mg / l)	Below 1000	Below 1000	Below 1000	Below 1000	Below 1001	Below 1000	Below 1001	Below 1000	Below 1001	Erosion
	Ethykene, Propylene Glycol (weight conc.)		Below 60%	Below 60%	Below ---	Below 60%	Below 60%	Below 60%	Below 60%	Below 60%	Below 60%	--
Items to be referred to:	Nitrate ion	(mg NO3-/l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 101	Below 100	Below 101	Corrosion
	TOC Total organic carbon	(mg/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
	Iron	[mgFe/l]	Below 1.0	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
	Copper	[mgCu/l]	Below 0.3	Below 0.1	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 0.1	Below 1.0	Below 0.1	Corrosion
	Sulfite ion	[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
	Remaining chloride	[mgCL/l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.25	Below 0.3	Below 0.1	Below 0.3	Corrosion
	Free carbide	[mgCO_2/l]	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 0.4	Below 4.0	Below 0.4	Below 4.0	Corrosion
	Stability index		6.0 ~ 7.0	---	---	---	---	---	---	---	---	Corrosion + Scale

NOTES

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.
Especially when the iron material is in direct contact with water without any protection shields, it is desireable to give the valid measures for corrosion. e.g. chemical measure.

3 In the cooling water using hermetic cooling tower, closed 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 representable 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.

WAFLOWQUA_1-2_Rev.00_1

10 Installation

10 - 2 Water Charge, Flow and Quality

Water content in cooling circuits

The cooled water distribution circuits should have a minimum water content to avoid excessive compressors starts and stops.

In fact, each time the compressor starts up, an excessive quantity of oil goes from the compressor's pump and simultaneously there is a rise in the temperature of the compressor motor's stator, due to the inrush current during the start-up.

To prevent damage to the compressors, it has been envisaged the application of a device to limit frequent stops and restarts.

During the span of one hour there will be no more than 6 starts of the compressor. The plant side should therefore ensure that the overall water content allows a more constant functioning of the unit and consequently greater environmental comfort.
The minimum water content per unit should be calculated using this simplified formula:

For 1 compressor unit
$M\,(Liters) = (0.94 \times \triangle T(°C) + 5.87) \times P(kW)$

For 2 compressors unit
$M\,(Liters) = (0.1595 \times \triangle T(°C) + 3.0825) \times P(kW)$

where:

M	minimum water content per unit expressed in litres
P	Cooling Capacity of the unit expressed in kW
△T	evaporator entering / leaving water temperature difference expressed in °C

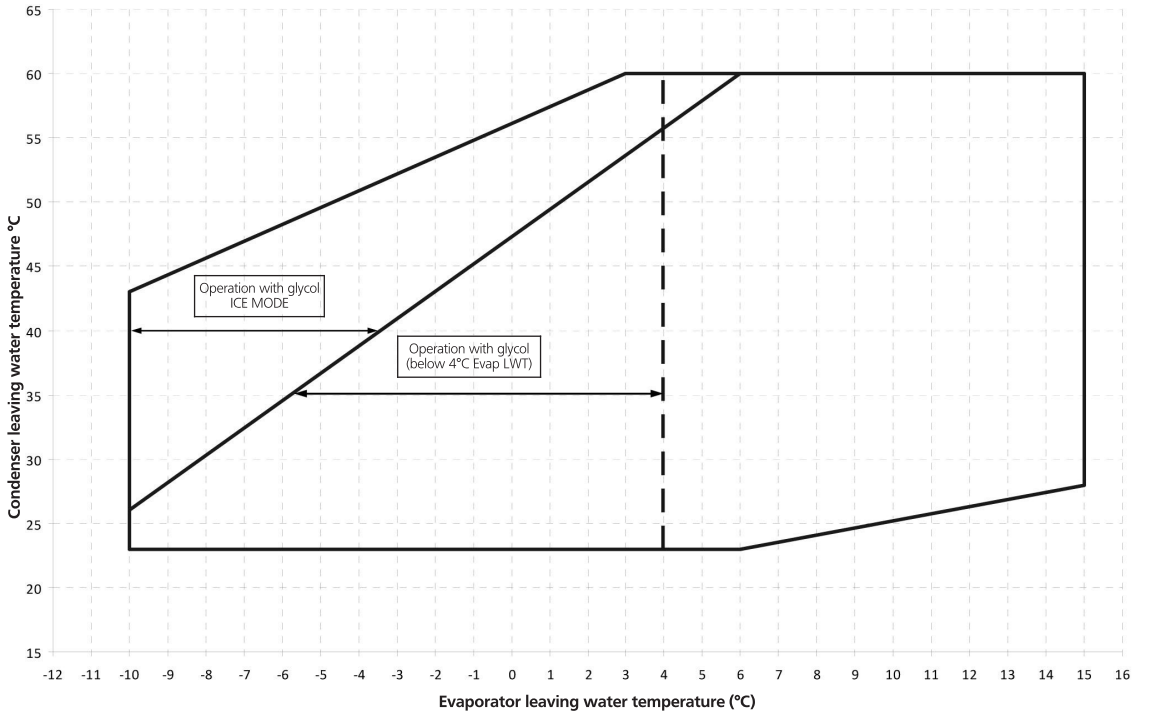
This formula is valid for:
- standard microprocessor parameters

For more accurate determination of quantity of water, it is advisable to contact the designer of the plant.

WAFLOWQUA_1-2_Rev.00_2

11 Operation range

11 - 1 Operation Range



11 Operation range

11 - 1 Operation Range

Table 1 - Evaporator/Condenser minimum and maximum △t

Max evaporator water △T	°C	8
Min evaporator water △T	°C	4
Min condenser water △T	°C	4
Max condenser water △T	°C	8

Table 2 - Evaporator fouling factors

Fouling factors $m^2°C$ / kW	Cooling capacity correction factor	Power input correction factor	EER correction factor
0.0176	1.000	1.000	1.000
0.0440	0.978	0.986	0.992
0.0880	0.957	0.974	0.983
0.1320	0.938	0.962	0.975

Minimum glycol percentage for low water temperature 3 - Condenser fouling factors

Fouling factors $m^2°C$ / kW	Cooling capacity correction factor	Power input correction factor	EER correction factor
0.0176	1.000	1.000	1.000
0.0440	0.978	0.986	0.992
0.0880	0.957	0.974	0.983
0.1320	0.938	0.962	0.975

Table 4.1 - Condenser fouling factors

Evaporator leaving water temperature °C	2	0	-2	-4	-6	-8
Ethylene glycol (%)	10	20	20	20	30	30
Propylene glycol (%)	10	20	20	30	30	30

Note: Minimum glycol percentage to be used with evaporator leaving water temperature below 4°C to prevent freezing of water circuit.

Table 4.2 - Minimum glycol percentage for low air temperature

Air ambient temperature (°C) (2)	-3	-8	-15	-23	-35
Ethylene glycol (%) (1)	10%	20%	30%	40%	50%
Air ambient temperature (°C) (2)	-3	-7	-12	-20	-32
Propylene glycol (%) (1)	10%	20%	30%	40%	50%

Note (1): Minimum glycol percentage to prevent freezing of water circuit at indicated air ambient temperature
Note (2): Air ambient temperature do exceed the operating limits of the unit, as protection of water circuit may be needed in winter season at non-working conditions.

Table 5 - Correction factors for low evaporator leaving water temperature

Evaporator leaving water temperature °C	2	0	-2	-4	-6	-8
Cooling capacity	0.842	0.785	0.725	0.670	0.613	0.562
Compressor power input	0.950	0.940	0.920	0.890	0.870	0.840

Note: Correction factors have to be applied at working conditions: evaporator leaving water temperature 7°C

Table 6 - Correction factors for water and glycol mixture

	Ethylene glycol (%)	10%	20%	30%	40%	50%
Ethylene glycol	Cooling capacity	0.991	0.982	0.972	0.961	0.946
	Compressor power input	0.996	0.992	0.986	0.976	0.966
	Flow Rate (△t)	1.013	1.04	1.074	1.121	1.178
	Evaporator Pressure Drop	1.070	1.129	1.181	1.263	1.308
Ethylene glycol	Cooling capacity	0.985	0.964	0.932	0.889	0.846
	Compressor power input	0.993	0.983	0.969	0.948	0.929
	Flow Rate (△t)	1.017	1.032	1.056	1.092	1.139
	Evaporator Pressure Drop	1.120	1.272	1.496	1.792	2.128

OPL_1-2-3_Rev.00_2

11 Operation range

11 - 1 Operation Range

How to use the Correction factors proposed in the previous tables

A) Mixture Water and Glycol---Evaporator leaving water temperature > 4°C
- depending from the type and percentage (%) of glycol filled in the circuit (see table 4.2 and 6)
- multiply the Cooling Capacity, the Compressor Power Input by the Correction factor of Table 6
- starting from this new value of Cooling Capacity, calculate the Flow Rate (l/s) and the Evaporatore Pressure Drop (kPa)
- now multiply the new Flow Rate and the new Evaporator Pressure Drop by the Correction Factors of Table 6

Example

Unit size:	**EWWD120J-SS**
Mixture:	Water
Working condition:	ELWT 12/7°C - CLWT 30/35°C
- Cooling capacity:	121 kW
- Power input:	27.3 kW
- Flow Rate (△t 5°C):	5.78
- Evaporator Pressure Drop:	15kPa
Mixture:	Water+Ethylene glycol 30% (for a winter air temperature up to -15°C)
Working condition:	ELWT 12/7°C - CLWT 30/35°C
- Cooling capacity:	121 x 0.972 = 118 kW
- Power input:	27.3 x 0.986 = 26.9 kW
- Flow Rate (△t 5°C):	5.64 l/s (referred to 118 kW) x 1.074 = 6.06 l/s
- Evaporator Pressure Drop:	16 (referred to 6.06 l/s) x 1.181 = 19kPa

B) Mixture Water and Glycol---Evaporator leaving water temperature < 4°C
- depending from the type and percentage (%) of glycol filled in the circuit (see table 4.1 and 4.2 and table 6)
- depending from the evaporator leaving water temperature (see table 5)
- multiply the Cooling Capacity, the Compressor Power Input by the Correction factor of Table 5 and Table 6
- starting from this new value of Cooling Capacity, calculate the Flow Rate (l/s) and the Evaporatore Pressure Drop (kPa)
- now multiply the new Flow Rate and the new Evaporator Pressure Drop by the Correction Factors of Table 6

Example

Unit size:	**EWWD120J-SS**
Mixture:	Water
Working condition:	ELWT 12/7°C - CLWT 30/35°C
- Cooling capacity:	121 kW
- Power input:	27.3 kW
- Flow Rate (△t 5°C):	5.78
- Evaporator Pressure Drop:	15kPa
Mixture:	Water+Ethylene glycol 30% (for a low evaporator leaving temperature of 0/-5°C)
Working condition:	ELWT 0/-5°C - CLWT 30/35°C
- Cooling capacity:	121 x 0.641 x 0.972 = 75.4 kW
- Power input:	27.3 x 0.880 x 0.986 = 23.7 kW
- Flow Rate (△t 5°C):	3.60 l/s (referred to 75.4 kW) x 1.074 = 3.87 l/s
- Evaporator Pressure Drop:	7 kPa (referred to 3.87 l/s) x 1.181 = 9kPa

OPL_1-2-3_Rev.00_3

12 Specification text

12 - 1 Specification Text

Technical Specification for Water Cooled Screw Chiller

General

The water cooled screw chiller will be designed and manufactured in accordance with following European directives:

Construction of pressure vessel	97/23/EC (PED)
Machinery Directive	2006/42/EC
Low Voltage	2006/95/EC
Electromagnetic Compatibility	2004/108/EC
Electrical & Safety Codes	EN 60204-1 / EN 60335-2-40
Manufacturing Quality Stds	UNI - EN ISO 9001:2004

The unit will be tested at full load in the factory at the nominal working conditions and water temperatures. Before shipment a full test will be held to avoid any losses.

Chiller will be delivered to the job site completely assembled and charged with refrigerant and oil.
Comply with the manufacturer instructions for rigging and handling equipment.

The unit will be able to start up and operate as standard at full load and condenser entering fluid temperature from . . . . °C to . . . . °C with an evaporator leaving fluid temperature between . . . . °C and °C

All units published performances have to be certified by **Eurovent**.

Refrigerant

Only HFC 134a will be accepted.

Freeze protection

- ✓ Number of water cooled screw chiller: .....
- ✓ Cooling capacity for single water cooled screw chiller: ..... kW
- ✓ Power input for single water cooled screw chiller in cooling mode: ..... kW
- ✓ Plate to plate evaporator entering water temperature in cooling mode: ..... °C
- ✓ Plate to plate evaporator leaving water temperature in cooling mode: ..... °C
- ✓ Plate to plate evaporator water flow: ..... l/s
- ✓ Shell & tube condenser entering water temperature in cooling mode: ..... °C
- ✓ Shell & tube condenser leaving water temperature in cooling mode: ..... °C
- ✓ Shell & tube condenser water flow: ..... l/s
- ✓ The unit should work with electricity in range 400V ±10%, 3ph, 50Hz without neutral and shall only have one power connection point.

Unit description

Chiller shall include as standard: 1 or 2 independent refrigerant circuits, semi-hermetic rotary single screw compressors, electronic expansion device (EEXV), direct expansion plate to plate evaporator and shell & tube condenser, R134a refrigerant, lubrication system, motor starting components, control system and all components necessary for safe and stable unit operation.
Chiller will be factory assembled on a robust base-frame made of zinc coated steel, protected by an epoxy paint.

Noise level and vibration

Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceed . . . . . dBA. The sound pressure levels must be rated in accordance to ISO 3744. Other types of rating unacceptable.
Vibration level should not exceed 2 mm/s.

Dimension

Unit dimensions shall not exceed following indications:

- ✓ unit length: ..... mm,
- ✓ unit width: ..... mm,
- ✓ unit height: ..... mm.

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12 Specification text

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Chiller Components

Compressors

- ✓ Semi-hermetic, single-screw type with one main helical rotor meshing with gaterotor. The gaterotor will be constructed of a carbon impregnated engineered composite material. The gaterotor supports will be constructed of cast iron.
- ✓ The oil injection shall be used in order to get high EER (Energy Efficiency Ratio) also at high condensing pressure and low sound pressure levels in each load condition.
- ✓ Refrigerant system differential pressure shall provide oil flow throught service replaceble, 0.5 micron, full flow, cartridge type oil filter internal to compressor.
- ✓ 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 dedicated heat exchanger and additional piping to carry the oil from the compressor to heat exchanger and viceversa will be not accepted.
- ✓ The compressor shall be provided with an external, high efficiency, cyclonic type oil separator and with built-in oil filter, cartridge type.
- ✓ The compressor shall be direct electrical driven, without gear transmission between the screw and the electrical motor.
- ✓ Shall be present two thermal protection realized by a thermistor 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.
- ✓ The compressor shall be equipped with an electric oil-crankcase heater.
- ✓ Compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

Cooling capacity control system

- ✓ Each unit will have a microprocessor for the control of compressor slide valve's position and instantaneous RPM value of the motor.
- ✓ The unit capacity control shall be infinitely modulating, from 100% down to 25% for each circuit (from 100% down to 12,5% of full load for unit with 2 compressors). The chiller shall be capable of stable operation to a minimum of 12,5% of full load without hot gas bypass.
- ✓ Step unloading unacceptable because of evaporator leaving water temperature fluctuation and low unit efficiency at partial load.
- ✓ The system shall stage the unit based on the leaving evaporator water temperature fluctuation that shall be controlled y a PID (Proportional Integral Derivative) loop.
- ✓ Unit control logic shall to manage frequency level of the compressor electric motor to exactly match plant load request in order to keep constant the set point for delivered chilled water temperature. In this operation condition unit control logic shall modulate electrical frequency level in a range lower and upper the nominal electrical network value at 50 Hz.
- ✓ The microprocessor unit control shall detect conditions that approach protective limits and take self-corrective action prior to an alarm occurring. The system shall automatically reduce chiller capacity when any of the following parameters are outside their normal operating range:
  - ○ High condenser pressure
  - ○ Low evaporation refrigerant temperature
  - ○ High compressor motor amps

Evaporator

- ✓ The units shall be equipped with a Direct Expansion plate to plate evaporator with copper tubes rolled into steel tubesheets.
- ✓ The external shell shall be linked with an electrical heater to prevent freezing down to -28°C ambient temperature, controlled by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material (10 mm thick).
- ✓ The evaporator will have 1 circuit.
- ✓ The water connections shall be threaded type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.
- ✓ Evaporator is manufactured in accordance to PED approval.

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12 Specification text

12 - 1 Specification Text

Condensers

- ✓ Condensers will be shell and cleanable, through-tube type.
- ✓ The unit will have one condensers per circuit.
- ✓ Each condenser shall have a carbon steel and seamless, integrally finned high efficiency copper tubes, roll expanded into heavy carbon steel tube sheets.
- ✓ Water heads shall be removable and include vent and drain plugs.
- ✓ Condensers will come complete with liquid shut-off valve, spring loaded relief valve.

Refrigerant circuit

Each circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, compressor discharge shut-off valve, suction line shut-off valve, replaceable core filter-drier, sight glass with moisture indicator and insulated suction line.

Control panel

- ✓ Field power connection, control interlock terminals, and unit control system should be centrally located in an electric panel (IP 54). Power and starting controls should be separate from safety and operating controls in different compartments of the same panel.
- ✓ Starting shall be Wye-Delta type as standard.
- ✓ Operating and safety controls should include energy saving control; emergency stop switch; overload protection for compressor motor, high and low pressure cut-out switch (for each refrigerant circuit); anti-freeze thermostat; cut-out switch for each compressor.
- ✓ All of the information regarding the unit will be reported on a display and with the internal built-in calendar and clock that will switch the unit ON/OFF during day time all year long.
- ✓ The following features and functions shall be included:

  - Resetting chilled water temperature by controlling the return water temperature or by a remote 4-20 mA DC signal or by controlling the external ambient temperature;
  - Soft load function to prevent the system from operating at full load during the chilled fluid pulldown period;
  - Password protection of critical parameters of control;
  - Start-to-start and stop-to-start timers to provide minimum compressor off-time with maximum motor protection;
  - Communication capability with a PC or remote monitoring;
  - discharge pressure control through intelligent cycling of condenser fans;
  - Lead-lag selection by manual or automatically by circuit run hours;
  - Double set point for brine unit version;
  - Scheduling via internal time clock to allow programming of a yearly start-stop schedule accommodating weekends and holidays.

Optional High Level Communications Interface

The controller as a minimum shall be capable of providing the data shown in the above list, using the following options:

- RS485 Serial Card
- RS232 Serial Card
- LonWorks interface to FTT10A Transceiver.
- Bacnet Compatible
- Use of Compass Points (manufactured by North Communications) to allow communications with such as Honeywell, Satchwell, Johnson controls, Trend etc.

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In all of us, a green heart

Daikin's unique position as a manufacturer of air conditioning equipment, compressors and refrigerants has led to its close involvement in environmental issues. For several years Daikin has had the intention to become a leader in the provision of products that have limited impact on the environment. This challenge demands the eco design and development of a wide range of products and an energy management system, resulting in energy conservation and a reduction of waste.

Daikin Europe N.V. participates in the Eurovent Certification programme for Air conditioners (AC), Liquid Chilling Packages (LCP) and Fan coil units (FCU), Check ongoing validity of certificate online: www.eurovent-certification.com or using: www.certiflash.com"

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