



Chillers

Technical Data

Water cooled chiller, high efficiency



ECDEN11-422

EWWD-H-XS

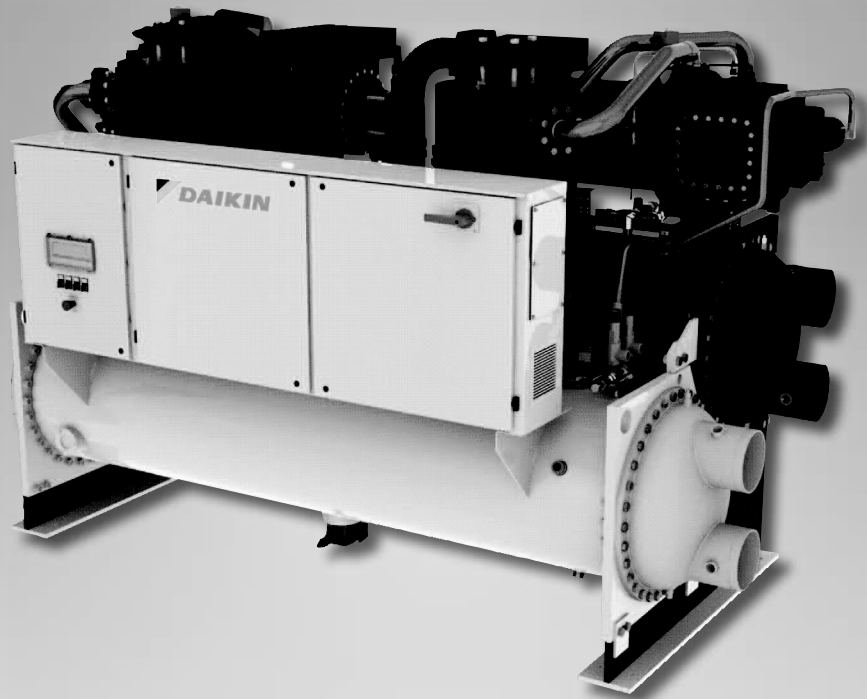
R-134a



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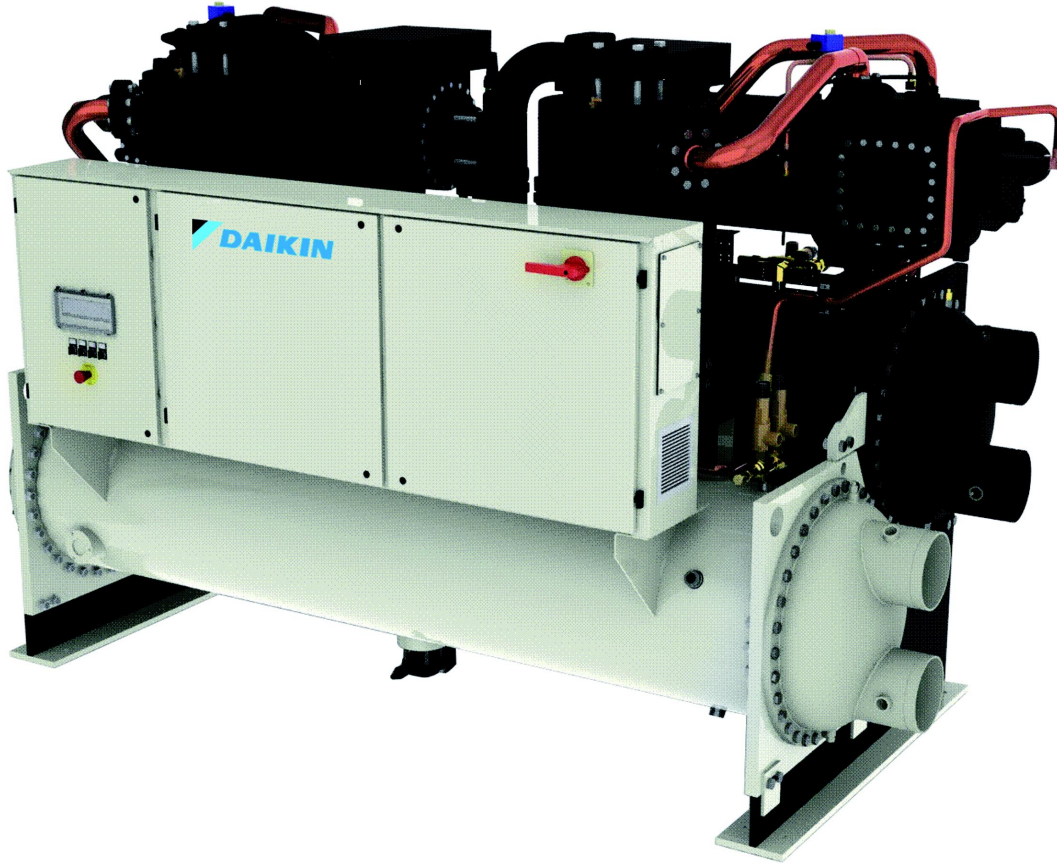
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EWWD-H-XS

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1 Features

- Cooling range: 369-1,215 kW
- Condenser leaving water temperatures (CLWT) up to 65°C (optional)
- Heat pump version available
- Flooded type heat exchangers
- MicroTech III controller



2 Specifications

2-1 Technical Specifications				EWWD 370H-XS	EWWD 450H-XS	EWWD 530H-XS	EWWD 610H-XS	EWWD 750H-XS	EWWD 830H-XS	EWWD 930H-XS	EWWD 980H-XS	EWWD C10H-XS	EWWD C11H-XS	EWWD C12H-XS		
Cooling capacity	Nom.			kW	369 (1)	445 (1)	521 (1)	608 (1)	748 (1)	827 (1)	932 (1)	978 (1)	1,050 (1)	1,133 (1)	1,215 (1)	
Heating capacity	Nom.			kW	419 (2)	505 (2)	589 (2)	687 (2)	837 (2)	924 (2)	1,036 (2)	1,093 (2)	1,173 (2)	1,265 (2)	1,356 (2)	
Capacity control	Method			Stepless												
	Minimum capacity			%	25						12.5					
Power input	Cooling	Nom.		kW	62.8 (1)	75.4 (1)	87.0 (1)	101 (1)	125 (1)	138 (1)	151 (1)	163 (1)	174 (1)	188 (1)	201 (1)	
	Heating	Nom.		kW	84.5 (2)	101 (2)	117 (2)	136 (2)	159 (2)	175 (2)	192 (2)	206 (2)	221 (2)	238 (2)	255 (2)	
EER					5.88 (1)	5.90 (1)	5.99 (1)	6.02 (1)	5.98 (1)	5.99 (1)	6.17 (1)	6.00 (1)	6.03 (1)		6.04 (1)	
ESEER					6.44	6.47	6.56	6.57	7.16	7.23	7.32	7.37	7.40	7.43	7.42	
COP					4.96 (2)	4.98 (2)	5.03 (2)	5.06 (2)	5.28 (2)	5.27 (2)	5.40 (2)	5.30 (2)	5.31 (2)	5.32 (2)	5.31 (2)	
IPLV					6.95	6.99	7.08	7.10	7.73	7.81	7.90	7.96	8.00	8.02		
Casing	Colour			Ivory white												
	Material			Galvanized and painted steel sheet												
Dimensions	Unit	Height	mm	2,121				2,048				2,161				
		Width	mm	1,353				1,384	1,689		1,711					
	Depth	mm	3,341		3,419	3,417	3,609				3,509					
Weight	Unit			kg	3,089	3,370	3,603	3,781	5,289	5,375	5,654	5,707	6,066	6,105	6,156	
	Operation weight			kg	3,250	3,588	3,870	4,163	5,694	5,835	6,174	6,262	6,709	6,773	6,859	
Water heat exchanger - evaporator	Type			Flooded shell and tube												
	Water volume			l	78	107	134	160	172	201	261	272	295	310	327	
	Water flow rate			Nom.	l/s	17.63	21.26	24.89	29.05	35.74	39.51	44.53	46.73	50.17	54.13	58.05
	Nominal water pressure drop		Cooling	Heat exchanger	kPa	48	40	38	42	48	40	38	35.0		37.0	40
	Insulation material			Closed cell												
Water heat exchanger - condenser	Type			Flooded Shell & Tube												
	Water flow rate			Nom.	l/s	20.63	24.86	29.05	33.87	41.71	46.11	51.74	54.52	58.48	63.12	67.65
	Nominal water pressure drop		Cooling	kPa	35	30	32	28	34	30	37	35.0	33.0		35	
	Insulation material			Closed cell												
Sound power level	Cooling	Nom.		dB(A)	96.7	97.7	98.7	99.1	100.2	100.7	101.2	101.7	102.2	102.7		
Sound pressure level	Cooling	Nom.		dB(A)	78.0	79.0	80.0		81.0	81.5	82.0	82.5	83.0	83.5		
Compressor	Type			Semi-hermetic single screw compressor												
	Quantity			1						2						
	Oil	Charged volume		l	30						60					
Operation range	Evaporator	Cooling	Min.	°CDB	-8 (4)											
			Max.	°CDB	15											
	Condenser	Cooling	Min.	°CDB	18											
			Max.	°CDB	65											
Refrigerant	Type			R-134a												
	Charge			kg	210	190	180	210	220	250	300		330			
	Circuits	Quantity		1												
Piping connections	Evaporator water inlet/outlet			mm	168.3				219.1							
	Condenser water inlet/outlet			inch	6				8							
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		Water freeze protection controller												

2 Specifications

2-2 Electrical Specifications			EWWD 370H-XS	EWWD 450H-XS	EWWD 530H-XS	EWWD 610H-XS	EWWD 750H-XS	EWWD 830H-XS	EWWD 930H-XS	EWWD 980H-XS	EWWD C10H-XS	EWWD C11H-XS	EWWD C12H-XS	
Compressor	Phase		3~											
	Voltage		V											
	Voltage range	Min.	%											
		Max.	%											
	Maximum running current		A	146 / 197 (11)	174 / 236 (11)	199 / 276 (11)	236 / 315 (11)	146 / 197 (11)	146 / 197 (11)	174 / 236 (11)	174 / 236 (11)	199 / 276 (11)	199 / 276 (11)	236 / 315 (11)
Starting method		Wye-delta												
Compressor 2	Maximum running current		-				146 / 197 (11)	174 / 236 (11)	174 / 236 (11)	199 / 276 (11)	199 / 276 (11)	236 / 315 (11)	236 / 315 (11)	
Power supply	Phase		3~											
	Frequency		Hz											
	Voltage		V											
	Voltage range	Min.	%											
		Max.	%											
Unit	Maximum starting current		A	330	330 / 464 (11)	330 / 464 (11)	464	447 / 488 (11)	469 / 622 (11)	469 / 653 (11)	489 / 685 (11)	489 / 685 (11)	623 / 716 (11)	653 / 716 (11)
	Nominal running current (RLA)	Cooling	A	106 / 111 (11)	123 / 136 (11)	140 / 153 (11)	166 / 175 (11)	213 / 223 (11)	230 / 248 (11)	247 / 273 (11)	263 / 290 (11)	280 / 306 (11)	306 / 328 (11)	331 / 349 (11)
	Maximum running current		A	146 / 197 (11)	174 / 236 (11)	199 / 276 (11)	236 / 315 (11)	293 / 395 (11)	320 / 433 (11)	347 / 472 (11)	373 / 512 (11)	398 / 552 (11)	435 / 591 (11)	472 / 630 (11)
	Max unit current for wires sizing		A	161 / 217 (11)	191 / 260 (11)	219 / 304 (11)	260 / 347 (11)	322 / 434 (11)	352 / 477 (11)	382 / 519 (11)	410 / 563 (11)	438 / 607 (11)	479 / 650 (11)	519 / 693 (11)

Notes

- (1) Cooling: entering evaporator water temp. 12°C; leaving evaporator water temp. 7°C; entering condenser water temp. 30°C; leaving condenser water temp. 35°C; full load operation.
- (2) Heating: entering evaporator watertemp. 12°C; leaving evaporator watertemp. 7°C; entering condenser watertemp. 40°C; leaving condenser watertemp. 45°C; unit at full load operation; with high temperature kit.
- (3) Sound level data are measured at entering evaporator water temp. 12°C; leaving evaporator water temp. 7°C; entering condenser water temp. 30°C; leaving condenser water temp. 35°C; full load operation; standard: ISO3744
- (4) The unit can not reach the minimum capacity when working in part load conditions
- (5) Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
- (6) Maximum starting current: starting current of biggest compressor + current of the other compressor at 75 % of maximum load
- (7) Nominal current cooling mode is referred to the following conditions: evaporator 12°C/7°C; condenser 30/35°C
- (8) Maximum running current is based on max compressor absorbed current in its envelope
- (9) Maximum unit current for wires sizing is based on minimum allowed voltage.
- (10) Maximum current for wires sizing: compressor full load ampere x 1.1
- (11) Unit + high temperature kit (max. leaving water temperature = 65°C)

3 Features and advantages

3 - 1 Features and Advantages

The water cooled chillers, featuring single R-134a refrigerant circuit with one or two single screw compressors, shell & tube 'flooded type' exchangers and MicroTech III controller, are manufactured to provide high efficiency and superior control for a broad spectrum of comfort and industrial applications.

Chiller design experience, combined with outstanding features, makes this chiller range unmatched in the industry.

Application flexibility

The new range boasts a wide operating range thanks to the use of the electronic expansion valve. This makes possible condenser leaving water temperatures (CLWT) of 50°C. The addition of an optional high temperature kit allows CLWT's up to 65°C.

A heat pump version is also available for supplying hot water, and is well suited to geothermal applications.

Superior control logic

The new range features the Microtech III controller that provides an easy to use control environmental. The control logic is designed to provide maximum efficiency, to continue operation in unusual operating conditions and to provide a history of unit operation. One of the greatest benefits is the easy interface with external systems such as building management systems and sequencing panels.

Extensive option list

The base model includes several standard factory mounted options such as: electronic expansion valve, double set point, main switch interlock, etc. Moreover, the new range features an extensive option list, including the heat pump version, the high temperature kit, the sound proof system, etc. The long list of additional options makes it ideal for a broad range of comfort and cooling applications.

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

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

Available in high efficiency version:

X: High Efficiency

11 sizes, covering a cooling capacity range from 370 up to 1,215 kW, EER up to 6.17 and ESEER up to 7.43.

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

Available in standard sound level configuration:

S: Standard sound

4 General Characteristics

4 - 1 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) (\pm 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 external high efficiency oil separator maximizes the oil separation. Standard start is Wye-delta ($Y-\Delta$).

Ecological R-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

Each unit is equipped with 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 evaporators are designed according to the 97/23/EC directive (PED). The water side is designed for 10 bar of maximum operating pressure; vents and drain are provided. Water connections are designed with Victaulic system, anyway flanges are available under request.

Condensers

Each unit is equipped with shell & tube condenser with water flowing inside the tubes and refrigerant condensing outside. The bottom of the condenser is provided with subcooler section for better refrigerant capacity. The tubes are enhanced for maximum heat transfer and rolled into steel tube sheet and sealed. The tubes are individually replaceable. The condensers are designed according to the 97/23/EC directive (PED). The water side is designed for 10 bar of maximum operating pressure; vents and drain are provided. Water connections are designed with Victaulic system, anyway flanges are available under request.

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 make 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.

Electronic expansion valve strength point is the capacity to work with lower ΔP 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 single refrigerant circuit including:

- One or two single screw compressor with external oil separator
- Evaporator
- Condenser
- Oil pressure transducer
- High pressure switches
- High pressure transducer
- Low pressure transducer
- Moisture liquid indicator
- Electronic expansion valve

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 Pressure / temperature 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 temperatures.
- Display of condensing-evaporating temperatures and pressures, suction and discharge superheat 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).
- Set point Reset.
- 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).

4 General Characteristics

4 - 1 General characteristics

- 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.

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 certified 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.

4 General Characteristics

4 - 1 General characteristics

Standard accessories (supplied on basic unit)

Wye-Delta Compressors starter (Y-Δ) – For low inrush current and reduced starting torque.

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 Victaulic Kit - Hydraulic joint with gasket for an easy and quick water connection.

Evaporator Water side design pressure 10 bar

20 mm evaporator insulation

Condenser Victaulic Kit - Hydraulic joint with gasket for an easy and quick water connection.

Condenser Water side design pressure 10 bar

Condenser 2 passes (DT 4-8°C)

Electronic expansion device

Discharge line shut-off valves - Discharge shut-off valve installed on the discharge of the compressor to facilitate maintenance operations.

Hour Run meter - Digital compressors hour run meter

General fault contactor - Contactor for alarm warning.

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 Δt. Moreover the device allows 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).

Main switch interlock door

Emergency stop

Evaporator 2 passes

Options (on request)

Soft start - Electronic starting device to reduce the mechanical stress during compressor start-up

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.

Under/Over Voltage – This device controls the voltage value of power supply and stops 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 shown on a digital display: Line-to-Line Voltage, Phase and Average Current, Active and Reactive Power, Active Energy, Frequency.

Capacitors for power factor correction – To increase the operating power factor of the unit at nominal operating conditions. The capacitors are “dry” self-regenerating type with over pressure disconnecting safety device insulated with a no toxic dielectric mix with no PCB or PCT.

Current limit – To limit maximum absorbed current of the unit whenever is required.

Evaporator marine water box

Condenser double flanges kit

20mm Condenser Insulation

Condenser marine water boxes

Cu-Ni 90-10 exchangers - to work with sea water the heat exchangers are fitted with Cu-Ni tubes and special protection inside the end covers.

Condenser 1/3 passes

4 General Characteristics

4 - 1 General characteristics

Evaporator / condenser flow switch for the water piping

Suction line shut off valve - Suction shut-off valve installed on the suction of the compressor to facilitate maintenance operation.

High/Low Pressure Side Manometers

Container kit

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.

Sound Proof System - Made of sheet metal and internally insulated, the cabinet is "integral kind" (around the whole chiller, not only around the compressors) to reach the best performance in noise reduction.

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).

Dual Pressure Relief Valve

Automatic circuit breakers

Ground fault relay

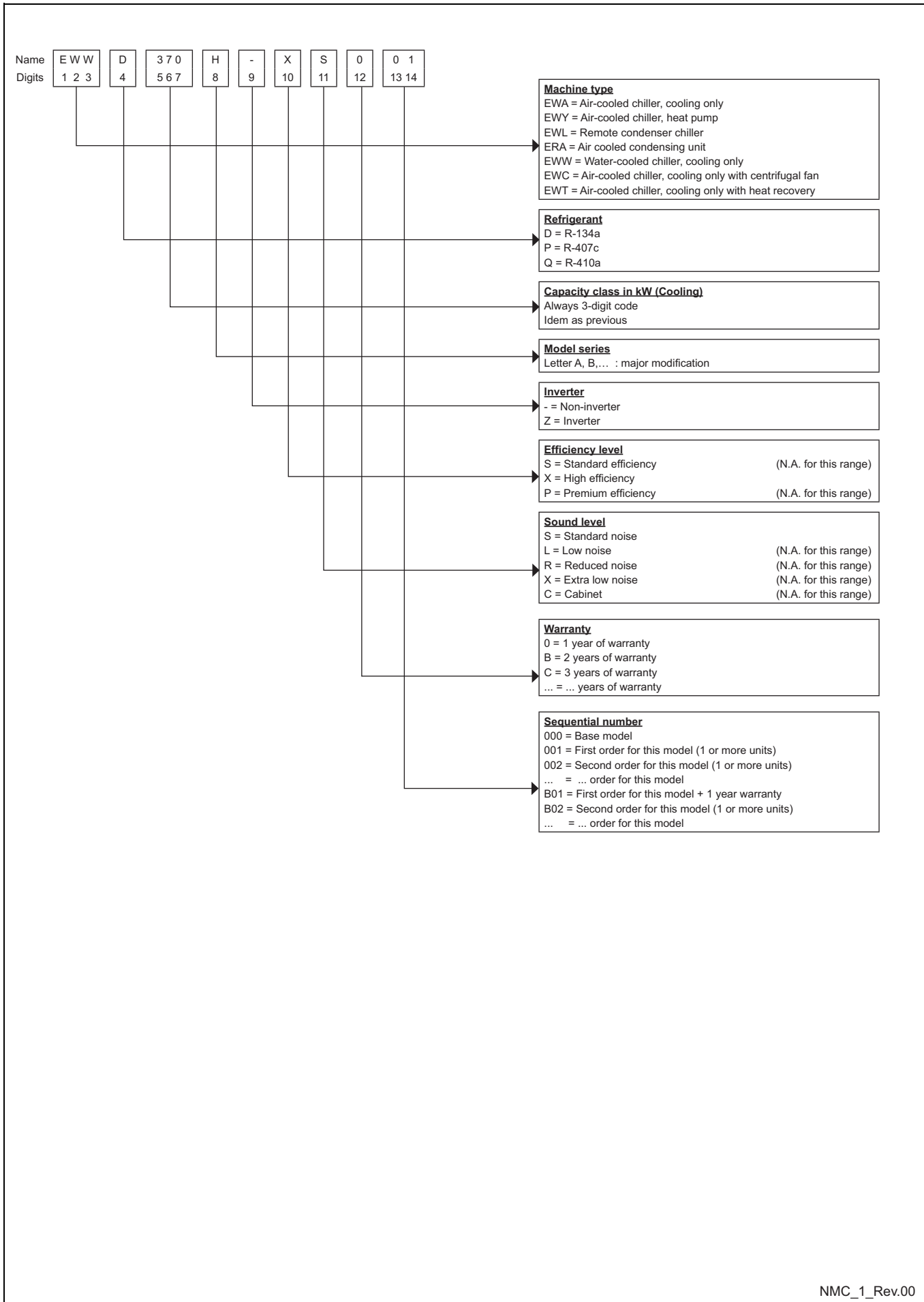
Evaporator 1/3 passes

Evaporator double flange kit

High temperature kit - Optional kit to allow the unit to operate up to 65°C leaving condenser water temperature. The unit operation diagram must be checked to evaluate when this option is required.

5 Nomenclature

5 - 1 Nomenclature



6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD370-610H-XS

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		4					5					6				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
370	25	347	55	402	16,60	43	360	55	415	17,19	46	373	55	428	17,80	49
	30	332	62	394	15,85	40	344	62	406	16,43	42	356	63	419	17,02	45
	35	316	70	386	15,09	36	328	70	398	15,65	39	340	70	410	16,23	41
	40											323	79	401	15,41	38
	45															
450	25	419	66	485	20,02	36	434	66	500	20,73	38	449	66	515	21,47	41
	30	400	74	475	19,12	33	415	75	489	19,82	35	430	75	505	20,53	38
	35	381	84	465	18,20	30	395	84	479	18,87	32	410	84	494	19,57	34
	40											389	95	484	18,58	31
	45															
530	25	490	76	566	23,43	34	508	76	584	24,27	36	526	76	602	25,13	39
	30	468	86	554	22,38	31	486	86	572	23,20	33	503	87	590	24,04	36
	35	446	97	542	21,30	29	463	97	559	22,10	31	480	97	577	22,91	33
	40											455	109	564	21,76	30
	45															
610	25	572	88	660	27,35	38	593	88	681	28,33	40	614	89	702	29,33	43
	30	547	100	646	26,12	35	567	100	667	27,07	37	587	101	688	28,05	39
	35	520	112	632	24,86	32	540	113	652	25,79	34	560	113	673	26,74	36
	40											531	127	658	25,39	33
	45															

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD370-610H-XS

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		7					8					9				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
370	25	386	55	441	18,42	52	399	55	454	19,06	55					
	30	369	63	432	17,63	48	382	63	445	18,25	51	395	63	459	18,88	54
	35	352	71	423	16,82	44	365	71	436	17,42	47	377	71	449	18,03	50
	40	334	79	414	15,98	40	347	79	426	16,56	43	359	80	439	17,16	46
	45											340	89	429	16,25	41
450	25	465	66	531	22,22	43	481	66	547	22,98	46					
	30	445	75	520	21,26	40	461	76	536	22,01	43	477	76	553	22,77	45
	35	424	85	509	20,28	37	440	85	525	21,01	39	455	86	541	21,75	42
	40	403	95	498	19,27	34	418	95	513	19,97	36	433	96	529	20,69	38
	45											410	107	517	19,60	35
530	25	544	76	621	26,01	41	563	77	640	26,91	44					
	30	521	87	608	24,89	38	539	87	627	25,77	40	558	88	646	26,66	43
	35	497	98	595	23,74	35	515	98	613	24,59	37	533	99	632	25,46	40
	40	472	110	582	22,56	32	489	110	599	23,38	34	507	111	618	24,22	36
	45											480	123	604	22,95	33
610	25	635	89	724	30,35	45	657	89	746	31,40	48					
	30	608	101	709	29,05	42	629	101	731	30,07	45	651	102	753	31,11	48
	35	580	114	694	27,71	39	601	114	715	28,70	41	622	115	737	29,71	44
	40	551	127	678	26,33	35	571	128	699	27,29	38	592	128	720	28,27	40
	45											561	143	704	26,78	36

NOTES

Cc (cooling capacity) - Pi (unit power input)

Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)

ELWT (evaporator leaving water temperature – Δt 5°C)

Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD370-610H-XS

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		10					11					12				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
370	25															
	30	409	63	472	19,53	58	423	64	486	20,19	61					
	35	391	72	462	18,66	53	404	72	476	19,30	56	418	72	490	19,96	60
	40	372	80	452	17,77	49	385	80	465	18,39	52	398	81	479	19,02	55
	45	352	89	442	16,84	44	365	90	455	17,44	47	378	90	468	18,05	50
450	25															
	30	493	76	569	23,55	48	510	76	586	24,35	51					
	35	471	86	557	22,51	44	487	86	574	23,28	47	504	87	590	24,07	50
	40	448	96	545	21,42	41	464	97	561	22,17	43	480	97	577	22,93	46
	45	425	107	532	20,31	37	440	108	548	21,03	39	456	108	564	21,77	42
530	25															
	30	577	88	665	27,57	46	597	88	685	28,51	49					
	35	551	99	651	26,35	42	570	100	670	27,25	45	590	100	690	28,18	48
	40	525	111	636	25,08	39	543	112	655	25,96	41	562	112	674	26,85	44
	45	498	124	622	23,78	35	515	124	640	24,62	37	533	125	658	25,48	40
610	25															
	30	674	102	776	32,18	50	696	102	799	33,27	54					
	35	644	115	759	30,75	47	666	116	781	31,80	49	688	116	804	32,88	52
	40	613	129	742	29,27	43	634	129	763	30,29	45	656	130	786	31,34	48
	45	581	144	725	27,75	39	601	144	746	28,73	41	622	145	767	29,74	44

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD370-610H-XS

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		13					14					15				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
370	25															
	30															
	35	432	72	504	20,62	64	446	73	518	21,30	67	460	73	533	21,99	71
	40	412	81	493	19,66	58	425	82	507	20,32	62	439	82	521	20,99	66
	45	391	91	481	18,67	53	404	91	495	19,30	57	417	91	509	19,95	60
450	25															
	30															
	35	520	87	607	24,87	53	538	87	625	25,69	56	555	88	643	26,52	60
	40	496	98	594	23,71	49	513	98	611	24,50	52	530	98	628	25,31	55
	45	471	109	580	22,52	44	487	109	596	23,28	47	503	110	613	24,06	50
530	25															
	30															
	35	609	100	710	29,11	50	629	101	730	30,07	53	650	101	751	31,05	57
	40	581	113	694	27,76	46	600	113	713	28,69	49	620	113	734	29,63	52
	45	552	125	677	26,36	42	570	126	696	27,25	45	589	127	716	28,16	47
610	25															
	30															
	35	711	117	828	33,98	56	735	117	851	35,09	59	758	117	876	36,23	63
	40	678	131	809	32,40	51	701	131	832	33,48	54	724	132	856	34,58	57
	45	644	146	789	30,76	47	666	146	812	31,80	49	688	147	835	32,87	52

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD370-610H-XS with high water temperature kit

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		4					5					6				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
370	25	347	62	409	16,60	43	360	63	423	17,19	46	373	64	436	17,80	49
	30	332	68	400	15,85	40	344	69	413	16,43	42	356	70	426	17,02	45
	35	316	75	391	15,09	36	328	76	403	15,65	39	340	76	416	16,23	41
	40	299	82	382	14,31	33	311	83	394	14,85	35	323	84	406	15,41	38
	45	283	91	374	13,51	30	294	92	385	14,03	32	305	92	397	14,57	34
	50	265	101	367	12,68	27	276	102	378	13,19	28	287	102	389	13,71	31
	55	248	113	361	11,84	23	258	113	371	12,32	25	268	113	382	12,82	27
60	225	125	350	10,75	20	235	125	360	11,23	21	246	125	371	11,75	23	
450	25	419	74	493	20,02	36	434	75	509	20,73	38	449	76	526	21,47	41
	30	400	82	482	19,12	33	415	83	497	19,82	35	430	84	513	20,53	38
	35	381	90	471	18,20	30	395	91	486	18,87	32	410	92	501	19,57	34
	40	361	99	460	17,25	27	375	100	474	17,91	29	389	100	489	18,58	31
	45	341	109	450	16,29	25	354	110	464	16,92	27	368	111	478	17,57	28
	50	320	122	442	15,30	22	333	122	455	15,91	24	346	122	468	16,53	25
	55	299	136	435	14,28	20	311	136	447	14,86	21	323	136	460	15,46	23
60	273	146	419	13,04	17	285	146	431	13,62	18	298	146	444	14,24	19	
530	25	490	86	576	23,43	34	508	87	595	24,27	36	526	88	614	25,13	39
	30	468	94	563	22,38	31	486	95	581	23,20	33	503	97	600	24,04	36
	35	446	104	549	21,30	29	463	105	567	22,10	31	480	106	585	22,91	33
	40	423	114	537	20,20	26	439	115	554	20,97	28	455	116	571	21,76	30
	45	399	126	525	19,07	24	415	127	541	19,81	25	431	128	558	20,57	27
	50	375	140	515	17,91	21	390	141	531	18,62	23	405	141	546	19,35	24
	55	350	157	507	16,72	19	364	157	521	17,40	20	379	157	536	18,10	21
60	320	171	491	15,29	16	334	171	505	15,96	17	349	171	520	16,67	18	
610	25	572	100	672	27,35	38	593	101	694	28,33	40	614	102	716	29,33	43
	30	547	109	656	26,12	35	567	111	677	27,07	37	587	112	699	28,05	39
	35	520	120	641	24,86	32	540	121	661	25,79	34	560	123	682	26,74	36
	40	493	132	626	23,57	29	512	133	646	24,47	31	531	135	666	25,39	33
	45	466	146	612	22,26	26	484	147	631	23,12	28	502	148	651	24,00	30
	50	437	163	600	20,90	23	455	163	618	21,73	25	473	164	637	22,58	27
	55	408	182	590	19,51	21	425	182	607	20,30	22	442	182	624	21,12	24
60	370	197	567	17,66	17	386	197	583	18,43	19	403	197	600	19,26	20	

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD370-610H-XS with high water temperature kit

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		7					8					9				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
370	25	386	64	450	18,42	52	399	65	464	19,06	55	412	66	478	19,71	59
	30	369	67	436	17,63	48	382	71	453	18,25	51	395	72	468	18,88	54
	35	352	77	429	16,82	44	365	78	443	17,42	47	377	79	456	18,03	50
	40	334	84	419	15,98	40	347	85	432	16,56	43	359	86	445	17,16	46
	45	316	93	409	15,12	36	328	94	422	15,68	39	340	94	434	16,25	41
	50	298	102	400	14,23	33	309	103	412	14,77	35	321	104	424	15,33	37
	55	279	114	393	13,32	29	290	114	404	13,84	31	301	114	415	14,37	33
60	257	125	382	12,28	25	268	125	393	12,80	27	279	125	404	13,33	29	
450	25	465	77	542	22,22	43	481	78	559	22,98	46	497	79	577	23,77	49
	30	445	80	525	21,26	40	461	86	546	22,01	43	477	87	564	22,77	45
	35	424	93	517	20,28	37	440	94	533	21,01	39	455	95	550	21,75	42
	40	403	101	505	19,27	34	418	102	520	19,97	36	433	103	537	20,69	38
	45	382	111	493	18,23	30	396	112	508	18,91	32	410	113	523	19,60	35
	50	359	123	482	17,16	27	373	124	497	17,82	29	387	124	511	18,48	31
	55	336	136	473	16,07	24	349	137	486	16,69	26	363	137	500	17,32	28
60	311	146	457	14,86	21	324	147	471	15,48	23	338	147	485	16,15	24	
530	25	544	89	634	26,01	41	563	90	654	26,91	44	582	91	674	27,83	46
	30	521	92	613	24,89	38	539	99	638	25,77	40	558	100	658	26,66	43
	35	497	107	604	23,74	35	515	108	623	24,59	37	533	109	642	25,46	40
	40	472	117	589	22,56	32	489	118	608	23,38	34	507	119	626	24,22	36
	45	447	129	575	21,35	29	463	130	593	22,14	31	480	131	611	22,95	33
	50	421	142	563	20,10	26	437	143	579	20,86	28	453	144	596	21,64	30
	55	394	157	551	18,81	23	409	158	567	19,54	25	425	159	583	20,28	26
60	364	171	535	17,39	20	380	172	552	18,16	22	396	172	568	18,92	23	
610	25	635	104	739	30,35	45	657	105	762	31,40	48	680	106	786	32,47	51
	30	608	107	715	29,05	42	629	115	744	30,07	45	651	116	768	31,11	48
	35	580	124	704	27,71	39	601	126	726	28,70	41	622	127	749	29,71	44
	40	551	136	687	26,33	35	571	137	708	27,29	38	592	139	730	28,27	40
	45	521	149	671	24,91	32	541	150	691	25,84	34	561	152	712	26,78	36
	50	491	165	656	23,45	29	509	166	675	24,34	31	529	167	695	25,25	33
	55	459	183	642	21,95	25	477	183	661	22,80	27	495	184	680	23,67	29
60	420	198	618	20,09	22	439	198	637	20,97	23	457	199	656	21,85	25	

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD370-610H-XS with high water temperature kit

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		10					11					12				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
370	25	426	67	493	20,37	62	441	67	508	21,05	66	455	68	523	21,74	70
	30	409	73	482	19,53	58	423	74	497	20,19	61	437	75	512	20,86	65
	35	391	80	470	18,66	53	404	81	485	19,30	56	418	82	500	19,96	60
	40	372	87	459	17,77	49	385	88	473	18,39	52	398	89	487	19,02	55
	45	352	95	448	16,84	44	365	96	461	17,44	47	378	97	475	18,05	50
	50	333	104	437	15,89	40	345	105	450	16,46	42	357	106	463	17,05	45
	55	312	115	427	14,90	35	323	116	439	15,45	38	335	116	451	16,01	40
450	25	514	80	594	24,57	52	531	81	612	25,39	55	549	82	631	26,22	58
	30	493	88	581	23,55	48	510	89	599	24,35	51	527	90	617	25,16	54
	35	471	96	567	22,51	44	487	97	584	23,28	47	504	98	602	24,07	50
	40	448	105	553	21,42	41	464	106	570	22,17	43	480	107	587	22,93	46
	45	425	114	539	20,31	37	440	115	555	21,03	39	456	116	572	21,77	42
	50	401	125	526	19,16	33	416	126	542	19,85	35	430	127	557	20,56	38
	55	376	138	514	17,97	30	390	139	529	18,63	32	404	140	544	19,31	34
530	25	602	92	694	28,77	49	622	93	715	29,72	52	643	94	737	30,70	55
	30	577	101	679	27,57	46	597	103	699	28,51	49	617	104	720	29,46	51
	35	551	111	662	26,35	42	570	112	682	27,25	45	590	113	703	28,18	48
	40	525	121	646	25,08	39	543	122	665	25,96	41	562	123	685	26,85	44
	45	498	132	629	23,78	35	515	133	648	24,62	37	533	134	668	25,48	40
	50	469	145	614	22,43	32	486	146	632	23,24	34	504	147	650	24,07	36
	55	440	159	600	21,04	28	457	160	617	21,82	30	473	161	634	22,61	32
610	25	703	107	810	33,57	54	726	108	834	34,69	58	750	110	859	35,83	61
	30	674	118	791	32,18	50	696	119	816	33,27	54	719	121	840	34,38	57
	35	644	128	772	30,75	47	666	130	796	31,80	49	688	132	820	32,88	52
	40	613	140	753	29,27	43	634	142	776	30,29	45	656	143	799	31,34	48
	45	581	153	734	27,75	39	601	154	756	28,73	41	622	156	778	29,74	44
	50	548	168	716	26,18	35	568	169	737	27,12	37	588	170	758	28,09	40
	55	514	185	699	24,56	31	533	186	719	25,46	33	552	187	739	26,38	35
60	477	200	677	22,79	27											

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD370-610H-XS with high water temperature kit

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		13					14					15				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
370	25	470	69	539	22,45	74	485	69	554	23,17	78	500	70	570	23,90	83
	30	451	76	527	21,55	69	466	77	542	22,25	73	481	78	558	22,96	77
	35	432	83	514	20,62	64	446	84	530	21,30	67	460	85	545	21,99	71
	40	412	90	502	19,66	58	425	91	516	20,32	62	439	92	531	20,99	66
	45	391	98	489	18,67	53	404	99	503	19,30	57	417	100	517	19,95	60
	50	369	107	476	17,64	48	382	108	490	18,25	51	395	109	504	18,87	54
	60															
450	25	567	83	649	27,07	62	585	83	668	27,94	65	603	84	687	28,82	69
	30	544	91	635	25,99	57	562	92	654	26,83	61	580	93	673	27,69	64
	35	520	99	620	24,87	53	538	101	638	25,69	56	555	102	657	26,52	60
	40	496	108	604	23,71	49	513	109	622	24,50	52	530	111	640	25,31	55
	45	471	117	589	22,52	44	487	119	606	23,28	47	503	120	623	24,06	50
	50	445	128	573	21,28	40	461	129	590	22,01	43	476	130	607	22,76	45
	60															
530	25	663	95	759	31,70	59	685	96	781	32,71	62	706	97	803	33,74	66
	30	637	105	742	30,43	55	657	106	764	31,41	58	679	108	786	32,42	61
	35	609	115	724	29,11	50	629	116	746	30,07	53	650	117	767	31,05	57
	40	581	125	706	27,76	46	600	126	727	28,69	49	620	128	748	29,63	52
	45	552	136	687	26,36	42	570	137	707	27,25	45	589	138	728	28,16	47
	50	521	148	669	24,91	38	539	149	688	25,77	40	558	150	708	26,64	43
	60															
610	25	774	111	885	36,99	65	799	112	911	38,17	69	824	112	937	39,38	73
	30	743	122	865	35,51	60	767	123	891	36,66	64	792	125	917	37,83	68
	35	711	133	844	33,98	56	735	135	869	35,09	59	758	136	895	36,23	63
	40	678	145	823	32,40	51	701	146	847	33,48	54	724	148	872	34,58	57
	45	644	157	801	30,76	47	666	159	825	31,80	49	688	161	849	32,87	52
	50	608	172	780	29,07	42	629	173	803	30,07	45	651	175	825	31,09	47
	60															

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD750-980H-XS

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		4					5					6				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
750	25	705	109	813	33,66	43	730	109	839	34,87	46	756	110	865	36,10	49
	30	673	123	796	32,15	40	698	124	821	33,33	42	723	124	847	34,53	45
	35	641	139	779	30,61	36	664	139	804	31,74	39	689	140	829	32,91	41
	40											654	157	811	31,26	38
	45															
830	25	778	120	898	37,18	36	806	121	927	38,51	38	835	121	956	39,88	41
	30	743	136	880	35,51	33	770	137	907	36,81	35	798	137	936	38,14	38
	35	708	153	861	33,80	30	734	154	888	35,06	32	761	155	916	36,35	34
	40											723	173	896	34,52	31
	45															
930	25	877	132	1009	41,90	34	908	132	1040	43,40	36	941	132	1073	44,94	39
	30	838	149	987	40,02	31	868	150	1018	41,48	33	900	150	1050	42,98	36
	35	797	168	965	38,09	29	827	168	995	39,51	31	857	169	1027	40,97	33
	40											814	189	1004	38,90	30
	45															
980	25	921	142	1062	43,99	31	954	142	1096	45,57	33	988	143	1130	47,18	36
	30	879	160	1040	42,02	29	912	161	1073	43,55	31	944	162	1106	45,12	33
	35	837	180	1018	40,00	26	868	181	1050	41,49	28	900	182	1082	43,01	30
	40											855	204	1059	40,85	27
	45															

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD750-980H-XS

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		7					8					9				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
750	25	782	110	892	37,37	52	809	110	919	38,66	55					
	30	748	125	873	35,76	48	775	125	900	37,01	51	802	126	928	38,30	54
	35	714	141	854	34,11	44	739	141	881	35,33	47	766	142	907	36,57	50
	40	678	157	836	32,41	40	703	158	861	33,59	43	728	159	887	34,80	46
	45											690	177	867	32,97	42
830	25	864	121	985	41,27	43	894	122	1015	42,70	46					
	30	827	138	965	39,50	40	856	139	994	40,88	43	885	139	1025	42,30	45
	35	788	155	944	37,67	37	817	156	973	39,02	39	845	157	1002	40,40	42
	40	749	174	923	35,80	33	777	175	951	37,10	36	804	175	980	38,44	38
	45											762	196	958	36,41	35
930	25	973	133	1106	46,51	41	1007	133	1140	48,12	44					
	30	932	151	1083	44,51	38	964	152	1116	46,07	40	998	152	1150	47,67	43
	35	889	170	1059	42,45	35	920	171	1091	43,97	37	953	172	1124	45,52	40
	40	844	190	1035	40,34	32	875	191	1066	41,81	34	907	192	1099	43,32	36
	45											859	214	1073	41,04	33
980	25	1022	143	1165	48,83	38	1057	143	1201	50,52	40					
	30	978	163	1141	46,73	35	1012	163	1176	48,37	37	1048	164	1212	50,06	40
	35	933	183	1116	44,57	32	966	184	1150	46,17	34	1000	185	1185	47,80	36
	40	887	205	1091	42,36	29	919	206	1125	43,90	31	952	207	1158	45,48	33
	45											902	231	1132	43,09	30

NOTES

Cc (cooling capacity) - Pi (unit power input)

Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)

ELWT (evaporator leaving water temperature – Δt 5°C)

Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD750-980H-XS

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		10					11					12				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
750	25															
	30	829	126	955	39,61	58	857	127	984	40,95	61					
	35	792	143	935	37,85	53	819	143	963	39,15	57	847	144	991	40,48	60
	40	754	160	914	36,03	49	780	160	941	37,29	52	807	161	968	38,57	55
	45	715	178	893	34,16	44	740	179	919	35,37	47	766	179	946	36,61	50
830	25															
	30	916	140	1055	43,75	48	947	140	1087	45,23	51					
	35	875	157	1032	41,81	44	905	158	1063	43,24	47	936	159	1094	44,71	50
	40	833	176	1009	39,80	41	862	177	1039	41,19	43	892	178	1070	42,60	46
	45	790	197	986	37,73	37	818	197	1015	39,07	39	846	198	1045	40,43	42
930	25															
	30	1032	153	1185	49,31	46	1067	153	1220	50,97	48					
	35	986	172	1158	47,11	42	1020	173	1193	48,73	45	1054	174	1228	50,38	47
	40	939	193	1132	44,85	38	971	194	1165	46,42	41	1005	195	1200	48,01	44
	45	890	215	1105	42,52	35	921	216	1137	44,03	37	954	217	1171	45,57	40
980	25															
	30	1084	164	1248	51,77	42	1120	165	1285	53,52	45					
	35	1035	185	1221	49,47	39	1071	186	1257	51,16	41	1107	187	1294	52,90	44
	40	986	208	1193	47,09	35	1020	208	1228	48,73	38	1055	209	1265	50,41	40
	45	934	231	1166	44,64	32	967	232	1200	46,22	34	1001	233	1235	47,84	37

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD750-980H-XS

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		13					14					15				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
750	25															
	30															
	35	875	144	1020	41,82	64	904	145	1049	43,20	68	934	145	1079	44,60	72
	40	835	162	996	39,88	58	863	162	1025	41,21	62	891	163	1054	42,57	66
	45	793	180	973	37,87	53	819	181	1000	39,15	57	847	182	1029	40,46	60
830	25															
	30															
	35	967	159	1126	46,20	53	999	160	1159	47,72	56	1031	160	1191	49,27	60
	40	922	179	1101	44,05	49	953	179	1132	45,52	52	984	180	1164	47,02	55
	45	875	199	1074	41,83	44	905	200	1105	43,24	47	935	201	1136	44,69	50
930	25															
	30															
	35	1090	174	1264	52,06	50	1125	175	1300	53,77	53	1162	175	1337	55,52	57
	40	1039	195	1234	49,64	46	1074	196	1270	51,30	49	1109	197	1306	52,98	52
	45	987	218	1204	47,13	42	1020	219	1239	48,73	45	1054	220	1274	50,36	47
980	25															
	30															
	35	1144	188	1332	54,66	46	1182	188	1370	56,46	49	1220	189	1409	58,29	52
	40	1091	210	1301	52,12	43	1127	211	1338	53,86	45	1164	212	1376	55,63	48
	45	1036	234	1270	49,49	39	1071	235	1306	51,17	41	1107	236	1343	52,87	44

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD750-980H-XS with high water temperature kit

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		4					5					6				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
750	25	705	116	821	33,66	43	730	118	848	34,87	46	756	119	875	36,10	49
	30	673	128	801	32,15	40	698	129	827	33,33	42	723	131	854	34,53	45
	35	641	140	781	30,61	36	664	142	806	31,74	39	689	143	832	32,91	41
	40	607	154	762	29,02	33	630	156	786	30,12	35	654	157	811	31,26	38
	45	573	171	744	27,40	30	596	172	768	28,46	32	618	173	791	29,55	34
	50	538	190	729	25,73	27	560	191	751	26,75	28	582	191	773	27,80	31
	55	503	212	715	24,02	23	523	213	736	24,99	25	544	213	757	26,00	27
60	451	247	698	21,55	19	471	247	718	22,49	21	492	248	739	23,50	23	
830	25	778	129	907	37,18	36	806	130	936	38,51	38	835	132	967	39,88	41
	30	743	141	884	35,51	33	770	143	913	36,81	35	798	145	943	38,14	38
	35	708	155	862	33,80	30	734	157	890	35,06	32	761	158	919	36,35	34
	40	671	171	841	32,05	27	696	172	868	33,27	29	723	174	896	34,52	31
	45	633	189	822	30,26	25	658	190	848	31,43	27	683	191	874	32,64	28
	50	595	210	805	28,42	22	618	211	829	29,55	24	643	212	854	30,70	25
	55	555	235	790	26,53	20	578	235	813	27,61	21	601	235	836	28,71	23
60	499	268	767	23,84	16	521	269	789	24,88	17	544	269	813	26,00	19	
930	25	877	141	1018	41,90	34	908	143	1051	43,40	36	941	144	1085	44,94	39
	30	838	154	992	40,02	31	868	156	1025	41,48	33	900	158	1058	42,98	36
	35	797	170	967	38,09	29	827	171	998	39,51	31	857	173	1031	40,97	33
	40	756	187	943	36,12	26	785	188	973	37,50	28	814	190	1004	38,90	30
	45	714	207	920	34,10	24	741	208	949	35,42	25	770	209	979	36,78	27
	50	670	230	900	32,02	21	697	231	928	33,30	23	724	231	956	34,60	24
	55	626	257	882	29,89	19	651	257	908	31,11	20	677	257	935	32,36	21
60	547	290	837	26,14	15	571	290	861	27,28	16	597	290	887	28,50	17	
980	25	921	151	1072	43,99	31	954	153	1107	45,57	33	988	155	1143	47,18	36
	30	879	166	1046	42,02	29	912	168	1080	43,55	31	944	170	1115	45,12	33
	35	837	182	1020	40,00	26	868	184	1053	41,49	28	900	186	1087	43,01	30
	40	794	201	995	37,92	24	824	203	1027	39,37	26	855	204	1059	40,85	27
	45	749	222	972	35,80	22	778	224	1002	37,19	23	808	225	1033	38,62	25
	50	704	247	951	33,62	19	732	248	980	34,96	21	760	249	1009	36,33	22
	55	657	276	933	31,39	17	684	277	960	32,66	18	711	277	988	33,97	20
60	594	315	909	28,36	14	619	316	935	29,60	15	647	316	963	30,93	17	

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD750-980H-XS with high water temperature kit

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		7					8					9				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
750	25	782	121	903	37,37	52	809	122	931	38,66	55	837	124	960	39,97	59
	30	748	133	881	35,76	48	775	134	909	37,01	51	802	136	938	38,30	54
	35	714	145	859	34,11	44	739	147	886	35,33	47	766	148	914	36,57	50
	40	678	159	837	32,41	40	703	160	863	33,59	43	728	162	890	34,80	46
	45	642	174	816	30,66	36	666	176	841	31,81	39	690	177	867	32,97	42
	50	604	192	797	28,87	33	627	193	821	29,97	35	651	195	845	31,08	37
	55	566	213	779	27,02	29	587	214	802	28,07	31	610	215	825	29,14	33
60	513	248	761	24,51	24	535	249	784	25,59	26	558	249	807	26,66	28	
830	25	864	133	997	41,27	43	894	135	1029	42,70	46	924	137	1061	44,15	49
	30	827	146	973	39,50	40	856	148	1004	40,88	43	885	150	1036	42,30	45
	35	788	160	948	37,67	37	817	162	979	39,02	39	845	164	1009	40,40	42
	40	749	175	924	35,80	33	777	177	953	37,10	36	804	179	983	38,44	38
	45	709	192	901	33,87	30	735	194	929	35,13	32	762	196	958	36,41	35
	50	667	213	880	31,88	27	693	214	906	33,10	29	719	215	934	34,33	31
	55	625	236	860	29,84	24	649	237	885	31,00	26	674	237	911	32,18	28
60	568	269	837	27,12	20	593	270	863	28,31	22	617	271	888	29,50	24	
930	25	973	146	1119	46,51	41	1007	148	1155	48,12	44	1041	150	1191	49,76	46
	30	932	160	1092	44,51	38	964	162	1127	46,07	40	998	164	1162	47,67	43
	35	889	175	1064	42,45	35	920	177	1098	43,97	37	953	179	1132	45,52	40
	40	844	192	1036	40,34	32	875	194	1069	41,81	34	907	196	1102	43,32	36
	45	799	211	1009	38,17	29	829	212	1041	39,59	31	859	214	1073	41,04	33
	50	752	233	985	35,93	26	781	234	1014	37,30	28	810	235	1045	38,69	30
	55	704	258	962	33,63	23	731	259	990	34,93	25	759	260	1019	36,27	26
60	622	291	913	29,73	18	650	292	941	31,04	20	677	292	969	32,34	21	
980	25	1022	157	1179	48,83	38	1057	159	1217	50,52	40	1093	161	1254	52,24	43
	30	978	172	1151	46,73	35	1012	175	1187	48,37	37	1048	177	1224	50,06	40
	35	933	188	1121	44,57	32	966	191	1157	46,17	34	1000	193	1193	47,80	36
	40	887	206	1093	42,36	29	919	208	1127	43,90	31	952	210	1162	45,48	33
	45	839	227	1065	40,07	27	870	228	1098	41,57	28	902	230	1132	43,09	30
	50	790	250	1040	37,73	24	820	252	1071	39,16	25	850	253	1103	40,62	27
	55	739	278	1017	35,31	21	768	279	1046	36,68	23	797	280	1077	38,08	24
60	675	317	992	32,26	18	705	317	1022	33,67	19	734	318	1053	35,09	21	

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature - Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD750-980H-XS with high water temperature kit

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		10					11					12				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
750	25	865	125	990	41,32	62	894	127	1020	42,70	66	923	128	1051	44,10	70
	30	829	138	967	39,61	58	857	139	996	40,95	61	886	141	1027	42,32	65
	35	792	150	942	37,85	53	819	152	971	39,15	57	847	154	1001	40,48	60
	40	754	163	918	36,03	49	780	165	946	37,29	52	807	167	974	38,57	55
	45	715	179	893	34,16	44	740	180	920	35,37	47	766	182	948	36,61	50
	50	674	196	870	32,22	40	699	197	896	33,39	42	724	199	922	34,58	45
	55	633	216	848	30,23	36	656	217	873	31,34	38	680	218	898	32,48	40
60	582	251	833	27,81	31											
830	25	955	138	1094	45,64	52	987	140	1127	47,16	55	1020	141	1161	48,71	58
	30	916	152	1068	43,75	48	947	154	1100	45,23	51	978	156	1134	46,74	54
	35	875	166	1041	41,81	44	905	168	1073	43,24	47	936	170	1105	44,71	50
	40	833	181	1014	39,80	41	862	183	1045	41,19	43	892	185	1076	42,60	46
	45	790	197	987	37,73	37	818	199	1017	39,07	39	846	201	1047	40,43	42
	50	745	216	961	35,59	33	772	218	990	36,88	35	799	220	1019	38,19	38
	55	699	238	937	33,39	30	725	240	964	34,62	32	751	241	992	35,87	34
60	644	272	916	30,77	26											
930	25	1077	151	1228	51,43	49	1112	153	1265	53,15	52	1149	155	1303	54,89	55
	30	1032	166	1198	49,31	46	1067	168	1235	50,97	48	1102	170	1273	52,67	51
	35	986	181	1167	47,11	42	1020	184	1203	48,73	45	1054	186	1240	50,38	47
	40	939	198	1136	44,85	38	971	200	1171	46,42	41	1005	202	1207	48,01	44
	45	890	216	1106	42,52	35	921	218	1139	44,03	37	954	220	1174	45,57	40
	50	839	237	1076	40,11	31	870	238	1108	41,56	34	901	240	1141	43,04	36
	55	787	261	1048	37,62	28	817	262	1079	39,01	30	846	264	1110	40,42	32
60	706	294	1000	33,73	23											
980	25	1130	163	1293	54,00	45	1168	165	1333	55,80	48	1206	166	1373	57,64	51
	30	1084	179	1262	51,77	42	1120	181	1301	53,52	45	1157	183	1341	55,30	47
	35	1035	195	1230	49,47	39	1071	198	1268	51,16	41	1107	200	1307	52,90	44
	40	986	213	1198	47,09	35	1020	215	1235	48,73	38	1055	217	1272	50,41	40
	45	934	232	1167	44,64	32	967	234	1202	46,22	34	1001	237	1238	47,84	37
	50	881	255	1136	42,11	29	913	257	1170	43,64	31	946	259	1204	45,19	33
	55	827	281	1108	39,50	26	857	282	1139	40,96	28	888	284	1172	42,44	29
60	766	320	1086	36,60	23											

NOTES

- Cc (cooling capacity) - Pi (unit power input)
- Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
- ELWT (evaporator leaving water temperature – Δt 5°C)
- Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD750-980H-XS with high water temperature kit

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		13					14					15				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
750	25	953	129	1082	45,53	74	984	130	1114	46,99	79	1015	131	1146	48,47	83
	30	915	142	1057	43,71	69	945	144	1089	45,13	73	975	146	1120	46,57	77
	35	875	155	1031	41,82	64	904	157	1062	43,20	68	934	159	1093	44,60	72
	40	835	169	1004	39,88	58	863	171	1034	41,21	62	891	173	1064	42,57	66
	45	793	184	976	37,87	53	819	186	1005	39,15	57	847	188	1034	40,46	60
	50	749	200	949	35,79	48	775	202	977	37,02	51	801	204	1005	38,27	54
	60															
830	25	1053	143	1195	50,29	62	1086	144	1230	51,90	65	1121	145	1266	53,54	69
	30	1010	157	1168	48,28	57	1043	159	1202	49,84	61	1077	161	1238	51,44	64
	35	967	172	1139	46,20	53	999	174	1173	47,72	56	1031	176	1207	49,27	60
	40	922	187	1109	44,05	49	953	189	1142	45,52	52	984	191	1175	47,02	55
	45	875	203	1078	41,83	44	905	205	1110	43,24	47	935	207	1143	44,69	50
	50	827	221	1049	39,53	40	856	223	1079	40,89	43	885	225	1110	42,27	45
	60															
930	25	1186	156	1342	56,68	59	1224	157	1382	58,49	62	1263	159	1422	60,34	66
	30	1139	172	1311	54,41	54	1176	174	1350	56,17	58	1213	176	1389	57,97	61
	35	1090	188	1278	52,06	50	1125	190	1316	53,77	53	1162	192	1354	55,52	57
	40	1039	204	1243	49,64	46	1074	207	1280	51,30	49	1109	209	1318	52,98	52
	45	987	222	1209	47,13	42	1020	224	1244	48,73	45	1054	227	1281	50,36	47
	50	932	242	1175	44,54	38	964	244	1209	46,08	40	997	247	1244	47,64	43
	60															
980	25	1245	168	1413	59,51	54	1285	169	1455	61,41	57	1326	171	1497	63,35	61
	30	1196	185	1381	57,12	50	1234	188	1422	58,98	53	1274	190	1463	60,86	56
	35	1144	202	1346	54,66	46	1182	205	1386	56,46	49	1220	207	1427	58,29	52
	40	1091	220	1311	52,12	43	1127	222	1350	53,86	45	1164	225	1389	55,63	48
	45	1036	239	1275	49,49	39	1071	242	1312	51,17	41	1107	244	1351	52,87	44
	50	979	261	1240	46,77	35	1013	263	1275	48,38	37	1047	265	1312	50,02	40
	60															

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWDC10-C12H-XS

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		4					5					6				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
C10	25	989	152	1140	47,25	31	1024	152	1176	48,94	33	1060	153	1213	50,67	36
	30	944	172	1116	45,13	29	979	172	1151	46,77	31	1014	173	1187	48,46	33
	35	899	193	1092	42,95	26	932	194	1126	44,55	28	967	195	1162	46,19	30
	40											918	218	1136	43,87	27
	45															
C11	25	1066	163	1230	50,94	33	1104	164	1268	52,76	35	1143	165	1308	54,63	38
	30	1018	185	1203	48,66	31	1056	186	1241	50,43	33	1094	187	1280	52,25	35
	35	969	208	1178	46,31	28	1005	209	1215	48,04	30	1042	210	1253	49,81	32
	40											990	235	1225	47,30	29
	45															
C12	25	1144	175	1319	54,64	36	1184	176	1360	56,59	38	1226	176	1403	58,60	41
	30	1092	199	1291	52,19	33	1132	199	1332	54,09	35	1173	200	1373	56,04	38
	35	1040	223	1263	49,67	30	1078	224	1303	51,52	32	1118	225	1343	53,42	34
	40											1062	252	1314	50,73	31
	45															

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD10-C12H-XS

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		7					8					9				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
C10	25	1098	153	1251	52,44	38	1135	153	1289	54,25	40					
	30	1050	174	1224	50,19	35	1087	175	1262	51,95	37	1125	175	1300	53,75	40
	35	1002	196	1198	47,87	32	1038	197	1234	49,58	34	1074	198	1272	51,33	36
	40	952	219	1171	45,49	29	987	220	1207	47,14	31	1022	221	1243	48,84	33
	45											968	247	1215	46,27	30
C11	25	1183	165	1348	56,54	40	1224	165	1390	58,50	43					
	30	1133	188	1320	54,11	37	1172	188	1361	56,01	39	1213	189	1402	57,96	42
	35	1080	211	1291	51,61	34	1119	212	1331	53,46	36	1158	213	1371	55,35	39
	40	1027	236	1263	49,05	31	1064	237	1301	50,83	33	1102	238	1341	52,66	35
	45											1044	266	1310	49,89	32
C12	25	1269	177	1446	60,65	43	1313	177	1490	62,74	46					
	30	1215	201	1416	58,04	40	1257	202	1459	60,08	43	1301	203	1504	62,16	45
	35	1159	226	1385	55,36	37	1200	227	1428	57,34	39	1242	228	1471	59,36	42
	40	1101	253	1354	52,60	34	1141	255	1396	54,52	36	1182	256	1438	56,48	38
	45											1120	285	1405	53,51	35

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD10-C12H-XS

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		10					11					12				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
C10	25															
	30	1164	176	1340	55,59	42	1203	176	1379	57,47	45					
	35	1112	198	1310	53,12	39	1150	199	1349	54,94	41	1189	200	1389	56,81	44
	40	1058	222	1281	50,57	36	1095	223	1318	52,33	38	1133	224	1357	54,14	40
	45	1003	248	1251	47,94	32	1039	249	1288	49,64	34	1075	250	1325	51,38	37
C11	25															
	30	1255	190	1444	59,94	44	1297	190	1487	61,97	47					
	35	1199	214	1413	57,28	41	1240	215	1455	59,24	44	1282	216	1498	61,25	46
	40	1141	239	1381	54,53	37	1181	240	1422	56,43	40	1222	242	1463	58,37	42
	45	1082	267	1349	51,69	34	1120	268	1388	53,52	36	1159	269	1429	55,40	39
C12	25															
	30	1346	203	1549	64,29	48	1391	204	1595	66,46	51					
	35	1286	229	1515	61,43	44	1330	230	1560	63,54	47	1375	231	1606	65,69	50
	40	1224	257	1481	58,48	41	1267	258	1525	60,52	43	1310	259	1569	62,61	46
	45	1160	286	1447	55,44	37	1202	288	1489	57,41	39	1244	289	1532	59,42	42

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD10-C12H-XS

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		13					14					15				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
C10	25															
	30															
	35	1229	201	1429	58,70	46	1269	201	1470	60,63	49	1310	202	1512	62,60	52
	40	1171	225	1397	55,97	43	1211	226	1437	57,84	45	1250	227	1477	59,74	48
	45	1112	251	1363	53,15	39	1150	252	1402	54,95	41	1188	253	1441	56,78	44
C11	25															
	30															
	35	1325	216	1541	63,29	49	1368	217	1585	65,37	52	1413	218	1630	67,50	55
	40	1263	243	1506	60,35	45	1305	244	1549	62,36	48	1348	245	1593	64,41	51
	45	1199	270	1470	57,30	41	1240	272	1512	59,24	44	1281	273	1554	61,22	46
C12	25															
	30															
	35	1421	232	1653	67,88	53	1468	233	1700	70,12	56	1515	234	1749	72,39	60
	40	1355	260	1615	64,73	49	1400	261	1661	66,89	52	1446	262	1708	69,09	55
	45	1286	290	1576	61,46	44	1330	291	1621	63,54	47	1374	293	1667	65,67	50

NOTES

Cc (cooling capacity) - Pi (unit power input)

Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)

ELWT (evaporator leaving water temperature – Δt 5°C)

Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD10-C12H-XS with high water temperature kit

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		4					5					6				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
C10	25	989	162	1151	47,25	31	1024	164	1188	48,94	33	1060	166	1227	50,67	36
	30	944	178	1122	45,13	29	979	180	1159	46,77	31	1014	182	1196	48,46	33
	35	899	195	1094	42,95	26	932	197	1130	44,55	28	967	199	1166	46,19	30
	40	852	215	1067	40,73	24	885	217	1102	42,28	26	918	219	1137	43,87	27
	45	805	238	1043	38,45	22	836	239	1075	39,94	23	868	241	1109	41,47	25
	50	756	265	1020	36,11	19	786	266	1051	37,55	21	817	267	1083	39,01	22
	55	705	296	1001	33,71	17	734	296	1030	35,08	18	764	296	1060	36,48	20
C11	60	640	341	981	30,58	14	668	341	1009	31,92	16	698	342	1040	33,35	17
	25	1066	175	1241	50,94	33	1104	177	1281	52,76	35	1143	179	1323	54,63	38
	30	1018	192	1210	48,66	31	1056	194	1250	50,43	33	1094	196	1290	52,25	35
	35	969	211	1180	46,31	28	1005	213	1218	48,04	30	1042	215	1257	49,81	32
	40	919	232	1151	43,91	25	954	234	1188	45,58	27	990	236	1226	47,30	29
	45	868	256	1124	41,46	23	901	258	1159	43,06	25	936	260	1196	44,71	26
	50	815	285	1100	38,93	20	847	286	1134	40,48	22	880	287	1168	42,06	24
C12	55	761	319	1079	36,34	18	792	319	1111	37,82	19	823	320	1143	39,34	21
	60	690	368	1058	32,97	15	720	368	1088	34,41	16	753	368	1121	35,95	18
	25	1144	187	1331	54,64	36	1184	190	1374	56,59	38	1226	192	1419	58,60	41
	30	1092	206	1298	52,19	33	1132	208	1340	54,09	35	1173	211	1384	56,04	38
	35	1040	226	1265	49,67	30	1078	228	1307	51,52	32	1118	231	1349	53,42	34
	40	986	249	1234	47,10	27	1023	251	1274	48,89	29	1062	253	1315	50,73	31
	45	931	275	1206	44,46	25	967	277	1243	46,19	27	1004	278	1282	47,96	28
C12	50	874	306	1180	41,76	22	909	307	1216	43,42	24	944	308	1253	45,12	25
	55	816	342	1158	38,98	20	849	342	1191	40,57	21	883	343	1226	42,19	23
	60	740	394	1134	35,35	16	772	394	1167	36,90	18	807	395	1202	38,55	19

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature - Δt 5 °C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD10-C12H-XS with high water temperature kit

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		7					8					9				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
C10	25	1098	168	1266	52,44	38	1135	170	1306	54,25	40	1174	172	1346	56,10	43
	30	1050	184	1235	50,19	35	1087	187	1274	51,95	37	1125	189	1314	53,75	40
	35	1002	202	1203	47,87	32	1038	204	1242	49,58	34	1074	206	1281	51,33	36
	40	952	221	1173	45,49	29	987	223	1210	47,14	31	1022	225	1247	48,84	33
	45	901	243	1143	43,04	27	934	244	1179	44,64	28	968	246	1215	46,27	30
	50	848	268	1116	40,51	24	880	269	1149	42,05	25	913	271	1184	43,62	27
	55	794	297	1091	37,92	21	824	298	1122	39,39	23	856	299	1155	40,89	24
C11	60	728	342	1070	34,78	18	760	343	1103	36,31	20	792	344	1136	37,84	21
	25	1183	181	1365	56,54	40	1224	184	1408	58,50	43	1266	186	1452	60,49	45
	30	1133	199	1331	54,11	37	1172	201	1374	56,01	39	1213	204	1417	57,96	42
	35	1080	217	1298	51,61	34	1119	220	1339	53,46	36	1158	222	1381	55,35	39
	40	1027	238	1265	49,05	31	1064	240	1304	50,83	33	1102	243	1345	52,66	35
	45	971	261	1233	46,40	28	1007	263	1271	48,13	30	1044	266	1310	49,89	32
	50	914	289	1203	43,68	25	949	290	1239	45,34	27	984	292	1276	47,04	29
C12	55	856	320	1176	40,89	22	889	321	1210	42,47	24	923	323	1245	44,09	26
	60	785	369	1154	37,50	19	819	370	1189	39,15	21	854	371	1225	40,80	22
	25	1269	194	1464	60,65	43	1313	197	1510	62,74	46	1358	199	1557	64,88	49
	30	1215	213	1428	58,04	40	1257	216	1473	60,08	43	1301	219	1520	62,16	45
	35	1159	233	1392	55,36	37	1200	236	1436	57,34	39	1242	239	1481	59,36	42
	40	1101	255	1356	52,60	34	1141	258	1399	54,52	36	1182	260	1443	56,48	38
	45	1042	280	1322	49,77	30	1080	283	1363	51,62	32	1120	285	1405	53,51	35
C12	50	981	310	1290	46,85	27	1018	311	1329	48,63	29	1056	313	1369	50,45	31
	55	918	343	1261	43,85	24	953	345	1298	45,55	26	990	346	1336	47,29	28
	60	842	396	1237	40,21	21	879	397	1275	41,98	22	916	398	1314	43,75	24

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD10-C12H-XS with high water temperature kit

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		10					11					12				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
C10	25	1214	174	1388	57,99	45	1254	176	1430	59,92	48	1295	178	1473	61,89	51
	30	1164	191	1355	55,59	42	1203	194	1397	57,47	45	1243	196	1439	59,39	47
	35	1112	209	1321	53,12	39	1150	211	1361	54,94	41	1189	214	1403	56,81	44
	40	1058	228	1286	50,57	36	1095	230	1325	52,33	38	1133	233	1366	54,14	40
	45	1003	248	1252	47,94	32	1039	251	1290	49,64	34	1075	253	1329	51,38	37
	50	947	273	1219	45,22	29	981	275	1255	46,86	31	1016	277	1292	48,52	33
	55	888	300	1188	42,42	26	921	302	1223	43,99	28	954	304	1258	45,58	29
C11	25	1309	188	1497	62,53	48	1352	190	1542	64,61	51	1397	192	1589	66,74	54
	30	1255	206	1461	59,94	44	1297	209	1506	61,97	47	1340	211	1552	64,03	50
	35	1199	225	1424	57,28	41	1240	228	1468	59,24	44	1282	231	1513	61,25	46
	40	1141	245	1387	54,53	37	1181	248	1429	56,43	40	1222	251	1472	58,37	42
	45	1082	268	1350	51,69	34	1120	270	1391	53,52	36	1159	273	1433	55,40	39
	50	1021	294	1314	48,76	31	1057	296	1354	50,52	33	1095	298	1393	52,32	35
	55	957	324	1281	45,74	27	993	326	1318	47,43	29	1029	327	1356	49,15	31
C12	25	1404	201	1605	67,07	52	1450	204	1654	69,30	55	1498	206	1704	71,58	58
	30	1346	221	1567	64,29	48	1391	224	1615	66,46	51	1437	227	1664	68,68	54
	35	1286	241	1527	61,43	44	1330	244	1574	63,54	47	1375	247	1622	65,69	50
	40	1224	263	1487	58,48	41	1267	266	1533	60,52	43	1310	269	1579	62,61	46
	45	1160	287	1448	55,44	37	1202	290	1492	57,41	39	1244	293	1536	59,42	42
	50	1095	315	1410	52,30	33	1134	318	1452	54,19	35	1175	320	1494	56,12	38
	55	1027	347	1374	49,06	30	1065	349	1414	50,87	32	1103	351	1454	52,71	34
60	955	400	1355	45,62	26											

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature - Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

6 Capacity tables

6 - 1 Cooling Capacity Tables

EWWD10-C12H-XS with high water temperature kit

Size	Entering Condenser Water Temperature (°C)	ELWT (°C)														
		13					14					15				
		Cc (kW)	Pi (kW)	Hc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)	Cc (kW)	Pi (kW)	Cc (kW)	Qwe (l/s)	Pdwe (kPa)
C10	25	1337	180	1517	63,90	54	1380	181	1562	65,95	57	1424	183	1607	68,03	61
	30	1284	198	1482	61,34	50	1326	201	1526	63,33	53	1368	203	1571	65,36	56
	35	1229	216	1445	58,70	46	1269	219	1488	60,63	49	1310	222	1532	62,60	52
	40	1171	235	1407	55,97	43	1211	238	1449	57,84	45	1250	241	1491	59,74	48
	45	1112	256	1368	53,15	39	1150	258	1408	54,95	41	1188	261	1450	56,78	44
	50	1051	279	1330	50,22	35	1087	281	1369	51,95	37	1124	284	1408	53,72	40
	55															
60																
C11	25	1442	194	1636	68,90	57	1488	196	1684	71,11	60	1535	197	1732	73,35	64
	30	1384	214	1598	66,14	53	1429	216	1646	68,29	56	1475	219	1694	70,47	59
	35	1325	233	1558	63,29	49	1368	236	1604	65,37	52	1413	239	1652	67,50	55
	40	1263	254	1517	60,35	45	1305	257	1562	62,36	48	1348	260	1608	64,41	51
	45	1199	276	1475	57,30	41	1240	279	1519	59,24	44	1281	282	1563	61,22	46
	50	1133	301	1434	54,15	37	1172	303	1476	56,02	39	1212	306	1518	57,92	42
	55															
60																
C12	25	1547	208	1754	73,90	62	1596	210	1806	76,27	65	1647	211	1858	78,68	69
	30	1485	229	1714	70,94	57	1533	232	1765	73,24	61	1582	235	1817	75,59	64
	35	1421	250	1671	67,88	53	1468	253	1721	70,12	56	1515	256	1771	72,39	60
	40	1355	272	1627	64,73	49	1400	275	1675	66,89	52	1446	278	1724	69,09	55
	45	1286	296	1582	61,46	44	1330	299	1629	63,54	47	1374	302	1676	65,67	50
	50	1216	323	1538	58,08	40	1258	325	1583	60,08	43	1300	328	1628	62,12	45
	55															
60																

NOTES

Cc (cooling capacity) - Pi (unit power input)
 Qwe (evaporator water flow) - Pdwe (evaporator pressure drop)
 ELWT (evaporator leaving water temperature – Δt 5°C)
 Data refers to 0.0176 m² °C/kW evaporator fouling factor

7 Pressure drops

7 - 1 Evaporator Pressure Drops

Pressure drops

	370	450	530	610	750	830	930	980	C10	C11	C12
Cooling Capacity (kW)	369	445	521	608	748	827	932	978	1050	1133	1215
Water Flow (l/s) - Evaporator	17.63	21.26	24.89	29.05	35.74	39.51	44.53	46.73	50.17	54.13	58.05
Evaporator Pressure Drops (kPa)	48	40	38	42	48	40	38	35	35	37	40
Water Flow (l/s) - Condenser	20.63	24.86	29.05	33.87	41.71	46.11	51.74	54.52	58.48	63.12	67.65
Condenser Pressure Drops (kPa)	35	30	32	28	34	30	37	35	33	33	35

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

7 Pressure drops

7 - 1 Evaporator Pressure Drops

Evaporator and condenser pressure drops

Evaporator and/or condenser pressure drops for different versions or different working condition can be calculated with the following formula:

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

where:

- PD_2 Pressure drop to be determined (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 formula: Example (evaporator)

The unit EWWD370H-XS has been selected for working at the following conditions:

- evaporator water in/out : 11/6°C

- condenser air inlet: 30/35°C

The cooling capacity at these working conditions is: 356 kW

The water flow at these working conditions is: 17.02 l/s

The unit EWWD370H-XS at nominal working conditions has the following data:

- evaporator water in/out : 12/7°C

- condenser air inlet: 30/35°C

The cooling capacity at these working conditions is: 369 kW

The evaporator water flow at these working conditions is: 17.63 l/s

The evaporator pressure drop at these working conditions is: 48 kPa

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

$$PD_2 \text{ (kPa)} = 48 \text{ (kPa)} \times \left(\frac{17.02 \text{ (l/s)}}{17.63 \text{ (l/s)}} \right)^{1.8}$$

$$PD_2 \text{ (kPa)} = 45 \text{ (kPa)}$$

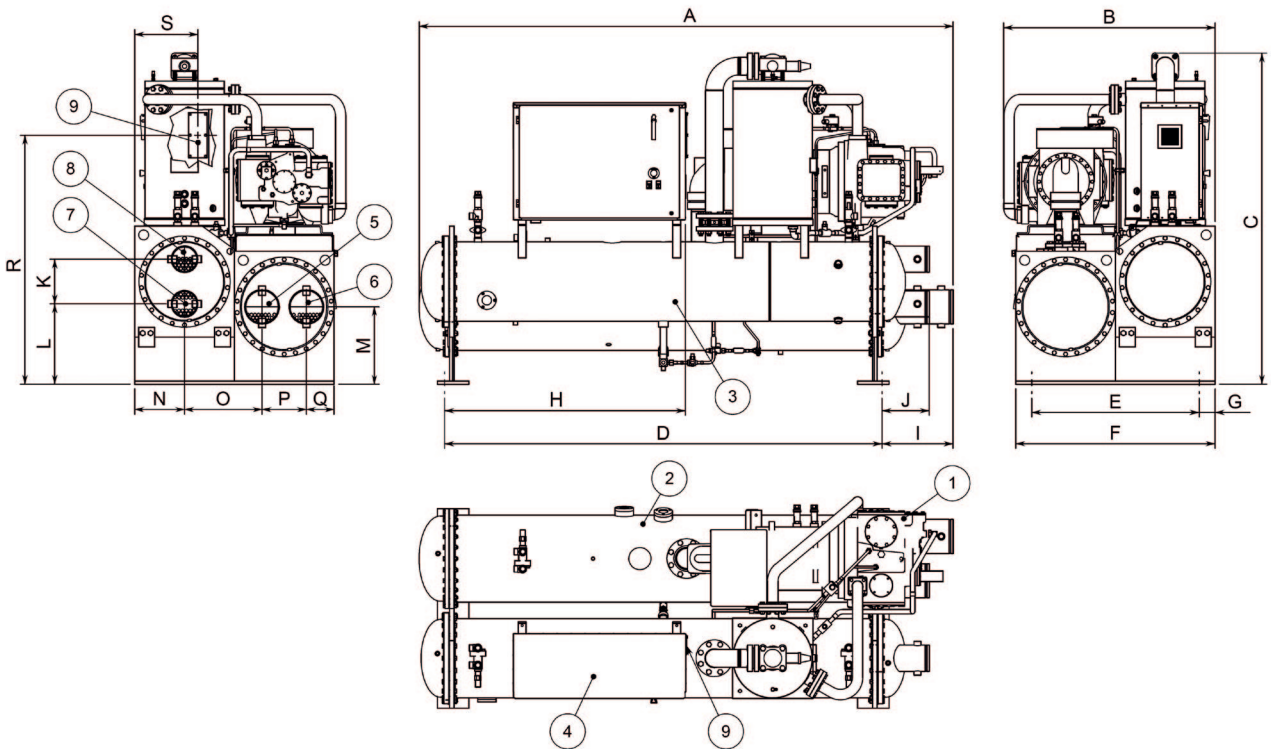
NOTE - Important

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

8 Dimensional drawings

8 - 1 Dimensional Drawings

EWWD370-530H-XS - 1 circuit



Models	Dimensions (mm)									
EWWD-H-XS	A	B	C	D	E	F	G	H	I	J
370	3341	1353	2121	2800	1072	1276	102	1541	303	303
450	3341	1353	2121	2800	1072	1276	102	1541	303	303
530	3419	1353	2121	2800	1072	1276	102	1541	456	303

EWWD-H-XS	K	L	M	N	O	P	Q	R	S
370	286	515	496	319	495	286	176	1595	384
450	286	515	496	319	495	286	176	1595	384
530	286	515	496	319	496	284	177	1595	384

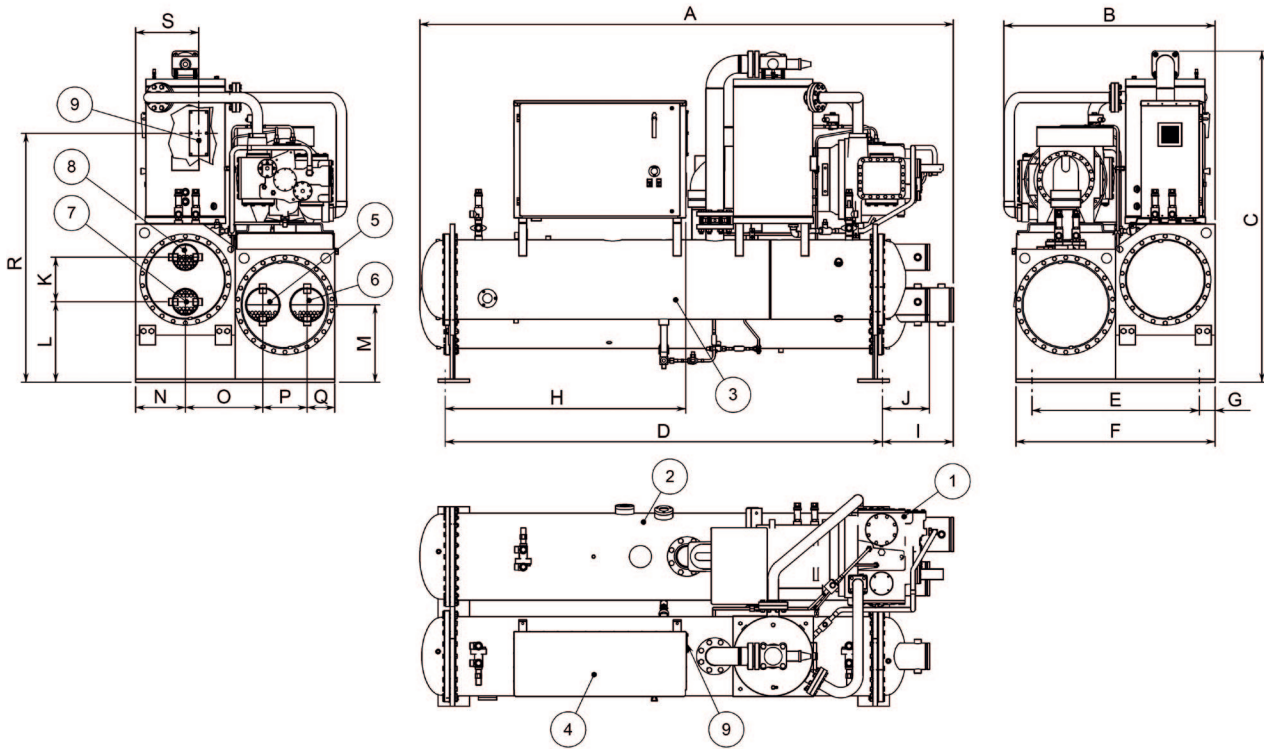
LEGEND

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

8 Dimensional drawings

8 - 1 Dimensional Drawings

EWWD610H-XS - 1 circuit



Models	Dimensions (mm)									
	A	B	C	D	E	F	G	H	I	I ²
EWWD-H-XS 610	3417	1384	2048	2805	1072	1276	102	1510	452	452
EWWD-H-XS	J	J'	K	L	M	N	O	P	Q	R
610	300	300	300	376	300	806	319	638	1521	384

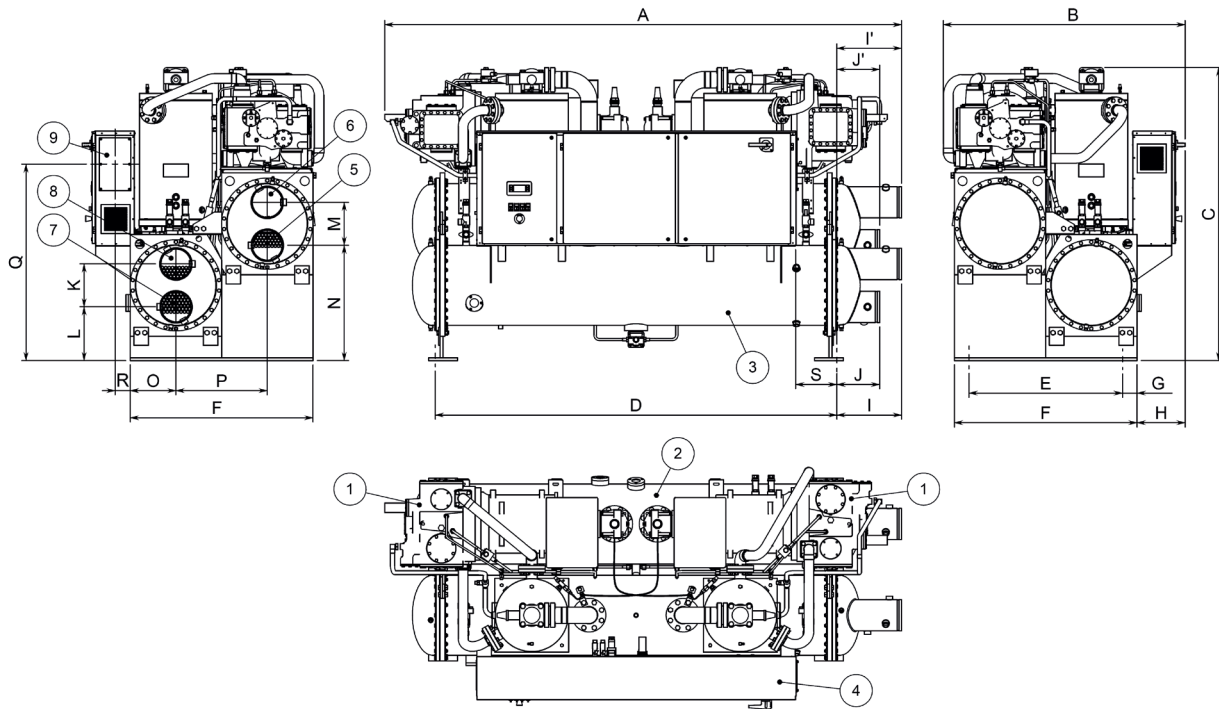
LEGEND

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

8 Dimensional drawings

8 - 1 Dimensional Drawings

EWWD750-C12H-XS - 2 circuits



Models	Dimensions (mm)										
EWWD-H-XS	A	B	C	D	E	F	G	H	I	I'	J
750	3609	1689	2048	2805	1072	1276	102	336	452	452	300
830	3609	1689	2048	2805	1072	1276	102	336	452	452	300
930	3609	1711	2048	2805	1157	1361	102	336	452	300	300
980	3609	1711	2048	2805	1157	1361	102	336	452	300	300
C10	3509	1711	2161	2805	1221	1425	102	272	300	300	300
C11	3509	1711	2161	2805	1221	1425	102	272	300	300	300
C12	3509	1711	2161	2805	1221	1425	102	272	300	300	300

EWWD-H-XS	J'	K	L	M	N	O	P	Q	R	S
750	300	300	376	300	806	319	638	1373	106	288
830	300	300	376	300	806	319	638	1373	106	288
930	300	300	376	360	725	319	660	1337	106	288
980	300	300	376	360	725	319	660	1337	106	288
C10	300	360	409	360	839	383	660	1487	42	288
C11	300	360	409	360	839	383	660	1487	42	288
C12	300	360	409	360	839	383	660	1487	42	288

LEGEND

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

9 Sound data

9 - 1 Sound Level Data

Unit size	Sound pressure level at 1 m from the unit in semispheric free field (rif. 2×10^{-5} Pa)									Power dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	
370	63,5	70,5	80,0	74,5	74,0	68,5	60,5	50,5	78,0	96,7
450	64,5	71,5	81,0	75,5	75,0	69,5	61,5	51,5	79,0	97,7
530	65,5	72,5	82,0	76,5	76,0	70,5	62,5	52,5	80,0	98,7
610	65,5	72,5	82,0	76,5	76,0	70,5	62,5	52,5	80,0	99,1
750	66,5	73,5	83,0	77,5	77,0	71,5	63,5	53,5	81,0	100,2
830	67,0	74,0	83,5	78,0	77,5	72,0	64,0	54,0	81,5	100,7
930	67,5	74,5	84,0	78,5	78,0	72,5	64,5	54,5	82,0	101,2
980	68,0	75,0	84,5	79,0	78,5	73,0	65,0	55,0	82,5	101,7
C10	68,5	75,5	85,0	79,5	79,0	73,5	65,5	55,5	83,0	102,2
C11	69,0	76,0	85,5	80,0	79,5	74,0	66,0	56,0	83,5	102,7
C12	69,0	76,0	85,5	80,0	79,5	74,0	66,0	56,0	83,5	102,7

NOTES

- (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 6dB(A) when the sound proof system (option) is installed.

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.

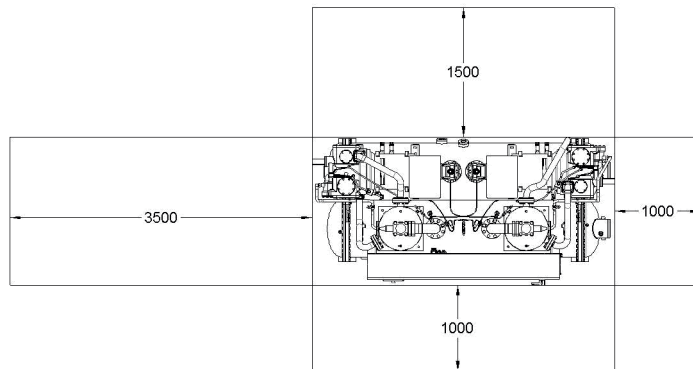
Location

A leveled 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 can be 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 is 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

10 Installation

10 - 2 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 [60°C ~ 80°C]	
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
	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)	[mgCaCO ₃ /l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mgCaCO ₃ /l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium harness	[mgCaCO 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	(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
	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 60%	Below 60%	Below 60%	Below 60%	Below 60%	Below 60%	--
	Items to be referred to	Nitrate ion	(mg NO ₃ ⁻ /l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 101	Below 100	Below 101
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 ₂ /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 4.0	Below 4.0	Below 4.0	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 desirable to give the valid measure for corrosion. E.g. chemical measure.
- (3) In the cooling water using hermetic cooling tower, close 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.

10 Installation

10 - 2 Water Charge, Flow and Quality

Water content in cooling circuits

The cooled water distribution circuits should have minimum water content to avoid excessive compressors start and stop. In fact, each time the compressor starts up, an excessive quantity of oil goes from the compressor sump 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, we have 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

$$M \text{ (liters)} = (0.94 \times \Delta T(^{\circ}\text{C}) + 5.87) \times P(\text{kW})$$

For 2 compressors unit

$$M \text{ (liters)} = (0.1595 \times \Delta T(^{\circ}\text{C}) + 3.0825) \times P(\text{kW})$$

where:

M minimum water content per unit expressed in litres

P Cooling Capacity of the unit expressed in kW

ΔT evaporator entering / leaving water temperature difference expressed in $^{\circ}\text{C}$

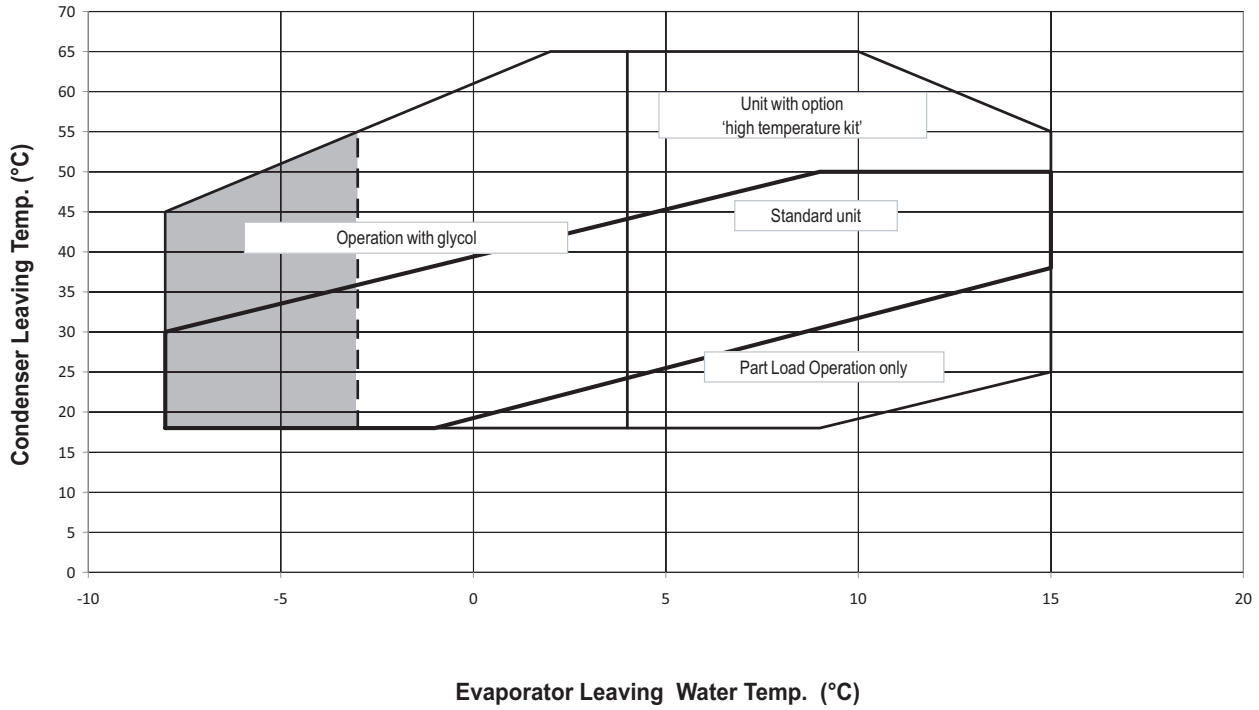
This formula is valid for:

- standard microprocessor parameters

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

11 Operation range

11 - 1 Operation Range



operange_1_Rev.00_1

11 Operation range

11 - 2 Correction Factors

Table 1 - Evaporator/Condenser minimum and maximum water Δt

Max evaporator water Δt	°C	8
Min evaporator water Δt	°C	4
Min condenser water Δt	°C	4
Max condenser water Δt	°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

Table 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 - Minimum glycol percentage for low water temperature

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

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%

(1): Minimum glycol percentage to prevent freezing of water circuit at indicated air ambient temperature

(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
Ethylene glycol (%)	0.842	0.785	0.725	0.670	0.613	0.562
Propylene glycol (%)	0.950	0.940	0.920	0.890	0.870	0.840

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 (Δt)	1.013	1.04	1.074	1.121	1.178
	Evaporator Pressure Drop	1.070	1.129	1.181	1.263	1.308
Propylene 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 (Δt)	1.017	1.032	1.056	1.092	1.139
	Evaporator Pressure Drop	1.120	1.272	1.496	1.792	2.128

11 Operation range

11 - 2 Correction Factors

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 Evaporator 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: **EWWD610H-XS**

Mixture: Water
 Working condition: ELWT 12/7°C – CLWT 30/35°C
 - Cooling capacity: 608 kW
 - Power input: 101 kW
 - Flow rate (Δt 5°C): 29.05 l/s
 - Evaporator pressure drop: 42 kPa

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: $608 \times 0.972 = 591$ kW
 - Power input: $101 \times 0.986 = 99.6$ kW
 - Flow rate (Δt 5°C): 28.23 (referred to 591 kW) $\times 1.074 = 30.33$ l/s
 - Evaporator pressure drop: 45 (referred to 30.33 l/s) $\times 1.181 = 53$ kPa

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 Evaporator 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: **EWWD610H-XS**

Mixture: Water
 Working condition: ELWT 12/7°C – CLWT 30/35°C
 - Cooling capacity: 608 kW
 - Power input: 101 kW
 - Flow rate (Δt 5°C): 29.05 l/s
 - Evaporator pressure drop: 42 kPa

Mixture: Water + Glycol 30% (for a low evaporator leaving temperature of -1/-6°C)
 Working condition: ELWT -1/-6°C – CLWT 30/35°C
 - Cooling capacity: $608 \times 0.613 \times 0.972 = 362$ kW
 - Power input: $101 \times 0.870 \times 0.986 = 86.6$ kW
 - Flow rate (Δt 5°C): 17.29 l/s (referred to 362 kW) $\times 1.074 = 18.58$ l/s
 - Evaporator pressure drop: 19 kPa (referred to 18.58 l/s) $\times 1.181 = 22$ kPa

12 Specification text

12 - 1 Specification Text

Technical Specification for Water Cooled Screw Chiller

GENERAL

The water coded 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 right refrigerant and oil quantity.

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 outside air 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 R-134a will be accepted.

PERFORMANCE

- ✓ 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
- ✓ Flooded shell & tube evaporator entering water temperature in cooling mode: °C
- ✓ Flooded shell & tube evaporator leaving water temperature in cooling mode: °C
- ✓ Flooded shell & tube evaporator water flow: l/s
- ✓ Flooded shell & tube condenser entering water temperature in cooling mode: °C
- ✓ Flooded shell & tube condenser leaving water temperature in cooling mode: °C
- ✓ Flooded shell & tube condenser water flow: l/s
- ✓ The unit should work with electricity in range 400 V ±10%, 3ph, 50Hz without neutral and shall only have one power connection point.

UNIT DESCRIPTION

Chiller shall include as standard: single refrigerant circuit, semi-hermetic single screw compressors, electronic expansion device (EEXV), flooded shell & tube heat exchangers, R-134a 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 VIBRATIONS

Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceeddB(A). 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.

DIMENSIONS

Unit dimensions shall not exceed following indications:

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

12 Specification text

12 - 1 Specification Text

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 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 to 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 the 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 that shall be controlled by 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 operating condition unit control logic shall modulate electrical frequency level in a range lower and upper the nominal electrical network value fixed 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:
 - o High condenser pressure
 - o Low evaporation refrigerant temperature
 - o High compressor motor amps

Evaporator

- ✓ The units shall be equipped with flooded shell & tube type evaporator with water flowing inside the tube and refrigerant boiling outside. 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 side shall be designed for 10 bar of maximum operating pressure; vents and drain shall be provided.
- ✓ The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.

12 Specification text

12 - 1 Specification Text

Condensors

- ✓ The units shall be equipped with shell & tube condenser with water flowing inside the tube and refrigerant condensing outside. The bottom of the condenser shall be provided with subcooler section for better refrigerant capacity. The tubes shall be enhanced for maximum heat transfer and rolled into steel tube sheet and sealed. The tubes shall be individually replaceable
- ✓ The condensers are designed in according to 97/23/EC directive (PED).
- ✓ The water side shall be designed for 10 bar of maximum operating pressure; vents and drain shall be provided.
- ✓ The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.

Refrigerant circuit

The refrigerant circuit shall include as standard: one or two single screw compressor with external oil separator, evaporator, condenser, oil pressure transducer, high pressure switches, high pressure transducer, low pressure transducer, moisture liquid indicator, electronic expansion valve.

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.

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.



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